

Bibliography No. 13

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THE LITERATURE OF SPACE SCIENCE AND EXPLORATION.

Compiled by Mildred Benton
Library Branch, Technical Information Division

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September 1958



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Washington, D.C.

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THE LITERATURE OF SPACE SCIENCE AND EXPLORATION

Introduction

In the years to come it is quite likely that much will be written about outer space, for with the dawn of the space age in late 1957 came greater opportunities for scientific observation and experiment. Progress and action should, and no doubt will, be recorded by bibliographers. Meanwhile, in this interval - the prelude to space travel - it seems desirable to record in bibliographic medium, and to a greater extent than in previous efforts, references to the printed thoughts of those whose enthusiasm and experimentation led to the planning and launching of the first rockets; the launching of the first earth satellites in 1957; and, in early 1958, to the announcement by President Eisenhower of the projected timetable for technical objectives which may result in a trip to the Moon.

SCOPE

The period covered is 1903 through June 1958.

This, therefore, is a fairly exhaustive bibliography of references to published unclassified information involving books, periodical articles and research reports on the more scientific aspects of space exploration, both theoretical and applied. Some news reports are included in order to delineate the course of events. News-paper coverage can be obtained through the New York Times Index and Soviet Bloc International Geophysical Year Information, a publication of the Office of Technical Services, U.S. Department of Commerce.

The references divide almost automatically into two categories; pre-satellite and satellite literature. The pre-satellite information is quite theoretical and, in fact, almost fanciful in some instances. Due to the stream of writing since the announcement of the International Geophysical Year plans, by far the greater portion of the bibliography concerns the progress, development and scientific uses of instrumented vehicles. Since the Vanguard Project is currently a major research project at the U.S. Naval Research Laboratory, a principal objective has been to cover everything, within the availability of the Naval Research Laboratory Library, that has been written on the artificial satellite, Vanguard. Included are all references to the Russian Sputniks and the United States Army's Explorers which it has been possible to locate through a search of indexes and journals.

Entries on rocket launching appear only if they apply to satellite problems. The use of manned vehicles is touched upon in several articles, as is the legality of space flight, and space medicine, but it has been the intent to exclude physiological and legal aspects. Some references to these phases may be found in the bibliographies listed below.

ARRANGEMENT

⊙

References are listed chronologically by author or issuing agency. An author index appears on pages 233-244, a subject index on pages 245-264.

For periodical references, the normal form of entry is author, title, and journal, volume, pagination, and date, followed by a brief annotation or abstract. Abbreviations for journal titles are based on those used by the U.S. Naval Research Laboratory. A list of these abbreviations together with the journals which they represent appears on the pages immediately following the Preface.

The form of entry for books is author, title, pagination, place of publication, publisher, and year. This sequence is also followed in citing articles in Proceedings of meetings, symposia and conferences.

Research reports are recorded in a similar manner except that place of publication follows the corporate author. The report number is also included following the date of publication, as well as the contract number, for sake of convenience in ordering or borrowing.

The majority of references have been examined. When examination was not possible, due to non-availability of the publication, entries located in abstracting journals were used, or the statement "not examined" included. Because of this fact, some citations are not complete, or some foreign language articles are recorded in English, rather than in the original language. In every such instance, however, a note indicates the language in which the article is written.

Sources Searched

Bibliographies

- Benton, Mildred. ARTIFICIAL SATELLITES - A BIBLIOGRAPHY OF RECENT LITERATURE. Part I-1956. *Jet Propul.* 28:301-302, 352-354, 356, 358-361, May 1958; Part II-1957-1958, 28:399-401, 418, 420, 422, 425, 426, 428-430, 432, June 1958.
- Benton, Mildred. THE CLOCK PROBLEM (CLOCK PARADOX) IN RELATIVITY. THEORIES, BOTH PRO AND CON, RECORDED IN THE LITERATURE. To be published in *J. Astronautics*. 200 references.
- Current interest in the possibilities of space flight and the prediction that atomic clocks in earth satellites may be utilized to check Einstein's theory have focused attention on the clock problem in relativity, or the so-called time-traveler paradox and its implications.
- Benton, Mildred. EARTH SATELLITES, GUIDED MISSILES, ROCKETS AND SPACE FLIGHT. A BIBLIOGRAPHY OF BOOKS AND PERIODICAL ARTICLES. *Wilson Lib. Bull.* 32:412-419, Feb. 1958.
- Chronologically arranged by the following categories: for young readers; for high school age; periodical articles, books-semi-technical; books-technical.
- Berger, Eric. BOOKS FOR YOUNG READERS ON THE IGY. *Senior Scholastic* 71:6-T, Oct. 25, 1957.
- Includes titles on artificial satellites.
- BOOKS ON GUIDED MISSILES & ROCKETS, SENT TO SHIPS, STATIONS, BY LIBRARY BRANCH. *All Hands* 482:56-57, Mar. 1957.
- Includes reviews of six, and lists authors and titles of several others.
- Chicago University. Systems Research, Chicago, Ill. THE FORCES ACTING ON AN AIR VEHICLE. A REVIEW OF THE LITERATURE, by M.Z. Krzywoblocki. 112 p., June 1955. (*Aerodynamic Studies*, Suppl. 10)
- Ch. XI, High-altitude problems, aerophysics and astrophysics, includes a few space-flight references.

Clarke, A.C. SPACE-TRAVEL IN FACT AND FICTION. *Brit. Interplan. Soc. J.* 9:213-230, illus., Sept. 1950.

A survey of certain aspects of the planetary story beginning with Lucian of Samos, who tried his hand at the theme in A.D. 160.

FROM ROCKETS TO SPACE SHIPS. *V Pom. Chit.* 3:9-12, 1956.

In Russian. Not examined.

Harvard College Observatory, Cambridge, Mass. BIBLIOGRAPHY ON METEORITIC DUST, WITH BRIEF ABSTRACTS, by Dorrit Hoffleit. 45 p., 1952. (Tech. Rpt. 9) (Contract #NOrd 10449, N5ori-07647)

A listing of 505 references, covering historical, observational and theoretical aspects, as well as a few on instrumentation and bordering topics.

Hogan, J.C. SPACE LAW BIBLIOGRAPHY. *J. Air Law & Commerce* 23: 317-325, Summer 1956.

In an introductory summary the author discusses geography, astronomy and the law; the limits of state sovereignty; and reasoning by analogy in the law, then lists recent literature on law and activities in space, by country. Argentina, Canada, England, France, Germany, Sweden, the United States and the U.S.S.R. are included.

Keswall, W.E. THE YOUNG ASTRONAUT'S LIBRARY. *Spaceflight* 1:187-188, Oct. 1957.

The headmaster of a British school suggests some books on astronomy and spaceflight, with comments.

Kölle, H.H. and Kaeppler, H.J. LITERATURVERZEICHNIS DER ASTRO-NAUTIK. (BIBLIOGRAPHY OF ASTRONAUTICS). 100 p., Titt-mong, Oberbayern, Pustet, 1954.

In German.

Lists 1,600 titles of original works on aviation and space-travel exploration. Includes small section on artificial satellites.

Krull, A.R. A HISTORY OF THE ARTIFICIAL SATELLITE. *Jet Propul.* 26:369-383, May 1956.

A chronological bibliography of about 350 references listing most of the significant published literature of artificial, manned or unmanned satellites of the earth through the year 1955.

Ley, Willy. ROCKETS, MISSILES AND SPACE TRAVEL. 528 p., illus., New York, Viking, 1957.

Bibliography, p. 489-520.

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Library of Congress. Reference Department, General Reference and Bibliography Division, Washington, D.C. THE INTERNATIONAL GEOPHYSICAL YEAR, 1957-1958. A SELECTIVE LIST OF REFERENCES. 14 p., Feb. 1957.

Includes a few entries on Project Vanguard.

MISSILES & MYTHS. *Missiles and Rockets* 2:74, Aug. 1957.

Refers to Talmud and Christian Bible passages on missiles, rockets and atomic power.

- National Bureau of Standards, Washington, D.C.
BIBLIOGRAPHY OF BOOKS AND PUBLISHED REPORTS ON GAS TURBINES, JET PROPULSION, AND ROCKET POWER PLANTS, by E.F. Fiock. 49 p., Sept. 1, 1949. (Circ. 482)
Period covered is 1910-1948. Arrangement is alphabetical in subject groupings. No annotations.
A Supplement was issued in 1954 covering the period 1950-1953.
- National Library of Medicine, Reference Division, Washington, D.C.
BIBLIOGRAPHY OF SPACE MEDICINE. PRELIMINARY EDITION, by Charles Roos. 43 p., Mar. 3, 1958.
This bibliography, which will be issued in definitive form in mid-summer 1958, covers material related to physiological aspects of space flight from 1950 through early 1958.
- National Science Foundation, Washington, D.C.
A BIBLIOGRAPHY FOR THE INTERNATIONAL GEOPHYSICAL YEAR. 51 p., Jly. 1, 1957. (NSF-57-25)
Earth satellite program, p. 36-50.
- Nebbia, Giorgio. BIBLIOGRAPHY ON JET PROPULSION AND REACTION PROPULSION WITH APPLICATION TO INTERPLANETARY FLIGHT (1949-1954). 112 p., Bologna Tipografia Compositori, 1955.
In Italian. Not examined.
- Newell, H.E., Jr. HIGH ALTITUDE ROCKET RESEARCH. 298 p., illus., New York, Academic Press, 1953.
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The first section of each part is a bibliography dealing with the historical, scientific and technical aspects of rocketry and astronautics in Russia.
- ROCKETS, SATELLITES, SPACE AND ALL THAT. Changing Times 12:44, Mar. 1958.
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- Rosen, M.W. TWENTY-FIVE YEARS OF PROGRESS TOWARD SPACE FLIGHT. Jet Propul. 25:623-626, Nov. 1955.
Includes a brief review of articles written in the era of theory.
- Smith, D.R. SPACE TRAVEL. A BIBLIOGRAPHY OF ENGLISH LANGUAGE TITLES. 15 p., Minneapolis, Minn., The Author, 1956. (Now out of print.)
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- Sunderman, J.F. BIBLIOGRAPHY OF SPACE LITERATURE. AF Mag. 41:168-174, Mar. 1958.
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- Sutton, G.P. ROCKET PROPULSION PROGRESS. A LITERATURE SURVEY. Am. Rocket Soc. J. 21:17-27, 31, Jan./Feb. 1952.
Space travel, p. 26-27.
- U.S. Dept. of the Army. MISSILES, ROCKETS AND SATELLITES. 5 v., Washington, U.S. Government Printing Office, 1958. (Pamphlets 70-5-1-70-5-5)
Includes the following titles: v. I, U.S.S.R., v. II, United States, v. III, Great Britain, France and Other Free Countries for the World, v. IV, Technology, Means and Methods, v. V, Earth Satellites and Space Exploration.
This bibliographic survey covers the period 1957 through March 1958 and includes about 1,500 unclassified titles, parts abstracted and annotated, selected from periodicals, books and studies.
Materials are arranged in alphabetical order, by title, within major and subordinate subject groups.
- U.S. Dept. of the Army. Adjutant General's Office. Army Library, Washington, D.C.
GUIDED MISSILES, ROCKETS AND ARTIFICIAL SATELLITES, (INCLUDING PROJECT VANGUARD). 153 p., Jan. 22, 1957. (Spec. Bib. 11)
- U.S. Dept. of the Army. Adjutant General's Office. Army Library, Washington, D.C.
MILITARY ASPECTS OF SPACE EXPLORATION. 55 p., June 5, 1958. (Spec. Bib. 16)
Includes about 300 titles, arranged in alphabetical order, by title, within major and subordinate subject groups.
- U.S. Dept. of Health, Education and Welfare. Office of Education, Washington, D.C.
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Prepared by the Specialist for Aviation Education for student use. Includes 63 entries.
- U.S. Engineer School, Fort Belvoir, Va.
GUIDED MISSILES AND ROCKETS. A BIBLIOGRAPHY, 1946-1956. 50 p., Oct. 1956.
References are listed alphabetically in subject groupings. There are no annotations.
- U.S. Work Projects Administration, New York, N.Y.
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- Universita di Bologna. Istituto di Merceologia. Italy.
BIBLIOGRAFIA SULLA PROPULSIONE A RAZZO E A REAZIONE E SUI VOLI INTERPLANETARI. (BIBLIOGRAPHY ON ROCKET PROPULSION AND INTERPLANETARY FLIGHTS), by Giorgio Nebbia. 1951.
In Italian. Not examined.

Catalogs

U.S. Naval Research Laboratory Library

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American Rocket Society, Journal. Technical Literature Digest, 1933-1953. (Now Jet Propulsion)

Applied Science & Technical Index, January-June 1958. (Formerly Industrial Arts Index)

Armed Services Technical Information Agency, Technical Abstract Bulletin, 1956 - June 1958.

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Battelle Technical Review, 1956 - June 1958.

Battelle Technical Laboratories. Technical Library, Index to Current Technical Literature, 1957 - June 1, 1958.

Booklist and Subscription Books Bulletin, 1956 - June 1, 1958.

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East Europeans Accessions Index, October 1957 - March 1958.

Electronic & Radio Engineer. Abstracts and References. (Formerly Wireless Engineer), December 1957 - June 1958.

Electronic Industries, August 1957 - March 1958.

Index Aeronauticus, 1956 - April 1958.

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IRE Proceedings, January-June 1958.

International Astronautical Congress, 3rd - 5th.

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Meteorological Abstract and Bibliography, 1957 - February 1958.

NACA Research Abstract, 1955 - June 5, 1958.

Raketentechnik und Raumfahrtforschung (Literaturhinweise), 1957 - January 1958.

Readers' Guide to Periodical Literature, September 1957 - June 1958.

Royal Aeronautical Society Journal, 1957 - June 1958.

Science Abstracts. Section A--Physics, 1955 - May 1958.

Science Abstracts. Section B--Electrical Engineering, 1957 - May 1958.

Spaceflight, 1957 - January 1958.

Technical Book Review Index, 1957 - May 1958.

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ACKNOWLEDGMENTS

Only one name appears on the title page of this work, but there have been, in a sense, many collaborators. It is the compiler's pleasure to acknowledge their contributions, especially that of Mr. Fred Howard, Science and Technology Division, Library of Congress; the staff of the Documents Section and of the Library Services Section of the U.S. Naval Research Laboratory Library.

The support of the Vanguard Project in the publication of this Bibliography is acknowledged with appreciation.

A special note of thanks is due Mrs. Kathryn Kozak, who assisted to a very great extent in organizing the material and in editing and typing the references. She also contributed the author index.

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Abbreviations Used in Citations to Periodicals

The following is a list of abbreviations used in citing references to periodicals, followed by the complete title of the periodical.

Acad.Sci.Paris.Compt.Rend.	Académie des Sciences, Paris. Comptes Rendus Hebdomadaires des Séances.
Acta Math.	Acta Mathematica.
Adv.Agency Mag.	Advertising Agency Magazine.
Aero.	Aeronautics.
Aero Dig.	Aero Digest.
Aero.Eng.Rev.	Aeronautical Engineering Review.
Aero.Purchasing	Aeronautical Purchasing.
Aero.Q.	Aeronautical Quarterly.
Aero/Space Eng.	Aero/Space Engineering.
AF Mag.	Air Force Magazine.
AF Times	Air Force Times.
Air Pict. & Air Reserve Gaz.	Air Pictorial and Air Reserve Gazette.
Air Res.	Air Research.
Aircraft & Missiles Mfg.	Aircraft and Missiles Manufacturing.
Aircraft Eng.	Aircraft Engineering.
Akad.Nauk.SSSR.Inst.Teor.Astron.	Akademii Nauk, SSSR. Institut Teoreticheskii Astronomii Izvestia.
Izvest.	Akademiya Nauk SSSR. Izvestia.
Akad.Nauk.SSSR.Izvest.	Akademiya Nauk SSSR. Vestnik.
Akad.Nauk.SSSR.Vest.	American Aviation.
Am.Avist.	American Journal of Physics.
Am.J.Phys.	American Machinist.
Am.Mach.	American Mercury.
Am.Mercury	American Meteorological Society Bulletin.
Am.Meteorol.Soc.Bull.	Bulletin of the American Physical Society.
Am.Phys.Soc.Bull.	American Rocket News.
Am.Rocket News	American Rocket Society Journal.
Am.Rocket Soc.J.	American Weekly.
Am.Wkly.	Analytical Chemistry.
Anal.Chem.	Aripile Patriet.
Arip.Patr.	Army Information Digest.
Army Info.Dig.	Army-Navy-Air Force Journal.
Army-Navy-Air Force J.	Army Ordnance.
Army Ord.	Army Signal and Engineering Laboratories.
Army Signal and Eng.Labs.Res.	Research and Development Summary.
& Devlpmt. Summary	Astronomical Journal.
Astron.J.	Astronomical Society of the Pacific Publication
Astron.Soc.Pac.Publ.	Astronomical Society of South Africa.
Astron.Soc.S.Afr.Mon.Notes	Monthly Notes.
Astron.Zhurn.	Astronomicheskii Zhurnal SSSR.
Astron.Zhurn.	Atlantic Monthly.
Atlantic Mon.	Australian Journal of Science.
Austral.J.Sci.	Automatic Control.
Automatic Contr.	Automation Progress.
Automation Prog.	Automotive Engineers Journal.
Automotive Engrs.J.	Automotive Industries.
Automotive Indus.	Aviation Age.
Aviat.Age	Aviation Week.
Aviat.Wk.	
Battelle Tech.Rev.	Battelle Technical Review.
Blok Agit.	Bloknot Agitatora.
Brit.Astron.Assoc.J.	British Astronomical Association Journal.
Brit.Comm.&Electron.	British Communications and Electronics.
Brit.Interplan.Soc.J.	British Interplanetary Society Journal.

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Bull. Atomic Sci.
 Bur. Centr. Intern. Telegr. Astr. Circ.
 Bus. Wk.
 Can. Aviat.
 Can. Mining J.
 Centro Aero. Atom. Ital.
 Chem.
 Chem. & Eng. News
 Chem. Eng. Prog.
 Chem. Wk.
 Christian Cent.
 Civil Eng.
 Civiltà D. Macch.
 Commercial and Finan. Chron.
 Contr. Eng.
 Cs. Spoje
 Curr. Hist.
 Elec. Eng.
 Elec. J.
 Elec. Mfg.
 Electron.
 Electron. Age
 Electron. Equip.
 Electron. Indus. & Tele-Tech.
 Electron. News.
 Electron. Wk.
 Elektrich.
 Eng.
 Eng. J.
 Engr.
 Exp. Tech. Physik.
 Fed. Bar J.
 Fiz. Szemle
 Flugwehr u. Tech.
 For. Affairs
 For. Serv. J.
 Forsch. Inst. Phys. Strahlantriebe.
 Mitt.
 Frank. Inst. J.
 Fusées Rech. Aero.
 Gaz. Matem.
 Gen. Elec. Rev.
 Gen. Radio Exp.
 Geofis. Pura Appl.
 German Sci. Bull.
 Grazhdansk. Aviat.
 Hawker Siddeley Rev.
 Hemel Dampkr. Haag
 IGY. Bull.
 Indian Air Force Q.
 Indus. Eng. Chem.
 Indus. Labs.
 Indus. Photo.
 Ing.

Bulletin of Atomic Scientists.
 Bureau Central Internationale des Tele-
 grammes Astronomiques Circular.
 Business Week.
 Canadian Aviation.
 Canadian Mining J.
 Centro Aeronautico e Atomico Italiano.
 Chemistry.
 Chemical and Engineering News.
 Chemical Engineering Progress.
 Chemical Week.
 Christian Century.
 Civil Engineering.
 Civiltà Delle Macchine.
 Commercial and Financial Chronicle.
 Control Engineering.
 Ceskoslovenske Spoje.
 Current History.
 Electrical Engineering.
 Electric Journal.
 Electrical Manufacturing.
 Electronics.
 Electronic Age.
 Electronic Equipment.
 Electronic Industries and Tele-Tech.
 Electronic News.
 Electronic Week.
 Elektrichestvo.
 Engineering.
 Engineering Journal.
 Engineer (London)
 Experimentelle Technik der Physik.
 Federal Bar Journal.
 Fizikai Szemle (Hungary)
 Flugwehr und Technik.
 Foreign Affairs.
 Foreign Service Journal.
 Forschungsinstitut für Physik der Strah-
 lantriebe (Stuttgart) Mitteilungen.
 Franklin Institute Journal.
 Fusées et Recherche Aéronautique.
 Gazeta Matematica (Bucharest)
 General Electric Review.
 General Radio Experimenter.
 Geofisica Pura e Applicata.
 German Science Bulletin.
 Grazhdanskaia Aviatsia.
 Hawker Siddeley Review.
 Hemel en Dampkring Haag
 IGY Bulletin.
 Indian Air Force Quarterly.
 Industrial and Engineering Chemistry.
 Industrial Laboratories.
 Industrial Photography.
 Ingenieur.

Inst. Elec. Engrs. J.
 Inst. Elec. Engrs. Proc.
 Inst. Nac. Invest. Ci. Ciencia Mexico
 Inst. Nav. J.
 Inst. Radio Engrs. Proc.
 Inst. Radio Engrs. (Australia)
 Proc.
 Inst. Transport. J.
 Instr. Soc. Am. J.
 Instr. Soc. Am. Proc.
 Internat. Rocket Soc. Bull.
 Intern. & Comp. Law Q.
 Iunyi Tekh.
 J. Aero. Sci.
 J. Air Law & Commerce
 J. Appl. Phys.
 J. Astronautics
 J. Aviat. Med.
 J. Geophys. Res.
 J. Inc. Plant Engrs.
 J. Inst. Nav.
 J. Sci. & Indus. Res.
 J. Space Flight
 Jet Propul.
 K. Ned. Met. Inst., Verspreide
 Opstellen
 Kryl. Rod.
 Linde Metalworking Bull.
 Lit. Nov.
 London Times Sci. Rev.
 Mach.
 Mach. Design
 Madrid. Inst. Nac. Geof. Rev. Geof.
 Mech.
 Mag. Magnesium
 Mag. Wall St.
 Marconi Rev.
 Marine Corps Gaz.
 Mat. Design Eng.
 Mech.
 Mech. Eng.
 Mem. Art. Franç.
 Metal Finish.
 Metal Prog.
 (La) Meteorol.
 Midwest Engr.
 Mil. Automat.
 Mil. Electron.
 Mil. Rev.
 Missile Design & Developmt.
 Missile Eng.
 Mod. Metals
 Mod. Plastics

Institute of Electrical Engineers. Journal
 Institute of Electrical Engineers.
 Proceedings.
 Instituto Nacional de Investigaciones Ci
 ciencia (Mexico)
 Institute of Navigation. Journal.
 Institute of Radio Engineers. Proceedings.
 Institution of Radio Engineers (Australia).
 Proceedings.
 Institute of Transport. Journal.
 Instrument Society of America. Journal.
 Instrument Society of America. Proceedings.
 Intermountain Rocket Society. Bulletin.
 International and Comparative Law
 Quarterly.
 Iunyi Tekhnik.
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 London Times Science Review.
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 Madrid. Instituto Nacional Geofisico, Revista
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 Magazine of Magnesium.
 Magazine of Wall Street.
 Marconi Review.
 Marine Corps Gazette.
 Materials in Design Engineering.
 Mechanics.
 Mechanical Engineering.
 Memorial del'Artillerie Française.
 Metal Finishing.
 Metal Progress.
 La Meteorologie.
 Midwest Engineer.
 Military Automation.
 Military Electronics.
 Military Review.
 Missile Design and Development.
 Missile Engineering.
 Modern Metals.
 Modern Plastics.

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N.Yorker
N.Zealand Eng.
Nachrtech.Z.
Nasi Razgl.
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Natl.Educ.Assoc.J.
Natl.Geog.Mag.
Natl.Res.Counc.Canada.Radio
Elec.Eng.Div.Bull.

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Natural Hist.
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Naturw.Rund.
Nav.
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Naval Comm.Bull.
Naval Human Eng.Bull.
Newswk.
Norsk Loftmil.Tid.
Nov.Vrem.
Nordwest.Deut.Ges.Weltraumsforsch.
Rpt.
Obz.Vazhn.Sob.SSSR
Oil, Paint & Drug Rpt.
Onde Elec.
Opt.Soc.Am.J.
Ord.
Otv. na Vop.Trud.

Pac. Rocket Soc.Bull.
Pac. Rockets
Petrol.Engr.
Petrol.Ref.
Phila.Astronaut.Soc.Bull.
Philco TechRep.Div.Bull.
Phys.Rev.
Phys. Today
Physik.Bl.
Physik.Verhand.Deut.
Plastics Tech.
Popular Mech.
Popular Sci.
Popular Sci.Mon.
Power Eng.
Prod.Eng.
Prog.Theor.Phys.

Q. J. Mach.&Appl.Math.

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Reader's Dig.
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N. Eesti Raadio Saated (Soviet Estonian
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New Republic.
New York Times Magazine.
New Yorker.
New Zealand Engineering.
Nachrichtentechnische Zeitschrift.
Nasi Razgledi.
National Academy of Sciences News Report.
National Education Association.Journal.
National Geographic Magazine.
National Research Council of Canada.
Radio and Electrical Engineering
Division.
National Research Council News Report.
Natur und Technik.
Natural History.
Nature Magazine.
Naturwissenschaftliche Rundschau.
Navigation.
Naval Aviation News.
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Norsk Luftmilaert Tidsskrift.
Novoe Vremia.
Nordwest-Deutsche Gesellschaft für
Weltraumsforschung.Report.
Obzor Vazhneishikh Sobytil SSSR.
Oil, Paint & Drug Reporter.
Onde Electrique.
Optical Society of America.Journal.
Ordance.
Otvety na Voprosy Trudiashchikhsia.

Pacific Rocket Society, Bulletin.
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Popular Science.
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Product Engineering.
Progress of Theoretical Physics.

Quarterly Journal of Mechanics and
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Radio-Electronics.
Raketentekhnika u. Raumfahrtforschung.
Reader's Digest.
Research and Engineering.

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Res.Revs.(ONR)

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Lab.)
Rev.Aero.
(La) Rev. de l'Aviat.
Rev.Geof.Inst.Nac.Geof.

Rev.Obras.Publicas.
Rev.Tech.Suisse.
(La) Ricerca Sci.
Riv.Marittima
Rocket News Ltr. (Chic. Rocket
Soc.)
Rocketsci.
Roy.Aeronaut.Soc.J.
Roy. Air Force Flying Rev.
Roy. Air Force Q.
Roy.Astron.Soc.J.
Roy.Astron.Soc.Mon.Not.
Roy.Astron.Soc.Occas.Notes

Roy.Astron.Soc.Can.J.

Rpts.Vilna

RRS News and Rocket Dig.

Rubber J.&Internatl. Plastics

S.Afr.Interplan.Soc.J.

Sat.Rev.
Schweiz.Bauz.
Sci.
Sci. & Culture
Sci.Am.
Sci.Dig.
Sci.Ed.
Sci. et Vie
Sci. e Vita
Sci. Lubrication
Sci.Mon.
Sci. News Ltr.
Sci.Prog.
Sdelovaci Tech. (Prague)
Shell Aviat. News
Skolot, Avize
Skrz. Polska
Smithsonian Astrophys.Observ.
Bull. for Visual Observers of
Satellites
Smithsonian Inst.Astrophys.Observ.
Smithsonian Contrib.Astrophys.

Soc. Automotive Engrs.J.
Soc. Automotive Engrs.Trans.
Soviet Bloc Internatl.Geophys.
Year Info.

Research Reviews (Office of Naval
Research)
Research Trends (Cornell Aeronautical
Laboratory)
Revista de Aeronautica.
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Geofisico. (Madrid)
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Notes.
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Journal.
Vilna Respublikenis Radijas (Reports of the
Soviet - Occupied Vilna Broadcasting
Station)
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Digest.
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Smithsonian Astrophysical Observatory
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Satellites.
Smithsonian Institution Astrophysical
Observatory. Smithsonian Contribu-
tions to Astrophysics.
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Society of Automotive Engineers.Trans-
actions.
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Information.

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Sov.Mor. Soviet Phys. JETP	Sovetskii Moriak. Soviet Physics JETP (Engl. tr. of Zhurnal Exsperimental 'noi i Teoreticheskoi Fiziki)
Sperry Eng.Rev. Steel Process.&Convers. Studia Geophys.	Sperry Engineering Review. Steel Processing and Conversion. Studia Geophysica et Geodaetica.
Tech.Rev. Tek.Tid. Tek.Ukeblad Telefunken Ztg. This Wk.Mag. Times Sci.Rev. Tool Eng. Toute R. The Trend in Eng. Tygod.Demokrat.	Technical Review. Teknisk Tidsskrift. Teknisk Ukeblad. Telefunken Zeitung. This Week Magazine. Times Science Review. Tool Engineering. Toute la Radio. The Trend in Engineering. Tygodnik Demokratyczny.
U.S.Dept.State Bull. U.S. Naval Res.Lab.Rpt.NRLProg.	U.S. Department of State.Bulletin. U.S. Naval Research Laboratory.Report of NRL Progress.
U.S.News and World Rpt. Usp.Fiz.Nauk.	U.S.News and World Report. Uspekhi Fizicheskikh Nauk.
V Pom.Chit. Ver.Deut.ing.Z. Vest.Vozd.Flota Veon.Znan.	V Pomoshch' Chitateliu. Verein Deutsche Ingenieure Zeitschrift. Vestnik Vozdushnogo Flota. Voennye Znaniya.
Wall Street J. Wash.Acad.Sci.J. Weld. and Metal Fabric. Weld.Engr. Weld.J. West.Aviat. Wilson Lib.Bull.	Wall Street Journal. Washington Academy of Science.Journal. Welding and Metal Fabrication. Welding Engineer. Welding Journal. Western Aviation. Wilson Library Bulletin.
Yale Sci.Mag.	Yale Scientific Magazine.
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THE LITERATURE OF SPACE SCIENCE AND EXPLORATION

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- 1 Baumgarten-Crusius, Artur. DIE RAKETE ALS WELT-FRIEDEN-STAUBE. (THE ROCKET AS A WORLD-PEACE STATION). 174 p., Leipzig, Verband der Raketen-Forscher und Forderer, 1931.
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- 3 Brugel, Werner, ed. MÄNNER DER RAKETE, IN SELBSTDARSTELLUNGEN (ROCKET MEN: SELF-SUMMARIES). 144 p., Leipzig, Hachmeister und Thal, 1933.
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13 Lasser, David. THE CONQUEST OF SPACE. 271 p., illus. New York Penguin Press, 1931.

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Ley, Willy. DIE FAHRT IN WELTALL. (THE JOURNEY INTO SPACE). 2nd ed. rev., 83 p., Leipzig Hachmeister und Thal, 1928. Die Aussenstation (The Space Station) p. 64-70.

In German

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- 77 Ridenour, Louis. PILOT LIGHTS OF THE APOCALYPSE. Fortune 33: 116-117, 219, Jan. 1946.
- A whimsical but prophetic playlet about the earth being surrounded by a swarm of atom-bomb-carrying satellites.
- 78 Rodeward, H.J. UEBER EINE NAHERUNGS FORMEL FUR DEN WIRKUNGSRADIUS GRAVITIERENDER MASSEN (AN APPROXIMATE RADIUS OF GRAVITATING MASSES). Z. Naturforsch. 4A:224-228 1949
- In German
- A formula for the null-gravity point between two bodies is given and its implication for space ship and for satellite and planet motion is discussed.
- 79 Rogers, E.M. MAN-MADE SATELLITES. GRAVITY-FREE ROCKETS ARE NO LONGER IMPOSSIBLE. Army Ord. 31:247-248, Nov./Dec. 1946.
- Launching and military uses of a space station.
- 80 Ross, H.E. ORBITAL BASES. Brit. Interplan. Soc. J. 8:1-19, Jan. 1949.
- Describes Ross-Smith single self-contained space station consisting of a mirror, living quarters and an arm, at the far end of which is a radio aerial array.
- 81 Rosser, J.B., Newton, R.R. and Gross, G.L. MATHEMATICAL THEORY OF ROCKET FLIGHT. 276 p., New York, McGraw-Hill, 1947.
- This is the official final report to the Office of Scientific Research and Development concerning the work done on the exterior ballistics of fin-stabilized rocket projectiles under the supervision of Section H of Division 3 of the National Defense Research Committee at the Allegany Ballistics Laboratory during 1944 and 1945. As such, its official title is "Final Report no. B2.2 of the Allegany Ballistics Laboratory, OSRD 5878."
- 82 Sadler, D.H. ASTRONOMY AND NAVIGATION. Roy. Astron. Soc. Occas. Not. 2:109-126, illus., Sept. 1949.
- The astronomical implications of artificial satellites are referred to, p. 125-126.
- 83 Sanger, Eugen. THE LAWS OF MOTION IN SPACE TRAVEL. Interavia 4:416-418, Jly. 1949.
- Estimates of the altitude losses for artificial satellites are made.
- 84 SATELLITE MISSILE NEEDED. Sci. News Ltr. 54:156, Sept. 4, 1948.
- Development of a satellite missile to circle the earth like a moon was revealed in a communication by J.A. Van Allen to the Association of Terrestrial Magnitude.
- 85 Seifert, H.S., Mills, M.W. and Summerfield, Martin. PHYSICS OF ROCKETS: DYNAMICS OF LONG RANGE ROCKETS. Am. J. Phys. 15:255-272, May/June 1947.
- Last of a series of 3 articles considers flight into space and shows that a rocket fueled by nitric acid and aniline could take a payload of 50kg. and achieve orbital velocity if its initial mass was 25,000 Kg (25 tons).
- 86 Shepherd, L.R. THE PROBLEM OF INTERPLANETARY PROPULSION. Brit. Interplan. Soc. Bull. 1:55-65, Nov. 1946.
- The purpose of this article is to examine the difficulties in the development of reaction propulsion to the stage where the projection of vehicles outside the Earth's gravitational field becomes possible.
- 87 STAR WAGON: U.S. MILITARY MEN REALLY PLAN EARTH SATELLITE VEHICLE. Bus. Wk, 1010:39, Jan. 8, 1949.
- Refers to "first public mention" in Defense Secretary Forrestal's annual report of "the earth satellite vehicle."
- 88 THE STATION IN SPACE, SUN POWER STATIONS PLANNED BY GERMANS. Am. Rocket Soc. J. 63: 8-9, Sept. 1945.
- Captured German war secrets reveal their plans for a space station based on early theories of Noordung, Von Pirquet, Oberth and others.
- 89 Stemmer, Josef. DIE ENTWICKELUNG DES RAKETENANTRIEBES IN ALLGEMEIN VERSTANDLICHE DARSTELLUNG. (THE DEVELOPMENT OF ROCKET PROPULSION IN GENERALLY ACCEPTED TERMS). 3v., Zurich, E. Hoffmann Verlag, 1944-1945.
- In German
- v.3, p. 122-135, Die Aussenstation. (The space station).
- 90 Stemmer, Josef. PROBLEME DES WELTRAUMFLUGES. (PROBLEMS OF SPACE FLIGHT). Flugwehr u. Tech. 11:279-284, illus., Dec. 1949.
- In German
- Elementary discussion of rocket propulsion and space flight.
- 91 U.S. Secretary of Defense. NATIONAL MILITARY ESTABLISHMENT. FIRST REPORT 1948. 172 p., Washington, D.C., U.S. Government Printing Office, 1948.
- 9

10

Under the section, Guided Missiles, p. 129, brief mention is made of the Earth Satellite Vehicle Program which was being carried out independently by each military service, and which was assigned to the Committee on Guided Missiles for coordination.

This report was signed by J.V. Forrestal.

92

Von Pirquet, Guido. ZEHN BEITRAEGE, HERAUSGEGEBEN VON DER GESELLSCHAFT FUER NATUR UND TECHNIK. (TEN ARTICLES REPRINTED FROM NATUR UND TECHNIK). 52 p., Verlagsbuchhandlung Natur und Technik, Vienna, 1948.

In German

The Outer-station, Springboard into Space, discusses the advantages of orbital refueling.

93

Wendt, Gerald. ROCKETS AND INTERPLANETARY TRAVEL. Soc. Automotive Engrs. J. 57:29-33, Sept. 1949.

Excerpts from paper, "The Space Ship and the Man-Made Moon" presented at SAE summer meeting, French Lick, Ind. June 5, 1949.

Capabilities of rockets and satellites are briefly discussed.

94

Wilcox, Arthur. MOON ROCKET. 161 p. London, Thomas Nelson, 1946.

Ch. 8, Stepping stones to space.

95

Wilson, C.E., Jr. ROBOTS INTO SPACE. Rocketsci. 2:25-28, June 1948.

Suggests sending robots out in space ships to record data of atmosphere.

96

Wilson, C.E., Jr. THE SPACESHIP. Rocketsci. 3:69-72, Sept. 1949.

Discusses the general design of interplanetary spaceships and the

conditions which will govern their final shape.

97

Zahm, A.F. PLANETARY PROPERTIES OF FAST CARS. Frank. Inst. J. 245:331-336, Apr. 1948.

Discusses several principles of weight and buoyancy, radial acceleration, control and gravity problems for a manned satellite.

1950

98

Ananoff, Alexandre. L'ASTRONAUTIQUE (ASTRONAUTICS). 498 p., Paris, Librairie Artheme Fayard, 1950.

In French

According to a review in Rocket-science 4:48, June 1950, two thirds of this book is devoted to space flight and such things as the space station, step rockets, manned space flights, astrogation and the numerous chemical and physical problems of space flight.

99

California Institute of Technology. Jet Propulsion Laboratory, Pasadena, Calif. EVALUATION OF ELECTRONIC SYSTEMS FOR THE DETERMINATION OF A MISSILE TRAJECTORY, by P.H. Reedy and W.H. Pickering. 68 p., Jan. 18, 1950. (Tech. Prog. Rpt. 18-2)

This study report has been carried out in an attempt to evaluate current electronic systems as applied to the determination of missile trajectories. Pulse, CW, and combination systems have been compared as to intrinsic accuracy. In particular, it is believed that the S/N considerations of Section II merit special note, inasmuch as the relationship between accuracy and S/N appears to have received scant attention in the past.

100

Chilcote, W. LEGAL CLAIMS IN SPACE. J. Space Flight 2:1-3, Feb. 1950.

Suggests two methods for protecting space stations.

101

Clarke, A.C. DYNAMICS OF SPACE FLIGHT. Inst. Nav. J. 3:357-364, Oct. 1950.

Includes consideration of the possibility of leaving excess fuel to circle the planet as a satellite before landing and picking it up on the next leg of the journey.

102

Clarke, A.C. INTERPLANETARY FLIGHT. AN INTRODUCTION TO ASTRONAUTICS. 164 p., New York, Harper, 1950.

Ch. 6, Interplanetary flight; ch. 7, The atomic rocket; and ch. 8, Space ships and space stations.

103

Cleaver, A.V. THE CALCULATION OF TAKE-OFF MASS. Brit. Interplan. Soc. J. 9:5-13, Jan. 1950.

In Ch. IV, Orbital Techniques, there is a discussion concerning take-off masses of rockets launched from the earth, as compared to the take-off masses of rockets launched from satellites.

104

Cleaver, A.V. INTERPLANETARY FLIGHT. Aircraft (London) 28:12-15, 46, Jly. 1950.

Includes mention of American plans for an artificial earth satellite.

105

Conley, Michael. AN EARTH-MOON ORBIT. J. Space Flight 2:1-7, June 1950.

Object of this paper is not only to present a finished course for an Earth-Moon rocket, whether manned or unmanned, but also to present a method of utilization.

106

Conley, Michael. THE MEN WHO CAN MAKE SPACE FLIGHT POSSIBLE TODAY. J. Space Flight 2:1-3, Dec. 1950.

11

Suggests a crew of six and the things each will need to know.

107

Conley, Michael. A METHOD OF ENGINE PLACEMENT. J. Space Flight 2:5-6, Dec. 1950.

Brief discussion on a method of placement of rocket engines on a space ship.

108

Engel, R. EARTH SATELLITE VEHICLES. Interavia 5:500-502, illus., 1950.

Excerpts from a German article by R. Engel, U.T. Edeqvadt and K. Hanisch, "The Space-Station - A Project for the Future" in O.N.E.R.A., Paris, 16 p., Sept. 1, 1949.

Examination of the physical and technical aspects of the earth satellite station.

109

Forbes, G.F. THE TRAJECTORY OF A POWERED ROCKET IN SPACE. Brit. Interplan. Soc. J. 9:75-79, Mar. 1950.

Abridgement of a Masters' thesis submitted to Massachusetts Institute of Technology.

It presents a mathematical analysis applicable to a rocket in a central force space under the general condition of thrust tangent to the rocket path. It is said to be of particular interest "in view of the new result obtained that the co-tangential ellipse is not necessarily the most economical interplanetary orbit." See also Item 142.

110

Gatland, K.W., Dixon, A.E. and Kunesch, A.M. INITIAL OBJECTIVES IN ASTRONAUTICS. Brit. Interplan. Soc. J. 9:155-178, illus., Jly. 1950.

Orbital rockets and the earth satellite vehicle program.

12

111
Gatland, K.W. TRENDS IN ASTRO-
NAUTICS. Sky and Telescope 10:27,
Dec. 1950.

Improved rockets will help attain
three initial goals in astronautics:
Close-orbit earth satellite vehicle;
extraterrestrial instrument vehicle;
and one-man research rocket.

112
Gillings, W.H. THE EFFECTS OF IN-
TERPLANETARY FLIGHT. Brit.
Interplan. Soc. J. 9:105-107, May
1950.

A general discussion of various
aspects of space flight.

113
Grant, L.J. FURTHER STUDIES IN
THE ECONOMICS OF A SPACE
STATION. J. Space Flight 2:1-7,
May 1950.

A general discussion of costs and
income of a space station.

114
Grant, L.J. THE USE OF THE SPACE
STATION FOR SPACE NAVIGA-
TION. J. Space Flight 2:1-5, Mar.
1950.

Describes the essential uses of a
satellite in space, such as a refuel-
ing base, repair station, etc.

115
Herrick, Samuel. ROCKET NAVIGA-
TION. Nav. 2:259-272, Dec. 1950.

The two-body problem is used to
explain the establishment of a satel-
lite orbit and of an orbital course to
Venus and Mars.

116
Herrick, Samuel. SPACE ROCKET
TRAJECTORIES. Brit. Interplan.
Soc. J. 9:235-241, Sept. 1950.

Thrust period should be ended as
soon as possible. Tangent direction
is almost immaterial for great dis-
tances. For interplanetary flights
two-body motion will simplify cal-
culations.

117
Kölle, H.H. RAUMNAVIGATION. ©
(SPACE NAVIGATION). Weltraum-
fahrt 3:54-57, June 1950.

In German

This is an introduction to space
navigation.

118
Lawden, D.F. MINIMAL TRAJECTO-
RIES. Brit. Interplan. Soc. J. 9:
179-186, Jly. 1950.

Mathematical statement about in-
terplanetary journeys via arbi-
trarily selected orbits.

119
Ley, Willy. THE SHAPE OF THINGS
TO COME. Interavia 5:496-499,
Oct. 1950.

Mentions satellite station as take-
off point to other celestial bodies.

120
MAN-MADE MOON? MAY BE. Naval
Aviat. News 302:20-21, Feb. 1950.

Briefly mentions the artificial
satellite. Emphasis is on the
problems to be met in regions above
the stratosphere.

121
Oberth, H. ELECTRIC SPACESHIPS.
I. Radio-Electron. 22:32-34, Dec.
1950.

Electrostatic propulsion of a space
ship. For Part II see item 168.

122
Proell, Wayne. ALUMINUM BORO-
HYDRIDE AS A FUEL FOR SPACE
SHIPS. J. Space Flight 2:1-6, Jan.
1950.

Discusses the fuel and examines its
proper application and promise in
newly developed techniques of satel-
lite acceleration as a part of reach-
ing true space flight.

123
Proell, Wayne. THE PROPER MILLI-
TARY USE OF A SPACE STATION.
J. Space Flight 2:5-8, Mar. 1950.

Jamming, observation, and propa-
ganda possibilities of a space sta-
tion.

124
Proell, Wayne. THE SIGNIFICANCE
OF MONATOMIC GASES IN PLANE-
TARY SPACE. Part 1. J. Space
Flight 2:1-8, Sept.; Part 2. OPERA-
TIONS. J. Space Flight 2:1-9, Oct.
1950.

A discussion of some of the rela-
tions of space ships travel-
ing near the speed of light.

In French. Not examined.

125
Sänger, Eugen. CONCERNING SOME
LIMITS OF ASTRONAUTICS.
Astron. 1:8-10, Sept. 1950.

In French. Not examined.

126
Spitzer, Lyman, Jr. PERTURBA-
TIONS OF A SATELLITE ORBIT.
Brit. Interplan. Soc. J. 9:131-136,
May 1950.

The motion of a small body, revolv-
ing in a circular orbit around the
Earth about 800 kilometers above
the Earth's surface, is considered.

127
Stemmer, Josef. DIE STELLUNG DES
INGENIEURS ZU AKTUELLEN
PROBLEMEN DES WELTRAUM-
FLUGES. (THE POSITION OF ENGI-
NEERS ON THE ACTUAL PROBL-
EMS OF SPACE FLIGHT).
Weltraumfahrt 2:31-34, Apr. 1950.

In German

A general review of the engineering
problems encountered in space
flight.

128
Von Pirquet, Guido. METEORS AND
SPACE TRAVEL. Brit. Interplan.
Soc. J. 9:153-154, Jly. 1950.

It is concluded that the danger of
meteorites is negligible for space
travel, but because of cosmic dust
the interstellar rocket is impracti-
cable.

129
Walker, Nigel. THE DESTROYER
AIRCRAFT WITH SATELLITE

ROCKETS. Roy. Air Force Q. 2:13-
16, 29, Jan. 1950.

Indicates the military advantage of a
satellite rocket system.

1951

130
Bartenbach, Herman. ROCKETS AS
EXTREMELY RAPID TRANSPOR-
TATION. J. Space Flight 3:1-2,
Feb. 1951.

Brief mention of artificial satellites.

131
Black, L.S. PREVIEW OF SPACE
FLIGHT. Aero Dig. 63:17-24, Oct.
1951.

General review of problems and
possibilities of space flight, includ-
ing artificial satellites.

132
Burgess, Eric. THE ARTIFICIAL
SATELLITE. Engr. 196:456-458,
Oct. 12, 1951.

The theoretical basis for the estab-
lishment of artificial satellite ve-
hicles and the engineering problems
involved are discussed.

133
Burgess, Eric. SATELLITE AND
TRANSFER ORBITS. Pac. Rocket
Soc. Bull. 4:5, Apr. 1951.

The establishment of satellite sta-
tions and supply missiles. Not
examined.

134
Clarke, A.C. THE EXPLORATION OF
SPACE. 198 p., New York, Harper,
1951.

Ch. 15, Stations in space.

135
Conley, Michael. A TILT-METER
COMPASS DESIGN. J. Space Flight
3:1-3, Oct. 1951.

Suggests a device for the control
panel of a space ship.

14

136 Dieminger, W. WELTRAUMFAHRT UND IONOSPHERE. (SPACE TRAVEL AND THE IONOSPHERE). In Merten, R. ed. Hochfrequenztechnik und Weltraumfahrt, p. 7-14, Zurich, S. Hirzel, 1951.

In German

A survey of conditions to be encountered by an escape rocket. The problem of meteors as well as temperature and ionization effects are discussed.

137 THE EARTH SATELLITE VEHICLE. Flight 60:449, Oct. 5, 1951.

Brief review of the Second International Congress on Astronautics, London, 1951.

138 Eula, Antonio. THE SECOND INTERNATIONAL CONGRESS ON ASTRONAUTICS. L'Aerotecnica 31:300-304, Oct. 1951.

In Italian. Not examined.

"Information on the Associazione Italiana Razzi, the International Astronautical Federation and a review of the technical papers presented at the Congress." Brit. Interplan. Soc. J. 11:136, May 1952.

139 Ewing, E.G. LANDING OF SPACE-CRAFT. Pac. Rocket Soc. Bull. 4: B1-B6, Oct. 10, 1951.

This paper, presented at the Second International Congress on Astronautics, surveys the possibilities of using parachutes.

Summary appears in Carter, L.J. ed. The Artificial Satellite. Proceedings of the Second International Congress on Astronautics, London, 1951, p. 69-70, London, British Interplanetary Society, 1952.

140 Fears, F.R. INTERPLANETARY BASES - THE MOON AND THE ORBITAL SPACE STATION. J. Space Flight 3:4-5, Sept. 1951.

Method of using three rockets to reach the moon.

141 Firsoff, V.A. ARTIFICIAL SATELLITES EXPLAINED. Flight 60:504-506, Oct. 19, 1951.

A popular account of a space station and the physical laws which make it possible. Discusses the German plans for setting up a huge mirror in space, the "sun-gun."

142 Forbes, G.F. APPLICATION OF THE GENERAL TRAJECTORY EQUATIONS. Brit. Interplan. Soc. J. 10: 194-196, Sept. 1951.

Emphasis is placed on the applicability of mathematics to the problem of moving a close-in satellite craft into an interplanetary orbit without the use of a high thrust motor.

This paper is an extension of one by the author appearing in Brit. Interplan. Soc. J. 9:75-79, Mar. 1950. See Item 109.

143 Gatland, K.W., Kunesch, A.M. and Dixon, A.E. MINIMUM SATELLITE VEHICLES. Brit. Interplan. Soc. J. 10:287-294, Nov. 1951.

Discusses some of the problems and prospects involved in the development of minimum satellite rockets, four types of which are described.

Also in Carter, L. J. ed. Realities of Space Travel. Selected papers of the British Interplanetary Society, p. 67-79, London, Putnam, 1957. Also in Flight 61:150-152, Feb. 8, 1952.

144 Gatland, K.W. ORBITAL ROCKETS. I. SOME PRELIMINARY CONSIDERATIONS. Brit. Interplan. Soc. J. 10: 97-123, May 1951.

A discussion of orbital techniques. For Pt. III, see Item 159.

145 Gellung, Leonard. DIE VERWENDUNG VON THERMOELEMENTEN

IN WELTRAUM. (THE APPLICATION OF THERMOELEMENTS IN SPACE). Weltraumfahrt 2:59-60, June 1951.

In German

Using elements of 90% bismuth and 10% tin and 75% tin and 25% cadmium, it is possible to obtain 1 KW power in the earth's orbit for a total weight of 150 kgm and surface area of 400 square meters.

146 Grant, L.J. POWER SOURCES FOR ORBITAL ROCKETS. J. Space Flight 3:1-3, Nov. 1951.

Considers nuclear and solar sources.

147 Grant, L.J. A SUGGESTED DESIGN PROJECT ON AN ORBIT ROCKET. J. Space Flight 3:1-5, Jan. 1951.

Organization of a new project committee in the Chicago Rocket Society is suggested which will discuss preliminary design problems of an unmanned satellite rocket.

148 Hansen, L. SPACE FLIGHT TECHNIQUE. Elektrotekniker 24:749-757, Dec. 22, 1951.

In Danish. Not examined.

"Review of rocketry and the basic problems of space flight." Brit. Interplan. Soc. J. 11:136, May 1952.

149 Hansson, S.A. RYMDRAKETER OCH JORDSATELLITER. (SPACE ROCKETS AND EARTH SATELLITES). Tek. Tid. 81:61-64, Jan. 27, 1951.

In Swedish

Selection of a satellite orbit and construction of a satellite are considered.

150 Hoepfner, Helmut. THE OPTIMUM SATELLITE FREIGHT ROCKET. Brit. Interplan. Soc. J. 10:301-302, Nov. 1951.

15

Description of each of four stages of a four-step rocket and a table summarizing relevant data.

Taken from abstract of paper given at the Second International Congress on Astronautics, London, 1951.

Summary appears in Carter, L.J. ed. The Artificial Satellite. Proceedings of the Second International Congress on Astronautics, London, 1951, p. 70-71, London, British Interplanetary Society, 1952.

151 Humphries, John. ARTIFICIAL SATELLITES FOR THE EARTH. Mach. 23:68-73, Nov. 10, 1951.

In English and Spanish. Not examined.

"Review of the technical papers presented at the Second International Congress on Astronautics." Brit. Interplan. Soc. J. 11:136, May 1952.

152 Humphries, John. SECOND INTERNATIONAL CONGRESS ON ASTRONAUTICS. Nature 168:733-734, Oct. 27, 1951.

Review of several of the technical papers.

153 Humphries, John. SPACE FLIGHT TALK GETS DOWN TO EARTH. Aviat. Wk. 55:21-23, Oct. 22, 1951.

Review of papers delivered at the Second International Congress on Astronautics, London, 1951.

154 Humphries, John. TOWARD THE CONQUEST OF SPACE. Aircraft 30:28-29, 58, Dec. 1951.

Review of papers delivered at the Second International Congress on Astronautics.

155 INTERPLANETARY FLIGHT. Mech. 60:367, 374, Aug. 31, 1951.

Applications of rockets and elements of satellite vehicles.

16

156
Joquel, A.L. THE SPACE-STATION AS AN ASTRONOMICAL OBSERVATORY SITE. Brit. Interplan. Soc. J. 10:304, Nov. 1951.

The advantages of the space station for astronomical observations are pointed out.

This is a summary of a paper given at the Second International Congress on Astronautics, London, 1951.

157
Kölle, H.H. DESIGN PROBLEMS OF THE SPACE-STATION. Brit. Interplan. Soc. J. 10:304, Nov. 1951.

This paper defines the space station and discusses the tasks it will have to fulfill during all stages of its development. A general equation for calculating construction and maintenance costs is derived.

Summary of paper given at the Second International Congress on Astronautics, London, 1951.

Also in Carter, L.J. ed. The Artificial Satellite. Proceedings of the Second International Congress on Astronautics, London, 1951, p. 73, London, British Interplanetary Society, 1952.

158
Kuhme, H. START, RETURN AND LANDING OF AN OPTIMUM SATELLITE STEP ROCKET. Brit. Interplan. Soc. J. 10:302-303, Nov. 1951.

Aerodynamics of such a rocket are considered.

Summary, only, of paper given at the Second International Congress on Astronautics, London, 1951.

Also in Carter, L.J. ed. The Artificial Satellite. Proceedings of the Second International Congress on Astronautics, London, 1951, p. 71-72, London, British Interplanetary Society, 1952.

159
Kunusch, A.M. CONCEPTION OF AN INSTRUMENT CARRYING ORBITAL

ROCKET. Brit. Interplan. Soc. J. 10:115-123, May 1951.

Covers the main design features of orbital instrument rockets.

Part III of Orbital rockets, by K.W. Gatland et al. See Item 144.

160
Lawden, D.F. ENTRY INTO CIRCULAR ORBITS. I. Brit. Interplan. Soc. J. 10:5-17, Jan. 1951.

Theoretical discussion of the most suitable trajectory which might be employed to effect the transfer of a body from the earth's surface into a circular orbit. For Part II, see Item 348.

161
McLarren, R. THE BRAINWORK IS DONE. Aero Dig. 63:34, 36, 38, 42, 44, 46, 52, 56, 58, 60, 63, 64, Oct. 1951.

Review of the basic theory involved in escape from the earth and consideration of the present status of rocket motors.

162
Merten, R. FUNKVERBINDUNGEN MIT DER AUSSENSTATION. (RADIO COMMUNICATION WITH THE SPACE STATION). In Merten, R. ed. Hochfrequenztechnik und Weltraumfahrt, p. 92-101, Zurich, S. Hirzel, 1951.

In German

163
Merten, R. HOCHFREQUENZTECHNIK UND WELTRAUMFAHRT. (HIGH FREQUENCY TECHNIQUE AND SPACE FLIGHT). 116 p., illus., Zurich, S. Hirzel, 1951.

In German

According to a review in Brit. Interplan. Soc. J. 11:143-144, May 1952, this book consists of eight papers delivered at the Fourth Annual Meeting of the Gesellschaft für Weltraumforschung.

Of particular interest are Fundamentals on Antennas for Spaceships by F.W. Gundlach and Control and Stability of Space Ships, by

F. Kirschstein. See Items 136 and 162 for articles by Dieminger and Merten.

164
Merten, R. OPTIMUM ORBIT OF A SPACE STATION FOR RADAR TRACKING. Brit. Interplan. Soc. J. 10:303, Nov. 1951.

Summary of paper presented at the Second International Congress on Astronautics, London, 1951.

Suggests use of radar tracking or doppler method for determining position of an orbital rocket both in ascending and orbital stages.

Summary also in Carter, L.J. ed. The Artificial Satellite. Proceedings of the Second International Congress on Astronautics, London, 1951, p. 72-73, London, British Interplanetary Society, 1952.

165
Moulin, G. LA CONQUETE DE L'ESPACE - L'ASTRONAUTIQUE, SES PROBLEMES ET REALISATIONS. (THE CONQUEST OF SPACE. ASTRONAUTICS, ITS PROBLEMS AND PROGRESS). Schweiz. Techn. Z. 48:879-892, illus., Dec. 1951.

In French

General review of the problems of space flight. Both chemical and atomic rockets are discussed.

166
Nebel, R. HOW WILL THE SPACE STATION BE CONSTRUCTED? Brit. Interplan. Soc. J. 10:304, Nov. 1951.

Summary of paper presented at the Second International Congress on Astronautics, London, 1951.

Early work at the Raketenflugplatz is reviewed by the author who indicates his opinions regarding design of space station to be essentially unchanged from original proposal in 1932.

167
Nonweiler, T. DESCENT FROM SATELLITE ORBITS USING

AERODYNAMIC BRAKING. Brit. Interplan. Soc. J. 10:258-274, Nov. 1951.

Also in Carter, L.J. ed. The Artificial Satellite. Proceedings of the Second International Congress on Astronautics, p. 26-42, London, British Interplanetary Society, 1952.

168
Oberth, Hermann. ELECTRIC SPACESHIPS. II. Radio-Electron. 22:74-82, Jan. 1951.

Uses of an artificial satellite. For Pt. I see Item 121.

169
ORBITAL SPACE VEHICLES FOR INTERPLANETARY FLIGHT. Aircraft Eng. 23:334, Nov. 1951.

Includes summaries of following papers from the British symposium on satellite vehicles. The Artificial Satellite, by L.R. Shepherd; The Importance of the Satellite Vehicle, as a Step Towards Interplanetary Flight, by Wernher Von Braun; The Foundation of the Space-Station, by G. Von Pirquet; Descent from Satellite Orbits Using Aerodynamic Braking, by T. Nonweiler; Interplanetary Travel Between Satellite Orbits, by Lyman Spitzer, Jr.; Start, Return, and Landing of an Optimum Satellite Step Rocket, by H. Kuhme; The Optimum Satellite Freight Rocket, by H. Hoepfner; Meteor-Hazards in Space Stations, by M.W. Ovenden; The Influence of the Layout of the Space-Station on the Overall Costs of the Project, by H.H. Kölle; Optimum Orbit of a Space Station for Radar Tracking, by R. Merten; Landing of Space Craft, by E.V. Sawyer; Orbital Rendezvous Problems, by R.A. Smith; Minimum Satellite Vehicles, by K.W. Gatland, A.M. Kunusch and A.E. Dixon; Proposal for the Construction of a Space Station, by A. Füllenberg.

170
Ovenden, M.W. METEOR HAZARDS TO SPACE-STATIONS. Brit. Interplan. Soc. J. 10:275-286, Nov. 1951.

17

18

The possibility of puncture through collision with meteors is one of the hazards to which a space station is exposed. It is the purpose of this paper to summarize the information which may be inherent in our present imperfect state of knowledge.

Also in Carter, L.J. ed. The Artificial Satellite. Proceedings of the Second International Congress on Astronautics, London, 1951, p. 43-54, London, British Interplanetary Society, 1952.

171
Ovenden, M.W. METEORS AND SPACE TRAVEL. Brit. Interplan. Soc. J. 10:176-180, Jly. 1951.

After a discussion of meteor and interstellar dust observations the statement is made that "as far as present observations can tell us, danger to an interstellar rocket of collision with interstellar dust particles is negligible."

172
Proell, Wayne. THE EVASION OF HAZARDOUS OBJECTS IN SPACE. Part I. THE CONDITIONS FOR MISSING. J. Space Flight 3:1-5, Apr. Part II. The Apparatus for Evasion. J. Space Flight 3:1-6, May 1951.

173
Püllenberg, A. PROPOSAL FOR THE CONSTRUCTION OF A SPACE-STATION. Brit. Interplan. Soc. J. 10:304, Nov. 1951.

A two-stage rocket is proposed with expendable tanks in the first step. In this type of construction the tanks are cast off as used and thereby a good mass ratio is obtained. The second step uses the same propulsion equipment as the first step and is used as the basis for the space-station.

174
Ross, F.X., Jr. GUIDED MISSILES, ROCKETS AND TORPEDOES, COVERING THE PRINCIPLES AND TECHNIQUES OF THE MISSILES OF TODAY AND TOMORROW. 186 p., New York, Lathrop Lee and Shepard, 1951.

Ch. VI, The Future and Guided Missiles, mentions earth satellites very briefly.

175
Sänger, Eugen. ATLAS OF PARTICULAR FLIGHT-PATHS OF A ROCKET AIRCRAFT TO AND FROM A SATELLITE. Nvest. Deut. Ges. Weltraumsforsch., Rpt. 3:1-95, Apr. 1951.

In German. Not examined.

Characteristics of flight paths for various exhaust velocities and mass ratios. All results plotted in a set of 50 graphs.

176
Sänger, Eugen. WAS KOSTET WELTRAUMFAHRT? (WHAT WILL SPACE-FLIGHT COST?) Weltraumfahrt 2:49-55, June 1951.

In German

Cost data for a manned satellite and trip to Mars.

177
Sänger, Eugen. WHAT WILL SPACE-FLIGHT REQUIRE? Rocketsci. 5:26-32, 1951.

Similar to article entitled "What will space-flight cost?"

Reviews the requirements of the various projects, antipodal bomber, earth satellite station, moon rocket, etc. in terms of starting weight and cost versus exhaust velocity.

178
Sawyer, E.V. LANDING OF SPACE-CRAFT. Brit. Interplan. Soc. J. 10:300-301, Nov. 1951.

The most efficient braking device is the parachute drag brake (also known as "drogue chute" or "parabrake"). It is controlled by a drag cord passing through rings on the skirt of the canopy so that the drag force can be varied.

179
Schaub, Werner. DIE RAUMSTATION ALS SCHWERER KREISEL, (THE SATELLITE STATION AS A GYROSCOPE). Weltraumfahrt 2:121-125, Dec. 1951.

In German

Consideration of the various conditions under which a satellite station can precess.

180
Schütte, K. FROM SEA NAVIGATION TO ASTRONAUTICS. Kosmos (Stuttgart) 47:241-244, June 1951.

In German. Not examined.

Methods for obtaining a spaceship's position.

181
Shepherd, L.R. THE ARTIFICIAL SATELLITE. Brit. Interplan. Soc. J. 10:245-248, Nov. 1951.

An introduction to the symposium on satellite vehicles at the Second International Congress on Astronautics, London, 1951.

Also in Carter, L.J. ed. The Artificial Satellite. Proceedings of the Second International Congress on Astronautics, London, 1951, p. 13-16, London, British Interplanetary Society, 1952.

182
Smith, R.A. ESTABLISHING CONTACT BETWEEN ORBITING VEHICLES. Brit. Interplan. Soc. J. 10:295-299, Nov. 1951.

Considers problems involved. Also in Carter, L.J. ed. The Artificial Satellite. Proceedings of the Second International Astronautical Congress, London, 1951, p. 63-67, London, British Interplanetary Society, 1952.

183
Spitzer, Lyman, Jr. INTERPLANETARY TRAVEL BETWEEN SATELLITE ORBITS. Brit. Interplan. Soc. J. 10:249-257, Nov. 1951.

Considers a nuclear powered electrical rocket.

Also in Am. Rocket Soc., J. 22:92-96, Mar. 1952, and Carter, L.J. ed. The Artificial Satellite. Proceedings of the Second International Congress on Astronautics, London,

19

1951, p. 17-25, London, British Interplanetary Society, 1952.

184
Thompson, L.N. FUNDAMENTAL DYNAMICS OF REACTION-POWERED SPACE VEHICLES. Aircraft Eng. 23:228-234, Aug. 1951.

"Mass ratio equations for motion of a space vehicle under various conditions are derived. Available energy sources are considered. With chemical fuels the maximum jet velocity is about 20,000 ft/sec. With nuclear fuels energy potentials are very high but practical realization presents very difficult problems. However only such fuels will give sufficiently low mass ratios to make space flight possible." J. Space Flight 2:7, Feb. 1953.

Article of same title appears in Inst. Mech. Engrs. Proc. 164:264-280, 1951.

185
Vergeret, P. BIOLOGICAL PROBLEMS OF THE EARTH SATELLITE VEHICLE. Brit. Interplan. Soc. J. 10:301, Nov. 1951.

The problem of life in interplanetary flight or on an artificial satellite is an extension of the problem of life in high altitude flight. The provision of a breathable atmosphere and maintenance of a tolerable temperature is the same in both cases.

186
Von Braun, Wernher. THE IMPORTANCE OF SATELLITE VEHICLES IN INTERPLANETARY FLIGHT. Brit. Interplan. Soc. J. 10:237-244, Nov. 1951.

A discussion of design and propulsion.

Paper presented at the Second International Congress on Astronautics, London, 1951.

Summary appears in Carter, L.J. ed. The Artificial Satellite. Proceedings of the Second International

20

Congress on Astronautics, London, 1951, p. 68, London, British Interplanetary Society, 1952.

187 Von Braun, Wernher. MULTI-STAGE ROCKETS AND ARTIFICIAL SATELLITES. In Marbarger, J.F., ed. Space Medicine, Ch. II, p. 14-30, Urbana, University of Illinois Press, 1951.

Discusses the practicality of developing and building a satellite, potential applications of the artificial satellite, and other topics.

188 Von Pirquet, Guido. THE FOUNDATION OF THE SPACE-STATION. Brit. Interplan. Soc. J. 10:303, Nov. 1951.

The first step towards the establishment of a space-station would be the long distance rocket which would have a maximum range of about one-half the earth's circumference. The space-station would have a number of uses - as an astronomical observatory, for astrophysical spectro-analysis, for radio and television transmission and weather observation.

This is a summary, only, of a paper delivered at the Second International Congress on Astronautics, London, 1951. The complete text appears in Linzer Sternbote 5:109-115, Nov./Dec. 1951.

Summary also in Carter, L.J. ed. The Artificial Satellite. Proceedings of the Second International Congress on Astronautics, London, 1951, p. 72, London, British Interplanetary Society, 1952.

189 Von Schrutka-Recktenstamm, G. POSSIBILITIES OF COMMUNICATION WITH SPACE-SHIPS. Nwst. Deut. Ges. Weltraumforsch. Rpt. 2:3-4, Mar. 1951.

In German. Not examined. Use of modulated light-beams.

190 Whipple, F.L. METEORIC COLLISION FACTOR IN SPACE SHIP DESIGN. Aviat. Age 16:25-26, Dec. 1951.

Based on a paper presented at the First Annual Symposium on Space Travel, Hayden Planetarium, New York, Oct. 12, 1951.

Considers probability of space vehicle being hit by a meteorite.

1952

191 Ananoff, Alexandre. L'ASTRONAUTIQUE - LES ETAPES D'UNE SCIENCE NOUVELLE. (ASTRONAUTICS - THE STAGE OF A NEW SCIENCE). Sci. et Vie (Special Astronautical Issue), p. 13-27, 1952.

In French
Chronological arrangement of names important in the history of rocketry and space travel.

192 Aubrey, C.T. DROPPABLE STAGES MAY BOOST ROCKETS TO EARTH-CIRCLING ORBITS. Soc. Automotive Engrs. J. 60:18-23, illus., Sept. 1952.

Performance of space rockets and general review of problems of space flight.

193 Berroth, A. DER KUNSTLICHE MOND ALS HILFSMITTEL FÜR GEODÄSIE UND ASTRONOMIE. (THE ARTIFICIAL MOON AS AN AUXILIARY IN GEODESY AND ASTRONOMY). Geofis. Pura Appl. 22:139-146, Apr./June 1952.

In German
Possibilities for solving problems in geodesy and astronomy by use of an artificial satellite.

Concerns satellite vehicle trajectories.

21

194 Bowman, N.J. THE COST OF INTERPLANETARY CARGO TRANSPORTATION. J. Space Flight 4:1-10, Mar.; 1-9, Apr. 1952.

This paper attempts to set a minimum value in cost per pound of cargo, based upon calculable minimum energy requirements for various space voyages and on known values for energy content of standard fuels.

195 Burgess, Eric. THE MARTIAN PROBE. Aeronautics 27:26-33, Nov. 1952.

Consideration of the orbits and construction of an unmanned robot vehicle to circle Mars and telemeter back scientific information. Size of vehicle to carry 500 Kg. of equipment would be about 640 tons.

Article of same title appears in Brit. Interplan. Soc. J. 12:72-74, Mar. 1953.

196 Burgess, Eric. ROCKET PROPULSION. 235 p., London, Chapman and Hall, 1952.

Includes discussion of the various proposed uses of artificial satellites.

197 Cap, Ferd. TECHNISCHE FRAGEN DER WELTRAUMFAHRT (TECHNICAL PROBLEMS OF SPACE TRAVEL). Natur. u. Tech. 6:102-104, illus., Apr. 1952.

In German
Discusses step rockets, the artificial satellite, and atomic and electric rockets.

198 Carter, L.J. ed. THE ARTIFICIAL SATELLITE. 75 p., London, British Interplanetary Society, 1952.

This is chiefly a reprint of papers published in the Journal of the British Interplanetary Society representing Proceedings of the Second

International Congress on Astronautics.

For review see J. Space Flight 4:10, June 1952. See entries under individual authors, Ewing, Hoepfner, Kölle, Kuhme, Merten, Nonweiler, Ovenden, Shepherd, Smith, Spitzer, Von Braun, and Von Pirquet.

199 Clarke, A.C. THE ROCKET AND THE FUTURE OF ASTRONOMY. Roy. Astron. Soc. Occas. Notes 2:1-10, Dec. 1952.

This paper is an attempt to summarize present achievements in the field of rocketry, as far as they are of interest to astronomers, and to assess what may reasonably be expected in the future on the basis of existing knowledge.

200 Cross, C.A. THE FUNDAMENTAL BASIS OF POWER GENERATION IN A SATELLITE VEHICLE. Brit. Interplan. Soc. J. 11:117-125, May 1952.

This paper seeks to establish the basic design principles which must be followed in constructing an orbiting solar power generator. The engineering developments required to translate these principles into practice are not touched upon.

201 Durant, F.C. HOW FAR ARE WE FROM SPACE FLIGHT? Aviat. Wk. 56:25, 26, 29-30, 33, 35, May 26, 1952.

Problems and achievements in the development of rocket-powered space-flight; proposals for satellite vehicles.

202 Ehrlicke, K.A. ESTABLISHMENT OF LARGE SATELLITES BY MEANS OF SMALL ORBITAL CARRIERS.

In International Astronautical Congress, 3rd Stuttgart, Sept. 1-6, 1952, Proceedings, p. 111-145. Not examined.

22

203 Ehrlicke, K.A. A METHOD OF USING SMALL ORBITAL CARRIERS FOR ESTABLISHING SATELLITES. n.p., New York, American Rocket Society, 1952 (ARS Preprint 69-52).

Paper presented at seventh annual meeting of the American Rocket Society, Dec. 3-5, 1952.

A method is presented which permits the utilization of comparatively small, manned vehicles (payload weight of 11,000 lbs.) as orbital carriers for establishing and maintaining satellites.

The payload of several carriers is transferred, in an auxiliary orbit just above the atmosphere, to a space ferry which moves between auxiliary orbit and satellite orbit, never entering the atmosphere. The ferry is refueled by orbital carrier in the auxiliary orbit. The inherently difficult supply problem can thus be solved economically, avoiding the delay and the expense resulting from the development of booster stages for very large satellite ships.

204 Elliott, J.P. INTERPLANETARY COMMUNICATIONS AND NAVIGATION. J. Space Flight 4:1-6, May 1952.

A summary of electronic methods that would be applicable for use in a space voyage.

205 Escanglon, Ernest. VOYAGES EXTRA-TERRRESTRES. (EXTRA-TERRRESTRIAL FLIGHT). Sci. et Vie (Special Astronautical Issue) p. 5-12, 1952.

In French
Uses of artificial satellites.

206 Forbés, G.F. THRUST AVAILABLE FROM ELECTRONIC ACCELERATORS. J. Space Flight 4:1-6, Dec. 1952.

A mathematical analysis of the propulsion of space vessels by ion

streams. Ion acceleration is intended as a source of acceleration or course adjustment in space and not as a power source for landing or take off.

207 Gartmann, Heinz. RAUMFAHRTFORSCHUNG. (SPACE TRAVEL RESEARCH). 200 p., illus., Munich, R. Oldenburg, 1952.

In German

Contents: The History of the Idea of Space Travel, by Willy Ley; The Celestial Mechanical Fundamentals of Space Travel, by Werner Schaub; The Space Station, by R. Engel, U. T. Bödewadt, and K. Hantsch; Station in Space, by Hermann Oberth; Medical Problems of Space Travel, by V. Diringshofen; The Astronautical Societies, by H.H. Kille, and a space travel bibliography.

208 Gatland, K.W. DESIGN FOR ZERO "G". Flight 61:774, 775, 779, illus., June 27, 1952.

Discusses mechanical problems of achieving space flight and proposals for a man-carrying research rocket.

209 Gatland, K.W., Kunesch, A.M. and Dixon, A.E. SATELLITE ROCKETS. Flight 61:150-152, Feb. 8, 1952.

Paper delivered at the Second International Congress on Astronautics, London, 1951.

Projects for minimum vehicles to perform various research duties.

210 Goode, H.H. AN ANALYSIS OF THE SPACE STATION. Rocketsci. 6:55-59, Sept. 1952.

Comment on Wernher von Braun's space station proposal.

211 Grant, Lewis, Jr. ASCENT FROM EARTH. J. Space Flight 4:1-4, Sept. 1952.

A discussion of the important first (and most difficult) step in space flight - attaining a high altitude above the earth's surface. Numerous methods of reducing the required energy and increasing efficiency in energy utilization, in this takeoff from earth are discussed.

212 Hahnemann, H.W. GEGENWÄRTIGER ENTWICKLUNGSSTAND. (PRESENT STAGE OF DEVELOPMENT). Ver. Deut. Ing. Z. 94:1045-1048, Nov. 11, 1952.

In German

Review of papers read at the Third International Astronautical Congress, Stuttgart, Sept. 1-6, 1952.

213 HAYDEN PLANETARIUM SYMPOSIUM ON SPACE TRAVEL. Brit. Interplan. Soc. J. 11:3-16, Jan. 1952.

Summary report of proceedings and papers at the symposium held on October 12, 1951 at the Hayden Planetarium in New York.

214 Hecht, Friedrich. CHEMISCHE PROBLEME DES WELTRAUMFLUGES. (CHEMICAL PROBLEMS OF SPACE FLIGHT). In Kille, H.H. ed. Probleme aus der Astronautischen Grundlagenforschung, p. 30-39, Stuttgart, Gesellschaft für Welttraumforschung, 1952.

In German

Discusses chemical problems which will be met in space ships, space stations and planetary bases.

Paper presented at the Third International Astronautical Congress, Stuttgart, Sept. 1-6, 1952. Also in Welttraumfahrt 4:3-9, Jan. 1953.

215 Heim, B. DIE DYNAMISCHE KONTRABARIE ALS LÖSUNG DES ASTRONAUTISCHEN PROBLEMS, (THE DYNAMIC CONTRABAR AS AN ANSWER TO ASTRONAUTICAL PROBLEMS). In Kille, H.H. ed. Probleme aus der Astronautischen Grundlagenforschung, p. 181-183,

Stuttgart, Gesellschaft für Welttraumforschung, 1952.

In German

Indicates that the artificial satellite program will be carried out with the use of chemical propellant rockets.

Paper presented at the Third International Astronautical Congress, Stuttgart, Sept. 1-6, 1952.

216 Hoeppner, Helmut. DIE SATELLITENRAKETE, 1952. (THE SATELLITE ROCKET, 1952). In Kille, H.H. ed., Probleme aus der Astronautischen Grundlagenforschung, p. 97-104, Stuttgart, Gesellschaft für Welttraumforschung, 1952.

In German

Discusses the major characteristics of a satellite rocket.

217 Humphries, John. ARTIFICIAL SATELLITES. Aeronautics 26:62, 65-66, 69, illus., Apr. 1952.

Artificial satellites, orbiting around the earth, are becoming accepted as a necessary preliminary to further extra-terrestrial explorations. This article sums up some current views on various aspects of such satellites.

218 Humphries, John. PRACTICAL APPROACH TO ASTRONAUTICS. Flight 61:528-532, Oct. 24, 1952.

Review of papers given at Third International Congress on Astronautics, Stuttgart, Sept. 1-6, 1952. Space flight problems are included.

219 Humphries, John. ROCKETS AND SPACE-FLIGHT. N. Zealand Eng. 7:82-85, Mar. 1952.

Mentions significance of space stations or artificial satellites in the conquest of space.

Article of same title appears in J. Inc. Plant Engrs. 2:534-540, 546, Sept./Oct. 1951.

23

24

220 Ketchum, H.B. FLIGHTS TO THE MAJOR PLANETARY SYSTEMS. *J. Space Flight* 4:1-3, Nov. 1952.

Mentions, briefly, the establishment of space stations close to the large planets for the purpose of obtaining information as to their structure and other characteristics.

221 Ketchum, H.B. A PRELIMINARY SURVEY OF THE CONSTRUCTIONAL FEATURES OF SPACE STATIONS. *J. Space Flight* 4:1-4, Oct. 1952.

The purpose of the article is to serve as a preliminary survey of the constructional features of space stations and indicate some of the problems to be solved before actual construction becomes feasible.

222 Kölle, H.H. GRAPHISCHES VERFAHREN ZUR ABSCHÄTZUNG DER OPTIMALEN KONSTRUKTIONSGRÜNDWERTE VON RAUMFAHRZEUGEN. (GRAPHICAL METHOD FOR EVALUATING THE OPTIMUM DESIGN CHARACTERISTICS OF SPACE VEHICLES). *Weltraumfahrt* 3:39-41, Apr. 1952.

In German

223 Kooy, J.M.J. SOME PROBLEMS OF INTERPLANETARY TRAVEL. *Ing.* 64:37-45, 1952.

In Dutch. Not examined.

"Calculation of satellite vehicle and escape vehicle. Discussion of overall mass-ratio as a function of exhaust velocity and acceleration." *Brit. Interplan. Soc. J.* 12:65, Mar. 1953.

224 Krause, H. DIE BEWEGUNG EINER AUSSENSTATION IN EINER ELLIPTISCHEN, ZUM ERDÄQUATOR GENEIGTEN BAHN UN DIE ERDE. (MOVEMENT OF A SPACE STATION IN AN ELLIPTICAL ORBIT, INCLINED TO THE EQUATOR.). *Weltraumfahrt* 3:17-25, Jan.; 74-79, Jly. 1952.

In German

Pt. 1. Fundamental equations for the calculation of the orbit. It is assumed that deviations from an accurate circle will always occur because of perturbations.

Pt. 2. Horizontal projection of the elliptical path, field of vision and rate of lighting of the space station.

Also issued as *Rand Corp. Trans.* T-52.

225 Krause, H. DIE SÄKULARSTÖRUNGEN EINER AUSSENSTATIONSBAHN. (SECCULAR PERTURBATIONS OF A SPACE STATION ORBIT.) In Kölle, H.H. ed. *Probleme aus der Astronautischen Grundlagenforschung*, p. 162-173, Stuttgart, Gesellschaft für Weltraumforschung, 1952.

In German

Discusses secular perturbations for satellite orbits and the possibility of the artificial satellite proving the general relativity theory of Einstein.

Paper presented at the Third International Astronautical Congress, Stuttgart, Sept. 1-6, 1952.

226 Kuhme, H. ZUR AERODYNAMIK VON START UND LÄNDUNG DER SÄKULAREN RAKETE. (AERODYNAMICS OF TAKE-OFF AND LANDING OF THE SATELLITE ROCKET.) *Weltraumfahrt* 3:53-59, Apr. 1952.

In German

A general investigation is made of aerodynamic forces and a sample calculation is given for the take-off landing and return of a satellite rocket.

227 Kuhme, H. KATAPULTSTART. (CATAPULT TAKE-OFF). In *International Astronautical Congress*, 3rd, Stuttgart, Sept. 1-6, 1952, Proceedings p. 106-110.

The vertical take-off hitherto used and resulting in the most favorable design of a rocket, is subject to a

velocity loss of 8 to 10 percent for generally used fineness ratio (0.2 to 0.3). This velocity loss pertains to the firing of the first step which (for the present designs) reaches a burn-out altitude between 40 and 50 km. The magnitude of this velocity loss ranges about 150m/sec. As a result of this acting air drag, the payload of the last step of the satellite is reduced by one half. Not examined.

228 Lawden, D.F. THE DETERMINATION OF MINIMAL ORBITS. *Brit. Interplan. Soc. J.* 11:216-224, diags., Sept. 1952.

The solution to the problem of the transfer of a rocket between two coplanar orbits, about a center of attraction using a minimum of fuel is stated and is applied in the particular case of transfer between two similar elliptical orbits differing only as regards the orientations of their axes.

Also in Carter, L.J. ed. *Realities of Space Travel*, p. 205-215, London, Putnam, 1957.

229 Lawden, D.F. INTER-ORBITAL TRANSFER OF A ROCKET. *Brit. Interplan. Soc. J.* 11:321-333, Nov. 1952.

The problem of the transfer of a rocket between two coplanar elliptical orbits about the same center of inverse square law attraction along a trajectory requiring a minimum fuel expenditure is solved. The solution is shown to involve a number of impulsive thrusts and equations are obtained from which the magnitudes and directions of these thrusts and the instants of their application may be calculated in particular cases. In the case of transfer between circular orbits, the solution is shown to be equivalent to that due to Hohmann.

Paper presented at the Third International Astronautical Congress, Stuttgart, Sept. 1-6, 1952.

25

230 Lawden, D.F. ORBITAL TRANSFER VIA TANGENTIAL ELLIPSES. *Brit. Interplan. Soc. J.* 11:278-289, Nov. 1952.

It is shown that there is an infinity of ellipses tangential to two given coplanar elliptical orbits and along which transfer from one orbit to the other may take place. A method for calculating a transfer via any one of these ellipses and for calculating the optimum transfer ellipse is described. The special case of transfer between two orbits of small eccentricity is considered in detail.

231 Lessac, Charles. LES SATELLITES ARTIFICIELS ET LES VOYAGES COSMIQUES. (THE ARTIFICIAL SATELLITES AND THEIR COSMIC VOYAGES). *Sci. et Vie*, (Special Astronautical issue), p. 134-156, 1952.

In French

Mechanics and establishment of a satellite and interplanetary voyages.

232 Ley, Willy. SHALL WE LIVE TO SEE THE SPACE SHIP? *Natur u.Tech.* 6:217-218, 1952.

Not examined.

A discussion of the approximate time when space flight can be achieved. Ley predicts the first flight in 1965 to 1970.

233 Ley, Willy. A STATION IN SPACE. *Collier's*, p. 30-31, Mar. 22, 1952.

An impression of a manned space station.

234 Maugin, C. ASTRONAUTIQUE ET RELATIVITE. (ASTRONAUTICS AND RELATIVITY). *Acad. Sci. Paris. Compt. Rend.* 234:1004-1007, Mar. 3, 1952, Mar. 24, 1952.

In French

26

The relationship between the distance x (in light years) travelled by a hypothetical vehicle, in a system in which the vehicle is at rest at zero time and the time t (in years) measured in the vehicle is derived for the case in which the vehicle is moving with a constant acceleration of 950 cm. sec^{-2} (measured with respect to a system instantaneously at rest relative to the vehicle at any instant). In this case $x = \cosh \tau - 1$, the corresponding time which elapses in the fixed system is $t = \sinh \tau$.

235

Merten, R. ÜBER EINIGE HOCHFREQUENZ TECHNISCHE PROBLEME DER WELTRAUMFAHRT. (ON SOME PROBLEMS OF HIGH-FREQUENCY TECHNIQUES IN SPACE TRAVEL). In Kölle, H.H. ed., Probleme aus der Astronautischen Grundlagenforschung, p. 239-244, Stuttgart, Gesellschaft für Welt-raumforschung, 1952.

In German

The use in a rocket of high frequency waves when ascending from the earth or on an artificial satellite.

Paper presented at the Third International Astronautical Congress, Stuttgart, Sept. 1-6, 1952.

236

Meyer, Alex. RECHTLICHE PROBLEME DES WELTRAUMFLUGS. (LEGAL PROBLEMS OF SPACE FLIGHT). In Kölle, H.H. ed., Probleme aus der Astronautischen Grundlagenforschung, p. 19-29, Stuttgart, Gesellschaft für Welt-raumforschung, 1952.

In German

Paper presented at the Third International Astronautical Congress, Stuttgart, Sept. 1-6, 1952.

237

Mueller, Gregg. OPTIMUM RANGE OF A WINGLESS ROCKET ABOUT A ROTATING EARTH. 41 p., Pasadena, California Institute of Technology, Ph.D. Thesis 1952.

The motion of a wingless rocket in a vacuum about a spherical non-rotating

earth describes the elliptic orbit of a material point of mass in a central field of force. . . but when considering the effects of a rotating earth there is no simple mathematical solution. To analyze these effects it is necessary to solve the equations for various initial velocities at various angles of elevation and optimize the results by interpolation formulas.

238

Newton, R.H.C. INTERSTELLAR FLIGHT. Brit. Interplan. Soc. J. 11:297-298, Nov. 1952.

Draws attention to clock paradox, by commenting on article by L.R. Shepherd. (See Item 252.)

Dr. Shepherd's reply appears on p. 298-299, Nov. 1952.

239

Oberth, Hermann. PRIVATE VORARBEIT ZUR WELTRAUMFAHRT. (PERSONAL FORETHOUGHTS ON SPACE FLIGHT). In Kölle, H.H. ed., Probleme aus der Astronautischen Grundlagenforschung, p. 11-19, Stuttgart, Gesellschaft für Welt-raumforschung, 1952.

In German

Construction of an artificial satellite is among topics considered.

Paper presented at the Third International Astronautical Congress, Stuttgart, Sept. 1-6, 1952.

240

Porter, J.G. INTERPLANETARY ORBITS. Brit. Interplan. Soc. J. 11:205-210, Sept. 1952.

Is concerned with the fundamentals of orbit work, only.

241

Preston-Thomas, H. GENERALIZED INTERPLANETARY ORBITS. Brit. Interplan. Soc. J. 11:76-85, Mar. 1952.

Discusses time of flight and power requirements for a journey between any two specified orbits.

242

Preston-Thomas, H. INTERORBITAL TRANSPORT TECHNIQUES. (WITH SPECIAL REFERENCE TO SOLAR DERIVED POWER). Brit. Interplan. Soc. J. 11:173-193, diags., Jly, 1952.

Discusses methods of propulsion; transit times and acceleration requirements; general design data; the ion gun; electrostatic generators; direct atomic drive; and the solar thermopile power system.

243

Proell, Wayne. SOME EFFECTS OF INTERPLANETARY HYDROGEN UPON SPACESHIPS. J. Space Flight 4:1-7, June 1952.

A preliminary calculation indicates that atomic hydrogen present in planetary space can cause appreciable deterioration of ship structures, although the effect is slow. Remedial measures such as cladding of the ship structure is recommended.

244

Rougeron, Camille. CLEF DES VOYAGES EXTRA-TERRESTRES. (THE KEY TO SPACE TRAVEL). Sci. et Vie, (Special astronomical issue), p. 87-95, 1952.

In French

Includes some mention of satellite rockets.

245

SAATELLITE ROCKETS. Flight 61: 150-152, Feb. 8, 1952.

Four types of rockets are outlined which could be used not as man-carrying vehicles but for lifting research instruments.

246

Sawyer, E.V. INTERNATIONAL ASTRONAUTICS FEDERATION. Pac. Rocket Soc. Bull. 5:B1-B4, Jan. 10, 1952.

A review of the proceedings of the Second International Congress on Astronautics, London, 1951.

247

Schachter, Oscar. LEGAL ASPECTS OF SPACE TRAVEL. Brit. Interplan. Soc. J. 11:14-16, Jan. 1952.

27

Paper read at the Hayden Planetarium Symposium on Space Travel.

248

Schachter, Oscar. WHO OWNS THE UNIVERSE? Collier's, p. 36, 70-71, Mar. 22, 1952.

Legal problems in space and on other bodies.

249

Schaub, Werner. DIE FLUTKRÄFTE AUF DER AUSSENSTATION. (TIDAL FORCES IN THE SPACE STATION). Weltraumfahrt 3:1-8, Jan. 1952.

In German

"The tidal forces on the station in space cause conditions which possibly cannot be observed during erection in the orbit. It seems to be questionable if a space station with moveable masses aboard can be stabilized in its orbit permanently." Brit. Interplan. Soc. J. 11:235, Sept. 1952.

250

Schaub, Werner. GEDANKEN EINES ASTRONOMEN ZUR WELTRAUMFAHRT. (THOUGHTS OF AN ASTRONOMER ON ASTRONAUTICS). Weltraumfahrt 3:34-38, Apr. 1952.

In German

Astronautics involves many more problems than is generally considered.

251

Schaub, Werner. MOEGLICHKEITEN DES UEBERGANGES AUS EINER ELLIPSENBAHNEN IN EINE KREISBAHN UND UNGEKEHRT. (POSSIBILITIES OF TRANSITION FROM ELLIPTICAL INTO CIRCULAR ORBIT AND VICE VERSA). Weltraumfahrt 3:81-86 Jly.; 106-111, Oct. 1952.

In German

Also issued as Rand Corp. Trans. T-54.

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Shepherd, L.R. INTERSTELLAR FLIGHT. Brit. Interplan. Soc. J. 11:149-167, Jly. 1952.

- 28
- Considers distance, time and energy; flight at near optic velocity; and the effect of interstellar matter.
- Also in Carter, L.J. ed. Realities of Space Travel, p. 395-416, London, Putnam, 1957.
- 253
Singer, S.F. RESEARCH IN THE UPPER ATMOSPHERE WITH SOUNDING ROCKETS AND EARTH SATELLITE VEHICLES. Brit. Interplan. Soc. J. 11:61-73, illus., Mar. 1952.
- Reasons are given why present upper atmosphere research is fundamental to the development of space flight; in particular, astrophysical research is believed to provide the main impetus for an Earth-satellite orbital rocket project.
- 254
Slater, A.E. ASTRONAUTICS AT STUTTGART. Aeroplane 83:456-457, Sept. 26, 1952.
- Summaries of papers delivered at the Third International Astronautical Congress, Stuttgart, Sept. 1-6, 1952.
- 255
SPACE MEETING. Aviat. Wk. 57:39, Nov. 10, 1952.
- Contains summaries of Third International Astronautical Congress, Stuttgart, Sept. 1-6, 1952. Papers by H.J. Schaefer and Werner Von Braun and A. Meyer are reviewed.
- 256
SPACE TALK - ROCKET SOCIETY PAPERS POINT TO OUTER FLIGHT. Aviat. Wk. 57:44-53, Sept. 29, 1952.
- Discusses papers by H.E. Newell, Jr., M.W. Rosen and R.B. Snodgrass, H.V. Schaefer and Werner Von Braun read at Fall meeting of the American Rocket Society.
- 257
Stemmer, Josef. RAKETENANTRIEBE, IHRE ENTWICKLUNG, ANWENDUNG UND ZUKUNFT. EINE EINFÜHRUNG IN DAS WESEN DES RAKETENANTRIEBES, SOWIE RAKETEN UND WELTRAUMFLUGES (ROCKET PROPULSION, ITS DEVELOPMENT, APPLICATIONS AND FUTURE: AN INTRODUCTION TO THE NATURE OF ROCKET PROPULSION, SOVIET ROCKETS AND SPACE FLIGHT). 523 p., Zurich, Schweizer, Druck und Verlagshaus, 1952.
- In German
Ch. 9. Weltraumflug. (Space flight)
- Very comprehensive review of the rocket motor and its applications - missile, aircraft, and space flight.
- 258
SUMMARIES OF PAPERS DELIVERED BY OTHER SOCIETIES (Third International Astronautical Congress, Stuttgart, 1952). Brit. Interplan. Soc. J. 11:348-356, 1952.
- Includes the following: Basic Astronautical Research on an International Basis, by J. Stemmer, p. 349; Chemical Problems of Space-Flight, by F. Hecht, p. 349; On the Optimum Combustion Chamber Pressure of Rocket Motors, by H.H. Kölle, p. 350; The Optimum Proportions of Rocket Components, by R.A. Cornog and F.L. Van der Wal, p. 350; Fluid Pump for Large Rocket Motors, by G.E. Janson, p. 351; Some Fundamental Questions Concerning Manned and Unmanned Space Vehicles, by A. Hjertstrand, p. 351; Further Development of the Freigh Rocket, by H. Hoepfner and H. Kühne, p. 351; Perturbations of a Satellite Orbit at an Altitude of 6,669 km Due to the Oblateness of the Earth and the Influence of the Moon and the Sun, by H. Krause, p. 353; The Problem of Radiation in Space, by C. Wiese, p. 352; Legal Problems of Space Flight, by A. Meyer, p. 353; Exposure Hazards from Cosmic Radiation at Extreme Altitude and in Free Space, by H.J. Schaefer, p. 354; Problems of High Frequency Techniques in Astronautics, by R. Merten, p. 354; Establishment of Large Artificial Satellites by Means of Small Carriers, by K.A. Ehrlicke, p. 355; Space Travel - Its Dependence Upon International Scientific Cooperation, by W. Von Braun, p. 356.
- See also Items under Hecht, Meyer, Merten.
- 259
THIRD INTERNATIONAL ASTRONAUTICAL CONGRESS, STUTTGART, 1952. Brit. Interplan. Soc. J. 11: 315-320, illus., Nov. 1952.
- Brief review of proceedings. For papers see entries under Lawden, Thompson and Summaries of papers.
- 260
Thompson, G.V.E. COST AND AVAILABILITY OF HIGH-ENERGY ROCKET PROPELLANTS. Brit. Interplan. Soc. J. 11:333-341, Nov. 1952.
- Considers the cost of propellants for space flight.
- A table on p. 341 lists various types of propellants, their cost, and availability.
- Paper given at Third International Astronautical Congress, Stuttgart, Sept. 1-6, 1952.
- 261
Thompson, L.N. ARTIFICIAL SATELLITES - KEY TO SPACE FLIGHT? Interavia 7:148-150, illus., Mar. 1952.
- An examination is made of the basic problems of space flight - escape velocity, landing procedures, atomic power plants and suborbital satellite stations.
- 262
Thuring, Bruno. TRÄGHEITS-KRÄFTE IM ERDE-MOND-FELD: BERECHNUNG UND KONSTRUKTION VON RAUMSCHIFF-BAHNEN. (INERTIAL FORCES IN THE EARTH-MOON FIELD: CALCULATION AND CONSTRUCTION OF ORBITS FOR SPACE-SHIPS). Weltraumfahrt 3: 112-115, Oct. 1952.
- In German
- A theoretical study of forces acting and a graphical method for orbital determination is suggested.
- 263
Vaeth, J.G. ESCAPE FROM EARTH. Flying 51:27-44, Dec. 1952.
- Suggests that space ships will be refueled by tanker rocket satellites circling the globe at several hundred miles above the earth.
- 264
Vaeth, J.G. VEHICLE FOR SPACE. Flying. 51:26-27, 46, illus., Oct. 1952.
- 265
Von Braun, Wernher. THE JOURNEY. Collier's, p. 52-56, 58, 60, Oct. 18, 1952.
- Popular description of the vehicles needed for a journey from an artificial satellite to the Moon and return.
- 266
Von Braun, Wernher. THE RETURN OF A WINGED ROCKET VEHICLE FROM A SATELLITE ORBIT TO THE EARTH. In White, C.S. and Benson, O.O. eds. Physics and Medicine of the Upper Atmosphere: A Study of the Aeropause, p. 432-440, Albuquerque, University of New Mexico Press, 1952.
- Partial excerpt from the author's Das Marsprojekt.
- 267
Von Braun, Wernher. WELTRAUMFAHRT, EINE AUFGABE FÜR DIE INTERNATIONALE WISSENSCHAFTLICHE ZUSAMMENARBEIT. (SPACE FLIGHT, A NOTE FOR THE INTERNATIONAL SCIENTIFIC CONVENTION). In Kölle, H.H. ed. Probleme aus der Astronautischen Grundlagenforschung, p. 246-256, Stuttgart, Gesellschaft für Weltraumforschung, 1952.
- In German
- A suggestion to delve into various scientific fields to discover fresh approaches to all aspects of an artificial satellite.
- 268
VON BRAUN OFFERS PLAN FOR STATION IN SPACE. Aviat. Age 18:61-63, Dec. 1952.
- Presents early steps for establishment of a space station. Suggests a study schedule to explore all phases of the problem and the development and testing program.
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269 Whipple, F.L. THE HEAVENS OPEN. Collier's, p. 32-33, Mar. 22, 1952.

The use of space vehicles for astronomical research.

270 Whipple, F.L. METEORITIC PHENOMENA AND METEORITES. In White, C.S. and Benson, O.O. eds. Physics and Medicine of the Upper Atmosphere: a Study of the Aeropause, p. 137-170, Albuquerque, University of New Mexico Press, 1952.

A discussion of the possibility of meteoritic penetration of high-altitude vehicles.

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271 Allen, W.A. TWO BALLISTICS PROBLEMS OF FUTURE TRANSPORTATION. Am. J. Phys. 21:83-89, 1953.

The problems of travelling along a great circle and of travelling radially out from the earth, both with constant acceleration, are considered.

272 Bottema, M.J. THE SPHERICAL DIFFERENTIAL ANALYZER FOR SOLVING DIFFERENTIAL EQUATIONS ARISING IN SPACE TRAVEL PROBLEMS. In International Astronautical Congress, 4th, Zurich, 1953. Space Flight Problems, p. 115-124, Biel-Bienne, Switzerland, Laubscher, 1953.

Describes the King-Hele-Shaw spherical integrator and its use in solving differential equations of interest in space flight.

273 Burgess, Eric. MILITARY AND CIVILIAN ROCKET RESEARCH. Engr. 196:581-583, Nov. 6, 1953.

Calls for establishment of an international group to work toward the creation of an artificial satellite which would be primarily for civilian use.

274 Burgess, Eric. A REALISTIC APPROACH TO SPACE FLIGHT. Aircraft (Australia), Oct. 1953.

Not examined.

Aerodynamic and astronomical problems of a typical limiting mission. Proposals are made for the development of atomic powered rocket engines.

275 Cardozo, A.L. A GENERAL FORMULA FOR THE RELATION BETWEEN A FIELD OF FORCES AND THE ORBIT OF A BODY THEREIN. In International Astronautical Congress, 4th, Zurich, 1953. Space Flight Problems, p. 103-106, Biel-Bienne, Switzerland, Laubscher, 1953.

Demonstrates forms of the functions used in calculating orbits which are suitable for use in differential analysers.

276 Casiraghi, G.P. MATERIALS FOR ROCKET FRAME AND MOTOR CONSTRUCTION. In International Astronautical Congress, 4th, Zurich, 1953. Space Flight Problems, p. 163-170, Biel-Bienne, Switzerland, Laubscher, 1953.

A review of the materials now available for application to space-vehicle structures, wing surfaces, rocket motors and their linings, and propellant handling systems.

277 Cleaver, A.V. NUCLEAR ENERGY AND ROCKET PROPULSION. Aeroplane 84:736-738, June 5, 1953.

Satellite rockets are mentioned.

278 Crocco, G.A. I FONDAMENTI DELL'ASTRONAUTICA. (FUNDAMENTALS OF ASTRONAUTICS). L'Aerotecnica 33:135-140, Apr. 1953.

In Italian

Some discussion of satellites and space stations is included.

279 Crocco, G.A. PROGRAMME OF ACTION. In International Astronautical Congress, 4th, Zurich, 1953. Space Flight Problems, p. 221-224, Biel-Bienne, Switzerland, Laubscher, 1953.

A general review of the problems of space flight.

280 Crocco, G.A. LE RAVITAILLEMENT DANS L'ESPACE ET LE PROBLEME DES POLISTADES. (REFUELLING IN SPACE AND THE PROBLEM OF MULTI-STAGE VEHICLES). In International Astronautical Congress, 4th, Zurich, 1953. Space Flight Problems, p. 152-160, Biel-Bienne, Switzerland, Laubscher, 1953.

In French

"A scheme for the design of a multi-stage vehicle as a cluster of recoverable tank-rockets surrounding the final stage. The problems of transfer of fuel in space and of aerodynamic return to the Earth's surface are also discussed." Brit. Interplan. Soc. J. 16:317, Jan./Feb. 1958.

281 Dixon, A.E., Gatland, K.W. and Kunesch, A.M. FABRICATION OF THE ORBITAL-VEHICLE. In International Astronautical Congress, 4th, Zurich, 1953. Space Flight Problems, p. 125-135, Biel-Bienne, Switzerland, Laubscher, 1953.

Considers propellant tanks and transfer, methods of assembly, and ground-to-orbit vehicles. A bibliography is included.

Also in Brit. Interplan. Soc. J. 12:274-286, Nov. 1953.

282 Ehrlicke, K.A. TAKE-OFF FROM SATELLITE ORBITS. Am. Rocket Soc. J. 23:372-374, Nov./Dec. 1953.

Comments on paper by H.S. Tsien (See Item 316).

The Tsien method is applied with the qualification that a space ship leaving a satellite orbit must have

hyperbolic rather than parabolic velocity. It is concluded that no general solution is possible in this case, for takeoff. The takeoff for various planets is discussed; there is an optimum satellite orbit for each planet.

283 Eula, Antonio. L'ASTRONAUTICA. (ASTRONAUTICS). L'Aerotecnica 33:231-244, June 1953.

In Italian

Paper presented at a conference held in Rome, May 16, 1953 of the Societa Geografica Italiana.

Discusses satellites as relay stations and as stepping stones to space.

284 Firsoff, V.A. OUR NEIGHBOR WORLDS. 336 p., New York, Philosophical Library, 1953.

Several chapters at the beginning of the book discuss the rationale and methods of space flight; however the major part is devoted to a systematic account of the astronomical bodies of the solar system.

285 Gartmann, Heinz. DIE EVOLUTION DES RAUMFAHRZEUGS. (EVOLUTION OF THE SPACE VEHICLE). Weltraumfahrt 4:36-42, illus., Apr. 1953.

In German

A survey of actual developments and future possibilities.

286 Gatland, K.W. and Kunesch, A.M. SPACE TRAVEL. 205 p., New York, Philosophical Library, 1953.

Ch. 4, The Artificial Satellite.

287 GERMAN SPACESHIP. Roy. Air Force Flying Rev. 8:16-17, illus., May 1953.

Description of Satellite Rocket 52 designed, in Germany, by Helmut Hoepfner and K.B. Schonenberger.

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Golay, M.J. THE APPLICATION OF RADIO INTERFEROMETRY TO THE GUIDANCE OF INTERPLANETARY ROCKETS. In International Astronautical Congress, 4th, Zurich, 1953. Space Flight Problems, p. 71-74, Biel-Bienne, Switzerland, Laubscher, 1953.

Describes a method by which position can be determined to 1 part in 10⁷ and velocity to 1 part in 10⁴ for interplanetary journeys such as that from Earth to Mars.

289
Haber, Heinz. THE CONCEPT OF MISSILE WEIGHT. Aero Dig. 66: 86-88, illus., Apr. 1953.

Haber suggests that the true weight of a missile or space ship should be the summation of the gravitational force and the inertial force on the body.

290
Haber, Heinz. MAN IN SPACE. 291 p., Indianapolis, Bobbs-Merrill, 1953.

This book is primarily concerned with the human problems involved in artificial satellites and space stations.

291
Hope-Jones, E.F. PLANETARY ENGINEERING. Brit. Interplan. Soc. J. 12:155-159, Jly. 1953.

Power sources for artificial satellites are briefly considered.

292
International Astronautical Congress, 4th, Zurich, 1953. SPACE FLIGHT PROBLEMS, BEING A COMPLETE COLLECTION OF ALL LECTURES. 224 p., illus., Biel-Bienne, Switzerland, Laubscher, 1953.

See also entries for Bottema, Cardozo, Casiraghi, Crocco, Dixon, Golay, Kooy, Krause, Langenecker, Neat, Rosen, Singer, Stehling, Von Braun.

293
Ketchum, H.B. NAVIGATIONAL CALCULATIONS IN SPACE FLIGHT (INVESTIGATION OF THE EFFECT OF THE PRECISION OF ASTRONOMICAL DATA) PART I - PLANETARY ORBITAL DISTANCES. J. Space Flight 5:1-8, Apr. 1953.

Deals with the effect of the precision of astronomical data upon calculating planetary orbital distances.

294
Ketchum, H.B. NAVIGATIONAL CALCULATIONS IN SPACE FLIGHT (INVESTIGATION OF THE EFFECT OF THE PRECISION OF ASTRONOMICAL DATA) PART II - PLANETARY ORBITAL VELOCITIES AND GRAVITATIONAL FIELDS, AND THE GRAVITATIONAL FIELD OF THE SUN. J. Space Flight 5:1-8, figs., Sept. 1953.

Deals with the uncertainties in the planetary orbital velocities and gravitational fields and the gravitational fields of the sun and the effect of these uncertainties in producing navigational maneuvers not considered heretofore.

295
Ketchum, H.B. NAVIGATIONAL CALCULATIONS IN SPACE FLIGHT (INVESTIGATION OF THE EFFECT OF THE PRECISION OF ASTRONOMICAL DATA) PART III - SATELLITE GRAVITATIONAL FIELDS, ORBITAL VELOCITIES, AND ELEMENTS OF ORBITS. J. Space Flight 5:1-9, Dec. 1953.

The uncertainties in the various satellite orbital elements and velocities, and satellite gravitational fields, due to imprecise astronomical data, are treated.

For Pt. IV, see Item 344.

296
Kooy, J.M.J. ON PLOTTING SMALL THRUOUT SPACE SHIP ORBITS. In International Astronautical Congress, 4th, Zurich, 1953. Space Flight Problems p. 107-114, Biel-Bienne, Switzerland, Laubscher, 1953.

Discusses the forces by which the space ship is acted upon during a trip, mainly the terrestrial attraction, the solar attraction and the attraction of the object planet.

297
Krause, H. STRENGE INTEGRATION DER BEWEGUNGSGLEICHUNG EINER SENKRECHT AUFSTIEGENDEN RAKETE NACH BRENNSCHLUSS IN DER ERDATMOSPHERE. (THE EXACT SOLUTION OF THE EQUATIONS OF MOTION OF A VERTICALLY ASCENDING ROCKET HAVING ITS ALL-BURNT POINT WITHIN THE ATMOSPHERE). In International Astronautical Congress, 4th, Zurich, 1953, Space Flight Problems, p. 171-180, Biel-Bienne, Switzerland, Laubscher, 1953.

In German

• Assumes an exponential atmospheric density with height and a mean value for the gravitational acceleration and allows the drag coefficient to vary with velocity. Brit. Interplan. Soc. J. 16:319, Jan./Feb. 1958.

298
Langenecker, B. ZUM PROBLEM DER RATIONELLEN THERMOELEKTRISCHEN STROMERZEUGUNG IM EXTRATERRESTRISCHEN AUFGABENBEREICH. (ON THE PROBLEM OF A PRACTICAL THERMOELECTRIC CURRENT GENERATOR FOR EXTRA-TERRESTRIAL APPLICATIONS.) In International Astronautical Congress, 4th, Zurich, 1953, Space Flight Problems, p. 181-188, Biel-Bienne, Switzerland, Laubscher, 1953.

In German

An account of the principles of thermoelectricity and their application.

299
Lawden, D.F. ESCAPE TO INFINITY FROM CIRCULAR ORBITS. Brit. Interplan. Soc. J. 12:68-71, Mar. 1953.

Includes a consideration of final velocity, using a minimum of fuel.

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300
Lawden, D.F. MINIMAL ROCKET TRAJECTORIES. Am. Rocket Soc. J. 23:360-367, 382, figs., Nov./Dec. 1953.

The problem of the navigation of a rocket vehicle between two fixed terminals in space, in such a manner as to minimize the fuel expenditure, is analyzed in a general fashion, account being taken of a gravitational field, variable in space and time. The theory is applied to the special case of the optimal transfer of a rocket between two coplanar elliptical orbits about a center of attraction.

301
Leonard, J.N. FLIGHT INTO SPACE. THE FACTS, FANCIES, AND PHILOSOPHY. 307 p., New York, Random House, 1953.

Theories of space flight, some fact and some speculative, are discussed.

302
Ley, Willy. ATTACK ON THE THIRD DIMENSION. Sky and Telescope, 12:56, Jan. 1953.

From a talk given at the Second Symposium on Space Travel at the Hayden Planetarium, October 13, 1952.

Compares a trip into space with Columbus' trip across the ocean.

303
Mur Vilaseca, Tomas. LA ASTRONAUTICA. QUE DEBEMOS PENSAR ACERCA DE LA POSIBILIDAD DE LOS VIAJES POR EL ESPACIO? (ASTRONAUTICS. WHAT OUGHT WE TO KNOW ABOUT THE POSSIBILITY OF VOYAGES THROUGH SPACE?) Rev. Obras Publicas 101:269-279, illus., June 1953.

In Spanish

Survey of astronautics, including propulsion of a space vehicle, historical outline, fundamental equations of the rocket, the space station, and the trip to the moon.

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304 National Bureau of Standards, Washington, D.C. TABLES FOR ROCKET AND COMET ORBITS, by Samuel Herrick. 100 p., Washington, U.S. Government Printing Office, 1953. (NBS. Applied Math. Ser. 20)

305 Neat, W.N. SOME LIMITING FACTORS OF CHEMICAL ROCKET MOTORS. In International Astronautical Congress, 4th, Zurich, 1953, Space Flight Problems, p. 140-151, Biel-Bienne, Switzerland, Laubscher, 1953.

A general review of the factors concerned in the application of rocket motors to interplanetary flight. Concludes that Earth-to-Moon return journeys are impractical within foreseeable development of the chemical rocket.

Similar article with same title appears in Brit. Interplan. Soc. J. 12:249-274, Nov. 1953.

306 Newell, H.E., Jr. HIGH ALTITUDE ROCKET RESEARCH. 298 p., illus., New York, Academic Press, 1953.

The principles of upper-air rocket research which have been published in the open literature during the past six or seven years.

307 Rosen, M.W. and Snodgrass, R.B. MARGIN FOR ERROR. In International Astronautical Congress, 4th, Zurich, 1953, Space Flight Problems, p. 60-62, Biel-Bienne, Switzerland, Laubscher, 1953.

Three proposals for satellite launching rockets are critically examined.

308 Ross, H.E. WIDE PEACE USE SEEN FOR EARTH SATELLITE. Aviat. Wk. 58:39-40, Apr. 27, 1953.

Discusses variety of uses for earth satellite.

309 Schütte, Karl. DIE BAHNBESTIMMUNG AUS DEM VEKTOR DER BAHNGESCHWINDIGKEIT UND DER EINFLUSS EINER ÄNDERUNG DESSELBEN AUF DIE BAHNELEMENTE. (DETERMINATION OF THE ORBIT BY THE VECTOR OF THE VELOCITY AND THE INFLUENCE OF ITS VARIATION ON THE ORBITAL ELEMENTS). Weltraumfahrt 4:98-109, Oct. 1953.

In German

A new method to determine the orbital elements by the velocity vector. May be applied to the determination of the orbits of rockets and stars.

Paper given at Fourth International Astronautical Congress, Zurich, Aug. 3-8, 1953.

310 Singer, S.F. A MINIMUM ORBITAL INSTRUMENTED SATELLITE - NOW. In International Astronautical Congress, 4th, Zurich, 1953. Space Flight Problems, p. 136-139, Biel-Bienne, Switzerland, Laubscher, 1953.

The author tells what constitutes a minimum satellite vehicle, and discusses problems of the solar radiations, and application of the satellite to the study of the sun.

Also in Brit. Interplan. Soc. J. 13: 74-79, Mar. 1954; and in Carter, L.J. ed. Realities of Space Travel. Selected papers of the British Interplanetary Society, p. 80-86, London, Putnam, 1957.

311 Slater, A.E. SPACE FLIGHT CONGRESS. Aeroplane 85:230-231, Aug. 21, 1953.

Summaries of 46 papers delivered at the Fourth International Astronautical Congress, Zurich, 1953.

312 Stehling, K.R. EARTH SCANNING TECHNIQUES FOR A SMALL

ORBITAL ROCKET VEHICLE. In International Astronautical Congress, 4th, Zurich, 1953. Space Flight Problems, p. 63-70, Biel-Bienne, Switzerland, 1953.

Compares radar and optical methods of detecting targets such as industrial plants from a satellite weighing 1,000 lb. in orbit at 500 miles height.

313 Sutton, G.P. ROCKETS BEHIND THE IRON CURTAIN. Am. Rocket Soc. J. 23:186-191, May/June 1953.

Reviews work done in USSR on rocket development, rocket motors and satellite vehicles.

314 SYSTEM STUDY URGED FOR SATELLITE. Aviat. Wk. 58:155, Mar. 2, 1953.

A study of the value of satellites is urged by Wernher Von Braun.

315 Thuring, Bruno. ÜBER DIE BEDEUTUNG DER MODERNEN PROGRAMM-GESTEUERTEN GROSSRECHENMASCHINEN FÜR DIE WELTRAUMFORSCHUNG. (ON THE IMPORTANCE OF MODERN COMPUTERS FOR SPACE RESEARCH). Weltraumfahrt 4:110-115, Oct. 1953.

In German

Description of computing machines and examples of application to space flight.

316 Tsieng, H.S. TAKE-OFF FROM SATELLITE ORBIT. Am. Rocket Soc. J. 23:233-236, Jly./Aug. 1953.

Characteristic velocity for the take-off of a space-ship from the satellite orbit is computed for radial thrust and circumferential thrust conditions. The latter is the more efficient method.

For comments by K.A. Ehrlicke, see Item 282.

317 Von Braun, Wernher (with Ryan, Cornelius). THE BABY SPACE

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STATION. Collier's 131:33-35, illus., June 27, 1953.

Describes a small orbit vehicle circling about the earth for 60 days, at 200-mile altitude before residual air drag brings it back to the earth's surface, to burn up like a meteor.

An illustration depicts one of 20 field stations scattered around the world, which will track the satellite and receive the reports it transmits by telemeter and TV.

318 Von Braun, Wernher, Whipple, F.L. and Ley, Willy. CONQUEST OF THE MOON, edited by Cornelius Ryan. 126 p., illus., New York, Viking, 1953.

This book was developed from a scientific symposium which appeared in Collier's magazine under the title "Man on the Moon". It tells how we will make the trip to the moon, what we will do when we get there, and how we will return. The purpose is to show that a lunar voyage is possible by applying the basic engineering knowledge and technical ability available to us.

319 Von Braun, Wernher. THE EARLY STEPS IN THE REALIZATION OF THE SPACE STATION. Brit. Interplan. Soc. J. 12:23-26, Jan. 1953.

Suggests what steps should be taken in planning and development of a man-made moon.

320 Von Braun, Wernher. THE MARS PROJECT. 90 p., Urbana, University of Illinois Press, 1953.

English version of DAS MARS-PROJEKT.

Consists, mainly, of tables with some connecting explanations, particularly concerning assumptions demonstrating how a flight to Mars may be achieved. Main topics are the three-stage ferry vessels used to establish a space station, building the space ships, the landing boats, some data on orbits, power plant

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performance and radio communications.

321 Von Braun, Werner. SPACE SUPERPRIORITY. Ord. 37:770-775, illus., Mar. 1953.

Review of military applications of the space station. Emphasized are uses as observation posts and as missile launching sites. The low vulnerability of the space station is mentioned.

322 Von Braun, Werner. WE NEED A COORDINATED SPACE PROGRAM. In International Astronautical Congress, 4th, Zurich, 1953. Space-Flight Problems, p. 206-211, Biel-Bienne, Switzerland, Laubscher, 1953.

Urges the consideration of the unmanned satellite rocket in our overall development and research plan.

323 Whipple, F.L. ASTRONOMY FROM THE SPACE STATION. Sky and Telescope 12:151, Apr. 1953.

The discussion is confined to astronomical problems, such as location of an observatory; technological problems concerning instruments; spectroscopic techniques; solar research, etc.

Also in Brit. Interplan. Soc. J. 12: 1-3, Jan. 1953.

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324 Anderton, D.A. SPACE EXPERTS OUTLINE TARGETS. Aviat. Wk. 60:34-36, 38, 40-41, Jan. 18, 1954.

Review of papers given at American Rocket Society space flight symposium.

325 Boyd, R.L.F., Seaton, M.J. and Massey, H.S.W. ROCKET EXPLORATION OF THE UPPER ATMOSPHERE. 376 p., New York, Interscience Publishers, 1954.

Papers included in this volume were read at a conference arranged by the Upper Atmosphere Research Panel of the United States and by the Gassiot Committee of the Royal Society of London.

Issued as special supplement (VI. 1) to the Journal of Atmospheric and Terrestrial Physics.

326 Caidin, Martin. RED STAR IN SPACE. Astronautics 1:8-9, 33, Fall 1954.

Possibility of a Russian artificial satellite.

327 Caidin, Martin. ROCKETS BEYOND THE EARTH. 304 p., New York, McBride, 1954.

Stations in space are discussed.

328 Cleator, P.E. INTO SPACE. 160 p., New York, Crowell, 1954.

Man-made moon, p. 127-131.

329 • Cleaver, A.V. A PROGRAMME FOR ACHIEVING INTERPLANETARY FLIGHT. Brit. Interplan. Soc. J. 13:1-27, Jan. 1954.

The various phases of research and development which must be traversed before interplanetary flight can be achieved are discussed. Phase I is considered as extending to the establishment through military sponsorship of unmanned satellite rockets, orbiting the Earth with telemetering equipment and automatic instruments.

Also in Carter, L.J. ed. Realities of Space Travel. Selected Papers of the British Interplanetary Society, p. 335-368, London, Putnam, 1957.

330 Conn, W.M. A NOTE ON THE UTILIZATION OF RADIANT ENERGY FROM THE SUN IN ROCKETS. Am. J. Phys. 22:341, May 1954.

The method is initially proposed as a supplementary propulsive device for interplanetary rockets.

It is stated that no streamlining of the collector for solar energy would be required in the case of rocket or satellite stations intended to remain in space for long periods of time.

331 Crocco, G.A. THE CRUCIAL PROBLEM IN ASTRONAUTICS: RECOVERY OF MULTISTAGE VEHICLES. Jet Propul. 24:313-315, Sept./Oct. 1954.

Deals with the problem of high-speed descent through the atmosphere and suggests means of avoiding destructively high temperatures.

332 Crocco, G.A. QUESITI SUI MISSILE GEODETICI (SOME PROBLEMS OF GEODETIC MISSILES). L'Aerotecnica 34:59-71, Apr. 1954.

In Italian

Possibility of military use of orbital stations.

333 Cross, C.A. ORBITS FOR AN EXTRA-TERRESTRIAL OBSERVATORY. Brit. Interplan. Soc. J. 13: 204-207, Jly. 1954.

Discusses ideal site for space station observatory.

334 Dryden, H.L. SUPERSONIC TRAVEL WITHIN THE LAST TWO HUNDRED YEARS. Sci. Mon. 78:289-295, illus., May 1954.

A review of progress leading to the development of the V-2 rocket in Germany.

335 Durant, F.C. SPACE FLIGHT NEEDS ONLY MONEY, TIME. Aviat. Wk. 61:46, illus., Sept. 27, 1954.

Reviews some of the papers given at the fifth annual congress of the International Astronautical Federation. Mentions those by Sanger-Bredt, Sanger and Stuhlinger.

336 Ehrlicke, K.A. A NEW SUPPLY SYSTEM FOR SATELLITE ORBITS -

37

PARTS I and II. Jet Propul. 24:302-309, Sept./Oct.; 369-373, Nov./Dec. 1954.

The subject of orbital supply is investigated stressing the engineering possibilities for improving the economic aspects of orbital operations and space flight. The existence of optimum satellite orbits for departure and arrival of interplanetary expeditions is demonstrated analytically. Examples of guided supply vehicles and passenger ships are presented. Their take-off weight and pay-load capacity serve to illustrate the effect of supply requirements on the over-all supply efforts.

337 Ehrlicke, K.A. SATELLITE ORBITS FOR INTERPLANETARY FLIGHT. Jet Propul. 24:381-382, Nov./Dec. 1954.

Concerns the energy equation for entering an elliptic orbit around the sun.

This is a supplementary comment on the author's previous paper, (A New Supply System for Satellite Orbits). It is indicated that the use of two impulse periods may provide superior fuel economy for space ships escaping a planet.

For comments by Lawden, see Item 347.

338 Fieck, SPACE FLIGHT AS AN AERODYNAMIC PROBLEM. Weltraumfahrt 5, Oct. 1954.

In German. Not examined.

Aerodynamic problems of high speed flight with specific reference to wings at high mach numbers. It is shown that a normal aircraft plan form might be the best shape under these conditions.

339 Gatland, K.W. DEVELOPMENT OF THE GUIDED MISSILE. 2nd ed., 292 p., illus., New York, Philosophical Library, 1954.

A semi-technical review including a chapter on space-satellite vehicles.

38

340
Gatland, K.W. PROGRESS TOWARDS
ASTRONAUTICS. Brit. Interplan.
Soc. J. 13:142-166, May 1954.

Brief note is included on a 3-step
unmanned rocket satellite to circle
earth at distance of 200 miles, and
the economics of satellites.

341
GROWING INTEREST IN SPACE
TRAVEL. A REPORT ON THE
FIFTH INTERNATIONAL ASTRO-
NAUTICAL CONGRESS, INNSBRUCK,
AUSTRIA, August 1-7, 1954. Aero.
Eng. Rev. 13:67-68, Nov. 1954.

Brief notes of 32 papers delivered
during the congress.

342
Hirst, W.P. SPACE TRAVEL. Astron.
Soc. S. Afr. Mon. Notes 13:92-95,
1954.

Survey of artificial satellites.

343
Hoover, G.W. INSTRUMENTATION
FOR SPACE VEHICLES. Paper
presented at ninth annual meeting of
American Rocket Society, New York,
Nov. 30-Dec. 3, 1954. (ARS Paper
157-54).

Instrumentation for space vehicles
can be divided into two categories:
research instrumentation, or the
measurement of scientific phenom-
ena; and instrumentation for control
and orientation of a manned vehicle.
Discussion of quantities to be meas-
ured and units of measurement.

344
Ketchum, H.B. NAVIGATIONAL CAL-
CULATIONS IN SPACE FLIGHT
(INVESTIGATION OF THE EFFECT
OF THE PRECISION OF ASTRO-
NOMICAL DATA) PART IV. THE
ASPECTS OF ATMOSPHERIC FRIC-
TION (THE EARTH'S ATMOSPHERE).
J. Space Flight 6:1-8, June 1954.

For Parts I, II, and III, see Items
293, 294, and 295.

345
Langton, N.H. THE MECHANICAL
PENETRATION OF BUMPER

SCREENS. Brit. Interplan. Soc. J.
13:283-294, Sept. 1954.

Penetration of different materials
by an iron or stone meteorite is in-
vestigated theoretically, tables and
graphs showing the penetrations for
different sized meteorites at varying
impact velocities being given.

346
LaPaz, Lincoln. ADVANCES OF THE
PERIGEE OF EARTH-SATELLITES
PREDICTED BY GENERAL RELA-
TIVITY. Astron. Soc. Pac. Publ.
66:13-18, Feb. 1954.

A suggestion for using earth satel-
lites for testing the predictions of
general relativity.

347
Lawden, D.F. "COMMENT ON ABOVE."
Jet Propul. 24:381, Nov. 1954.

Comment on Ehrlicke's "Satellite
Orbits for Interplanetary Flight"
(Item 337). Lawden says that "his
paper on the two impulse method
which Ehrlicke studied, indicates that
no optimum radius exists for a satel-
lite orbit, but rather the largest
practical radius is best. Ehrlicke's
selection of an optimum orbit is
really only the transition zone orbit
at which a two impulse firing sched-
ule becomes more efficient than the
single impulse." J. Space Flight
7:13, Mar. 1955.

348
Lawden, D.F. ENTRY INTO CIRCU-
LAR ORBITS - II. Brit. Interplan.
Soc. J. 13:27-32, figs., Jan. 1954.

The problem of navigating a rocket
approaching a planet from a great
distance, into a circular orbit about
the planet with minimum fuel ex-
penditure, is analysed. Effects of
varying the line of approach and the
radius of the circular orbit are
discussed.

For Part I see Item 160.

349
Lawden, D.F. FUNDAMENTALS OF
SPACE NAVIGATION. Brit. Inter-
plan. Soc. J. 13:87-101, Mar.
1954.

Conditions to be satisfied by a
rocket trajectory connecting two
terminal points, if the fuel expendi-
ture is to be a minimum, are given
for the general case of an arbitrary
gravitational field.

350
Lawden, D.F. PERTURBATION MA-
NEUVERS. Brit. Interplan. Soc. J.
13:329-334, Nov. 1954.

The calculation of the velocity in-
crement induced in a spaceship due
to its attraction by a large moving
body and without expenditure of fuel
is explained. Such a perturbation
maneuver is seen as a means of
economizing in the fuel requirement
of an interplanetary journey.

351
Lawden, D.F. STATIONARY ROCKET
TRAJECTORIES. C.J. Mech. & Appl.
Math. 7:488-504, Dec. 1954.

Conditions to be satisfied by a
rocket trajectory joining two speci-
fied terminals in space, if it is to be
stationary relative to fuel expendi-
ture, are calculated.

352
Leyson, B.W. MAN, ROCKETS AND
SPACE. 188 p., New York, Dutton,
1954.

Ch. 5, Plans for the conquest of
space; Ch. 6, Is space travel pos-
sible?

353
Logie, J. EFFECT OF TIDAL FRIC-
TION ON A NEAR SATELLITE.
Brit. Interplan. Soc. J. 13:170-175,
May 1954.

Discusses the effect of tidal friction
on an artificial satellite.

A space station revolving around the
earth at lower than 1000 miles would
need powerful engines to sustain it
as otherwise tidal action will bring
it down to earth in a few months
through friction.

354
Lyapunov, B.V. RAKETA - RAKET-
NAYA I REAKTIVNAYA. (ROCKETS -
ROCKET PROPULSION AND

REACTION AVIATION). 128 p.,
Moscow, Military Publishing House
of the Department of Defense,
U.S.S.R., 1954.

Translation from the Russian.

"The creation of tactical rockets, de-
velopment of rocket weapons, design
and use of rocket engines, applica-
tion of rockets as a scientific tool,
and the conquest of interplanetary
space are reviewed." Nuclear Sec.
Abs. 12:5136, Apr. 30, 1958.

355
Massachusetts Institute of Technology.
Instrumentation Laboratory, Cam-
bridge, Mass. KINEMATIC AND
GEOMETRIC RELATIONS ASSOCI-
ATED WITH MOTION OF A VEHI-
CLE OVER THE EARTH, by
Ephraim Weiss, 59 p., Mar. 1954.
(Rpt. 68)

356
MOUSE (MINIMUM ORBITAL UN-
MANNED SATELLITE OF THE
EARTH). Sky and Telescope 14:15,
17, 1954.

Details of satellite carrying 50 Kg.
pay-load at 320 km. altitude.

357
Nicoll, N.R. DESIGN OF THE LIFE
COMPARTMENT NECESSARY FOR
SPACE TRAVEL. Brit. Interplan.
Soc. J. 13:277-282, Sept. 1954.

The composition of the life com-
partment of a spaceship is dealt
with and an overall weight of under
one ton is developed as being real-
istic. The compartment is of
double-wall construction, containing
equipment for atmosphere control,
variations in g and other necessities
for the survival of a crew of thirteen
for 15 days.

358
Oberth, Hermann. MENSCHEN IM
WELTRAUM: NEUE PROJEKTE
FUERRAKETEN UND RAUMFAHRT.
(MEN IN SPACE: A NEW PROJECT
FOR ROCKETS AND SPACE
FLIGHT). 256 p., Düsseldorf, Econ-
Verlag, 1954.
In German

39

40

Satellite rockets, space stations, the space mirror and other topics are discussed.
For translation, see Item 1295.

359 Porter, J.G. NAVIGATION WITHOUT GRAVITY. Brit. Interplan. Soc. J. 13:68-74, Mar. 1954.

Small errors in the initial speed and direction of space ships is discussed in relation to the larger errors which these cause in the size and shape of the orbit. It is shown that some form of navigation is essential in space travel and some simple methods are suggested.

360 POWER SUPPLIES FOR AN INSTRUMENT CARRYING SATELLITE. Brit. Interplan. Soc. J. 13:294-296, Sept. 1954.

Refers to four announcements concerning various types of power. Radioactive strontium 90, silicon photocells, and cadmium-nickel KOH batteries are mentioned.

361 Richardson, R.S. EXPLORING MARS. 261 p., New York, McGraw-Hill, 1954.

How flights to the various planets may be accomplished and an account of present-day knowledge of the planet Mars.

362 Romick, D.C., Knight, R.E. and Van Pelt, J.M. A PRELIMINARY DESIGN STUDY OF A THREE-STAGE SATELLITE FERRY ROCKET VEHICLE WITH PILOTED RECOVERABLE STAGES. n.p., New York, American Rocket Society, 1954. (ARS Preprint no. 186-54.)

Paper presented at the ninth annual meeting of the American Rocket Society, New York, Nov. 30-Dec. 3, 1954. Not examined.

"An extensive preliminary design study of a large 9,000 ton, three-stage satellite vehicle having recoverable stages. Each stage would be winged and have an auxiliary propulsion system for use after re-entry into the atmosphere following

jettisoning at burnout. This system was compared to other proposals namely, (a) simple jettisoning of spent stages and (b) the system based on recovery of spent stages by parachute drop into large water areas and subsequent recovery by ship. The design study indicates feasibility of the system and suggests operational, logistical, and other advantages using piloted recovery stages. The size used in this study was determined for reasons of efficiency and the desire to place a payload of about 40 tons on the 500 mile orbit. Considerable effort was involved in this study with the following phases being considered; structural design, weight and balance; rocket propulsion performance; aerodynamics; stability and control." J. Astronautics 2:78, Summer 1955.

For comment on paper of same subject and similar title see Stelling, K.R. "Space Flight Notes, Astronautics." Jet Propul. 26:115, Feb. 1956.

363 Sanger, Eugen. STOFFGLIEDERUNG DER RAUMFAHRTFORSCHUNG. (CLASSIFICATION SYSTEMS FOR SPACE FLIGHT). Weltraumfahrt 5:60-61, Apr. 1954.

In German
Comparison of systems in use by various astronomical societies and proposed systems.

364 Shepherd, L.R. POSSIBLE COSMIC RAY HAZARDS IN SPACE FLIGHT. Phila. Astronaut. Soc. Bull. 2:115-120, June 1954.
Surveys the potential hazard to manned space flight due to cosmic rays.

365 Singer, S.F. ASTROPHYSICAL MEASUREMENTS FROM AN ARTIFICIAL EARTH SATELLITE. In Boyd, R.L.F. and Seaton, M.J. eds. Rocket Exploration of the Upper Atmosphere, p. 368-370, diags., London, Pergamon Press, 1954.

The possibilities are discussed of using an artificial satellite for the study of solar ultraviolet and X-rays; the primary cosmic radiation; and solar corpuscular streams.

366 Singer, S.F. MOUSE (MINIMUM ORBITAL UNMANNED SATELLITE OF THE EARTH.) Ciel & Terre 70:393-400, 1954.

In French. Not examined.

Details of satellite carrying 50 kg. payload at 320 km. altitude.

367 Singer, S.F. ORBITS AND MINIMUM LIFETIMES OF SATELLITE VEHICLES. n.p., New York, American Rocket Society, 1954. (ARS Preprint 160-54.)

Paper presented at the ninth annual meeting of the American Rocket Society, New York, Nov. 30-Dec. 3, 1954.

General characteristics of proposed minimum satellite vehicle MOUSE, power supply to be obtained from solar batteries. Expected lifetime is less than 100 days, permitting upwards of 1,500 complete revolutions around the earth.

368 Smith, R.A. and Clarke, A.C. THE EXPLORATION OF THE MOON. 112 p., illus., New York, Harper, 1954.

A profusely illustrated book. Part I is entitled, On the Frontier of Space; and Part II is To the Moon.

369 Stanyukovich, Kirill. TRIP TO THE MOON - A RUSSIAN VIEW. Aviat. Wk. 61:36-38, Aug. 30, 1954.

A translation of an article appearing in a Russian periodical. It criticizes the use of a space station for military advantage.

370 Stelling, Kurt. HIGH ALTITUDE LAUNCHING OF A SMALL ORBITAL VEHICLE. 18 p., New York, American Rocket Society, 1954. (ARS Preprint 187-54.)

Paper presented at the ninth annual meeting of the American Rocket Society, New York, Nov. 30-Dec. 3, 1954.

Indicates that launching of a rocket from a balloon offers an advantage in missile weight and cost, particularly for high acceleration rate vehicles, through the reduction of aerodynamic drag.

371 Sterling, G.E. UTILIZATION OF RADIO FREQUENCIES IN CONNECTION WITH ROCKETS. Jet Propul. 24:322-323, Sept./Oct. 1954.

Discusses technical and political problems of communications with artificial satellites.

372 Stone, Irving. MARTIN TEAM PUSHES ANTIGRAVITY STUDY. Aviat. Wk. 61:42-44, 46, 48, illus., Oct. 18, 1954.

Among projects of the Advance Design Department are the space ship and a satellite vehicle.

373 Story, Vincent. REVIEW OF RECENT ARTICLES ON RELIABILITY. J. Space Flight 6: Jan. 1954.

Not examined.

It is pointed out that parallel arrangement of components or factors gives greater reliability than series arrangement. It is impossible to have complete duplication of controls, propulsion system, etc. in a space ship but without any duplication space ship reliability is only 73%. By duplicating control systems we increase this to 80% and by duplicating both control and guidance systems we get 87%.

374 Sutton, G.P. EVALUATION OF RUSSIAN ROCKET DEVELOPMENTS. Brit. Interplan. Soc. J. 13:262-268, Sept. 1954.

Comment on implications of a Russian satellite program.

Paper presented at third Space Travel Symposium, May 1954.

375 Symposium on Space Travel, 3rd, at the Hayden Planetarium, American

41

42

Museum of Natural History, May 4, 1954. NEWS RELEASES. v.p., 1954.

Includes releases of talks as follows: Astronautics - the Historical Prospective, by A.C. Clarke; Evaluation of Russian Rocket Developments, by G.P. Sutton; The MOUSE - a Minimum Orbital Unmanned Satellite of the Earth for Astrophysical Research, by S.F. Singer; A National Space Flight Program, by R.C. Truax; Observing the Weather From a Satellite Vehicle, by Harry Wexler. See also under authors - Sutton, and Wexler.

376 Thomas, L.H. THE VULNERABILITY OF SATELLITE VEHICLES TO COUNTERMEASURES. *Jet Propul.* 24:321-322, Sept./Oct. 1954.

Suggests that a satellite vehicle could be rendered useless by exploding a warhead containing small shot in a counter-orbit. The shot would have an attack velocity of twice orbital velocity.

377 Thuring, Bruno. COMPENSATION FOR PATH DEVIATIONS BY CONTINUOUS ROCKET THRUST. *Welt-raumfahrt* 5: Oct. 1954.

In German. Not examined.

Method of compensating the flight path of a spaceship for the perturbations of heavenly bodies. Specific examples are given.

378 Venter, J. SPACE FLIGHT AND ROCKET PROPULSION. I, THERMODYNAMICAL NOTIONS APPLICABLE TO CHEMICAL ROCKET PROPELLANTS. *S. Afr. Interplan. Soc. J. p. 51-64, Oct./Dec. 1954.*

For Parts III and IV, see Item 504.

Analysis of fundamental problems related to forms, transformation, and potentialities of energy, includes design and construction data for the supply system to the combustion chamber to feed the rocket motor with oxidizer and fuel at a desired rate to obtain maximum efficiency.

379 Wexler, Harry. OBSERVING THE WEATHER FROM A SATELLITE VEHICLE. *Brit. Interplan. Soc. J.* 13:269-276, Sept. 1954.

Use of satellite vehicles for weather forecasting.

Paper presented at Third Space Travel Symposium, May 1954.

380 Whipple, F.L. WHY CONQUER SPACE? *Astronautics* 1:7, Fall 1954.

Cites reasons for getting a man into space, including astronomical gains from observations from a space station.

1955

381 Aberdeen Proving Ground, Ballistic Research Laboratories, Aberdeen, Md. SCIENTIFIC OBJECTIVES AND OBSERVING METHODS FOR A MINIMUM ARTIFICIAL EARTH SATELLITE, by L.G. deBey, W.W. Berning, D. Reuhl and H.M. Cobb. 162 p., illus., Oct. 1955. (Rpt. 956)

A report of project Orbiter, or project Boxlunch, a study involving instrumenting a minimum satellite vehicle.

382 AMERICA'S MAN-MADE MOON. *Life* 39: 26-27, illus., Aug. 8, 1955.

Announcement of the proposed launching of small, unmanned earth satellites during the International Geophysical Year.

383 Anderson, Jack and Blumenthal, Fred. WILL RUSSIA BEAT US TO THE SATELLITE? *Parade* 16:8-11, illus., May 8, 1955.

Cites published facts to point out the prospects of the Pentagon and the Kremlin "in a grim race to build a rocket to the Moon."

43

384 Anderton, D.A. ROCKET GROUP URGES SATELLITE STUDY. *Aviat. Wk.* 62:28-30, 32, 34, Mar. 28, 1955.

Résumé of recommendations forwarded to the National Science Foundation by the Space Flight Committee of the A.R.S. The utility of a small instrumented artificial satellite to astronomy, biology, astrophysics, meteorology, geodesy and communications are pointed out and a detailed study of these and other uses urged.

385 THE ARTIFICIAL SATELLITE. *Brit. Interplan. Soc. J.* 14:297-299, Nov./Dec. 1955.

Editorial relative to the announcement of the proposed launching of an earth satellite during the International Geophysical Year.

386 Bangs, Scholer. SPACE FLIGHT IS POSSIBLE (BUT WHO'LL PAY FOR IT?) *Interavia* 10:497-501, illus., Jly. 1955.

Comments on possibilities of flight and the value of Walt Disney's film "Man in Space" in directing the attention of the public to the flight equipment needed to probe the space wilderness and problems and sensations which will be encountered.

387 Bergaust, Erik. PRELUDE TO MANNED SPACE FLIGHT. *Pegasus* 24:1-6, Nov. 1955.

Careful planning must precede any space flight attempts.

388 Bleksley, A.E.H. SOME PARADOXES OF INTERSTELLAR TRAVEL. *S. Afr. Interplan. Soc. J.*, p. 49-53, Jly./Sept. 1955.

Not examined.

389 Bolley, Eugene. COMMENTS CONCERNING METEOROLOGICAL INTERESTS IN AN ORBITING UNMANNED SPACE VEHICLE. *Jet Propul.* 25:75, Feb. 1955.

390 Boni, A. ARTIFICIAL SATELLITE, UNIFICATION AND MECHANICS (SIDAR-MECHANICS). *Astronautica Acta* 1:120-126, 1955.

A contribution to the solution of some of the theoretical and technical problems associated with an artificial satellite.

The opportunity of introducing a nomenclature which would indicate the subjects pertaining to artificial satellites is stressed. An example is the word "sidar" from which, according to the author, convenient derivatives can be formed.

391 Bowen, I.S. ASTRONOMICAL OBSERVATIONS FROM A SATELLITE. *Jet Propul.* 25:72, Feb. 1955.

392 Burgess, Eric. ASTRONAUTICS IN COPENHAGEN. *Flight* 68:270-271, Aug. 19, 1955.

Summary of papers given at Sixth International Astronautical Congress, Copenhagen, 1955.

393 Burgess, Eric. FRONTIER TO SPACE. 174 p., London, Chapman and Hall, 1955.

Deals with problems of the unmanned space station and of probing deep into space with unmanned rockets that will be capable of radio-telemetering information.

394 C., A.V. SATELLITE FOR THE STARS AND STRIPES. *Aeroplane* 88:657, May 20, 1955.

A press release from Popular Mechanics indicated that America may have accidentally established the first satellite rocket, through a malfunctioning of a multistage major rocket. The altitude claimed is 800 miles; the time, early 1955.

395 California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif. FEASIBILITY STUDY FOR MINIMUM-WEIGHT RADIO

44

INSTRUMENTATION OF A SATELLITE. Sept. 21, 1955. (Publ. 48)

Not examined.

396 Canney, H.E., and Ordway, F.I., III. SATELLITE VEHICLE FOR COMMUNICATIONS AND NAVIGATION. Aero Dig. 71:40-46, Dec. 1955.

Considers use of a satellite as a communications agency. The problem of ground-to-satellite communications depends on characteristics of satellites, their orbits, radio frequencies used and noise conditions.

397 Clarke, A.C. THE PLANETS ARE NOT ENOUGH. Sat. Rev. 38:11-12, 34-36, Nov. 26, 1955.

The writer enumerates the difficulties confronting those who try to reach other planets but indicates that "sooner or later we will come to the edge of the solar system and will be looking out across the ultimate abyss. We may pause there for centuries, making preparations, gathering our strength. Then we will reach out for the stars."

Discussion in Sat. Rev. 38:23, Dec. 17, 1955; 39:21, Jan. 21, 1956.

Same, abridged with title Space Flight to the Stars. Sci. Dig. 39:37-42, Mar. 1956.

398 Cocca, A.A. DIE RECHTLICHE NATUR DES WELTRAUMS. (THE LEGAL ASPECTS OF SPACE FLIGHT). In International Astronautical Congress, 5th, Innsbruck, Austria, August 5-7, 1954. Report, p. 283-290, Vienna, Springer, 1955.

In German
Discusses limited sovereignty of the sky, freedom of space and simultaneous claims of sovereignty in space.

399 Crocco, G.A. IN ANTICIPATION OF INTERPLANETARY NAVIGATION. Civiltà D. Macch. 3:49-53, May/June 1955.

In Italian. Not Examined.
Some considerations of the earth satellite and the Earth-Mars voyage.

400 Cross, G.A. EXTRA-TERRESTRIAL OBSERVATORIES - THEIR PURPOSE AND LOCATION. Brit. Interplan. Soc. J. 14:137-143, May/June 1955.

Cites disadvantages of observing from earth's atmosphere, and gives immediate and future prospects of observations outside the atmosphere.

401 Durbin, Kenneth. A NEW DESIGN FOR THE SPACE STATION. J. Space Flight 7:1-6, Jan. 1955.

The writer proposes a modification of Von Braun's suggested space station.

402 EARTH SATELLITE. Elec. J. 155:1275, Oct. 14, 1955.

Brief review of information concerning the American, British and Russian rocket programs.

403 EARTH SATELLITE. Sci. 122:322, Aug. 19, 1955.

Brief synopsis of satellite program and of the U.S. IGY program.

404 EARTH SATELLITE VEHICLE. Mech. Eng. 77:894-895, Oct. 1955.

Announcement of IGY earth satellite plans.

405 Ehrlicke, K.A. ANALYSIS OF ORBITAL SYSTEMS. In International Astronautical Congress, 5th, Innsbruck, Austria, August 5-7, 1954, Report, p. 18-58, diags., Vienna, Springer, 1955.

Orbital supply systems are discussed, distinguishing between passenger-carrying and load-carrying orbital vehicles. Desirable features add configurations for observational satellites and for

orbital vehicles are also discussed.

406 Ehrlicke, K.A. ENGINEERING PROBLEMS OF MANNED SPACE FLIGHT. Interavia 10:506-511, Jly. 1955.

The four developmental phases toward interplanetary flight - manned orbital vehicle, permanent satellite, cislunar operations and interplanetary flight - are reviewed.

Includes tables showing steps in (a) research programme for (b) flight into space; (c) return to earth; (d) establishments in space; and (e) interplanetary flight.

407 Ehrlicke, K.A. ON THE DESCENT OF WINGED ORBITAL VEHICLES. Astronautica Acta 1:137-155, diags., 1955.

This paper is concerned mainly with a general velocity altitude relation and its effect on the various external conditions which have a bearing on the heating as well as on the dissipation problem during the descent.

408 Ehrlicke, K.A. ON THE MECHANICS OF DESCENT TO A CELESTIAL BODY. J. Astronautics 2:137-144, Winter, 1955.

Discusses the descent under conditions of departure from great circle flight.

409 ELECTRONICS AIDS SPACE STATION. Electron. 28:7-8, Sept. 1955.

A brief discussion of the Vanguard satellite and some ideas on proposed instrumentation.

410 ELECTRONICS IN THE "BIRDS". Brit. Com. & Electron. 2:78, Nov. 1955.

Some problems in the design of the electronic equipment to be employed in the American IGY earth satellites are discussed.

45

411 Fitzer, E. DIE ENTWICKLUNG HOCHTEMPERATURBESTÄNDIGER WERKSTOFFE FÜR DIE LUFT UND WELTRAUMFAHRT. (DEVELOPMENT OF MATERIALS WHICH ARE RESISTANT TO HIGH TEMPERATURES, FOR AVIATION AND SPACE TRAVEL). In International Astronautical Congress, 5th, Innsbruck, Austria, August 5-7, 1954, Report, p. 190-209, Vienna, Springer, 1955.
In German

412 Forbes, G.F. POWERED ORBITS IN SPACE. Brit. Interplan. Soc. J. 14:85-87, Mar./Apr. 1955.

Presents the powered trajectory equations in a form suitable for differential analyzer solution.

413 Fraenkel, S.J. OUT OF THIS WORLD: ENGINEERING PROBLEMS OF SPACE TRAVEL. Midwest Engr. 8:3-4, 11-14, June 1955.

414 FROM CONTINENT TO CONTINENT. Life 38:28-31, illus., Mar. 7, 1955.

As U.S. reveals intercontinental missile program (Atlas), weapons experts describe rocket Russians may have. This rocket is based on skip-flight idea developed by Irene Sänger-Bredt and Eugen Sänger.

415 GEOPHYSICAL SATELLITE. Sci. Am. 193:68-69, Sept. 1955.

Announcement of United States plans for an earth satellite.

416 Grant, L.J. THE LOCATION OF A PERMANENT ROCKET LAUNCHING STATION. J. Space Flight 7:3-6, Feb. 1955.

Suggests reasons for selecting a site for launching satellite rockets as soon as possible and proposes the east coast of Africa as being ideal.

46

417
GROPING TOWARDS OUTER SPACE.
Bus. Wk., p. 154, Jan. 22, 1955.

Announcement of IGY. Research is turning towards establishment of a space station for permanent long term studies.

418
GUGGENHEIM: MAIL ROCKETS IN FIVE YEARS. Jet Propul. 25:724-732, Dec. 1955.

During a speech receiving Honorary Membership in the American Rocket Society (complete text given) Harry F. Guggenheim predicted that rockets will carry mail from New York to Santiago, Chile within an hour's time.

419
Haley, A.G. INTERNATIONAL CO-OPERATION IN ROCKETRY AND ASTRONAUTICS. Jet Propul. 25: 627-632, Nov. 1955.

In this account of the efforts human beings, private and public associations and governments have made to cooperate in the exchange of ideas and achievements in the fields of rocketry and astronautics, developments concerning the earth satellite project are outlined.

Efforts of the Space Flight Committee of the American Rocket Society which, in its first report, issued in 1952, called for an orbital unmanned satellite project, are traced.

420
HAVE WE SENT A ROCKET INTO SPACE? Popular Mech. 103:109-112, 268, 270, May 1955.

Reports rumor of launching of an earth satellite from the Banana River rocket range in Florida in 1954; also discusses possibilities, proposals and problems connected with space flight.

421
Hoover, G.W. SPACESHIP INSTRUMENT STUDY NEEDED NOW. Aviat. Wk. 62:30, 32, 34, illus., May 2, 1955.

Written by an individual whose work has been primarily that of cockpit simplification, particularly the engineering, this article points out and discusses some of the problems of research and control instrumentation for space vehicles.

422
INTERNATIONAL GEOPHYSICAL YEAR INSTRUMENTED SATELLITE PROGRAM. Natl. Acad. Sci. News Rpt. 5:59-60, Jly./Aug. 1955.

423
Kaeppler, H.J. and Kübler, M.E. DIE RÜCKKEHR VON GEFLÜGELTEN GERÄTEN VON AUSSENSTATIONSBAHNEN. (RETURN OF WINGED DEVICES FROM OUTER STATION PATHS). In International Astronautical Congress, 5th, Innsbruck, Austria, August 5-7, 1954, Report, p. 120-149, Vienna, Springer, 1955.

In German
Solution of the equations for the return of a winged vehicle to the earth from an orbit around the earth.

424
Kaeppler, H.J. UEBER EINE SIMULTANE ANALYTISCHE INTEGRATION DER BEWEGUNGSGLEICHUNGEN EINES GEFLÜGELTEN GERÄTES IM UEBERSCHALLGLEITFLUG. (ON A COMPOSITE ANALYTICAL INTEGRATION OF THE EQUATION OF MOTION OF A FLYING VEHICLE AT SUPERSONIC SPEEDS). Astronautica Acta 1:166-170, 1955.

In German
Supersonic characteristics of satellite vehicles.

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In an address Dr. Kaplan said that hundreds of research vehicles will be launched from locations ranging from the Arctic to the Antarctic. Ten LRP's will be fired with the hope that at least five of them might

establish themselves in orbits at 200-800 miles altitudes.

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Kelly, J.J. EARTH SATELLITES. Weatherwise 8:121-122, Oct. 1955.

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Ketchum, Harold. ORBIT LIFETIMES OF THE U.S. ARTIFICIAL SATELLITES. J. Space Flight 7:1-5, Oct. 1955.

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Discusses present technology in powder metallurgy as applicable to space flight problems.

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Klass, P.J. SOLAR ENERGY COULD DRIVE SPACESHIPS ELECTROSTATIC PLANT. Aviat. Wk. 62:76, 78, 81-82, illus., Apr. 25, 1955.

A report of the IRE symposium on space station problems. Briefly reviews papers by Stuhlinger on the ideal space ship; Pierce on use of the space station as a communications and television relay; and Singer on the space MOUSE.

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Summary of information about the satellite program announced by Dr. James Van Allen and Dr. Martin Summerfield at the joint meeting of the American Rocket Society and the Institute of Radio Engineers.

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Kucherov, I. RADIOUPRAVLYAEMIE RAKETI. (RADIO CONTROLLED ROCKETS.) Radio (USSR) no. 8:50-53, illus., 1955.

In Russian
This report is concerned with the radio control of rocket capable of reaching the moon.

Also issued as Canada. Directorate of Scientific Intelligence, Translation 13, and as p. 31-43 of Rand Corporation, Santa Monica, Calif. A Casebook on Soviet Astronautics, Part II, by F.J. Krieger, June 21, 1957 (RM-1922) (ASTIA Document No. AD133018).

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Langton, N.H. THE THERMAL DISSIPATION OF METEORITES BY BUMPER SCREENS. In International Astronautical Congress, 5th, Innsbruck, Austria, August 5-7, 1954, Report, p. 72-80, Vienna, Springer, 1955.

A theoretical investigation of protecting an artificial satellite from the effects of colliding meteorites.

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LARGER SATELLITES PREDICTED SOON FOR GOVERNMENTS' IGY PROPOSAL. Aviat. Wk. 63:23-24, Aug. 15, 1955.

Outlines uses of a satellite in contrast to a satelloid.

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Lawden, D.F. DYNAMIC PROBLEMS OF INTERPLANETARY FLIGHT. Aero. Q. 6:165-180, Aug. 1955.

Discussion of the problem of transferring a rocket between two terminals in space.

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- 436 Lawden, D.F. OPTIMAL PROGRAMMING OF ROCKET THRUST DIRECTION. *Astronautica Acta* 1:41-56, 1955.

It is deduced that it is advantageous to displace the line of thrust from the direction of motion by a small angle in the sense of the field and steadily to diminish this angle to zero as the maneuver proceeds. This conclusion is tested by considering various methods of escape from a circular orbit, employing a thrust which yields a constant acceleration.

- 437 Lawden, D.F. OPTIMAL TRANSFER BETWEEN CIRCULAR ORBITS ABOUT TWO PLANETS. *Astronautica Acta* 1:89-99, 1955.

The general theory of optimal rocket trajectories is modified into a form convenient for the problem of transfer between circular orbits about two planets.

- 438 Lawden, D.F. OPTIMUM LAUNCHING OF A ROCKET INTO AN ORBIT ABOUT THE EARTH. *Astronautica Acta* 1:185-190, 1955.

Equations are obtained governing the trajectory along which a rocket may be guided into a circular orbit about the earth from a launching point on its surface with a minimum expenditure of fuel. The numerical integration of these equations is discussed.

- 439 Levitt, I.M. GEODETIC SIGNIFICANCE OF A MINIMUM SATELLITE VEHICLE. *Astronautics* 2:1-6, Spring 1955.

It is shown that an unmanned, uninstrumented, nonreturnable satellite vehicle circling the Earth will enable geodesists to determine large distances across the surface of the Earth, especially over bodies of water, which are difficult to measure.

Paper with same title appears in International Astronautical Congress, 5th, Innsbruck, Austria, August 5-7, 1954. Report, p. 255-261, Vienna, Springer, 1955.

- 440 Lukens, L.A. THIS AGE OF MIRACLES, ATOMIC POWER, ELECTRONICS AND SATELLITE VEHICLES. *Mag. Wall St.* 96:684-687, Sept. 3, 1955.

Industrial benefits to be derived from an artificial satellite development program, e.g. development of new fuels and metals.

- 441 Mallan, Lloyd. MEN, ROCKETS AND SPACE RATS. 335 p., New York, Julian Messner, 1955.

The accomplishments in rocket technology, which made possible the announcement of a planned earth satellite, are brought together in terms of the men who are pioneering in the design and testing of rocket ships and are risking their lives as the guinea pigs of space medicine to determine the effects of spaceflight upon human beings.

- 442 MAN-MADE MOON IS PROGRESSING. *Bus. Wk.* 1363:196, 198, Oct. 15, 1955.

Announces administrators and contractors for Project Vanguard.

- 443 Mannal, C. CAN NUCLEAR ENERGY DRIVE INTERPLANETARY ROCKETS? *Gen. Elec. Rev.* 58:49-52, May 1955.

Survey of atomic power plants, including their operating temperatures, heat removal, control, shielding, and refueling in order to draw conclusions concerning applicability of such power plants to rockets; fundamentals of fusion, fission, and nuclear reactors; biological problems; nuclear waste disposal; fuel recovery; propulsion engine efficiency; interplanetary problems.

- 444 Minnes, C.M. ROCKETS AND RADIO. *Brit. Comm. & Electron* 2:72-73, Nov. 1955.

Predicts that radio and radar techniques will play an important part both in the telemetering of information and in the measurement of ionospheric propagation during rocket and satellite flights.

- 445 Minnesota University. Department of Aeronautical Engineering, St. Paul, Minn. AN ADJUSTABLE STANDARD ATMOSPHERE, WITH APPLICATION TO GRAVITY-PROPELLED BODIES, by R.H. Upson, 51 p., May 1955. (Rpt. Eng. Mem. 43)

High-altitude and rarefied atmospheric research into such problems as aerodynamic drag, change of altitude, and return-to-earth of a space rocket or a satellite body, with calculations based on the fundamental assumption of constant temperature gradient within a given atmospheric layer, taking into account the theory of vertically rising or falling bodies, include detailed measurements of drag in the troposphere and lower stratosphere.

- 446 Moore, Patrick. EARTH SATELLITE. THE NEW SATELLITE PROJECTS EXPLAINED. 128 p., London, Eyre, 1955.

An astronomer presents for the general reader the history of the satellite program, the launching of the satellite from Florida sometime in 1957, and its scientific significance.

American ed. published by Norton, 1956, with title *Earth Satellites*, 157 p., illus., by Irving Geis. Refers on p. 54-55, to "The first official mention of an artificial satellite" by James V. Forrestal in his annual report to Congress on the National Military Establishment, in December 1948.

- 447 Murray, F.J. IONIC AND NUCLEAR PROBLEMS OF ROCKET

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- PROPULSION. IRE Convention Paper, N.Y. Mar. 21-24, 1955, Pt. 10, p. 35-36.

Passenger-carrying vehicles which can attain a satellite status around the earth are usually thought of as rocket-propelled. However, a solution to the problem of air resistance by ionic controlled air flow may permit the development of high-speed air vehicles. The energy requirements may also induce a change in the developments in nuclear power.

- 448 Neufeld, M.J. NUCLEAR MAGNETISM AS SPACE REFERENCE. M.S. Thesis, Massachusetts Institute of Technology, Instrumentation Laboratory, 1955. (T-82)

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The object of this paper is to investigate the magnetic moment of a nucleus and its subsequent motion and orientation in the presence of magnetic fields and to determine as far as possible whether the principles involved may lead to a feasible solution to the problem of acquiring a reliable reference in inertial space.

- 449 Newell, H.E., Jr. and DeVore, Charles. MAN-MADE SATELLITE NEW TOOL FOR SCIENTIFIC RESEARCH. *Signal* 10:17-19, Nov./Dec. 1955.

Value of an uninstrumented satellite, the instrumented satellite as a radio-relay station, and the comparative value of a satellite and a rocket as a data-collecting device.

- 450 Newell, H.E., Jr. THE SATELLITE PROJECT. *Sci. Am.* 193:29-33, illus., Dec. 1955.

Surveyed here are some of the possibilities and limitations facing the designers of "mankind's first leap on the space frontier."

See also item 1292.

- 451 Newell, H.E., Jr. SCIENTIFIC USES OF AN ARTIFICIAL EARTH

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SATELLITE. *Jet Propul.* 25:712-713, illus., Dec. 1955.

Seven possible fields for research in which an earth satellite might be useful are set forward by means of diagrams and captions.

452 NEWS OF SCIENCE, EARTH SATELLITE. *Sci.* 122:322, Aug. 19, 1955.

Announcement of plans for constructing an earth satellite, and its uses.

453 Office of Naval Research, London. THE SIXTH INTERNATIONAL ASTRONAUTICAL CONFERENCE - COPENHAGEN, by J.B. Fenn. 6 p., Sept. 15, 1955. (Tech. Rpt. ONRL-89-55)

"Over 125 delegates from 15 countries listened to twenty papers on various subjects of interest in connection with space travel. The earth satellite has become the center of interest."

Included in the complete list of papers presented are those by: H.E. Newell, Jr. - The Role of Rockets in the International Geophysical Year; and R. Tousey - The Visibility of an Earth Satellite.

454 O'Keefe, John. THE GEODETIC SIGNIFICANCE OF AN ARTIFICIAL SATELLITE. *Jet Propul.* 25:75, Feb. 1955.

455 ON THE UTILITY OF AN ARTIFICIAL UNMANNED EARTH SATELLITE. *Jet Propul.* 25:71-78, Feb. 1955.

A proposal to the National Science Foundation prepared by the A.R.S. Space Flight Committee recommending that the Foundation sponsor a study of the utility of an artificial unmanned satellite. There are six appendices: Astronomical Observations From a Satellite, by I.S. Bowen; Biological Experimentation With an Unmanned Temporary Satellite, by H.J. Schaefer; The Satellite Vehicle and Physics of the Earth's Upper

Atmosphere, by H.E. Newell, Jr.; Comments Concerning Meteorological Interests in an Orbiting Unmanned Space Vehicle, by E. Bolla; The Geodetic Significance of an Artificial Satellite, by J. O'Keefe; and Orbital Radio Relays, by J.R. Pierce. See also under individual authors.

456 Ordway, F.I., III and Canney, H.E. ASTRONAUTICS IN THE UNITED STATES, PT I. *Astronautics* 2:9-13 13, Spring 1955.

Based on a paper presented at the Fifth International Astronautical Congress, Innsbruck, Austria, August 1954.

457 Ordway, F.I., III and Canney, H.E. THE RESPECTABILITY OF ASTRONAUTICS AS REFLECTED BY RECENT DEVELOPMENTS IN THE UNITED STATES. In *International Astronautical Congress, 5th, Innsbruck, Austria, August 5-7, 1954*. Report, p. 226-247, Vienna, Springer 1955.

Traces the activities of various scientific disciplines toward the space flight goal.

458 Partel, G.A. IAF:UTOPIA OR REALITY? In *International Astronautical Congress, 5th, Innsbruck, Austria, August 5-7, 1954*. Report, p. 248-254, Vienna, Springer, 1955.

As a feasible activity of the near future to make the first practical step towards the conquest of space - the author proposes to win the broadcasting and telecasting companies of the Earth for the construction of a small space station which could be destined exclusively for broadcasting and telecasting purposes.

459 Petersen, N.V. THE CONQUEST OF SPACE. *Sperryscope* 13:14-17, 1955.

Describes the MOUSE project and uses to be made of satellites.

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and astronomical problems are discussed.

464 PLANS FOR EARTH SATELLITE ANNOUNCED. *Frank. Inst. J.* 260: 343-344, Oct. 1955.

General announcement of IGY plans.

465 Porter, J.G. SOME PROBLEMS IN SPACE TRAVEL. *Inst. Nav. J.* 8: 224-230, Jly. 1955.

Orbital techniques of rockets and space stations involved in a trip to the moon and other planets.

466 Preston-Thomas, H. TWO ASPECTS OF THE TIME ELEMENT IN INTERPLANETARY FLIGHT. In *International Astronautical Congress, 5th, Innsbruck, Austria, August 5-7, 1954*. Report, p. 150-156, diags., 1955.

Design characteristics of very high powered ion rockets are derived and applied in the case of a flight between Earth and Neptune. It is shown that this requires power conversion units having a power output per unit mass of the order of ten times that of a unit that is adequate for an Earth-Mars rocket.

467 Proell, Wayne. PROBLEMS OF SPACE DEBRIS WITH THE SATELLITE STATION. *J. Space Flight* 7:1-4, Dec. 1955.

The discussion is directed toward calculating the mathematical probability of impact with debris.

468 PROGRESS OF THE EARTH SATELLITE PROGRAM. *Natl. Acad. Sci. News Rpt.* 5:97-98, Nov./Dec. 1955.

Discusses the program's progress and its aims.

469 Rand Corporation, Santa Monica, Calif. SCIENTIFIC USES OF AN ARTIFICIAL SATELLITE, by H.K. Kallmann and W.W. Kellogg. 32 p., June 8, 1955. (Res. Memo 1500)

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Petersen, N.V. GENERAL CHARACTERISTICS OF SATELLITE VEHICLES. *J. Astronautics* 2:41-46, Summer 1955; 105-110, Fall 1955.

Purpose of this paper is to present some of the general characteristics of satellite vehicles orbiting about the earth. Three areas of interest are discussed and illustrated, namely, the characteristics or requirements for effecting transit from the earth's surface to any arbitrary altitude, the maximum viewing time permitted a ground observer in viewing a satellite and the sight line rotational rates relative to ground observation and tracking and the space and time-history plots of the characteristics of the von Braun satellite vehicle.

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Phillips. WHAT'S BECOME OF SPACE TRAVEL. *Intermt. Rocket Soc. Bull.* 1:3, June 1955.

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"The thesis advanced that the primary objectives of space flight are philosophical if undefinable, and that the prime function of amateur rocket societies is to provide the philosophical guidance and incentive for a continued space flight effort." *J. Space Flight* 7:10, Sept. 1955.

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Pierce, J.R. INTERPLANETARY COMMUNICATIONS. *J. Astronautics* 2:75-76, Summer 1955.

Summary of speech given at 1955 meeting of the American Astronautical Society in which Dr. Pierce of Bell Telephone Laboratories indicates that an earth satellite station could provide an excellent radio relay point. (See also next item.)

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Pierce, J.R. ORBITAL RADIO RELAYS. *Jet Propul.* 25:153-157, Apr. 1955.

Aspects of transoceanic communication via a satellite are considered and problems of microwave communication as well as mechanical

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The study consists of three major parts; first, about a dozen major scientific topics are discussed for which information can be obtained only from an artificial satellite; second, uses of this information in the solution of scientific problems are described; third, auxiliary requirements of altitude control, sensing devices, and telemetering equipment are investigated.

Conclusions are presented in a table which shows the type of observations which can be made and the various orientation requirements on the vehicle.

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Redstone Arsenal, Ordnance Missile Laboratories, Huntsville, Ala. EQUATIONS OF MOTION OF SATELLITE IN UPPER REGION OF EARTH'S ATMOSPHERE, by C. A. Lundquist, 14 p., Apr. 18, 1955. (Rpt. 6M64)

Equations of motion of a satellite under the influence of the gravitational field of the earth and a drag force due to air resistance are formulated. Effect of the rotation of the atmosphere is discussed.

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RESEARCH IN THE SPACE AGE. Chem. & Eng. News, 33:3478-3479, illus., Aug. 22, 1955.

Satellite experiments, including some proposed experiments with chemicals, based on an interview with Joseph Kaplan.

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Romick, D.C. BASIC DESIGN PRINCIPLES APPLICABLE TO REACTION-PROPELLED SPACE VEHICLES. In International Astronautical Congress, 5th, Innsbruck, Austria, August 5-7, 1954, Report, p. 81-99, illus., Vienna, Springer, 1955.

This paper develops the fundamental relationships governing the kinetic behavior of ships in free space, along with a method for using them. A sample preliminary design utilizing this method is presented for a 1000-ton, high performance space ship incorporating a linear electronic

accelerator drive, which is also described.

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Romick, D.C. PRELIMINARY ENGINEERING STUDY OF A SATELLITE STATION CONCEPT AFFORDING IMMEDIATE SERVICE WITH SIMULTANEOUS STEADY EVOLUTION AND GROWTH. New York American Rocket Society, 1955. (ARS Preprint 274-55)

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Romick, D.C. A SUGGESTED ORGANIZATION OF SPACE FLIGHT SCIENCES. Astronautica Acta 1: 199-208, 1955.

A suggested organization of component sciences intended to make up the complete field of astronautical sciences, along with a definition, and a brief description and discussion of each, in some cases including a breakdown of the more novel or complex ones into their more elementary components, presented in outline form.

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Rosen, M.W. TWENTY-FIVE YEARS OF PROGRESS TOWARD SPACE FLIGHT. Jet Propul. 25:623-626, Nov. 1955.

Reviews, briefly, the articles written in the era of theory; cites accomplishments during the era of experimentation; mentions formation of the American Interplanetary Society; describes the Wac-Corporal, Aerobee and Viking rockets; and announces plans for the scientific earth satellite.

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Rosen, M.W. THE VIKING ROCKET STORY. 242 p., illus., New York Harper, 1955.

Mentions the satellite as a tool for measuring the earth, weather forecasting, relay station, etc.

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ROUNDTABLE CONFERENCE ON THE VANGUARD SATELLITE, Washington, D.C., Oct. 31, Aero Dig. 71:28-30, Dec. 1955.

Questions and answers from transcription of discussion at symposium dealing with utility and significance of artificial satellites, held in Washington, D.C., Oct. 31, 1955.

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RUSSIAN APPROVES U.S. SATELLITE BUT SAYS HE CAN BUILD A BETTER ONE. Aviat. Wk. 63:33, Oct. 31, 1955.

Quotes from translated version of an article appearing in a semi-monthly Moscow Journal and written by Professor Kirill Stanyukovich.

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Samaras, D.G. NUCLEAR PROPULSION AVIATION'S FUTURE. Can. Aero. J. 1:163-168, Nov. 1955.

Future aviation subdivided into terrestrial, interplanetary or solar, and intragalactic aviation; terrestrial aviation achieved in 1903; interplanetary aviation may be attained by use of nuclear propulsion system; jet propulsion seems satisfactory; intragalactic aviation seems unlikely by known methods of propulsion, however, more advanced methods, such as field interaction propulsion, may give satisfactory results.

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Singer, Eugen. FORSCHUNG ZWISCHEN LUFTFAHRT UND RAUMFAHRT. (RESEARCH IN AIRCRAFT FLIGHT AND SPACE FLIGHT.) Weltraumfahrt 6:12-24, Jan. 1955.

In German

Review of the research required in various branches of physics and chemistry.

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SATELLITE ONLY IN PLANNING STAGE: AIRCRAFT INDUSTRY NOT CONSULTED. Aviat. Wk. 63:14, Aug. 8, 1955.

Brief mention of NSF announcement of the Vanguard satellite plan.

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SATELLITE VEHICLES. Engr. 200: 174, Aug. 5, 1955.

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Concerns announcement of plans for an earth satellite during the IGY.

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SCIENCE: THE BIGGEST DREAMS YET; EARTH-CIRCLING SATELLITE AND RESEARCH ON PEACEFUL USES OF NUCLEAR FUSION. Bus. Wk. 1353:31-32, Aug. 6, 1955.

Refers to announcement of the intended launching of an earth satellite.

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SECRECY IN THE SKY. Sci. 122:322, Aug. 19, 1955.

Discusses editorials praising the satellite program in America as continuing the summit conference tradition of telling the world of our scientific discoveries.

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Seese, R.W. ELECTRIC SPACE SHIP. Coronet 39:116-124, Dec. 1955.

A simple but revolutionary idea, developed by a German-born physicist, Dr. Ernst Stuhlinger, removes major difficulties in outer space flying and brings interplanetary travel closer to reality.

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Shepherd, L.R. BASIC PRINCIPLES OF ASTRONAUTICS. Brit. Interplan. Soc. J. 14:37-44, Jan./Feb. 1955.

An account of the principles of rocket flight in gravitational fields leading up to an assessment of the magnitude of the task of flying to the Moon and the lesser task of setting up orbital rockets.

The satellite vehicle is discussed on p. 43.

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Singer, S.F. APPLICATIONS AND DESIGN CHARACTERISTICS OF MINIMUM SATELLITES. New York, American Rocket Society, 1955. (ARS Preprint 278-55)

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SECRECY IN THE SKY. Sci. 22:322, Aug. 19, 1955.

Discusses editorials praising the satellite program in America as continuing the summit conference tradition of telling the world of our scientific discoveries.

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Seese, R.W. ELECTRIC SPACE SHIP. Coronet 39:116-121, Dec. 1955.

A simple but revolutionary idea, developed by a German-born physicist, Dr. Ernst Stuhlinger, removes major difficulties in outer space flying and brings interplanetary travel closer to reality.

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- 488 Singer, S.F. THE MOUSE. A MINIMUM ORBITAL UNMANNED SATELLITE OF THE EARTH FOR ASTROPHYSICAL RESEARCH. *Astronautics* 2:91-97, Fall 1955.
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- Uses of instrument-carrying satellite and suggested layout for MOUSE.
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- 491 Singer, S.F. STUDIES OF A MINIMUM ORBITAL UNMANNED SATELLITE OF THE EARTH (MOUSE). PART I. GEOPHYSICAL AND ASTROPHYSICAL APPLICATIONS. *Astronautica Acta* 1:171-184, 1955.
- It is the purpose of this paper to present a strong justification for the establishment of a minimum artificial satellite of the earth in terms of the advances it would lead to in our knowledge of the earth's outer atmosphere, of extraterrestrial radiations and their influences on the earth.
- 492 SOVIET SATELLITE PROGRESS HINTED. *Aviat. Wk.* 63:14-15, Aug. 8, 1955.
- A review of the Russian satellite program.
- 493 Stehling, K.R. BALLOON LAUNCHING AN EARTH SATELLITE ROCKET. *Aviat. Age* 24:16-25, illus., Jly. 1955.

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- Reviews proposals concerning space flight which appeared in various journals prior to announcement of plans for launching an earth satellite.
- Historical development is covered; space travel, large space stations, and small earth satellites.
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- This article concerns the work with telescope-cameras by C.W. Tombaugh at Headquarters, Outer Space Control, Lowell Observatory, Flagstaff, Arizona.
- 496 Strong, James. 1G IN ALL DIRECTIONS. *Aeroplane* 88:676, May 20, 1955.
- A half-humorous review of space travel aspects of acceleration. The author believes that space ships should be designed for 1G acceleration and deceleration in spite of fuel economics.
- 497 Strughold, H. WELTRAUMÄQUIVALENTE BEDINGUNGEN INNERHALB DER ERDATMOSPHERE, (SPACE EQUIVALENT CONDITIONS WITHIN THE EARTH'S ATMOSPHERE.) *Weltraumfahrt* 6:2-5, Jan. 1955.
- In German
- This paper discusses the conditions found in space and shows that all these become effective by 200 Km altitude in the earth's atmosphere.
- 498 Stuhlinger, Ernst. ELECTRICAL PROPULSION SYSTEM FOR SPACE

SHIPS WITH NUCLEAR POWER SOURCE. Part I. THEORETICAL CONSIDERATIONS. *J. Astronautics* 2:149-152, Winter 1955.

Principles of electric propulsion systems are investigated, particularly in view of optimum dimensioning of initial mass, total power, and driving voltage.

- 499 Stuhlinger, Ernst. POSSIBILITIES OF ELECTRICAL SPACE SHIP PROPULSION. In *International Astronautical Congress, 5th, Innsbruck, August 5-7, 1955, Report, p. 100-119, illus., Vienna, Springer, 1955.*
- A propulsion system is proposed in which a suitable propellant (cesium or rubidium) is vaporized and ionized at incandescent platinum surfaces. Ions and electrons are accelerated and expelled at equal rates; they recombine immediately after leaving the thrust chambers. The power for the accelerating fields is obtained from turbo-electric generators. Heat source is the sun.
- A space ship with a payload of 50 tons, a total mass of 270 tons, and a total flight time of one year would cover a distance of about $183 \cdot 10^6$ km if started with the velocity zero and traveled through space without gravity fields.
- 500 Tombaugh, C.W. PROPOSED GEODETIC TRIANGULATION FROM AN UNMANNED ORBITAL VEHICLE BY MEANS OF SATELLITE SEARCH TECHNIQUE. *Jet Propul.* 25:232-233, May 1955.
- Outlines a satellite search technique and method and indicates effectiveness and benefit to geodetic triangulation if applied from a small unmanned artificial satellite.
- 501 Townsend, J.W. ELECTRONIC AIDS FOR A SPACE STATION. *Electron.* 28:7-8, Sept. 1955.

In an interview Mr. Townsend emphasizes a number of features which will highlight the likely electronic operations of the small scientific IGY satellite.

- 502 Vaeth, J.G. 200 MILES UP. THE CONQUEST OF THE UPPER AIR. 2nd ed., 261 p., New York, Ronald Press, 1955.
- The whole American program of upper air research relating the program to its latest development, the earth satellite.
- In the last three chapters, the Vanguard program is reviewed.
- 503 Vassey, B. LES SATELLITES ARTIFICIELS, LEUR INTERET POUR L'ETUDE DE L'ATMOSPHERE. (ARTIFICIAL SATELLITES: THEIR IMPORTANCE IN THE STUDY OF THE ATMOSPHERE.) (*La Meteorol.* ser. 4:40:283-290, Oct./Dec. 1955.
- In French, English summary.
- The writer shows that it is necessary for some types of research to have a means of rapid high-altitude exploration along a meridian. It is demonstrated that it is possible to make artificial satellites. Summary report of the American "MOUSE" project.
- 504 Venter, J. SPACE FLIGHT AND ROCKET PROPULSION. Parts III, IV. *S. Afr. Interplan. Soc. J.* p. 41-48, Apr./June; 68-81, Jly./Sept. 1955.
- For Part I, see Item 378.
- 505 VENTURE INTO SPACE. THE CONCEPT, THE OBJECTIVE - AND NOW THE MONEY. *Newswk.* 46:23-26, illus., Aug. 8, 1955.
- The background, the idea and future possibilities for the space satellite announced in August 1955.

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506 Waterman, A.T., Shapley, A.H. and Spilhaus, A.F. ABC'S OF TRAVEL IN SPACE - SATELLITE NOW, MOON NEXT? U.S. News & World Rpt., 41:66-71, Aug. 12, 1955.

507 Zaehring, A.J. and Baker, N.L. SATELLITES. Jet Propul. 25:647-648, Nov. 1955.

Announces the work being done by various companies in building the Vanguard satellite.

508 Zaehring, A.J. SOLID PROPELLANTS AND ASTRONAUTICS. In International Astronautical Congress, 5th, Innsbruck, August 5-7, 1954, Report, p. 13-17, Vienna, Springer, 1955.

It is pointed out that solid propellants compare very favorably with liquid propellants especially for applications in high-altitude rockets and in boosters for space aggregates.

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509 AEROJET ANSWERS VANGUARD CHALLENGE. Rocket News Ltr., 1:94-95, Oct./Nov. 1956.

510 Allward, M.F. THE WORLD OF SPACE. 191 p., Glasgow, Collins Clear-Type Press, 1956.

Non-technical facts about missiles, rockets and space travel.

511 AMERICAN EARTH SATELLITES AND BRITISH ROCKETS. Mach. 89:850, illus., Oct. 12, 1956.

Description of the Vanguard satellite and of the British high-altitude (100 mile) rocket designed by the Royal Aircraft Establishment.

512 Anderton, D.A. GAS DYNAMICS, PART I - KEY TOOL FOR ICBM,

SATELLITE STUDIES. PART II - HYPERSONIC QUEST YIELDS NEW TECHNIQUES. Missile Eng. 1:4-11, illus., Sept. 1956.

A discussion of the two extremes of aerodynamics flow problems - hypersonics (ICBM) and super aerodynamics (IGY satellite).

513 Anderton, D.A. VANGUARD DEPENDS ON TOOLS AND GAGES. Aviat. Wk. 65:50-52, Nov. 5, 1956.

Tools and gages will determine whether the Vanguard will be a satellite or a meteor.

514 Army Signal Corps Engineering Laboratories, Ft. Monmouth, N.J. DEVELOPMENT AND DESIGN OF SOLAR POWER SYSTEMS FOR AEROBEE ROCKET TESTS AND IGY EARTH SATELLITES, by M.A.A. Druesne. Z p., Nov. 1, 1956. (MEB Memo. 57-37)

515 Army Signal Corps Engineering Laboratories, Ft. Monmouth, N.J. THE ENVIRONMENT OF AN EARTH SATELLITE, by R. Griffith, W. Nordberg, and W.G. Stroud. 41 p., diagr., 1956. (Tech Memo 1642)

This report represents an effort to collect in a single volume the basic data relating to the satellite environment during both the launching and the orbit phases. It is a collection of graphs, tables, and other data.

516 Army Signal Corps Engineering Laboratories, Ft. Monmouth, N.J. METEOROLOGICAL MEASUREMENTS FROM A SATELLITE VEHICLE, by W. Nordberg, and W.G. Stroud. 8 p., June 26, 1956. (Memo 1784)

The usefulness of an earth satellite in studying the meteorology of the earth is reviewed. The various levels of information available from the various levels of complexity of instrumentation are

outlined. A specific instrumentation suitable for the initial (IGY) satellites is presented and the basic aspects of the operational problems outlined. It is shown that the necessary orientation information can be obtained from the albedo data.

517 ARTIFICIAL SATELLITE. Time 67: 94, Apr. 23, 1956.

Description of the rocket launching vehicle which will toss the US earth satellite into its orbit, how the launching will take place and how the satellite will finally be placed in its orbit.

518 ARTIFICIAL SATELLITES. Eng. 181: 263, Apr. 27, 1956.

Gives a few general details of the Vanguard satellite.

519 ATOMIC OXYGEN IN ATMOSPHERE AS FUEL SOURCE. Missiles and Rockets 2:24-25, Oct. 1956.

In a speech at the Rome International Astronautical Federation Congress, Sept. 1956, Jerome Pressman told of experiments which point to possible use of atmospheric atomic oxygen as an energy source to power satellite vehicles for reasonably long times at altitudes of about 65 miles.

520 BASIC FACTS ABOUT THE SATELLITE ORBITS. Smithsonian Astrophys. Observ. Bull. for Visual Observers of Satellites 1:3-4, Jly. 1956.

This bulletin also appears in Sky and Telescope 15; insert between pages 408-409, Jly. 1956.

521 Baugh, Barney. NAVY AND IGY: SAILORS, SCIENTISTS AND SATELLITES. All Hands, p. 2-6, May 1956.

Some of the Navy's activities that will contribute to scientific research during the IGY, including the earth satellite program (Project Vanguard).

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522 Baum, W.A. A FUNDAMENTAL COSMOLOGICAL EXPERIMENT FOR THE ARTIFICIAL SATELLITE. Astron. Soc. Pac. Publ. 68:118-120, Apr. 1956.

Information to be sought by means of instruments is brightness and color of the extragalactic sky.

523 Bena. LAUNCHING THE MAN-MADE SATELLITE. Slaboproudny Obzor. 17:640-641, diag., Nov. 1956.

In Czech. Not examined.

From a paper by Milton W. Rosen (Placing the Satellite in its Orbit). See Item 746.

524 Bena. RADIOELECTRIC TRACKING OF THE MAN-MADE SATELLITE AND TRANSMISSION OF SIGNALS. Slaboproudny Obzor. 17:641-643, diag., Nov. 1956.

In Czech. Not examined.

From a paper by John T. Mengel (Tracking the Earth Satellite, and Data Transmission, by Radio). See Item 682.

525 Bennett, W.H. PROPOSED MEASUREMENT OF SOLAR STREAM PROTONS. In Van Allen, J.A. ed. SCIENTIFIC USES OF EARTH SATELLITES, p. 194-197, Ann Arbor, University of Michigan Press, 1956.

The solar protons in their initial approach in free orbits and any protons traveling later in captive orbits can be detected and measured only in the vicinity of the auroral zones of magnetic latitude and an artificial satellite which passes approximately over the two poles of the earth will be needed for this purpose.

526 Bergaust, Erik. PROPULSION IS BIGGEST HEADACHE FOR VANGUARD ENGINEERS. Am. Aviat. 20:44, June 4, 1956.

Liquid fuels.

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527 Bergaust, Erik and Beller, William. SATELLITE. 287 p., illus., New York, Hanover House, 1956.

A general non-technical discussion of the projected program for the launching of earth satellites; their operation, their possible uses and their likely effects on earth.

528 Bergaust, Erik. SATELLITE SCIENCE NOT SO SIMPLE. U.S. MISSILES AND ROCKETS 4:18-19, Nov. 1956.

Includes illustration from a Russian magazine which indicates what the Russian public thought their IGY satellite would look like. It is an exact copy of Dr. S.F. Singer's early (1954) MOUSE.

529 Berning, W.W. IONOSPHERIC STRUCTURE AS DETERMINED BY A MINIMAL ARTIFICIAL SATELLITE. In Van Allen, J.A. ed. Scientific Uses of Earth Satellites, p. 253-262, Ann Arbor, University of Michigan Press, 1956.

Discusses the problems and develops the analytical methods necessary for determining ionospheric electron densities from trajectory measurements.

530 Blitzer, Leon, Weisfeld, M. and Wheelon, A.D. PERTURBATIONS OF A SATELLITE'S ORBIT DUE TO EARTH'S OBLATENESS. J. Appl. Phys. 27:1141-1149, Oct. 1956.

Points up possible use of the U.S. IGY satellites for determining the earth's oblateness to a new precision.

For extension of this paper see Item 913.

531 BRITISH "MOUSE" SATELLITE. Engr. 202:153, Aug. 3, 1956.

Briefly describes features of the British Interplanetary Society project "MOUSE" and gives technical data compared with American Vanguard project.

532 BUILDING THE FIRST SATELLITE. Missiles and Rockets 1:68-70, Oct. 1956.

Photos and text describe the progress of Project Vanguard.

533 Caidia, Martin. INTERNATIONAL GEOPHYSICAL YEAR. Flying 58: 22-24, 54, 56-57, June 1956.

A popular article concentrating mainly on the rocket and satellite programs. Contains a diagram of the preliminary schematic trajectory of the earth satellite.

534 California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif. FEASIBILITY STUDY FOR MINIMUM-WEIGHT RADIO INSTRUMENTATION OF A SATELLITE, by W.F. Sampson. 14 p., illus., June 15, 1956. (Publ. 48, 2nd ed.)

Data requirements are examined; environmental conditions evaluated; necessary radiated power and desirable operating frequencies determined; possible configurations for an airborne beacon and an appropriate ground station and antenna studied.

Appendix A, Computation of Satellite Temperature; Appendix B, Phase-Steerable Tracking Antenna.

535 California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif. MICROLOCK: A MINIMUM-WEIGHT RADIO INSTRUMENTATION SYSTEM FOR A SATELLITE, by W.F. Sampson, Henry L. Richter, Jr. and Robertson Stevens. 37 p., illus., Nov. 14, 1956. (Prog. Rpt. 20-308)

Design, construction and laboratory testing of a satellite-tracking system are described.

536 California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif. PROPOSAL FOR THE MEASUREMENT OF COSMIC LIGHT AND RADIATION FROM AN EARTH SATELLITE, 15 p., illus., July 26, 1956. (Publ. 70).

Necessary electronic circuitry to provide power for the two experiments suggested, as well as data transmission, is briefly discussed. A proposal for fm-pm data encoding and transmitting using a minimum-weight, low-power, long-life beacon transmitter is made. Ground equipment for the reception of the beacon signal is discussed, as are data recovery and reduction.

537 California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif. THE TEMPERATURE OF AN ORBITING MISSILE, by A.R. Hubbs. 20 p., Mar. 28, 1956. (Prog. Rpt. 20-294) (Contract DA-04-495-ord-18).

Discusses temperature control by surface coating and insulation so as to assure successful operation of radio equipment carried in an orbiting satellite.

538 Canney, H.E. and Ordway, F.F. III. THE USES OF ARTIFICIAL SATELLITE VEHICLES. Astronautica Acta 2:147-174, 1956.

Astronomical and astrophysical advantages of the artificial satellite are covered, as are benefits to the biological and medical sciences deriving from a space station. For Part II, see Item 945.

539 Caroli, R.L. A NEW TYPE OF NUCLEAR POWER FOR SPACE FLIGHT. New York, American Rocket Society, 1956. (ARS Preprint 375-56).

Investigation to develop a type of nuclear reaction which is the reverse of fusion and which, because it provides mass in motion with high velocities (25,000 mi./sec.), is naturally applicable to the problem of rocket propulsion for space travel. Includes calculation indicating the advantages of such a fuel over the present chemical fuels. It is shown that the reaction can be made self-sustaining as long as reacting material is present and that it can be confined within the walls of a solid material. The rate of reaction can then be controlled by the rate at which fuel is introduced.

540 Castruccio, P.A. SPACE NAVIGATION CHALLENGES ENGINEERS. Aviat. Wk. 65:82-87, 89, 91, 94, 97, 99, Sept. 3, 1956.

Covers planetary mapping, communications and radar techniques.

541 Chubb, T.A., Friedman, H. and Kupperian, J. A LYMAN ALPHA EXPERIMENT FOR THE VANGUARD SATELLITE. In Van Allen, J.A. ed. Scientific Uses of Earth Satellites, p. 147-151, Ann Arbor, University of Michigan Press, 1956.

A satellite experiment offers the possibility of monitoring the sun in Lyman alpha almost continuously for many days and would be worth hundreds of individual rockets for the same purpose.

542 Chubb, T.A., Friedman, H. and Kupperian, J. A SATELLITE EXPERIMENT TO DETERMINE THE DISTRIBUTION OF HYDROGEN IN SPACE. In Van Allen, J.A., ed. Scientific Uses of Earth Satellites, p. 152-156, Ann Arbor, University of Michigan Press, 1956.

Proposed use of a photon counter to measure simultaneously the intensity of hydrogen Lyman alpha radiation (1215.7 A) received directly from the sun and the resonance

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radiation of the same wavelength produced by sunlit hydrogen atoms in space.

543 Cleaver, A.V. INTERPLANETARY TRAVEL. Inst. Transport J. 26: 401-410, Jly. 1956.

Attitudes toward interplanetary travel; history of astronautics, including references to current work on rocket aircraft and missiles in various countries and to principle of satellite rocket; interplanetary vehicles compared with other forms of transport; possibility that other forms will supersede rocket for space travel.

544 Clement, G.H. THE MOON ROCKET. In Franklin Institute, Earth Satellites as Research Vehicles. Proceedings of the Symposium, Philadelphia, April 18, 1956, p. 14-21, Lancaster, Pa., Journal of the Franklin Institute, June 1956. (Monograph 2)

A re-examination of the problem of designing a vehicle to land on the moon.

(Also issued by Rand Corporation. See Item 736.)

545 Computer Usage Company, Inc., New York. COMPUTATION OF THE ORBIT OF AN ARTIFICIAL SATELLITE, 3/4 in. thick, Feb. 24, 1956. (Rpt. 6235, Contract AF33(616)3106).

Describes mathematical research and analysis performed.

546 Cornog, R.A. ECONOMICS OF ROCKET PROPELLED AEROPLANES. II. Aero. Eng. Rev. 15:49-58, Oct. 1956.

An appendix is included which indicates costs for placing material in a satellite orbit.

547 Cushman, Robert. NEXT SATELLITE PROBLEM: DATA DESCENT. Aviat. Wk. 64:53, 56-57, May 14, 1956.

Discusses satellite data recovery and mentions proposal by R.W. Porter to recover data from a future earth satellite by a stainless steel balloon.

Article with same title appears in Missile Eng. 1:48-49, illus., Sept. 1956.

548 Dailey, James. ONE ORBIT OUT OF TWELVE "GOOD" SATELLITE AVERAGE, MARTIN SAYS. Aviat. Wk., 65:30-31, Oct. 15, 1956.

Summary of lecture on Vanguard giving orbital details. Radio amateurs will be able to build Minitrack receivers for about \$1,000.

Also in Missile Eng 1:23, Dec. 1956.

549 Daniels, F.B. ELECTROMAGNETIC PROPAGATION STUDIES WITH A SATELLITE VEHICLE. In Van Allen, J.A., ed. Scientific Uses of Earth Satellites, p. 276-282, Ann Arbor, University of Michigan Press, 1956.

The proposed experiment is a determination of the integrated value of the ionization from the earth's surface to the satellite, by measuring the rotation of the plane of polarization of a radio wave transmitted from the satellite.

550 Davis, R.J., Whipple, F.L. and Zierker, J.B. THE ORBIT OF A SMALL EARTH SATELLITE. In Van Allen, J.A., ed. Scientific Uses of Earth Satellites, p. 1-22, Ann Arbor, University of Michigan Press, 1956.

Considers motion of a satellite launched into an inclined, moderately eccentric orbit from a point approximately 500 km above sea level. Discusses effects on desired initial orbit produced by deviations from desired launching conditions and atmospheric drag. Additional perturbations are discussed such as action of the sun and moon, and variations of the density of the upper

atmosphere with time and latitude, Bernoulli forces acting on a spinning object, and effect of upper-atmospheric winds.

551 Davis, R.J. ULTRAVIOLET STELLAR MAGNITUDES. In Allen, J.A., ed. Scientific Uses of Earth Satellites, p. 157-165, Ann Arbor, University of Michigan Press, 1956.

Computations are performed from which it is possible to construct a tentative map of the sky at 1249 A. Results of this survey should prove valuable in the selection of the most interesting regions for study when extraterrestrial photometry of high resolution from artificial satellites becomes possible.

552 Davis, W.O. FUNDAMENTAL BASIS OF SPACE FLIGHT. J. Astronautics 3:9, 10, 25, Spring 1956.

Briefly calls attention to problems such as propulsion; survival in space; exposure to violet rays; and re-entry into the earth's atmosphere.

553 deBey, L.G. SYSTEMS DESIGN CONSIDERATIONS FOR SATELLITE INSTRUMENTATION. In Van Allen, J.A., ed. Scientific Uses of Earth Satellites, p. 49-54, Ann Arbor, University of Michigan Press, 1956.

Discusses some of the factors which must be considered in establishing sound objectives and adequate observing methods.

554 deNike, John. THE EFFECT OF THE EARTH'S OBLATENESS AND ATMOSPHERE ON A SATELLITE ORBIT. In Franklin Institute, Earth Satellites as Research Vehicles, Proceedings of the Symposium, Philadelphia, April 15, 1956, p. 79-86, Lancaster, Pa., Journal of the Franklin Institute, June 1956. (Monograph 2)

A member of the Martin Company, designers and builders of the rocket

vehicle for the Vanguard satellite, relates some of the problems.

Summary of article with same title - Brit. Interplan. Soc. J. 16:29-30, Jan./Mar. 1957.

555 DeVore, Charles. RADIO TO TRACK VANGUARD SATELLITE. Naval Comm. Bull. 48:9-10, Fall 1956.

The radio tracking system known as "Minitrack" developed at the Naval Research Laboratory, for use in tracking the earth-circling satellite. Includes description of the system.

556 Dingle, Herbert. RELATIVITY AND SPACE TRAVEL. Nature 177:782-784, Apr. 28, 1956.

Calls for a re-examination of assumptions. Refers to ideas expressed by Sir George Thomson in his book "The Foreseeable Future"; and by W.H. McCrea, P.S. Epstein, and Einstein.

557 Dingle, Herbert. RELATIVITY AND SPACE TRAVEL. Nature 177:785, Apr. 28, 1956.

A reply to McCrea's criticism, Nature 177:784-785, Apr. 28, 1956.

558 Dingle, Herbert. RELATIVITY AND SPACE TRAVEL. Nature 178:680-681, Sept. 29, 1956.

Statement prepared in conclusion of clock paradox argument with W.H. McCrea.

559 Dobronravov, V. THE ARTIFICIAL SATELLITES OF THE EARTH. Kiy. Rod. 8:19-22, Aug. 1956.

The author outlines, in a popular form, the scientific aspects of the problem of creating artificial earth satellites, and indicates schematically how this may be solved in practice.

Not examined.

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Also in Arip. Patr. 2:20-23, Dec. 1956. (In Rumanian.)

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Dryden, H.L. THE INTERNATIONAL GEOPHYSICAL YEAR. MAN'S MOST AMBITIOUS STUDY OF HIS ENVIRONMENT. Natl. Geog. Mag. 109:285-298, illus., Feb. 1956.

An outline of projects for the IGY, including mention of the man-made satellites.

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Dubin, Maurice. METEORIC BOMBARDMENT. In Van Allen, J.A. ed. Scientific Uses of Earth Satellites, p. 292-300, Ann Arbor, University of Michigan Press, 1956.

An experiment for the detection of meteoric particles entering the earth's atmosphere is proposed for an earth satellite.

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Due, A. ALGUNOS PROBLEMAS PRACTICOS EN LOS SATELITES ARTIFICIALES. (SOME PRACTICAL PROBLEMS OF ARTIFICIAL SATELLITES). Rev. Geof. Inst. Nac. Geof., 15:449-457, 1956.

In Spanish. Not examined.

563

Dufur, T.B. THE COST PROBLEM IN SPACE TRAVEL. J. Space Flight 8:1-2, Oct. 1956.

The writer contends that insufficient attention has been given to ways and means of cost-cutting for heavy expense items such as motors, pumps and guidance equipment, and provides some suggestions.

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Dufur, T.B. A QUICKER METHOD FOR THE CONQUEST OF SPACE. J. Space Flight 8:4-6, Feb. 1956.

Items believed to be of importance are (a) making the rocket itself out of frozen fuel, to save weight; (b) pre-orbital refueling from the moon; (c) extremely small payload (c) use of rarified hydrogen as a propellant and solar energy as a power source, (d) use of temperatures near absolute

zero to stabilize hitherto unmanageable fuels such as fluorine, ozone and monatomic hydrogen.

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Durant, F.C. SOUTH AFRICA PREPARES FOR SATELLITE TRACKING. Missiles and Rockets 1:102, Dec. 1956.

Plans of South African Interplanetary Society.

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EARTH SATELLITE DEVELOPMENTS DETAILED. Elec. Eng. 75:664, Jly. 1956.

Preliminary data on the Vanguard project.

567

EARTH SATELLITE INSTRUMENTS DISPLAYED IN NEW YORK. Res. Revs., (ONR), p. 25, Oct. 1956.

Mentions the 10-milliwatt MINITRACK transmitter, the pressure, erosion and temperature gauges, a subminiature meteoric collision microphone and the Lyman-Alpha storage equipment.

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EARTH SATELLITE VEHICLE LAUNCHING SCHEME. Engr. 201: 543, May 18, 1956.

Vanguard launching program.

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EARTH SATELLITES. J. Astronautics. 3:73, illus., Autumn-Winter, 1956.

Construction details of the Project Vanguard satellite released by Brooks and Perkins, Inc., Detroit.

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Easton, R.L. RADIO TRACKING OF THE EARTH SATELLITE. AN OPPORTUNITY FOR AMATEUR COLLABORATION. QST 40:38-41, 134, illus., Jly. 1956.

Describes simplified tracking system for amateur use.

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Edrev, D. SPUTNITSITE NA ZEM-YATA V SLUZHBA NA CHOVEKA. (EARTH SATELLITES IN SERVICE OF MAN). N: Narodna Armiya no. 2525, p. 3, Oct. 21, 1956.

In Bulgarian

Also issued as AFCIN-IAI, Rept. 1R-1119-58 in English.

Article deals with the orbits, construction and equipment of artificial earth satellites, and briefly, with the general idea of "cosmic islands" and freight passenger rockets.

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AN EERIE MODEL OF A SATELLITE. Life. Oct. 15, 1956. 41:99-102, illus.

Five photographs of models of the satellite and its rocket vehicle.

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Ehrlicke, K.A. AERO-THERMODYNAMICS OF DESCENDING ORBITAL VEHICLES. Astronautica Acta 2:1-19, 1956.

The theory of laminar and turbulent friction and heat transfer in the compressible boundary layer with and without dissociation is discussed with respect to the descent of orbital vehicles through the atmosphere.

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Ehrlicke, K.A. ASCENT OF ORBITAL VEHICLES. Astronautica Acta 2: 175-190, 1956

Ascent into a satellite orbit along a minimum energy ellipse (elliptic ascent) is compared with ascent along an arc of an elliptic trajectory (ballistic ascent) where the satellite stage is transferred into the orbit at or near the summit. Discussed are basic energy requirements (other than losses during powered ascent), thrust program, effect on the size of stages, visibility during ascent, and flight time.

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Ehrlicke, K.A. ASTRONAUTICAL AND SPACE-MEDICAL RESEARCH WITH AUTOMATIC SATELLITES.

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In Franklin Institute, Earth Satellites as Research Vehicles. Proceedings of the Symposium, Philadelphia, Franklin Institute, April 18, 1956, p. 25-62, Lancaster, Pa., Journal of the Franklin Institute, June 1956. (Monograph 2)

Technical and scientific research aspects in conjunction with technological satellites are outlined and their correlation with various phases of manned astronautics is shown. The survey of the space-medical research by means of bio-satellites also considers the relevant technical and scientific aspects.

576

Ehrlicke, K.A. FLIGHT MECHANICS OF THE SATELLOID. Aero. Dig. 73:46-48, 50, 52, 54, Jly. 1956.

Analysis of space re-entry problems and the proposal of a low-thrust rocket-powered vehicle called a satelloid for flights between 300,000 and 600,000 ft. Operation of such a vehicle as a satellite auxiliary is discussed.

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Ehrlicke, K.A. INSTRUMENTAL SATELLITES AND INSTRUMENTAL COMETS. Interavia 11:960-962, Dec. 1956.

Discussion of future developments in satellites and their scientific applications. Concerns flight performances, and accuracy, tracking, and data transmission.

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Ehrlicke, K.A. THE SATELLOID. Astronautica Acta 2:63-100, diagrams, 1956.

See also Aero Dig. 73:46-48, 50, 52, 54, Jly. 1956.

This paper, presented at the sixth I.A.F. Congress at Copenhagen, August 3, 1955, gives a theoretical analysis of a powered orbiting vehicle operating in the region between 350,000 and 450,000 feet or higher. Its use and flight mechanics are discussed.

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An abstract appears in *J. Astronautics* 3:16, Spring 1956.

Also issued as *American Rocket Society Paper* 235-55, 1955.

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Ehrlicke, K.A. SOLAR POWER FOR SPACECRAFT. *Missiles and Rockets*, 1:44-46, illus., Nov. 1956.

Hydrogen-manufacturing satellites could rely on concentration of solar power in power collectors. The manufacturing process could be completely automatic, requiring only occasional human supervision and maintenance.

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Ehrlicke, K.A. THE SOLAR-POWERED SPACE SHIP. New York, American Rocket Society, 1956. (ARS Preprint 310-56)

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ELECTRONICS TO AID EARTH SATELLITE. *Franklin Inst. J.*, 261:684, June 1956.

The radio system known as "Mini-track" will supplement weather-dependent optical methods for keeping track of the progress of the satellite about the earth and will provide through electronic computers immediate information on its position.

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Emeriat, M. PILES SPÉCIALES POUR L'AÉRONAUTIQUE ET LES ENGINES SPÉCIAUX. (SPECIAL BATTERIES IN AERONAUTICS AND SPECIAL MISSILES.) *Fusées* 1:179-181, Oct. 1956.
In French

"Particular requirements to be fulfilled by electrical batteries used in aeronautics and rocket projectiles include a constant reliable output under extreme conditions of temperature and pressure, and retention of efficiency even after long storage. For many purposes conventional batteries are thus inconvenient, and developments in this field are reported. A new type of battery meeting the requirements is fully described." *Index Aeronauticus* 13:105, Jan. 1957.

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Engle, Leonard. MYSTERY OF THE AIR WE EXPLORE. *N.Y. Times Mag.*, p. 27, 62-64, Apr. 15, 1956.

A popular article on the structure, composition and methods of exploring the atmosphere, especially in the highest layers (by ionospheric radio-sounding rockets, satellites, etc.).

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Ewing, A. SEEING EARTH SATELLITES. *Sci. News Ltr.* 70:346-347, Dec. 4, 1956.

Visibility possibilities.

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Felt, N.E., Jr. THE VANGUARD SATELLITE TRANSPORT ROCKET. *Interavia* 11:958, Dec. 1956.

Summary of a paper read to the 7th International Astronautical Conference in Rome, describing the three stages of the Vanguard transport vehicle for the planned US earth satellite.

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Findlay, D.A. ELECTRONICS IN THE IGY PROGRAM. *Electron.* 29:138-142, Dec. 1956.

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IGY SATELLITE EXPERIMENTS NAMED. Missiles and Rockets 1:22, Nov. 1956.

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- 637 Joseph, Alexander. YOU AND THE EARTH SATELLITES. Grade Teacher. 24:50, 116, illus., Oct. 1956.
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- 638 Kaplan, Joseph and Odishaw, Hugh. THE EARTH SATELLITE PROGRAM. Natl. Acad. Sci. News Rpt. 6:103, Jan./Feb. 1956.
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- 639 Kaplan, Joseph. THE I.G.Y. ROCKET AND SATELLITE PROGRAM. Interavia 11:953-955, Dec. 1956.
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- 641 Kaplan, Joseph. INTERNATIONAL GEOPHYSICAL YEAR PROGRAM. Inst. Radio Engrs. Proc. 44:741-743, June 1956.
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- 643 Kaplan, Joseph. SATELLITE RESEARCH: EIGHT EXPERIMENTS TO BE CONDUCTED ON FIRST SATELLITES. Chem. & Eng. News 34:1188, 1190, Mar. 12, 1956.
Brief listing.
- 644 Kaplan, Joseph. UNITED STATES PROGRAMME FOR THE INTERNATIONAL GEOPHYSICAL YEAR. Nature 178:665-667, Sept. 20, 1956.
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- 645 Katz, Ludwig. GEOMAGNETIC INFORMATION POTENTIALLY AVAILABLE FROM A SATELLITE. In Van Allen, J.A., ed. Scientific Uses of Earth Satellites, p. 247-252. Ann Arbor, University of Michigan Press, 1956.
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A discussion of the re-entry problem.
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it spirals down through the earth's atmosphere from an initially circular orbit under the action of air drag. The earth and its atmosphere are taken as spherically symmetrical. For altitudes above about 125 n. miles a simple solution is found: the velocity of the satellite is independent of its size, shape, weight and initial altitude and equal to its orbital velocity appropriate to its current altitude, while its angle of descent, in radians, is twice its drag/weight ratio. Estimates of lifetimes are also made.

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647 Klass, P.J. THREE AUTOPILOTS WILL GUIDE VANGUARD. Aviat. Wk. 65:54-55, Dec. 24, 1956.

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648 Klass, P.J. VANGUARD TO USE EIGHT CONTROL SYSTEMS. Aviat. Wk. 65:24-25, Dec. 1956.

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649 Kooy, J.M.J. ON THE POSSIBILITY OF SPACE-FLIGHT BY THE AID OF INDUSTRY AND PRESENT-DAY CHEMISTRY. Ing. 68:0.41-0.54, 1956.

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Review of the use of unmanned artificial satellites. (Brit. Interplan. Soc. J. 16:58, Jan./Mar. 1957.)

650 Kooy, J.M.J. PRINCIPLES MOGELLKHEDEN VAN RUIMSTEVART. (BASIC POSSIBILITIES OF SPACE FLIGHT.) Ing. 68: 55-64, June 15, 1956.

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651 Kooy, J.M.J. SPACE TRAVEL AND FUTURE RESEARCH INTO THE STRUCTURE OF THE UNIVERSE. Brit. Interplan. Soc. J. 15:248-259, Sept./Oct. 1956.

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652 LaGow, H.E. EXPERIMENTS FOR MEASURING TEMPERATURE, METEOR PENETRATION, AND SURFACE EROSION OF A SATELLITE VEHICLE. In Van Allen, J.A., ed. Scientific Uses of Earth Satellites. Ann Arbor, University of Michigan Press, p. 68-72, 1956.

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653 LaGow, H.E. INSTRUMENTING UNMANNED SATELLITES. Jet Propul. 26:496-497, June 1956.

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A preliminary survey of the problems encountered in instrumenting a satellite, such as orbit, lifetime, orientation, shape, payload, accelerations, temperature, pressurization, residual pressure, forces on satellite, environmental hazards, and data transmission.

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LARGER ORBIT FOR SATELLITE.
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Lawden, D.F. TRANSFER BETWEEN CIRCULAR ORBITS. *Jet Propul.* 26:555-558, Jly. 1956.

Solution to the problem of transferring a rocket from a circular orbit about one planet into another about a second planet with minimum expenditure of fuel.

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Lawrence, Lovell, Jr. "ASTRO" - AN ARTIFICIAL CELESTIAL NAVIGATION SYSTEM. In *Franklin Institute Earth Satellites as Research Vehicles*. Proceedings of the Symposium, Philadelphia, Franklin Institute, April 18, 1956, p. 89-99, Lancaster, Pa., Journal of the Franklin Institute, June 1956. (Monograph 2)

Discusses design, orbit, propagation of electromagnetic wave signals, and nuclear power source for "Astro" - an artificial satellite time- and radio-orbit.

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Lawrence, Lovell, Jr. NAVIGATION BY SATELLITES. *Missiles and Rockets* 1:48-52, Oct. 1956.

Indicates that an artificial satellite time- and radio-orbit celestial navigation system that is simple, yet reliable may be feasible.

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LAYOUT AND ORGANIZATION OF A MOONWATCH STATION. *Smithsonian Astrophys. Observ. Bull. for Visual Observers of Satellites* 2:3-4, Oct. 1956.

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Lehnert, B. ELECTRODYNAMIC EFFECTS CONNECTED WITH THE MOTION OF A SATELLITE OF THE EARTH. *Tellus* 8:408-409, Aug. 1956.

Letter to the editor based on anticipated performance of the U.S. satellite.

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Ley, Willy. ROCKET FUEL RESEARCH PAVES WAY FOR SPACE FLIGHT. *Indus. Labs.* 7:100-101, Jly. 1956.

Discussion of liquid and solid rocket fuels, advantages and disadvantages of each, and their applications to Project Vanguard.

661
Ludwig, G.H. and Van Allen, J.A. INSTRUMENTATION FOR A COSMIC RAY EXPERIMENT FOR THE MINIMAL EARTH SATELLITE. *J. Astronautics* 3:59, 60, 90, Autumn/Winter 1956.

Discussion of a proposed experiment in which a single Geiger-Müller counter would be used to study the geographical and temporal variations of the primary cosmic ray intensity. The counter would incorporate a system for storing its output during the orbit of the satellite for a short-time read-out of this information.

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McCrea, W.H. RELATIVITY AND SPACE TRAVEL. *Nature* 178:681-682, Sept. 29, 1956.

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MacPherson, G.L. FIRST STAGE PROPULSION - PROJECT VANGUARD. New York, American Rocket Society, 1956. (ARS Preprint 385-56).

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MAGNESIUM JOURNEYS INTO SPACE. *Light Metals* 19:301-302, Oct. 1956.

Technical details of the American artificial earth satellite Vanguard which is to be a magnesium sphere 20 in. in diameter.

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MAGNESIUM MOON. *Light Metal Age* 14:23, Oct. 1956.

Brief description of the instrumentation contained in the 20-in. diameter sphere of the earth's satellite Vanguard. Data on the orbits of the satellite and some comments on its scientific value.

667
MAGNESIUM MOON. *Mod. Metals* 12:56-63, Oct. 1956.

Application of magnesium to Vanguard satellite.

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MAKING AND REPORTING SATELLITE OBSERVATIONS. *Smithsonian Astrophys. Observ. Bull. for Visual Observers of Satellites*, 4:3-4 Dec. 1956.

Instructions for a practice session.

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Mallan, Lloyd. THE GIANT SATELLITE THAT WILL RULE THE EARTH. *Am. Wkly.* June 3, 1956, p. 6-9, illus.

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A forecast of what "Big Brother" might be able to do. This is a satellite, now being talked about unofficially, which has prospects of being launched within six years and which would revolve about the earth permanently carrying an ingenious system of telescopes and television cameras.

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MAN LAUNCHES A MIDGET MOON - HOW TO KEEP IT ALOFT. *Natural Hist.* 65:318-319, illus., June 1956.

A brief summation of the basic discoveries which have paved the way for the launching of an earth satellite. Includes a photograph of a full-size model satellite.

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Manchester, Harland. WHAT CAN WE EXPECT OF THE MAN-MADE MOON? *Reader's Dig.* 69:162-166, Jly. 1956.

Truths and untruths behind one of science's most ambitious ventures.

672
MAN-MADE EARTH SATELLITES. *Mech. Eng.* 78:553, illus., June 1956.

Quotes paper given by Lovell Lawrence, Jr., at Franklin Institute symposium on Earth Satellites as Research Vehicles. The paper forecasts man-made ASTRO satellites circling the earth every 105 minutes to serve as all-weather "space compasses" for ships and planes. See also Item 656.

673
MAN-MADE MOON ALL SET TO GLOW. *Bus. Wk.*, p. 181-182, Nov. 24, 1956.

Engineers at Brooks and Perkins work on the artificial satellite Vanguard which may solve many of the mysteries of outer space.

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MAN'S MILIEU. *Time* 68:68-76, Dec. 17, 1956.

Following a review of the growth of meteorology in the United States it is noted that a grand era in

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meteorology will begin when artificial satellites can watch the atmosphere from above. When U.S. sends up its satellite in 1958, one of its most important jobs will be to keep track of the global movements of clouds as an aid in weather forecasting.

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Marion, W.G. A CHRONOGRAPH FOR TIMING SATELLITE OBSERVATIONS. Smithsonian Astrophys. Observ. Bull. for Visual Observers of Satellites, 3:4, Nov. 1956.

Describes a timing procedure.

This Bulletin also appears in Sky and Telescope 16; insert between p. 26-27, Nov. 1956.

676
Martin, D.C. THE INTERNATIONAL GEOPHYSICAL YEAR. (The Listener 12:387-388, Apr. 12, 1956.

Background and proposed program for the IGY with emphasis on the Antarctic expeditions and the satellite program.

677
Martin Co., Baltimore, Md. EFFECT OF THE EARTH'S OBLATENESS AND ATMOSPHERE ON A SATELLITE ORBIT, by George Fosdick and Marvin Hewitt. 41 p., Aug. 1956. (ER 8262)

Presents results of investigations to determine the effects of the earth's oblateness and atmosphere on a satellite orbit.

678
Martin Co., Baltimore, Md. A MOON IS BORN. 20 p., illus., 1956.

A description of the Vanguard vehicle; the rocket stages; the launching plans; trajectory phases; and orbit probabilities.

There is also a motion picture film with this title.

679
MARTIN DESCRIBES PROGRAM FOR LAUNCHING EARTH SATELLITES. U.S. Air Service 41:8, Sept. 1956.

Details of the test firings scheduled for the Project Vanguard as disclosed by the Martin Company (prime contractor) before the Seventh Annual Astronautical Congress in Rome, on 18 September 1956.

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Singer, S.F. SPACE FLIGHT-FICTION AND FACT. *N.Y. Times Mag.* p. 27, Nov. 25, 1956.

The first man-made earth satellite, soon to be launched, will open the way to future space projects that may not be as fantastic as they seem.

783
Singer, S.F. STUDIES OF A MINIMUM ORBITAL UNMANNED SATELLITE OF THE EARTH (MOUSE) PART II. ORBITS AND LIFE-TIMES OF MINIMUM SATELLITES. *Astronautica Acta* 2:125-144, 1956.

Purpose is to (a) describe the (elliptical) orbit of an artificial satellite in terms of the launching conditions (i.e., at burnout); in particular, to give perigee (minimum) and apogee (maximum) altitudes of the ellipse as a function of launching altitudes and of errors in launching velocity and angle and to (b) investigate the subsequent behavior of the orbit under the influence of the drag of the upper atmosphere.

Paper presented at the 9th annual meeting of the American Rocket Society, New York, Nov. 30-Dec. 3, 1954.

784
SIXTH ANNUAL CONGRESS OF INTERNATIONAL ASTRONAUTICAL FEDERATION (IAF): ABSTRACTS OF PAPERS. *J. Astronautics* 3:15-16, 25, Spring 1956.

Includes the following selected abstracts: Uses of Satellite Vehicles, by H.E. Canney and F.I. Ordway; The Visibility of an Earth Satellite, by R. Tousey; The Sateiloid, by K. A. Ehrlicke; Some Problems on Rocket Development, by G.A. Partel; Estimated Lifetimes of Satellites from Near Circularity, by N.V. Petersen.

For complete papers, see under individual authors.

785
Smith, E.T.B. comp. SATELLITE VEHICLES. *Brit. Interplan. Soc. J.* 15:280-281, Sept./Oct. 1956.

General information.

786
Smith, E.T.B. TECHNICAL REVIEW. *Brit. Interplan. Soc. J.* 15:338-340, Nov./Dec. 1956.

Reviews paper by H.E. LaGow, on satellite instrumentation given at the American Rocket Society annual meeting in 1955 and refers to drag coefficients mentioned by Singer in NACA, TN 1270 and by Ashley in *J. Aero.Sci.* Feb. 1949.

Considers, also, the satellite vehicle recovery discussed by R.W. Porter in *Aviat. Wk.* May 14, 1956. (This in Cushman, Robert, Next Satellite Problem: Data Decent. *Aviat. Wk.* 64:53, 56-57, May 14, 1956.)

787
Southworth, M.P. A LOW-NOISE 108/144 Mc CONVERTER, USING THE 417-A IN A DESIGN SUITABLE FOR EARTH SATELLITE TRACKING OR TWO-METER DX. *QST* 40: 11-15, 130, illus., Nov. 1956.

788
SOVIETS PLAN 100-LB., 20-24 IN. SATELLITE. *Aviat. Wk.* 65:6Z, Oct. 29, 1956.

789
Spitz, A.N. A HUNDRED MOONWATCH STATIONS READY FOR DECEMBER 8th ALERT. *Smithsonian Astrophys. Observ. Bull. for Visual Observers of Satellites* 4:1, Dec. 1956.

Includes map showing observing stations.

This Bulletin also appears in *Sky and Telescope* 16, insert between p. 78-79, Dec. 1956.

790
Spitz, A.N. MOONWATCH PREPARATIONS SWING INTO HIGH GEAR. *Smithsonian Astrophys. Observ. Bull. for Visual Observers of Satellites* 3:10, Nov. 1956.

This Bulletin also appears in *Sky and Telescope* 16: insert between p. 26-27, Nov. 1956.

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791
Spitz, A.N. A NOTE FROM THE COORDINATOR. *Smithsonian Astrophys. Observ. Bull. for Visual Observers of Satellites* 1:1-2, Jly. 1956.

Invites participation in the Moonwatch and Seesaw programs.

This Bulletin also appears in *Sky and Telescope* 15: insert between p. 408-409, Jly. 1956.

792
Spitzer, Lyman, Jr. ASTROPHYSICAL RESEARCH WITH AN ARTIFICIAL SATELLITE. In *Earth Satellites as Research Vehicles*. Proceedings of the Symposium, April 28, 1956, Franklin Institute, Philadelphia, p. 69-74, Lancaster, Pa., Journal of the Franklin Institute, June 1956. (Monograph 2)

Lists and discusses, briefly, problems that could be investigated such as: earth's atmosphere; planetary atmospheres; matter in space; and stellar atmospheres.

793
Spitzer, Lyman, Jr. ON THE DETERMINATION OF AIR DENSITY FROM A SATELLITE. In Van Allen, J.A. ed. *Scientific Uses of Earth Satellites*, p. 99-108, Ann Arbor, University of Michigan Press, 1956.

Discusses various possible methods of evaluating the atmospheric density, including observation of the satellite's orbit, and by measuring the change of spatial orientation.

794
SPOT RADIO NEWS: LAUNCHING OF THE EARTH SATELLITE. *Radio & TV News* 55:12, June 1956.

Telemetering of data from the satellite.

795
Stakutis, V.J. and Brennan, J.X. VISIBILITY FROM A SATELLITE AT HIGH ALTITUDES. In

Van Allen, J.A. ed. Scientific Uses of Earth Satellites, p. 137-146, Ann Arbor, University of Michigan Press, 1956.

The simple design of two types of instrumentation for measuring luminous quantities is described to show their applicability to satellite installation.

796 Stearns, E.V. SOME APPLICATIONS OF AUTOMATIC NAVIGATION. J. Inst. Nav. 9:66-72, June 1956.

Discussion of the techniques of an automatic navigation system and its application to interplanetary navigation.

797 Stedfield, R.L. ENGINEERING THE EARTH SATELLITE. Mach. Design. 28:82-86, Nov. 1, 1956.

Description of the orbit, the launching rocket and of the Vanguard satellite itself and its instrumentation.

798 Stehling, K.R. CHARACTERISTICS AND APPLICATION OF ROCKET PROPELLANTS. Aero Dig. 73:56-58, 60, Jly. 1956.

A review of the current characteristics of available and proposed liquid rocket fuels. Modern developments in rocket fuel characteristics are surveyed with respect especially to the differences in needs between manned and unmanned rocket craft.

799 Stehling, K.R. RECOVERY OF A SATELLITE VEHICLE. Jet Propul. 26:390, May 1956.

This article, based on a paper by T.F. Reinhardt, K.R. Stehling and Leo Dean, shows a method of protecting a re-entering vehicle from the expected rapid and great temperature rise. A ceramic coating is suggested.

Also issued as American Rocket Society Paper 280-55, 1955.

800 Stehling, K.R. SPACE FLIGHT NOTES. Jet Propul. 26:48, Jan. 1956.

Comment on paper by R.P. Haviland of the General Electric Company entitled "On Applications of the Satellite Vehicle." See item 612.

801 Stehling, K.R. SPACE FLIGHT NOTES. ASTRONAUTICS. Jet Propul. 26:115, Feb. 1956.

Comment on paper by D.C. Romick of Goodyear Aircraft Corporation entitled, "Preliminary Engineering Study of a Satellite Station Concept." See item 473.

802 Stehling, K.R. SPACE TRAVEL AND RELATIVITY OR HOW TO KEEP FROM GROWING OLD. Jet Propul. 26:1105-1106, 1108, Dec. 1956.

A review of opinions and arguments regarding time dilatation.

803 Steier, H.P. FIRST SATELLITES WON'T HAVE SMOOTH SAILING. Am. Aviat. 19:38, Apr. 9, 1956.

IRE convention gets sober view of Project Vanguard from leading scientists who warn that missile systems do not always meet expectations.

804 Steier, H.P. TRACKING THE IGY SATELLITE. Missiles and Rockets 1:76-77, Oct. 1956.

Details of the transistorized sub-miniature transmitter called the Minitrack.

805 Steier, H.P. WHAT GUIDES THE VANGUARD. Missiles and Rockets, 1:70-72, Nov. 1956.

Minneapolis-Honeywell builds complex gyro reference system. Description and photos included.

806 Stine, G.H. SOME GENERAL CONSIDERATIONS OF THE UTILITY

AND OPERATION OF A LONG RANGE MANNED ROCKET RESEARCH VEHICLE. New York, American Rocket Society, 1956. (ARS Preprint 357-56)

807 Stroud, W.G. and Nordberg, W. METEOROLOGICAL MEASUREMENTS FROM A SATELLITE VEHICLE. In Van Allen, J.A. ed., Scientific Uses of Earth Satellites, p. 119-132, Ann Arbor, University of Michigan Press, 1956.

Usefulness of observations is reviewed and various levels of information available from various levels of complexity of instrumentation are outlined. A specific instrumentation suitable for the initial (IGY) satellites is presented and basic aspects of operational problems outlined. It is shown that the necessary orientation information can be obtained from the albedo data.

Also issued as Army Signal Corps Eng. Lab. Tech. Memo. 1784.

808 Stuhlinger, Ernst. CONTROL AND POWER SUPPLY PROBLEMS OF INSTRUMENTED SATELLITES. Jet Propul. 26:364-368, illus., May 1956.

Discusses minimum instrumentation; instrumentation for higher requirements; and power sources for satellite instrumentation (photoelectric generators, thermocouples heated by radioactive isotopes and thermocouples with sun mirror).

Article with same title in Inst. Radio Engrs. Trans. PGI 5:49-26, illus., June 1956.

809 Stuhlinger, Ernst. INSTRUMENTATION PROBLEMS OF UNMANNED SATELLITES. Paper presented at ARS semiannual meeting, Cleveland, June 18-20, 1956, New York, American Rocket Society, 1956. (ARS Paper 306-36)

Since the development of an unmanned satellite was publically

announced, a large number of proposals have been made on how this satellite could be used as a tool for scientific investigations. The usefulness of a satellite for scientific investigations depends mainly on its size, the available electric power, and the control of its attitude. In the present study, the capabilities of satellites for scientific measurements are investigated. A tentative scheme is offered which shows how the planning for satellite instrumentation might be scheduled.

810 SYMPOSIUM ON THE U.S. EARTH SATELLITE PROGRAM - VANGUARD OF OUTER SPACE. Inst. Radio Engrs. Proc. 44:741-767, illus., June 1956.

See entries under Hagen, Rosen, Mazor, Mengel, Whipple and Van Allen for papers given at this symposium.

811 Thiruvenkatachar, V.R. AN ARTIFICIAL SATELLITE FOR THE EARTH. J. Sci. Indus. Res. 15A:61-63, Feb. 1956.

Nature, orbit, launching and scientific uses (astronomy, geodesy, meteorology, etc.) of an earth satellite such as is being developed for use during IGY is described at some length.

812 Thompson, G.V.E. A ROCKET SATELLITE NEXT YEAR? Air Pict. & Air Reserve Gaz. 18:386-387, Nov. 1956.

A discussion of the papers presented at the Seventh International Astronautical Congress, Rome, September 17-22, 1956.

Deals mostly with the American Project Vanguard.

813 THREE-STAGE ROCKET. Mech. Eng. 78:446, illus., May 1956.

Announcement of preliminary flight details of the Vanguard three-stage rocket vehicle.

88

814
Tousey, R. **ROCKETRY**. Smithsonian Inst. Astrophys. Observ. Smithsonian Contrib. Astrophys. 1:39-44, 1956.

Suggests experiments that cannot be done with ordinary rockets but which may be feasible from a satellite, such as a study of solar ultra-violet and X-ray radiation; a search of the sky for radiation hot spots; a study of the earth's magnetic field; and a study of micrometeorites.

815
Tousey, R. **THE VISIBILITY OF AN EARTH SATELLITE**. Astronautica Acta 2:101-112, 1956.

Conditions for naked eye and telescopic visual observation of white 21-in. diam. earth satellite are calculated using known values of sky brightness, solar illumination and visual thresholds of eye.

816
TOWARDS SPACE FLIGHT: THE INTERNATIONAL ASTRONAUTICAL CONGRESS. Eng. 182:478, Oct. 12, 1956.

Papers reporting on: the Vanguard satellite, skin heating of satellites, observing the artificial satellites, moon satellite, and propulsion in space flight by solar power.

817
TWENTY COMMON QUESTIONS ABOUT THE MINIMOONS. Popular Sci. Mon. 169:122-124, diag., Aug. 1956.

Questions and answers to them are used to set forth certain basic information concerning the earth satellites. Included is a preliminary schematic trajectory. Appended is a brief glossary of satellite "lingo".

818
Trepka, A. **SATELLITOID AS A NEARLY ARTIFICIAL MOON**. Skrz. Polska 12:14, June 1956.
In Polish. Not examined.

819
Traux, R.C. **DAWN OF THE SPACE AGE**. Britannica Book of the Year

1956. Preliminary leaves, unpagged, Chicago, Encyclopedia Britannica, 1956.

An illustrated review and summary of developments leading to space flight from pre-war to post-war years and to the present day, including a section on rockets and space travel.

820
U.S. EARTH SATELLITE PROGRAMME FOR THE INTERNATIONAL GEOPHYSICAL YEAR. Eng. 202:247-249, Aug. 17, 1956.

Full details of launching vehicle and experiments to be carried out.

821
U.S. National Committee for the International Geophysical Year. **USNCGY ROCKETRY AND SATELLITE PROGRAMS**. 41 p., Washington, National Academy of Sciences, National Research Council, 1956.

Collection of five articles: The IGY Rocket and Satellite Program, by Joseph Kaplan; The U.S. IGY Rocketry Program, by H.E. Newell, Jr.; Observations with Satellite-borne Apparatus, by J.A. Van Allen; Radio Tracking - Earth Satellite Program, by J.P. Hagen; and The Optical Program, by F.L. Whipple.

822
Vaeth, J.G. **LANDINGS IN SPACE**. Flying 58:29, 64-65, illus., Jan. 1956.

The first practical steps toward future landings in space are being taken, starting with small satellites.

823
Van Allen, J.A. **THE ARTIFICIAL SATELLITE AS A RESEARCH INSTRUMENT**. Sci. Am. 195:41-47, Nov. 1956.

824
Van Allen, J.A. **COSMIC-RAY OBSERVATIONS IN EARTH SATELLITES**. In Van Allen, J.A. ed. Scientific Uses of Earth Satellites, p. 171-187, diags., Ann Arbor, University of Michigan Press, 1956.

A single Geiger tube or scintillator carried in a satellite will make possible the study of the cosmic-ray intensity above the atmosphere on comprehensive geographical and temporal bases for the first time.

825
Van Allen, J.A. ed. **SCIENTIFIC USES OF EARTH SATELLITES**. 316 p., illus., Ann Arbor, University of Michigan Press, 1956.

Includes thirty-three papers given at the Upper Atmosphere Rocket Research Panel at the University of Michigan on January 26 and 27, 1956.

Principal purpose of the book is, according to the editor's preface, to bring the potential value of artificial satellites to the attention of the scientific community at large.

See also entries under individual authors: Bennett; Berning, Chubb; Daniels; Davis; deBey; Dabun; Cast; Hartman; Hepper; Hinteregger; Hok; Hudson; Jones; Katz; LaGow; Merrill; Pfister; Sedwick; Sicinski; Singer; Spitzer; Stakutis; Stroud; Van Allen; Vestine; Ziegler; Zirker.

826
Van Allen, J.A. **SCIENTIFIC VALUE OF THE EARTH SATELLITE PROGRAM**. Inst. Radio Engrs. Proc. 44: 764-767, June 1956.

Highest "flight-priority" in the Vanguard Project has been assigned to the following: (a) the monitoring of the intensity of the solar ultra-violet; (b) the monitoring of cosmic ray intensity and the measurement of its latitude, longitude, and altitude dependence; (c) the measurement of the size spectrum and the number density of interplanetary dust; and (d) the measurement of the earth's optical albedo over large areas.

827
Van Allen, J.A. **STUDY OF THE ARRIVAL OF AURORAL RADIATIONS**. In Van Allen, J.A. ed. Scientific Uses of Earth Satellites, p. 188-193, diag., Ann Arbor, University of Michigan Press, 1956.

A satellite in a nearly pole-to-pole orbit is considered a splendid vehicle for plotting out the auroral zone by direct observation.

828
VANGUARD DEFENDS ON TOOLS AND GAGES. Missile Eng. 1:22-23, Dec. 1956.

General description of Vanguard vehicle and test facilities.

829
VANGUARD ENGINES READY TO GO. Missiles and Rockets 1:62-63, Nov. 1956.

Photos of the first Vanguard main-stage engine.

830
VANGUARD RESEARCH VEHICLE. Marine Corps Gaz. 40:57, June 1956.

831
Vestine, E.H. **EXPLORING THE ATMOSPHERE WITH A SATELLITE-BORNE MAGNETOMETER**. In Van Allen, J.A. ed. Scientific Uses of Earth Satellites, p. 198-214, diags., Ann Arbor, University of Michigan Press, 1956.

Summary of explorations for consideration. Various electric current systems suggested for explaining the known geomagnetic variations at ground level are briefly described.

832
VICKERS AUTO-PILOT TO CONTROL PROJECT VANGUARD FLIGHT. Signal 10:113-114, May/June 1956.

The flight of the Project Vanguard launching vehicle will be controlled by a magnetic amplifier auto-pilot unit.

833
Von Braun, Wernher. **CROSSING THE LAST FRONTIER**. In Great Adventures in Science, edited by Helen Wright and Samuel Rapport, p. 320-338, New York, Harper, 1956.

A prediction of the space satellite.

Article with this title appears in Collier's, p. 24-29, 72, 74, Mar. 22, 1952.

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- 834 Webb, J.A. INTERPLANETARY COMMUNICATIONS. *J. Astronautics* 3:29-30, 36, illus., Summer 1956.
- Considers, in part, an earth satellite radio relay link.
- 835 WHAT WE WILL LEARN FROM THE ARTIFICIAL EARTH SATELLITE. *Otv. Na. Vop. Trud.* 74:61, 1956.
- In Russian. Not examined.
- 836 Whipple, F.L. THE ARTIFICIAL SATELLITE. *Sky and Telescope.* 15:112-114, Jan. 1956.
- From a paper presented at the American Astronautical Society, November 1955.
- 837 Whipple, F.L. and Hynek, J.A. INSTRUMENTATION FOR THE OBSERVATION OF THE IGY SATELLITES. *Inst. Soc. Am. Proc.* 11, Part 2, IGY, 2 p., 1956.
- Relates, briefly, the visual search and tracking program and the photographic tracking program assigned to the Smithsonian Astrophysical Observatory.
- 838 Whipple, F.L. and Hynek, J.A. A MESSAGE TO VOLUNTEER OBSERVERS. *Smithsonian Astrophys. Observ. Bull. for Visual Observers of Satellites* 1:1, 1ly. 1956.
- Outlines opportunities for amateurs in tracking the earth satellites.
- This Bulletin also appears in *Sky and Telescope* 15. Insert between p. 408-409, Jly. 1956.
- 839 Whipple, F.L. MOONTRACKING: NEW GLOBAL SPORT. *Sat. Rev.* 39:37-39, Sept. 1, 1956.
- Details of the "Moon-watch" Project designed to enlist groups of volunteers in tracking the earth's satellite. Data on the task of integrating

the work of these volunteers into the observations of professional astronomers for the IGY.

- 840 Whipple, F.L. and Hynek, J.A. RESEARCH PROGRAM BASED ON THE OPTICAL TRACKING OF ARTIFICIAL EARTH SATELLITES. *Inst. Radio Engrs. Proc.* 44:760-764, June 1956.
- Problems and goals of satellite tracking. Possible photographic techniques for observing a satellite; and the tracking system.
- 841 Whipple, F.L. SCIENTIFIC VALUE OF ARTIFICIAL SATELLITES. *Frank. Inst. J.* 262:95-109, Aug. 1956.
- History, present status, and scientific value of artificial satellites launched as a part of the Vanguard Project during the IGY.
- 842 White, E.C., Foley, J. and Wilkins, R.G. POWER SUPPLIES AND TELEMETRY FOR AN INSTRUMENTED ARTIFICIAL SATELLITE. PART I. ORBITAL CONSIDERATIONS. PART II. INSTRUMENTATION AND TELEMETRY. PART III. AVAILABILITY OF POWER. *Brit. Interplan. Soc. J.* 15:177-191, Jly./Aug. 1956.
- 843 Wiggins, J.W. IMPORTANCE OF MASS RATIO AND ADAPTABILITY OF CASE BONDED SOLID PROPELLANT ROCKET SYSTEMS FOR ACHIEVEMENT OF SUPER VELOCITIES. *New York, American Rocket Society, 1956.* (ARS Preprint 303-56)
- 844 Winterberg, F. RELATIVISTISCHE ZEITDILATATION EINES KUENSTLICHEN SATELLITEN. (RELATIVISTIC TIME DILATION IN AN ARTIFICIAL SATELLITE). *Astronautica Acta* 2:25-29, 1956.
- In German

Applies the general theory of relativity to the problem of time measurement in a satellite.

- 845 Wintermartz, P.F. THE PHYSICAL AND CHEMICAL FUNDAMENTALS OF SATELLITE FLIGHT: PART I AND II. *J. Astronautics* 3:43-47, Spring; 65, 68, 70, 80, Autumn-Winter, 1956.
- Physical principles of rocket operation; chemical principles; application to the design of rocket power plants for satellites; computation of circular and escape velocity; period of revolution of a satellite; lifetime.
- 846 WORLD'S FIRST MAN-MADE SATELLITE. *Automotive Indus.* 115:60-61, 138, 142, illus., Nov. 15, 1956.
- Manufacturing techniques, propulsion, controls and testing techniques of the Vanguard satellite rocket vehicle.
- 847 Zaehring, A.J. ROCKETS AND GUIDED MISSILES. *Ord.* 40:844, 846, Mar./Apr. 1956.
- Summarizes the details which have been made available concerning the U.S. earth satellite program, Project Vanguard.
- 848 Zaehring, A.J. ROCKETS AND MISSILES. *Ord.* 40:1021-1022, May/June 1956.
- Gives some details about the U.S. earth satellite, among them the fact that the three-stage rocket which will establish the satellite will use an improved Viking rocket as the first stage, a modified Aerobee rocket as the second stage, and a solid-propellant rocket as the third stage.
- 849 Ziegler, H.K. COMPONENTS FOR INSTRUMENTATION OF SATELLITES. In Van Allen, J.A. ed. *Scientific Uses of Earth Satellites*,

p. 55-67, Ann Arbor, University of Michigan Press, 1956.

Environmental conditions are reviewed and special attention is given to comparison of power sources. Present and predictable availability of suitable chemical and solar batteries, electron tubes, transistors, and frequency control devices is discussed.

- 850 Zirker, J.B., Whipple, F.L. and Davis, R.J. TIME AVAILABLE FOR THE OPTICAL OBSERVATION OF AN EARTH SATELLITE. In Van Allen, J.A. ed. *Scientific Uses of Earth Satellites*, p. 23-28, Ann Arbor, University of Michigan Press, 1956.

Light curves during a twilight observation are computed for specularly and diffusely reflecting spheres of 20-in. diameter. The specular reflector is visible over a larger fraction of its path.

The time available for observation of the specular reflector is computed for several cases. Sky brightness, geometry and the earth's shadow are factors.

1957

- 851 Aaronson, Michael. THE LAW OF SPACE. *Flight* 72:889-890, Dec. 1957.
- Discusses the three most important legal questions arising from developments to explore interplanetary space: altitude of territorial space sovereignty; the rules of navigation relating to space vehicles; and the law of discovery of planetary bodies.
- 852 Aberdeen Proving Ground, Ballistic Research Laboratories, Aberdeen, Md. ON THE MOTION OF A SATELLITE OF AN OBLATE PLANET, by B. Garfinkel. 33 p., Jly. 1957. (Rpt. 1018)
- Orbit calculation.

91

853
Aberdeen Proving Ground, Ballistic Research Laboratories, Aberdeen, Md. ORBIT MEASUREMENTS OF AN ARTIFICIAL EARTH SATELLITE (SPUTNIK II) FROM PHOTOGRAPHS TAKEN WITH A TRACKING BALLISTIC TELESCOPE SYSTEM, by D. Reuhl. 1/4 in. thick, Nov. 1957. (Tech. Note 1156)

A brief resumé is given of optical methods for measurement of artificial earth satellites. Observation of the third-stage rocket of Sputnik I and II with tracking ballistic telescope systems, based on SMT and IAOR instruments are described.

854
Aberdeen Proving Ground, Ballistic Research Laboratories, Aberdeen, Md. THEORY OF THE SPIN OF A CONDUCTING SATELLITE IN NON-EQUATORIAL ORBITS, by J.P. Vinti. 73 p., Oct. 1957. (Rpt. 1031)

For orbits which are precessing circles, theory of spin of a conducting spherical satellite, as affected by magnetic field of earth, is simplified by smoothing out high-frequency fluctuations at the start, in the differential equations.

855
Aberdeen Proving Ground, Ballistic Research Laboratories, Aberdeen, Md. THEORY OF THE SPIN OF A CONDUCTING SATELLITE IN THE MAGNETIC FIELD OF THE EARTH, by J. P. Vinti. 70 p., Jly. 1957. (Rpt. 1020).

A theoretical investigation of spin.

856
Ackeret, J. ELEMENTARY CONSIDERATIONS ON SATELLITE AND SPACE TRAVEL PROBLEMS. Schweiz. Bauz. 75:814-822, 1957. Not examined.

"A wide review of some of the basic principles governing such factors as energy requirements, for given masses and trajectories, effect of using stepped rockets, energy calculations for propellants. Brief analytical comments are made on some of the projects advanced for

space travel, especially the Mars project of von Braun." Index Aero. 14:95, Mar. 1958.

857
ADMINISTRATION DIVIDED ON SPUTNIK. Aviat. Wk. 67:30-31, Oct. 28, 1957.

Quotes some public statements made following the launching of Sputnik I.

858
AEROJET DELIVERS VANGUARD ENGINE. Aviat. Wk. 66:34, May 13, 1957.

859
AF BASES ORGANIZE TEAMS TO HELP TRACK EARTH SATELLITE. AF Times 17:52, Apr. 27, 1957.

860
Air Force. Cambridge Research Center. THE THRESHOLD OF SPACE. THE PROCEEDINGS OF THE CONFERENCE ON CHEMICAL AERONOMY, Cambridge, Mass., June 25-28, 1956, edited by M. Zelikoff. 342 p., illus., New York, Symposium Publications Division, Pergamon Press, 1957.

The papers included concern examination of atmospheric phenomena and the environment which will confront space travelers.

Arrangement is as follows: I. Atmospheric photochemistry-Earth and Venus; II. Spectroscopy and photochemistry; III. Rocket probing of the upper atmosphere; IV. Phenomena produced by hypersonic flight.

861
Air Force. Wright Air Development Center, Wright-Patterson Air Force Base, Ohio. PRELIMINARY INVESTIGATION OF HYPER ENVIRONMENTS AND METHODS OF SIMULATION, by R.A. Ditaranto and J.J. Lamb. 79 p., diags., Jly. 1957. (Tech. Rpt. 57-456)

Contains conclusions as to the natural and induced environments which will be encountered by future USAF weapon-systems (short-duration flying type and long-duration satellite vehicles) and the

extent to which these environments are considered detrimental to the operational characteristics of subsystems and equipments.

862
Air Force. Wright Air Development Center, Wright-Patterson Air Force Base, Ohio. TRANSFER BETWEEN VEHICLES IN CIRCULAR ORBITS, by B.H. Palewonsky. 9 p., Aug. 1958. (Tech. Note 57-267)

Development of a method for calculating the initial angular separation between two vehicles in circular orbits, required for the orbital transfer of a commuter rocket with a minimum expenditure of fuel.

863
Air University. School of Aviation Medicine, Randolph Air Force Base, Texas. EPITOME OF SPACE MEDICINE. 1 in. thick, 1957.

A collection of research reports and scientific journal articles relating to space environment and the human aspects of space flight.

864
Almar, Ivan. KUTATOMUNKA MESTERSEGES HOLD AKKAL. (RESEARCH WORK WITH ARTIFICIAL MOONS). Fiz. Szemle 7:53-62, Apr./June 1957.

In Hungarian.
Satellite research, including the U.S. Project Vanguard.

865
AMERICAN SATELLITE SHRINKS. Discovery 18:438, Oct. 1957.

Brief mention of change in size of American satellite.

866
Anderson, R.A. and Keay, C.S.L. NEW ZEALAND VISUAL OBSERVATIONS OF THE ROCKET ACCOMPANYING THE RUSSIAN ARTIFICIAL SATELLITE. Astronautica Acta 2:227-230, diags., 1957.

Tracks derived from New Zealand visual observations are presented and a comparison made between the observed regression of the nodes of the orbit and that expected by theory.

867
Anderton, D.A. DETAILS OF SPUTNIK SURPRISE SCIENTISTS. Aviat. Wk. 67:30-31, Oct. 21, 1957.

Also in Missile Eng. 2:6-8, illus., Jan. 1958.

868
Anderton, D.A. SATELLITES' GLOW PERMEATES BARCELONA. Aviat. Wk. 67:29-31, Oct. 14, 1957.

Summary of Eighth International Astronautical Congress at Barcelona 12 September, 1957.

869
ANOTHER RUSSIAN SATELLITE. Sky and Telescope 17:55, 65, Dec. 1957.

Summary of information about Sputnik II.

870
Antrushin, A. CONQUERING OUTER SPACE. Koster 9:28-29, Sept. 1957. In Russian. Not examined.

871
ARE EARTH SATELLITES ILLEGAL? Aero. 36:37-38, Aug. 1957.

Refers to legal "squabble" over necessity and means of legalizing satellites.

872
Army Ballistic Missile Agency, Huntsville, Ala. THE DAMPING OF METALLIC CYLINDRICAL AND SPHERICAL BODIES ROTATING IN A UNIFORM MAGNETIC FIELD, by J. W. Hooper. 27 p., Nov. 1, 1957. (DG-R-15)

The magnetic damping of the motion of metallic bodies rotating in a magnetic field is studied particularly as applicable to the operation of an earth satellite. Generalized cylindrical and spherical bodies are considered both analytically and from a model theory standpoint. The general solution for the field distribution within the rotating bodies, as derived from Maxwell's equations, is discussed.

873
ARMY ENGINEERS ASSISTING IN DEVELOPING SATELLITE. Frank. Inst. J. 263:93-94, Jan. 1957.

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Includes optical tracking plans for the Project Vanguard satellite.

982 Croome, Angela. comp. THE INTERNATIONAL GEOPHYSICAL YEAR MONTH BY MONTH. *Discovery* 18:526-528, illus., Dec. 1957.

Includes remarks on tracking the Russian satellite; rocket survival; discovery that atmosphere is thinner and colder; increasing British observations and Sputnik I helps ionospheric studies.

983 Cross, C.A. LANDING A ROCKET ON THE MOON. *Aero.* 37:128-129, illus., Sept. 1957.

Describes an analog computer which simulates a rocket falling vertically on the Moon. It is of the "Link Trainer" type and provides a simulation of a spaceship on which a pilot can be tested and trained.

984 Cross, C.A. SATELLITE PARADOX. *Spaceflight* 1:48, Jan. 1957.

Concerns velocity of satellite vehicles.

985 Cross, C.A. THE SATELLITE PARADOX. *Brit. Interplan. Soc. J.* 16:110-111, Apr./June 1957.

Refers to two papers (See Items 984 and 1183) in which authors have independently made the point that when a satellite encounters air resistance it is speeded up, instead of slowed down as might have been expected.

This paradox has led the writer to speculate on the behavior of a composite satellite, made up of a light sphere and a dense one linked by a thin cord.

986 Cross, C.A. THE USE OF PROBE ROCKETS. *Brit. Interplan. Soc. J.* 16:148-162, Jly./Sept., 1957.

This paper considers the uses and operation of probe rockets that are not restricted to a closed orbit around the earth. Three specific missions are considered in detail: to orbits round the Moon, Mars and Venus. Conditions for their successful accomplishment are derived, and the information that might be obtained is considered in each case. The prospects for direct investigation of planetary surfaces by remotely controlled landings is examined.

987 Crouse, V.J. VANGUARD INSTRUMENTATION SYSTEM. *Signal* 12:33-34, 36, illus., Sept. 1957.

A discussion of the system, how it works, and what it is expected to do.

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988
CSAGI ROCKET AND SATELLITE
CONFERENCE. IGY Bull. 5:15-16,
Nov. 1957.

Brief summary of conference held
in Washington, D.C., September 30 -
October 5, 1957. Includes list of
official delegates; and some of the
resolutions adopted.

989
Cummings, S. VANGUARD COMPUT-
ING CENTER. Automotive Indus.
117:94, 96, Aug. 1, 1957.

Brief description of purpose and
operation.

990
Cunningham, C.B. VIBRATION
MEASUREMENTS ON THE VAN-
GUARD VEHICLE. Feb. 1957.
Order from OTS. (PB-132865)
\$1.80

Described here are possible sources
of shock and vibration of the satel-
lite to be launched by the Vanguard
vehicle. Available data on the vi-
bration and noise levels measured
during captive firings of the second
and third stages are presented,
along with available power density
spectra.

991
Danilin, B.S. INVASION OF THE
COSMOS. Nauka i Zhizn 12:4-8,
Dec. 1957.
In Russian.

How the second Russian satellite is
constructed, new data obtained, such
as that on solar radiation and cosmic
rays; how the receivers work; and
the first cosmic passenger.

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ZADACHA IZMERENIYA DAVLENIIA
I PLOTNOSTI VYSOKIKH SLOEV
ATMOSFERY S POMOSHCHIU IS-
KUSSTVENNOGO SPUTNIKA ZEMLI.
(THE PROBLEM OF MEASURING
PRESSURE AND DENSITY OF THE
UPPER ATMOSPHERIC LAYERS
WITH THE AID OF AN ARTIFICIAL
EARTH SATELLITE). Usp. Fiz.
Nauk. 63(1b) 205-225; Sept. 1957.
In Russian.

Deals with an analysis of the physi-
cal control of the problem pertaining
to measurements of the pressure
and density of high altitude layers of
the atmosphere with the use of a
satellite for this purpose.

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Das, Anaditjan. THE ARTIFICIAL
SATELLITE AND THE RELATIV-
ISTIC RED SHIFT. Prog. Theor.
Phys. 18:554-555, Nov. 1957.

Refers to formula derived by Singer
and extended by Hoffman, which, ac-
cording to the author does not follow
directly from the solution of the
field equation. This the author pro-
ceeds to do.

994
DATA FROM THE SPUTNIKS. Time
70:57, Dec. 30, 1957.

Indicates revisions in standard
theories of the earth and its atmos-
phere as a result of information
obtained from the Russian Sputniks.

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Daugherty, B.W. BUYING FOR THE
EARTH SATELLITE. Aero. Pur-
chasing 1:22-23, illus., Oct. 1957.
Gives an idea of the miscellaneous
items acquired by the Martin Com-
pany from twelve major suppliers in
connection with Project Vanguard.

Relates, in particular, the making of
the mouse trap springs.

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Davidon, W.C. SOVIET SATELLITES.
U.S. REACTIONS. Bull. Atomic Sci.
13:357-358, Dec. 1957.

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well as periodicals to indicate psy-
chological reaction.

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Davis, R.J., Wells, R.C. and Whipple,
F.L. ON DETERMINING THE
ORIENTATION OF A CYLINDRICAL
ARTIFICIAL EARTH-SATELLITE.
Astronautica Acta 3:231-236, diag.,
1957.

A method is proposed for determin-
ing the orientation of the spent third

stage of the satellite launching
rocket by observing the flash from a
specularly reflecting cylindrical
surface.

The name "Barbe Pole" is sug-
gested for this type of satellite from
which it is believed much useful
data could be obtained at almost no
additional cost.

998
DEATH OF TV-3. Time 70:9-10,
Dec. 16, 1957.

Some details of the attempted first
launching of the Navy's satellite.

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DE FENSE SEEKS CAUSE OF SATEL-
LITE FAILURE. VANGUARD TEST
VEHICLE 3. Aviat. Wk. 67:28-30,
Dec. 16, 1957.

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De Groat, G.H. BUILDING THE
SPACE SATELLITES. Am. Mach.
101:101-106, Jan. 14, 1957.

Vanguard production details.

1001
Del Ray, Lester. ROCKETS THROUGH
SPACE: THE STORY OF MAN'S
PREPARATION TO EXPLORE THE
UNIVERSE. 127 p., illus., Philadel-
phia, Winston, 1957.

Theories about possibilities in space
exploration.

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Detra, R.W., Kemp, N.H. and Riddell,
F.R. ADDENDUM TO HEAT TRANS-
FER TO SATELLITE VEHICLES
RE-ENTERING THE ATMOSPHERE.
Jet Propul. 27:1256-1257, Dec. 1957.

Original article is by N.H. Kemp and
F.R. Riddell.

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Devienne, M. TEMPERATURE
REACHED BY A MISSILE MOVING
IN THE UPPER ATMOSPHERE.
Fusées 2:43-47, Mar. 1957.

In French. Not examined.

"Two problems are considered
(a) what is the equilibrium tempera-
ture reached by a satellite or missile

on its trajectory and the range of
variations at this condition, (b) at
what height does a given missile be-
come incandescent or reach a given
temperature. At the altitudes dis-
cussed (80 to 120 km) the flow re-
gimes are those of a rarefied gas.
The characteristics of such flows
are briefly discussed. The results
of experiments simulating these
conditions for a plate and a sphere
are summarized. It is shown that on
such results calculations for the
above problems can be based and
particularly for bodies of cylindro-
conical form." - Index Aeronauticus
7:32, Jly. 1957.

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Dickinson, T.A. EARTH SATELLITE
NO. 1. Weld. & Metal Fabric; 25:
289, 305, illus., Aug. 1957.

Importance of welding in construc-
tion of the satellite.

1005
Dingle, Herbert. RELATIVITY AND
SPACE TRAVEL. Nature 180:500,
Sept. 7, 1957.

A reply to J.H. Fremlin's sugges-
tion and calculations for a solution
of the problem.

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Dobronravov, V. FIRST STEP INTO
SPACE. Kryl. Rod. 8:2-3, Dec. 1957.
In Russian. Not examined.

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THE COSMOS. Kryl. Rod. 8:20-22,
June 1957.

In Russian. Not examined.

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USING INTERPLANETARY SPACE.
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ogy. Lincoln Laboratory, Lexington,
Mass.

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Dobronravov, V. SOVETSKIE ISKUS-
STVENNYE SPUTNIKI ZEMLI.

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(THE SOVIET EARTH SATELLITES). Elektrich. 12:1-2, Dec. 1957.

In Russian.

Sizes, orbits and equipment are described.

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Dorrance, W.H. SOME PROBLEMS IN THE AEROTHERMODYNAMICS OF HYPERSONIC FLIGHT. Aero. Eng. Rev. 16:26-28, illus., Jan. 1957.

A survey of problems encountered in some aerothermodynamic analysis of bodies in hypersonic flight within the earth's atmosphere.

The region of interest includes velocities for vehicles ranging from conventional missiles to velocities exceeding those achieved by earth satellites.

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In Russian.

Equisignal zones methods for determining when satellite vehicles pass over receiving point.

Translation R-2762 available at Special Libraries Association, Translation Center, Crerar Library, Chicago, Ill.

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Dubrovin, V. RABOTA S PELENZATZIONNOY PRISTAVKOY. (OBSERVATION OF ARTIFICIAL EARTH-SATELLITE SIGNALS. WORK WITH THE DIRECTION-FINDING ATTACHMENT). Radio (USSR) no. 8: 19-20, Aug. 1957.

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Continuation of an article on the subject in the July issue of Radio. Describes the mounting of the two receiving antennas and of the auxiliary equipment involved in the determination of the passage of the satellite over a certain locality.

Translation no. R-2386 available at Special Libraries Association,

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EARLY SATELLITE TESTS A SUCCESS. AF Times 18:E5, Aug. 24, 1957.

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THE EARTH SATELLITE. 5 p., maps, Severna Park, Md., Mooney-Rowan Publications, 1957.

In a pamphlet describing the first report of Russia's first artificial satellite, a 45 RPM record reproducing the "beep-beep" of Sputnik I is inside the front cover. It contains on one side what is described as "an imaginative dramatization" of the launching of Sputnik I and its carrier rocket.

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THE EARTH SATELLITE PROGRAM. IGY Bull. 1:9-12, Jly. 1957.

Satellite rocketry and launching; physical description and orbit; radio observations and measurements; optical observations and measurements; ground station experiments; and satellite-borne experiments.

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THE EARTH SATELLITE PROJECT VANGUARD. Mag. Magnesium, p. 1-7, illus., May 1957.

Brief account of "the what, when, and where of this much publicized scientific experiment," and several pages of pictures.

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Brief account of satellite instrumentation.

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Details and comment on the Russian satellite.

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Easton, R.L. CALIBRATION OF THE MARK II MINITRACK: USING RADIO STARS AS SIGNAL SOURCES. QST 41:42-44, illus., Apr. 1957.

Outlines the necessary requirements of the receiving equipment and lists the stars that will be useful.

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Easton, R.L. MARK II MINITRACK BASE-LINE COMPONENTS. CONSTRUCTIONAL DETAILS OF ANTENNA SYSTEM FOR SATELLITE TRACKING. QST 41:37-41, illus., Sept. 1957.

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Easton, R.L. THE MARK II MINITRACK SYSTEM. In Am. Astronautical Soc. Proc., 3rd Annual Meeting; Dec. 6-7, 1956, p. 53-58; New York, The Society, 1957.

A brief history of the preliminary design leading to final specifications for the Vanguard satellite radio tracking program. Also in J. Astronautics 4:31-32, 39, illus., Summer, 1957.

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Easton, R.L. VANGUARD. U.S. Naval Res. Lab. Rpt. NRL Prog. p. 25-26, Oct. 1957.

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Edelbaum, T.N. COMMENTS ON THE POWERED FLIGHT TRAJECTORY OF A SATELLITE. Jet Propul. 27: 1260-1261, Dec., 1957.

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Comments appear in the September issue, p. 635-641.

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The paper concludes with some observations on satellite vehicles which are treated as a limiting case of the ballistic vehicles previously discussed.

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Egorov, V.A. O NEKOTORYKH ZADACHAKH DINAMIKI POLETA K LUNE. (CERTAIN PROBLEMS OF MOON FLIGHT DYNAMICS). Usp. Fiz. Nauk. 63(a):73-117, Sept., 1957.

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Ferri, Antonio, Feldman, Lewis and Daskin, Walter. THE USE OF LIFT FOR RE-ENTRY FROM SATELLITE TRAJECTORIES. Jet Propul. 27:1184-1191, Nov. 1957.

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FIRST ACTUAL VANGUARD ROCKET DELIVERED. Electron. Indus. & Tele-Tech. 16:11, Aug. 1957.

Announcement of the first prototype satellite launching vehicle tests; also announcement that tests of solar cells as the primary satellite power supply will be conducted during early satellite launchings.

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Russian article (not examined) concerning Sputnik I.

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A review of activity after launching of the Russian satellites.

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FIRST STEP IN THE COSMOS. Skrz. Polska 13(no. 42):2, Oct. 1957.
In Polish. Not examined.
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Framant, J. L'ANNÉE GÉOPHYSIQUE INTERNATIONALE. LES ENGINES DE RECHERCHE A TRÈS HAUTE ALTITUDE ET LE PROJET "VANGUARD." (THE INTERNATIONAL GEOPHYSICAL YEAR: HIGH ALTITUDE RESEARCH MISSILES AND THE PROJECT "VANGUARD"). Docaero 42:3-12, Jan. 1957.

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Fraser, Ronald. ONCE AROUND THE SUN. 160 p., London, Hodder and Stoughton, 1957.

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Fraser, Ronald. REGARD THE EARTH. THE STORY OF THE INTERNATIONAL GEOPHYSICAL YEAR 1957-1958, with a foreword by Sir James Wordie. 24 p., illus., London, Junior Art Club Publications, 1957.

Plans for artificial satellites are detailed on pages 22-24.

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Fremlin, J.H. RELATIVITY AND SPACE TRAVEL. Nature 180:499-500, Sept. 7, 1957.

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See reply by Herbert Dingle, Nature 180:500, Sept. 7, 1957 (Item 1005)

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Fried, B.D. ON THE POWERED FLIGHT TRAJECTORY OF AN EARTH SATELLITE. Jet Propul., 27:641-643, June 1957.

The problem of programming the powered flight trajectory of an earth satellite to obtain maximum orbit altitude is investigated.

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Friedman, Herbert. SCIENTIFIC EXPERIMENTS IN IGY SATELLITES. Yale Sci. Mag., p. 1-5, May 1957.

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FUELS FOR SPACE. Time 70:91-92, Nov. 18, 1957.

A brief review of super fuels.

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Furnas, C.C. AROUND THE WORLD IN NINETY MINUTES. Elec. Eng. 76:103-105, Jan. 1957.

Address given by the Asst. Secretary of Defense (Research and Development) before the American Rocket Society, Buffalo, N.Y. Sept. 25, 1956.

A portion of this address is included in Inter-Range Instrumentation Group Proceedings of the First Symposium, October 9-11, 1956, The Lodge, Cloudcroft, N. Mex., p. 1-10, White Sands Proving Ground, New Mexico, Oct. 11, 1956, reprinted Apr. 1958.

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Furnas, C.C. THE VANGUARD SATELLITE. Ord. 41:596-599, Jan./Feb. 1957.

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FURTHER RADIO OBSERVATIONS OF THE FIRST SATELLITE (reported by the British Ministry of Supply). Nature 180:944, Nov. 9, 1957.

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Galai, N. THE SOVIET SATELLITES AND THE PROBLEM OF PROGRESS IN THE TOTALITARIAN AND FREE SOCIETY. Obz. Vazhn. Sob. SSSR 4:1-17, Dec. 1957.

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Summary of proceedings and papers.

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Gatland, K.W. ROCKETS AND ARTIFICIAL SATELLITES IN THE IGY.

Spaceflight 1:130-138, illus., Jly. 1957.

The scope and objectives of the IGY with background histories of the rockets and artificial satellites (including Vanguard) that will play vital roles in the biggest and most intensive program of research ever attempted by man.

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Gazley, Carl, Jr. and Masson, D.J. DESIGNING A RECOVERABLE SCIENTIFIC SATELLITE. Aviat. Age 28:44-51, Aug. 1957.

A recoverable orbiting body appears to be the logical sequel to the IGY satellite project. At first such a body would closely resemble the 21.5 lb., 20-in. diameter IGY sphere, the only "payload" being its own skin and a radio beacon.

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Gazley, Carl, Jr. and Masson, D.J. RECOVERY OF A CIRCUMLUNAR INSTRUMENT CARRIER. Paper given at 8th International Astronautical Congress, Barcelona, Oct. 6-12, 1957. New York, American Rocket Society, 1957. (ARS Preprint 488-57)

Possibility of the physical recovery of a circumlunar vehicle widens the scope of scientific investigations possible for a vehicle with lunar capabilities. While a very high guidance capability is necessary to impact such a recoverable vehicle within a given area on the earth's surface, only moderate accuracy is required to effect just a return to earth. Radio tracking during return would enable prediction of the approximate impact point.

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Gejer, S. RADIO SIGNALS FROM SPUTNIK I. Tek. Tid. 87:989-990, Nov. 12, 1957.

In Swedish. Not examined.

"A large number of signal-strength recordings and frequency measurements were carried out at Enkoping radio control station both at 20 and 40 Mc/s, and 0.25 sec pulses at 0.2

sec intervals were observed. The passage of the satellite was observed at night only. Signal-strength curves for the 20 Mc/s transmissions on the 8th of October are reproduced. The 40 Mc/s signals from the second Sputnik were heard between 0500 and 1600 hrs over Sweden, the time for its passage from horizon to horizon being 10-15 sec. 40 Mc/s signals could be recorded for 10 min. and 20 Mc/s signals for approximately 1/2 hr. The recordings show marked selective fading, very similar to point-to-point s.w. transmission on earth, which suggests that multichannel transmission is taking place. Frequency measurement curves obtained at Enkoping are compared with those obtained at Lyngby in Denmark." Sci. Abs. 61B:1030, Feb. 1958.

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Gil'zin, K.A. THE FUTURE OF ROCKET ENGINES FROM THE ROCKET TO THE SPACE SHIP. CHAPTER VI. 35 p., 1957. (?) Russian manuscript. Not examined. Translation R-3229 available at Special Libraries Association Translation Center, Crerar Library, Chicago, Ill.

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Ginzburg, V.L. UEBER DIE VERWENDUNG KUNSTLICHER ERD-SATELLITEN ZUR PRUEFUNG DER ALLGEMEINEN RELATIVITAETSTHEORIE. (ON THE USE OF THE ARTIFICIAL EARTH SATELLITE TO PROVE THE GENERAL THEORY OF RELATIVITY). Exp. Tech. Physik 5:89-92, 1957. In German. Paper given at the International Geophysical Year, Rocket and Satellite Conference, Washington, D.C., Sept. 30-Oct. 5, 1957.

In a suggestion for measuring the gravitational displacement of frequency it is proposed that one measures not the frequency but the difference between the readings on clocks on earth and the readings of clocks on the satellite.

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Also in Priroda 45:30-39, Sept. 1956 and Usp. Fiz. Nauk 63(1a):119-122, Sept. 1957 (both in Russian).

Translation appears in The Russian Literature of Satellites, Part I, p. 176-181, New York, International Physical Index, Inc., 1958.

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Glaser, A.H. SATELLITE TELEVISION FOR METEOROLOGY. Weatherwise 10:183-186, 213, illus., Dec. 1957.

Proposes a photocell pointing outward from a spinning satellite to scan the earth's surface in a series of lines across the path of the satellite. After transmission to earth, these lines may be reassembled to form an image of the surface and the clouds of the atmosphere.

Possible changes in weather forecasting are also discussed.

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GOLD PLATING OF MAGNESIUM. Electroplating 10:319-321, Oct. 1957. Vanguard construction detail.

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Goldman, D.T. and Singer, S.F. STUDIES OF A MINIMUM ORBITAL UNMANNED SATELLITE OF THE EARTH (MOUSE) III. RADIATION EQUILIBRIUM AND TEMPERATURE. Astronautica Acta 3:110-129, 1957.

Presents the problem of predicting the equilibrium temperature of an artificial earth satellite and methods for designing and controlling its temperature under all types of conditions. The results for the equilibrium temperature are presented in the form of convenient nomograms to aid in preliminary design.

Also issued as Maryland University, Physics Dept., Technical Rpt. 46, June 1956.

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Golovine, M.N. SPACE TRAVEL - SCIENCE OR FICTION? Hawker

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- Siddeley Rev. 10:88-91, illus., Sept. 1957.
- Description of some basic astronomical concepts and of some practical projects.
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Goodyear, Joseph. THE EARTH SATELLITE. I - CONCEPT AND PREPARATION. Indian Skyways, p. 41, 43, 45, June 1957.
- Not examined.
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GOODYEAR PROPOSES SMALLER SPACE STATION. Aviat. Wk. 67: 115, 117, 119, 123, illus., Oct. 14, 1957.
- Summary of papers by D.C. Romick, R.E. Knight and Samuel Black given at the Eighth International Astronautical Congress.
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- (IAS 24th Annual Meeting, N. Y. Jan. 23-26, 1956) (Preprint 608)
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- 1092
Grammer, George. SATELLITE TRACKING. QST 41:31, Sept. 1957.
- Minitrack calibration by moon-bounce signals. Suggestions to amateurs for tracking the satellite.
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Grammer, George. WHAT TO DO ABOUT SATELLITES. QST 41:14-15, 17, 14, Dec. 1957.
- What to do at a launching; afterward; telemetering and experiments. Suggestions for amateurs.

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- Gravelos, F.G. A METHOD OF INTEGRATING THE EQUATIONS OF MOTION OF A BODY ENTERING AN ARBITRARY ATMOSPHERE WITH AN AUTOMATIC ERROR ANALYSIS. New York, American Rocket Society, 1957. (ARS Preprint 507-57)
- Paper given at the 8th International Astronautical Congress, Barcelona, Oct. 6-12, 1957.

The method of numerical integration is outlined and four examples of results obtained are given (the earth's atmosphere and three hypothetical planetary atmospheres).

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- Great Britain. Royal Aircraft Establishment, Farnborough. THE EFFECT OF THE EARTH'S OBLATENESS ON THE ORBIT OF A NEAR SATELLITE, by D.G. King-Hele and D.M.C. Gilmore, 40 p., figs., Oct. 1957. (Tech. Note GW-475)

The equations of motion of a satellite in an orbit over an oblate earth in vacuo are solved analytically, by a perturbation method.

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- Gringaus, K.I. and Zelikhman, M.K. ISMERENIE KONTSENTRALSH POLOZHITEL'NYKH IONOV VDOL'ORBITY ISKUSSTVENNOGO SPUTNIKA ZEMLI (MEASUREMENT OF THE CONCENTRATION OF POSITIVE IONS ALONG THE ORBIT OF AN ARTIFICIAL EARTH SATELLITE). Usp. Fiz. Nauk., 63(1b):239-252, Sept. 1957.

In Russian.

Concerns possibility of utilizing the earth satellites as a means of investigating the structure of the ionosphere.

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- Groves, G.V. VELOCITY OF A BODY FALLING THROUGH THE ATMOSPHERE AND THE PROPAGATION OF ITS SHOCK WAVE TO EARTH. J. Atmos. Terr. Phys. 9:73-83, Feb. 1957.

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- Grupp, G.W. ELECTROPLATING IS AN IMPORTANT STEP IN THE CONSTRUCTION OF A MAN-MADE SATELLITE. Metal Finish. 55:40-44, illus., Jly. 1957.

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- Gunther, Max. TRACKING THE MAN-MADE SATELLITE. Radio & TV News 58:31-33, illus., Jly. 1957.

A complex and elaborate recording system will be used to keep track of the tiny sphere after it is launched in space.

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- Haas, W.H. OPERATION MOON-WATCH. Spaceflight 1:49-51, Jan. 1957.

Explanation of the satellite visual tracking program aimed at British amateur observers.

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- Hagen, J.P. PLACING THE VANGUARD SATELLITE IN ORBIT. In-teravia 12:1245-1250, illus., Dec. 1957.

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- Hagen, J.P. RADIO TRACKING, ORBIT AND COMMUNICATION FOR THE EARTH SATELLITE. Aero. Eng. Rev. 16:62-66, May 1957.

A chain of receiving stations create a radio fence which will intercept a satellite each time it circles the earth.

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- Hagen, J.P. THE SATELLITE LAUNCHING VEHICLE - PLACING THE SATELLITE IN ORBIT. Griff. Obs. 21:134-146, illus., Dec. 1957.

A paper detailing the physical characteristics of the Vanguard satellite package; orbits; time in sunlight; satellite temperature; magnetic damping of satellite rotational velocity; satellite designs; the launching vehicle; and the launching program.

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- Hagen, J.P. THE SATELLITE PROGRAM - PHYSICAL ASPECTS. Ciencia, 16:323-334, illus., June 10, 1957.

The launching and tracking of a U.S. satellite; paper presented at the Western Hemisphere IGY Conference, Rio, July 1956.

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- Halacy, D.S., Jr. FABULOUS FIRE-BALL. THE STORY OF SOLAR ENERGY. 154 p., illus., New York, Macmillan, 1957.

Ch. 11, Solar-powered space ships, includes picture of Dr. Hagen, Director of Project Vanguard, and models of the earth satellite. It is stated that the first use of solar energy in space will probably consist of solar batteries installed in such a satellite.

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- Haley, A.G. THE INTERNATIONAL ASTRONAUTICAL FEDERATION. Fed. Bar J. 17:470-474, Oct./Dec. 1957.

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Haley, A.G. LAW MUST PRECEDE MAN INTO SPACE. *Missiles and Rockets* 2:67-70, Nov. 1957. •

Analysis based upon practical methods of formulating the jurisdiction of air space suggested by von Karman.

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Haley, A.G. THE PRESENT DAY DEVELOPMENTS IN SPACE LAW AND THE BEGINNINGS OF METALAW. 15 p., 1957.

Reprinted from *Canad. Oil J. v. 8*, Mar., Apr., May 1957.

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Haley, A.G. SPACE LAW AND METALAW - JURISDICTION DEFINED. *J. Air Law & Commerce* 24:286-303, Summer 1957.

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HALF-TON SPUTNIK. *Commonweal* 67:163-164, Nov. 15, 1957.

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Hancock, J.H. ANALOG COMPUTORS. *U.S. Naval Res. Lab. Rpt. NRL Prog.*, p. 32, Oct. 1957.

Outlines a scheme devised for following the career of a satellite.

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Usefulness of an earth satellite in studying the meteorology of the earth is discussed. Planned measurements of the distributions and motions of cloud cover over the surface of the earth will contribute vitally to the long- and short-range forecast problems, to location and tracking of violent storms such as hurricanes, and to battle-area surveillance problems.

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Hansen, C.F. SOME CHARACTERISTICS OF THE UPPER ATMOSPHERE PERTAINING TO HYPER-VELOCITY FLIGHT. *Jet Propul.* 27:1151-1156, Nov. 1957.

The chemical processes which occur in the air are discussed relative to their effects on the density and temperature structure of the atmosphere. The reactions responsible for most of the solar energy absorption are outlined along with the major rate controlling reactions which determine the atmosphere's state of chemical equilibrium. It is demonstrated that because of the low density most of the aerodynamic force and heat transfer effects become secondary above 60 miles altitude for vehicles traveling at speeds up to escape velocity.

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Harvard University. Blue Hill Meteorological Observatory, Milton, Mass.,

METEOROLOGICAL UTILIZATION OF IMAGES OF THE EARTH'S SURFACE TRANSMITTED FROM A SATELLITE VEHICLE, by A.H. Glaser, 145 p., Oct. 31, 1957.

Inspects the potential meteorological use of satellites and questions their utility.

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Hass, G.H., Bradford, A.P. and Cox, J.T. COATINGS FOR INFRARED OPTICS AND FOR THE SATELLITE. In *Army. Chief of Research and Development, Report of Army Science Conference, U.S. Military Academy, West Point, N.Y.*, June 26-28, 1957, v. 2, p. 268-281, illus., Washington, D.C., 1957.

Describes the construction of new high-vacuum evaporation units suitable for preparing durable and adherent films and film combinations with precisely controlled thicknesses for infrared optics and for coating the earth satellite.

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Hass, G.H. THE COATINGS THAT GO ON THE SATELLITE. *Mag. Magnesium*, p. 4-5, illus., Aug. 1957.

The application and effect of the four exterior coatings applied to the Vanguard satellite sphere.

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Haviland, R.P. THE COMMUNICATION SATELLITE. Paper given at 8th International Astronautical Congress, Barcelona, October 6-12, 1957. New York, American Rocket Society, 1957. (ARS Paper 487-57)

The interrelations between an artificial satellite and the earth and the characteristics of satellites are reviewed to determine their effect on communication systems (television, television, and radio broadcasts). The requirements for typical communication systems are studied. A set of services are proposed for incorporation in a large earth satellite.

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Hawkes, Russell. CAMERA READY TO TRACK SOVIET SATELLITE.

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Aviat. Wk. 67:123, 125, 127, illus., Oct. 28, 1957.

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HELLIARC WELDING REACHES FOR THE SKY. *Linde Metalworking Bull.* p. 1-3, illus., Dept. 1957.

Illustrated account of the welding of the satellite sphere and frame.

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Henderson, G.A. LETTER TO THE EDITOR (CONCERNING THE ARTICLE BY EHRICKE AND GAMOW ENTITLED A ROCKET AROUND THE MOON). *Sci. Am.* 196:18, 20, Sept. 1957.

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Henize, K.G. THE BAKER-NUNN SATELLITE-TRACKING CAMERA. *Sky and Telescope*, 16:108-111, illus., Jan. 1957.

Includes a suggested layout for a typical camera station.

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Henry, I.G. LIFETIMES OF ARTIFICIAL SATELLITES OF THE EARTH. *Jet Propul.*, 27:21-24, 27, Jan. 1957.

The effect of variations in upper-atmosphere density on the lifetimes of satellites in elliptical and circular orbits, calculated from kinetic theory.

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Herrick, Samuel, Baker, R.M.L., Jr. and Hilton, C.G. GRAVITATIONAL AND RELATED CONSTANTS FOR ACCURATE SPACE NAVIGATION. New York, American Rocket Society, 1957. (ARS Preprint 497-57)

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1126 Hersey, Irwin. THE MEANING OF "SPUTNIK." *Astronautics* 2:22-25, 83-86, Nov. 1957.

A chronological review of the launching of the Russian earth satellite and what happened afterward.

A table on p. 23 gives details of U.S. versus Russian satellites.

1127 Hessberg, R.R., Jr. ACCELERATIVE FORCES ASSOCIATED WITH LEAVING AND RE-ENTERING THE EARTH'S GRAVITATIONAL FIELD. In *American Astronautical Society. Proceedings, 3rd Annual Meeting, New York, December 6-7, 1956*, p. 95-100, New York, The Society, 1957.

Accelerative forces associated with leaving and re-entering the earth's gravitational field are considered from the escape, space flight and re-entry approach.

1128 HIGHLIGHTS ON VANGUARD. *All Hands* 491:26-27, illus., Dec. 1957.

Summary of J.P. Hagen's remarks at the National Press Club.

1129 Hilton, W.F. RE-ENTRY AND RECOVERY. *Engr.* 204:120-121, Jly. 26, 1957.

1130 Hoening, S.A. METEORIC DUST EROSION PROBLEM AND ITS EFFECT ON THE EARTH SATELLITE. *Aero. Eng. Rev.*, 16:37-40, illus., Jly. 1957.

A survey of research on the subject, indicating that for a satellite whose life is measured in days the effects of erosion are negligible.

1131 Hoffmann, B. GENERAL RELATIVISTIC RED SHIFT AND THE ARTIFICIAL SATELLITE. *Phys. Rev.* 106:358-359, Apr. 15, 1957.

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satellite is modified to take account of the diurnal rotation of the earth and the lack of spherical symmetry of its gravitational field. It is shown that the Singer rates of the earth and satellite clocks need slight modifications, but that these modifications tend to cancel each other except at large distances from the earth, so that when one uses a mean radius of the earth in Singer's formula, the formula is adequate for present purposes.

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1134 House, C.B. and Van Allen, R.L. COMMUTATION AND NONDESTRUCTIVE READ-OUT OF MAGNETIC MEMORY CORES IN EARTH SATELLITE. In *National Telemetering Conference. Papers presented at El Paso, Texas, May 27-29, 1957*, p. I-A-2-1-I-A-2-11, New York, American Institute of Electrical Engineers, 1957.

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1135 HOW CAN ROCKETS OPERATE IN SPACE? *All Hands* 491:7, illus., Dec. 1957.

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1136 HOW TO BUILD A SATELLITE. *Mill & Factory* 61:81-82, illus., Dec. 1957.

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1137 HOW U.S. LOST SATELLITE RACE. *U.S. News & World Report* 43:48, Oct. 18, 1957.

What slowed up the U.S. satellite program? And who is to blame?

In words of military men, political leaders and scientists who know the facts, some of the explanations being offered are quoted.

1138 Howard, A.L. RANDOM VIBRATION TESTING OF PROJECT VANGUARD SATELLITE AND OTHER UPPER-ATMOSPHERE ROCKET COMPONENTS. *U.S. Naval Res. Lab. Rpt. NRL Prog.*, p. 23-24, Jly. 1957.

Report on Problem A02-18.

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1139 Humphries, John. OBSERVATIONS OF ARTIFICIAL SATELLITES. *Brit. Interplan. Soc. J.* 15:347-349, Dec. 1956; 16:57-58, Jan./Mar. 1957.

Report on American Moonwatch program and Minitrack equipment.

1140 Humphries, John. ROCKETS AND ROCKET PROPELLANTS. In *Bates, D.R. and Moore, Patrick, eds. Space Research and Exploration*, p. 37-54, London, Eyre & Spottiswoode, 1957.

The application of rockets to the conquest of space.

1141 Hyde, M.O. EXPLORING EARTH AND SPACE. THE STORY OF THE IGY.

160 p., illus., New York, McGraw-Hill, 1957.

Plans for studying the wonders of the earth and the universe during the third International Geophysical Year are outlined in dramatic fashion.

Use of the Vanguard earth satellite is mentioned.

1142 Iatsunskii, I.M. O VLIHANII GEOFIZICHESKIKH FAKTOROV NA DVIZHENIE SPUTNIKA. (THE EFFECT OF GEOPHYSICAL FACTORS ON THE MOTION OF A SATELLITE). *Usp. Fiz. Nauk* 63(1a):59-71, Sept. 1957.

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1143 IBM DISTRIBUTING FILM ON PROJECT VANGUARD. *Astronautics* 2:52, Oct. 1957.

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1144 IBM MACHINE TO PREDICT SATELLITE ORBIT. *Am. Aviat.* 20:53, Jan. 14, 1957.

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IL PROBLEMA DELLA STRUMENTAZIONE DEL SATELLITE ARTIFICIALE. (THE PROBLEM OF INSTRUMENTATION OF ARTIFICIAL SATELLITE). Centro Aero. Atom. Ital. no. 19:21-27, Sept. 26, 1957. In Italian.
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Jones, H.S. THE INTERNATIONAL GEOPHYSICAL YEAR. J. Inst. Nav. 10:17-30, Jan. 1957.

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Includes proposal to launch artificial satellites and a discussion of the geophysical problems to be studied.

1166 Joquel, A.L. SOLAR POWER AND THE ARTIFICIAL SATELLITE. *The Sun at Work*, 2:3-4, 15, June 1957.

Relates use of solar cell in clearing the memory unit.

1167 Joyce, J.W. THE WHOLE WORLD - A LABORATORY. 21 p., Washington, D.C., National Science Foundation, Jan. 28, 1957.

Address by Head, Office of International Geophysical Year, National Science Foundation before the Scientific Research Society of America, Phila., Pa.

The earth satellite is described.

1168 Kaempffert, Waldemar. THE COMING EXPLORATION OF SPACE. *Sci. Dig.*, 41:79-81, Feb. 1957.

The satellite program, condensed from the New York Times.

1169 Kahn, W.D. CALIBRATION OF MINITRACK MARK II. *Astron. J.* 62:396-399, Dec. 1957.

Treats the calibration by an error analysis of preliminary results obtained by tracking stellar radio sources.

1170 Kallmann, H.K. and Kellogg, W.W. USE OF AN ARTIFICIAL SATELLITE IN UPPER AIR RESEARCH. *Am. Meteorol. Soc. Bull.* 38:17-19, 1957.

Discussion of the types of data to be collected by satellites and their scientific applications.

1171 Kane, J.T. OPERATION MOON-WATCH. *Natural Hist.* 66:126-129, illus., Mar. 1957.

America's amateur astronomers are building "optical fences" for charting the behavior of the first space satellites.

1172 Kaplan, Joseph. HOW MAN-MADE SATELLITES CAN AFFECT OUR LIVES. *Natl. Geog. Mag.* 112:791-810, illus., Dec. 1957.

Explains how satellites can teach us about the most fundamental problems of science which will enable us to improve many things we already possess and to achieve things that we now only dream about.

1173 Kaplan, Joseph. THE INTERNATIONAL GEOPHYSICAL YEAR. *Yale Sci. Mag.*, 31:8-13, illus., May 1957.

The Antarctic, oceanography, upper atmosphere, seismology and satellite programs.

1174 Karpenko, A.G. and Lidov, M.L. TEMPERATURE CONDITIONS OF AN EARTH SATELLITE. *Akad. Nauk. SSSR. Ser. Geofiz. Izvest.*, 4:527-533, Apr. 1957.

In Russian.

The authors propose, as an ideal satellite, a body with infinite heat conductivity completely without means of orientation in space, and say that, with such a concept, the specific design parameters of the satellite cannot be considered in the calculations.

The article presents calculations made for certain orbits and graphs of the minimum and maximum temperatures attainable by the body in relation to the nature and reflectivity of the surface.

1175 Kazantsev, A. NABLYODENIYA ZA RADIOSIGNALAMI S ISKUSSTVENNOGO SPUTNIKA ZEMLI I KOSMOSU. (OBSERVATION OF RADIO SIGNALS FROM THE ARTIFICIAL EARTH SATELLITE AND THEIR SCIENTIFIC SIGNIFICANCE). *Radio (USSR) no.* 6:17-19, June 1957.

123

In Russian.

See also *Wireless World* 63:574-578, Dec. 1957 for Summary.

"A U.S.S.R. satellite launched during the IGY will be equipped with two 1-W transmitters operating at 20 and 40 Mc/s respectively, alternately transmitting pulse signals of 0.05-0.7 sec duration from above the F layer."

Electronic & Radio Engr. Abs. and Ref. 34:3861, Dec. 1957.

Translation no. R-2387 available at Special Libraries Association Translation Center, Crerar Library, Chicago, Ill.

1176 Kazantsev, A. PREDVARITEL'NYE DANNYE O RASPROSTRANENII RADIOVOLN. (PRELIMINARY DATA ON THE PROPAGATION OF RADIO WAVES). *Radio (USSR) no.* 12:7-8, Dec. 1957.

In Russian.

Discussion of preliminary data on wave propagation obtained from artificial earth satellites.

1177 Kemp, N.H. and Riddell, F.R. HEAT TRANSFER TO SATELLITE VEHICLES RE-ENTERING THE ATMOSPHERE. *Jet Propul.* 27:132-137, 147, illus., Feb. 1957.

Computations of use in determining conditions under which a satellite may be expected to survive.

Is also Avco Research Laboratory, Research Report 2, and American Rocket Society Preprint 358-56.

For addendum see Detra, R.W.

1178 Ketchum, H.B. THE ORBIT LIFETIMES OF THE U.S. ARTIFICIAL SATELLITES. In *American Astronomical Society Proceedings*, 3rd Annual Meeting, December 6-7, 1956, p. 31-41; New York, The Society, 1957.

Presents a method of calculating the probable orbit lifetimes of the satellites insofar as present knowledge of the upper atmosphere will allow.

Similar article with same title in *J. Space Flight* 7:1-5, Oct. 1955.

1179 Khaikin, S. O TOCHNOM OPREDELNIH SKOROSTI SPUTNIKA. (ON ACCURATE DETERMINATION OF THE VELOCITY OF A SATELLITE). *Radio (USSR) no.* 12:5-7, Dec. 1957.

In Russian.

Discussion of methods for measuring the orbital velocity of artificial satellites.

1180 Kidwell, R.E., Jr. VANGUARD SATELLITE THERMAL INVESTIGATION. *U.S. Naval Res. Lab. Rpt. NRL Prog.*, p. 22-23, Jly. 1957.

In connection with the thermal design of Vanguard satellites, the problem arose as to the quantity of heat loss from the electronics container to the satellite shell by supports and by instrument leads. The Litton 40, a small, desk-type, digital computer, is being used to generate solutions to certain heat flow equations pertinent to this problem.

Two equations under study are mentioned.

1181 Kimball, D.A. CHEMISTRY, ROCKETS AND THE FUTURE. 13 p., n.p., Commercial Chemical Development Association, 1957.

Paper given at French Lick, Ind. conference, May 13, 1957.

Survey of the rocket industry, including special mention of the chemical aspects and of its two current major projects, ICBM and Vanguard.

1182 King, I.R., McVittie, G.C., Swenson, G.W., Jr. and Wyatt, S.P., Jr. FURTHER RADIO OBSERVATIONS

124

OF THE FIRST SATELLITE.
Nature 180:943, Nov. 9, 1957.

This communication, from the University of Illinois Observatory, deals with the observations on 40 Mc/s made with two-element interferometers, one with a north-south base-line of 5.45 wave-lengths, the other with a north-south base-line of 1 wave-length.

1183
King-Hele, D.G. THE SATELLITE PARADOX. Brit. Interplan. Soc. J. 16:111-112, Apr./June 1957.

Comment on article by C.A. Cross with the same title (See Item 985) and a suggestion that the explanation be re-worded so as to emphasize that the blunt statement "air resistance speeds up a satellite" is not true.

1184
Kirkpatrick, J.S. EARTH SATELLITE HAS MAGNESIUM SHELL. Civil Eng. 27:26-30, illus., Jan. 1957.

Twelve objectives of the Vanguard project are discussed.

1185
Klemperer, W.B. SATELLITE LIBRATIONS. Astronautica Acta 3:16-27, Nov. 1957.

The paper deals with the computations of the frequency of oscillations about the equilibrium attitude which are called librations and which can be computed from the shape and the orbital period of the satellite.

Mathematical details are given in two appendices, viz I, Integration of equation of dumbbell oscillation; and II, Plane libration of a prolate spheroid.

1186
KODAK PRODUCTS HAVE ROLE IN GEOPHYSICAL YEAR PROJECTS. Highlights, 10:1, illus., Nov. 1957.

Kodak films and cameras used in satellite tracking, in solar and aurora photography and in the Antarctic.

1187
Kölle, H.H. SPUTNIK AND VANGUARD: A COMPARISON. Astronautics 2:32-33, 80, illus., Dec. 1957.

An educated guess as to what the first Soviet launching vehicle was like, along with an analysis of the different approaches used by Russia and this country in constructing their orbital carriers.

1188
Konopl'ova, V. MAN-MADE MOON. Ukraina 21:17-18, Nov. 1957.
In Ukrainian. Not examined.

1189
Kooy, J.M.J. ON THE APPLICATION OF THE METHOD OF VARIATION OF ELLIPTIC ORBIT ELEMENTS IN CASE OF A SATELLITE VEHICLE. Astronautica Acta 3:179-214, 1957.

Paper presented at 7th International Astronautical Congress, Rome, 1956.

An outline is given of the determination of the six elliptical orbit elements of the instantaneous Kepler motion of an artificial earth satellite and of the application of the method of variation of orbit elements, if the influences of the oblateness of the earth and the atmospheric drag, as well as the solar and lunar disturbing force are taken into account, more specially in connection with the purpose to use the satellite as a celestial tool for geophysical research.

1190
Krause, E.H. TELEMETERING FOR INTERPLANETARY FLIGHT. Instr. Soc. Am. J., 4:478-480, Oct. 1957.

The article is primarily concerned with telemetering details. Mention is made of the use of long-distance telemetry in the Vanguard satellite and problems which may arise as space flight develops are outlined.

1191
Krasovskiy, V. and Okhotsimskiy, D. VERKHNAYA ATMOSFERA I

ISKUSSTVENNYE SPUTNIKI ZEMLI. (UPPER ATMOSPHERE AND ARTIFICIAL EARTH SATELLITES). Pravda 80:2, Mar. 21, 1958.

In Russian.

Information on the studies of the upper atmosphere conducted in the Soviet Union with the help of artificial earth satellites.

1192
Kurtz, L.A. PROJECT VANGUARD. In Radio Technical Commission for Aeronautics. Papers presented at the Fall 1957 Assembly Meeting, September 26-27, Washington, D.C., p. A-1-17 (Paper 180-57/AS-185), Washington, D.C., The Commission, 1957.

General information about the launching vehicle; fabrication of the satellite; the flight plan; plans for tracking; and the schedule.

1193
Lagenpusas, V. SPACE FLIGHTS. Santarve no. 3:126-131, 1957.
In Lithuanian. Not examined.

1194
Lang, Daniel. EARTH SATELLITE NO. I. N. Yorker, 33:106-121, May 11, 1957.

Scientific facts about Project Vanguard are interpreted for the general reader.

1195
Lang, Daniel. MOON IN A BOX. N. Yorker, 33:50, 52-57, Dec. 28, 1957.

Report of an interview with the Project Vanguard personnel at the Naval Research Laboratory shortly after the misfiring of the earth satellite on December 6. The trials and tribulations of scientific experiments are brought out as well as the fact that the "silvery six-inch satellite, though never destined to become a celestial body (it now resides in a plain brown cardboard box) proved as sturdy as its makers intended it to be."

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1196
LaQue, F.L. METALS FOR SPACE TRAVEL. Steel Process & Convers. 43:691-694, 709, 710, Dec. 1957.

Discussion of design problems and of some materials to meet these problems.

1197
LANSAREA UNVI SATELIT ARTIFICIAL. (LAUNCHING AN ARTIFICIAL SATELLITE: FROM THE ACTIVITIES OF THE IGY). Arip. Patr. 3:8-10, Jly. 1957.

In Rumanian. Not examined.
The U.S. satellite program.

1198
LAST MONTH WITH VANGUARD. Res. Revs. (ONR) Oct./Dec. 1956; Jan./Mar. 1957.

Progress reports appearing on back cover of Research Reviews.

This is a continuing feature.

1199
LAST PLACE ON EARTH. Midwest Engr., 10:8-9, Aug. 1957.

A look at the launching platform - the last place on earth where the satellite Vanguard and its launching vehicle will be.

1200
LAUNCHING PLATFORM READY FOR VANGUARD. Missiles and Rockets, 2:34, Apr. 1957.

1201
LAUNCHING WILL BE THE ACID TEST FOR VANGUARD INSTRUMENTS. Mach. Design, 29:22, Feb. 7, 1957.

1202
Lautman, D.A. THE IGY OPTICAL TRACKING PROGRAM. Yale Sci. Mag., 31:31-34, 69, illus., May 1957.

Description of satellite tracking camera.

1203
Lautman; Stowey; and McCorsky. THE SOVIET SATELLITE. Bur.

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Centr. Internation. Electr. Astr. Circ. no. 1622, 1957.

Not examined.

1204

Lawden, D.F. INTERPLANETARY ORBITS. In Bates, D.R. and Moore, Patrick, eds. Space Research and Exploration, p. 134-150, London, Eyre & Spottiswoode, 1957.

Concerns problems of space navigation.

1205

Lawden, D.F. OPTIMAL ROCKET TRAJECTORIES. *Jet Propul.* 27: 1263, Dec. 1957.

Generalizes result proved by B.D. Fried in his article entitled "On the Powered Flight Trajectory of an Earth Satellite" (See Item 1066).

1206

Lawden, D.F. THE SIMULATION OF GRAVITY. *Brit. Interplan. Soc. J.* 16:134-140, illus., Jly./Sept. 1957.

The artificial gravitational field produced by rotating a spaceship or artificial satellite about its axis is compared and contrasted with normal gravity at the Earth's surface.

1207

Lea, Norman. FURTHER OBSERVATIONS ON THE FIRST SATELLITE. *Nature* 180:943, Nov. 9, 1957.

The 40 Mc/s frequency of the satellite has been measured at Chelmsford (Research Division, Marconi's Wireless Telegraph Company) for the condition of zero doppler effect.

1208

Lear, John. SPUTNIK AND THE SCHOOLTEACHER. *Sat. Rev.*, 40: 39-41, Nov. 2, 1957.

Comment on the Russian achievement of launching the first earth satellite; the attitude of the American public; the neglect of an opportunity to educate millions in the long perspective of science; the great issues in which scientific method and democratic policy must be

meshed; and suggestions for attracting more interest in mathematics.

1209

Leitmann, G. A NOTE ON GODDARD'S PROBLEM. *Astronautica Acta* 4: 237-240, 1957.

Investigation showing that it is necessary to take into account the variation of burning time for "neighboring" trajectories, when considering the classical problem of minimizing the initial mass of a rocket required to reach specified altitude and velocity.

1210

Leitmann, G. OPTIMUM THRUST PROGRAMMING FOR HIGH-ALTITUDE ROCKETS. *Aero. Eng. Rev.* 16:63-66, diags., June 1957.

A discussion of the problem of establishing the thrust-time relation which will achieve the optimum compromise between reduction in gravity and drag losses and thereby result in minimum fuel expenditure.

1211

Lepson, Benjamin. TRAJECTORIES AND ORBITS OF THE VANGUARD SATELLITE. New York, American Rocket Society, 1957. (ARS Preprint 429-57)

1212

Lewellen, J.B. THE EARTH SATELLITE. MAN'S FIRST TRUE SPACE ADVENTURE, [foreword by J.P. Hagen], 59 p., illustrated by Ida Schieb, Knopf, 1957.

The first book for the younger child to be published on the earth satellite is an introduction to the Vanguard Project.

1213

Ley, Willy. ROCKETS, MISSILES AND SPACE TRAVEL. Rev. and enl. ed., 528 p., illus., New York, Viking Press, 1957.

A book devoted to the past, present and future of rockets. Especially valuable for its historical material.

1214

Liapunov, Boris. "VANGUARD" IN THE REAR GUARD. *Ozonek* 35:5, Dec. 1957.

In Russian. Not examined.

1215

Lidov, M.L. STUDY ON RESISTANCE OF A BODY (SATELLITE) MOVING IN A RAREFIED MEDIUM. *Akad. Nauk SSSR. Ser. Geofiz. Izvest.*, 12:1524-1528, Dec. 1957.

In Russian.

Lidov considers that a body, moving in a free molecular flow with no special orientation of the body relative to the direction of its motion, will rotate relative to the center of its mass with a variable angular velocity under the influence of random disturbances.

1216

Link, Frantisek. CONDITIONS DE VISIBILITE DU SATELLITE ARTIFICIEL. (VISIBILITY CONDITIONS OF AN ARTIFICIAL SATELLITE). *Studia Geophys. et Geodaetica*, 1:114-123, 1957.

In French. Not examined.

1217

London. House of Commons. EARTH SATELLITE. London, House of Commons, Parliamentary Debates (Hansard) 575, no. 156, 1957, col. 30-32.

Not examined.

1218

Long, E.J. TRACKING THE SATELLITE. *Nature Mag.*, 50:154-155, 162, illus., Mar. 1957.

The role of amateur watchers in the satellite observation program.

#219

Loos, H.G. TIME DILATION IN SPACE FLIGHT. *Jet Propul.*, 27: 665, June 1957.

Contents that since "time dilatation is a straightforward result of the hypothetical basis of the theory of relativity" there is no reason to doubt its existence.

127

1220

M., F.T. SUMMING UP THE SATELLITE. *Aeroplano* 93:581-582, Oct. 18, 1957.

Deductions and facts related to Sputnik I.

1221

MacDonald, N.D. COMPUTATION FOR AN EARTH SATELLITE. *Computers and Automation.* 6:6-9, 23, illus., Feb. 1957.

Illustrated description of the Navy-IBM high-speed electronic computer facility for predicting the satellite's orbit.

1222

McMillan, E.M. THE "CLOCK PARADOX" AND SPACE TRAVEL. *Sci.* 126:381-384, Aug. 30, 1957.

This article has three sections. In the first, the "paradox" is stated and resolved, using only inertial coordinate systems; in the second, a treatment of accelerated coordinate systems based on the principles of special relativity is given; and in the third, the possibility of practical implications for space travel is examined.

1223

Maco Magazine Corporation. THE COMPLETE BOOK OF SATELLITES AND OUTER SPACE. 2nd ed., 130 p., illus., New York, Maco Magazine Corporation, 1957.

Contents: Development of the Space-ship, by Willy Ley; Station in Space, by Werner Von Braun; Space Medicine, by Heinz Haber; Space Suits, by D.H. Menzel; The High Altitude Program, by R.P. Haviland; History of the Rocket Engine, by J.H. Wylid; Legal Aspects for Space Travel, by Oscar Schachter; Exploitation of the Moon, by Hugo Gernsback; Life Beyond the Earth, by Willy Ley; Interstellar Flight, by L.R. Shepherd; The Spaceship in Science Fiction, by Jeffrey Logan; and A Plea for a Co-ordinated Space Program, by Werner Von Braun.

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- 1224
McQuay, Jordan. TRACKING U.S. SATELLITES. Radio-Electron, 28:44-45, illus., Dec. 1957.
Includes illustration of high performance preamplifier-converter for satellite tracking.
- 1225
Maloney, Terry. OTHER WORLDS IN SPACE. 128 p., illus., London, Acorn Press, 1957.
Includes a short chapter on artificial satellites and space travel.
- 1226
MAN IN SPACE NEEDED TO RECAPTURE LEAD. U.S. SCIENTISTS WARN THAT SATELLITES ARE NOT ENOUGH TO OVERTAKE SOVIET'S TECHNICAL-PROPAGANDA LEAD. Aviat. Wk., 67:26-27, illus., Nov. 18, 1957.
- 1227
Mandel'shtam, S.L. and Efremov, A.I. ISSLEDOVANIYA KOROT KOVOLNOVOGO UL'TRAIOLETOVOGO ISLUCHENIYA SOLUTSA. (INVESTIGATION OF SHORTWAVE ULTRAVIOLET SOLAR RADIATION). Usp. Fiz. Nauk. 63(1b):163-180, Sept. 1957. In Russian.
Discusses use of artificial earth satellites for discovering and studying shortwave ultraviolet radiations.
Translation available from U.S. Joint Publications Research Service.
- 1228
MANNED SATELLITE. Signal 12:66, Nov. 1957.
A design for a manned satellite which, within eight years, could become the nucleus for an economically feasible space station has been developed by the Goodyear Aircraft Co. of Akron, Ohio.
Details of the vehicle were reported in a paper prepared for a meeting of the International Astronautical Federation in Barcelona, Spain.

- 1229
MAN'S CHALLENGE TO OUTER SPACE. Naval Aviat. News, 38:1-7, illus., Jly. 1957.
A general article on the International Geophysical Year and plans for launching an earth satellite.
- 1230
MANUFACTURING THE SATELLITE. Mag. Magnesium, p. 2-7, illus., May 1957.
A picture story of Brooks & Perkins, Inc. operations in the production of the basic structure and certain other structural parts of the Vanguard satellite.
- 1231
Martin Co., Baltimore, Md. DESIGN DATA REQUIREMENTS FOR VANGUARD LAUNCHING SYSTEM, Specification 1082, 22 p., June 26, 1957, Revised.
- 1232
Martin Co. PROJECT VANGUARD. 7 p., illus., Baltimore, Md., The Company, 1957.
A leaflet giving some background for the project; and information on the Vanguard mission; early rocket research; Vanguard launching vehicles; satellite problems; and the world's fastest moving object.
- 1233
Martin Co., Baltimore, Md. VANGUARD FIELD HANDLING CONCEPT, by F.A. Alden. 25 p., [1957]. (Eng. Rpt. 8532)
Concepts upon which procedures are to be formulated.
- 1234
Martin Co., Baltimore, Md. VANGUARD, SUMMARY OF DESIGN DATA. 41 p., Jly. 31, 1957. (Contract Nonr-1817(00))
- 1235
Martin Co., Baltimore, Md. VANGUARD TEST VEHICLE THREE, (TV-3 & TV-3B, Serials 004 & 005) APPLICABLE FIELD PROCEDURES. 1-1/2 in. thick, Aug. 15, 1957. (Contract Nonr 1817(00))

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- 1236
Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. ANSWERS TO SPUTNIK? by A. von Hippel. 7 p., Dec. 1957. (Tech. Rpt. 124) (Contracts Nonr-1841(10); AF 30(635)-2872; AT(30-1)-1937)
After a brief introductory paragraph in which there is reference to the Russian earth satellite, the document is devoted to the importance of modern materials research.
- 1237
Massey, H.S.W. THE EARTH SATELLITE PROGRAMME. In Bates, D.R. and Moore, Patrick, eds. Space Research and Exploration, p. 100-124, London, Eyre & Spottiswoode, 1957.
Largely a discussion of measurement to be made from the satellite, with an appendix, p. 218-219, describing recent developments.
- 1238
Matthews, N.W. EARTH SATELLITE INSTRUMENTATION. Elec. Eng., 76:562-567, Jly. 1957.
Design requirements of a unique telemetering encoder system are examined in the light of the limitations imposed by the over-all satellite program.
- 1239
Matthews, N.W. EARTH SATELLITE INSTRUMENTATION PROGRAM. In National Telemetering Conference, Papers Presented at El Paso, Texas, May 27-29, 1957, p. I-A-1-1-I-A-1-6, New York, American Institute of Electrical Engineers, 1957.
Directs attention to that use of an instrumented satellite wherein measurements made in the vehicle are transmitted to the ground recording stations by means of a radio telemetering system.
- 1240
Matthews, N.W. TELEMETERING IN EARTH SATELLITES. Elec. Eng. 76:976-981, illus., Nov. 1957.
A new instrumentation technique combining square hysteresis loop magnetic cores with switching transistors is discussed in the description of the magnetic telemetry encoding system.
- 1241
MEETING OF THE ROYAL ASTRONOMICAL SOCIETY. Observatory, 77:217-219, Dec. 1957.
Mullard Radio Astronomy Observatory tracking of Sputnik I.
- 1242
Mengel, J.T. EAR TO THE SKY. Astronautics 2:28-30, 48, illus., Oct. 1957.
A report of the Minitrack System, how it works, and how it will be used to prove the earth satellite has been placed in orbit.
- 1243
Mengel, J.T. MINITRACK DETAILS: SATELLITE TRACKING BASED ON PHASE COMPARISON. Aviat. Age 27:98-105, Mar. 1957.
- 1244
Mengel, J.T. MINITRACK SYSTEM DESIGN CRITERIA. Elec. Eng. 76: 666-672, Aug. 1957.
Examination of the operating principles of the radio phase-comparison angle-tracking system, and discussion of the appropriate design with reference to the severe weight and size limitations and altitude limits of the Vanguard satellite.
- 1245
Mengel, J.T. RADIO SYSTEM WILL TRACK EARTH SATELLITE. Soc. Automotive Engrs. J. 65:30-33, Apr. 1957.
- 1246
Merrill, H.W. PROJECT VANGUARD. In Conference on Industrial Applications of X-Ray Analysis, 8th, Denver, 1957. Proceedings, p. 1-16, illus., Denver, Metallurgy Division, Denver Research Institute, University of Denver, 1957.
A banquet address by the Vice-President of the Martin Co., Vanguard contractor.

130

1247
METHODS TO DETERMINE THE POSITION OF ARTIFICIAL SATELLITES. *Toute R.* no. 220. 2 p., Nov. 1957.

Translation of a Russian article which describes dual antenna input stages gated by a multivibrator system. Similar to the operation of Minitrack, the trajectory of the satellite can be determined from the received signal. The satellite passes through azimuth when the signals from the two antennas reach equal amplitudes.

Not examined.

1248
Metreveli, G. SPUTNIK ZEMLI (EARTH SATELLITE). *Voen. Znan.* 3:20-22, Mar. 1957.

In Russian.

This article is based, for the most part, on Project Vanguard information.

1249
MEZHDYNARODNIE GEOFIZICHESKII GOD. (THE INTERNATIONAL GEOPHYSICAL YEAR). *Radio (USSR)* no. 5:20-21, May 1957.

In Russian.

Includes discussion of the earth satellite.

1250
Michelson, I. ULTIMATE DESIGN OF HIGH ALTITUDE SOUNDING ROCKETS. *Jet Propul.* 27:1107-1108, Oct. 1957.

A note pointing out that techniques are available which determine optimum sounding rocket capability as function of fuels and materials limitations, for multistage rockets of importance to space flight. Calculations results are given for two examples representing extreme altitude sounding to a summit height of one earth diameter and minimal lunar flight.

1251
Michely, W. BERICHT ÜBER DEN VII INTERNATIONALEN ASTRONAUTISCHEN KONGRESS IN ROM VOM 17

bis 22 September 1956. (PROCEEDINGS OF THE 7th INTERNATIONAL ASTRONAUTICAL CONGRESS IN ROME, Sept. 17-22, 1956). *Ver. Deut. Ing. Z.* 99:197-199, Feb. 11, 1957.

In German.

Papers on satellite problems are summarized.

1252
Michielsen, H.F. THE CASE FOR THE LOW ACCELERATION SPACESHIP. *Astronautica Acta* 3:130-152, 1957.

Analysis of the mechanics of the escape trajectories for low-acceleration propulsion. The method used involves inversion of the formulation of the problem, i.e., a trial-and-error procedure is used to choose a probable trajectory, which is then used to compute the corresponding thrust components; if these components are economically justified in terms of fuel consumption, the trajectory is deemed feasible.

1253
Miczkaika, G.R. DAS INTERNATIONALE GEOPHYSIKALISCHE JAHR, IV, "PROJEKT VANGUARD," DER KÜNSTLICHE ERDSATELLIT UND SEINE BAHN. (THE IGY, PT. 4, PROJECT VANGUARD: THE ARTIFICIAL SATELLITE AND ITS PATH). (*Die Umschau* 57:193-195, Apr. 1, 1957).

In German.

"Properties of the atmosphere at a height of 500 km are summarized; improved data may be obtained with a satellite. Life has been variously calculated as a few days to a year. Launching mechanism and elliptical track are briefly described." *Meteorol. Abs. and Bibl.* 8:889, Jly. 1957.

1254
Miczkaika, G.R. DAS INTERNATIONALE GEOPHYSIKALISCHE JAHR VII "PROJEKT VANGUARD," BEOBACHTUNGS-UND NACHRICHTENMITTEL DES KÜNSTLICHEN ERDSATELLITEN. (THE IGY PT. 7 "PROJECT VANGUARD.")

METHODS OF OBSERVATION AND TRANSMISSION OF THE ARTIFICIAL EARTH SATELLITE). (*Die Umschau* 57:394-396, Jly. 1, 1957).

"The scientific value of the satellite depends on how far it is possible to follow its track and record the values which it transmits. After projection it will be located by interference of two radio signals." *Meteorol. Abs. and Bibl.* 8:1468, Nov. 1957.

1255
Mikhailov, A.A. O NABLIUDENII ISKUSSTVENNOGO SPUTNIKA. (ON THE OBSERVATION OF THE ARTIFICIAL SATELLITE). *Astron. Zhurn.*, SSSR 34:313, 1957.

In Russian.

Relates to tracking of a satellite.

Translation no. R-2679 available at Special Libraries Assoc. Translation Center, Crerar Library, Chicago, Ill.

1256
Mikhailov, V.A. THE APPLICATION OF ATOMIC ENGINES IN AVIATION. 167 p., Moscow, Military Publishing House of the Department of Defense, 1957.

In Russian.

"A compilation of published data on applications of nuclear power plants in aviation and in rockets is given in popular form. Various aspects of nuclear reactors - their performance, the fuels used, and their prospective applications in aviation and in interplanetary flight are discussed. . . Interplanetary flight, altitude and speed performance, advantages of nuclear rocket engines, and a program for attaining cosmic velocities are discussed." - R.V.J. in *Nuclear Sci. Abs.* 12:4024, Mar. 31, 1958.

1257
Mirtov, B.A. and Istomin, V.G. ISSLEDOVANIIE IONNOGO SOSTAVA IONIZIROVANNYKH SLOEV ATMOSFERY. (INVESTIGATION OF THE ION COMPOSITION OF THE IONIZED LAYERS OF THE ATMOSPHERE). *Usp. Fiz. Nauk.* 63(1b): 227-238, Sept. 1957.

In Russian.

Use of artificial satellite for study of the spectrum of ions in the ionosphere.

Translation available from U.S. Joint Publications Research Service.

1258
A MISS AND HITS? *Newsbk.* 50:48, Dec. 23, 1957.

Concerns premature announcement by the Air Force for a Directorate of Astronautics; the shape of the expected Sputnik III; the Army's Jupiter-C; and the Navy's announcement that the Vanguard failure was due to a mechanical failure in the propulsion system.

1259
Mittra, A.P. THE INTERNATIONAL GEOPHYSICAL YEAR: 1957-58 - WORLD PROGRAMME. *J. Sci. & Indus. Res.* 16A:327-336, Aug. 1957.

Satellites (brief mention of U.S. project) p. 335.

1260
Mohr, Ernst. UEBER FESTSTOFF-FRAKETEN. (ON SOLID-PROPELLANT ROCKETS). *Welt-raumfahrt* 7:111-116, Dec. 1957.

In German.

Outline of the principles of charge construction, presentation of data for calorific values and thrust of some conventional propellants, and description of the thrust-producing mechanism in a typical rocket configuration. Includes description of a two-stage, spin-stabilized meteorological sounding rocket as an example of solid propellant application and outline of a project for the construction of an 11-stage solid-propellant satellite rocket.

1261
Möller, C. ON THE POSSIBILITY OF TERRESTRIAL TESTS OF THE GENERAL THEORY OF RELATIVITY. *Nuovo Cimento*:6:Suppl. 1:381-398, 1957.

Appendix B, Satellite problems.

Considers the application of artificial satellites to testing of the

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132

general theory of relativity. The idea which suggests itself, according to the writer, is an attempt at using atomic clocks to verify the relativistic formula for the rate of clocks placed at different potentials in a gravitational field.

1262 "MOON" KEEPS ITS SECRETS. *Elec. Eng.* (Bus. ed.) 30:15, illus., Nov. 20, 1957.

Preliminary reports suggest that Sputnik II transmitted its important data - multiplexed and pulse-modulated - over the Eastern hemisphere.

1263 "MOON" RADAR CALIBRATES MINITRACK EQUIPMENT. *Elec. Eng.* 76:935-936, illus., Oct. 1957.

Using the giant radar transmitter DIANA, Army Signal Corps engineers have been bouncing signals off the moon for several years. At Blossom Point, Md., the Navy's Minitrack Test Facility has received these signals during several test pick ups.

Purpose of the tests is to perfect a technique by which the operation of all of the Western Hemisphere satellite tracking stations can be tested as soon as they have been completed and placed in operation.

1264 MOON RADAR CHECKS MINITRACK. *Radio & TV News*, 58:161, Oct. 1957.

1265 MOON WILL RISE, BUT NOT OFFICIALLY. *Bus. Wk.* no. 1447:41, May 25, 1957.

Speculates on cause of delay in launching the U.S. earth satellite.

1266 MOONWATCH OBSERVING METHODS. *IGY Bull.* 6:1010-1011, Dec. 1957.

Basic principles of a Moonwatch station; essential data to be obtained; and observing techniques.

1267 Morezov, S. THE FIRST TRAVELER INTO THE COSMOS. *Ogonek* 46:6-7, Nov. 1957.

In Russian. Not examined.

1268 Mullard Radio Astronomy Observatory Staff. RADIO OBSERVATIONS OF THE RUSSIAN EARTH SATELLITE. *Nature* 180:879-883, illus., Nov. 2, 1957.

Observational methods; derivation of an approximate orbit; variation of the intensity of the received signal; investigation of the ionosphere.

1269 Müller, R.H. INSTRUMENTS TO STUDY SPUTNIK. *Anal. Chem.* 29: Suppl. 61A-62A, Dec. 1957.

Includes reproductions of recordings made by Dr. Peterson and staff of the Stanford Research Institute. Figure I shows doppler shift in transmission from Sputnik; Figure II shows equipment arrangement used to make the record.

1270 Müller, W.D. MAN AMONG THE STARS. 307 p., New York, Criterion Books, 1957.

Translated from *Du Wirst Die Erde Sehn Als Stern*, published in Germany.

In eminently readable style the author details the beginnings, progress and future prospects of space flight. Included are essays on such diverse subjects as religion in space and the possibility of finding creatures on other worlds, as well as capsule histories of astronomy, exploration and space literature.

Ch. 3, A Moon of Our Making, concerns the Vanguard project.

1271 MYSTERY OF THE SIDETRACKED SATELLITE. THE DOCUMENTED STORY OF A DECISION THAT GAVE RUSSIA THE EDGE. U.S.

News & World Rpt. 43:36-38, illus., Nov. 22, 1957.

The step-by-step story, beginning in December 1948 through the decisions, hesitations and cancellations, fitted together from official papers and reports from former officials.

1272 NA PUNKTAKH NABLIODENIYA DOSAAF. (OBSERVATIONS AT THE STATIONS OF THE ALL-UNION VOLUNTEER SOCIETY FOR ASSISTANCE TO THE ARMY, AIR FORCE, AND NAVY). *Radio (USSR)* no. 12:17-18, Dec. 1957. In Russian.

1273 National Advisory Committee for Aeronautics, Washington, D.C. A COMPARATIVE ANALYSIS OF THE PERFORMANCE OF LONG-RANGE HYPERVELOCITY VEHICLES, by A.J. Eggers, Jr., H.J. Allen, and S.E. Neice. 66 p., diags., Oct. 1957. (NACA TN 4046. Supersedes RM A54L10)

A simplified analysis is made of the motion and aerodynamic heating of long-range ballistic, skip, and glide-type vehicles. The ballistic vehicle appears relatively attractive because convective heat transfer can be reduced by using blunt shapes. The glide vehicle appears attractive because it has a relatively efficient trajectory, and the possibility of substantial radiative cooling. These vehicles compare favorably to the sense of the Breguet range equation, to the supersonic airplane for very long-range flight.

1274 National Advisory Committee for Aeronautics, Washington, D.C. A STUDY OF THE MOTION AND AERODYNAMIC HEATING OF MISSILES ENTERING THE EARTH'S ATMOSPHERE AT HIGH SUPERSONIC SPEEDS, by H.J. Allen and A.J. Eggers, Jr. 61 p., diags., Oct. 1957. (NACA TN 4047. Supersedes RM A53D28)

A simplified analysis of the velocity and deceleration history of missiles

entering the earth's atmosphere at high supersonic speeds is presented. The results of this motion analysis are employed to indicate means available to the designer for minimizing aerodynamic heating. The heating problem considered involves not only the total heat transferred to a missile by convection, but also the maximum average and local time rates of convective heat transfer.

1275 National Advisory Committee for Aeronautics, Washington, D.C. THE USEFUL HEAT CAPACITY OF SEVERAL MATERIALS FOR BALLISTIC NOSE-CONE CONSTRUCTION, by J.R. Stalder. 19 p., Nov. 1957. (NACA TN-4141)

Analysis of the heat-absorption characteristics of Cu, Inconel-X, graphite, and Be indicates that significant weight saving could be achieved in a ballistic missile heat sink by the use of graphite or Be in place of Cu.

1276 National Council of Social Studies. SCIENCE AND THE SOCIAL STUDIES, Twenty-Seventh Yearbook, 1956-57, edited by H.H. Cummings. 271 p., Wash., D.C., 1957.

Contains a chapter which briefly relates plans for the IGY and the launching of earth satellites.

1277 Naval Research Laboratory, Washington, D.C. MINITRACK SYSTEM TRAINING MANUAL. 334 p., diags., 1957. ?

This manual contains 7 parts as follows: Pt. I, Introduction to Project Vanguard and the Minitrack System, by J.T. Mengel; Pt. II, Antenna System, by M.J. Votaw; Pt. III, Prime Minitrack Radio Frequency Receiver System, by V.R. Simas and C.A. Bartholomew; Pt. IV, Prime Minitrack Time Standard System; Pt. V, Minitrack Phase Measurement and Data System, by C.A. Schroeder, C.H. Looney, Jr. and H.E. Carpenter, Jr.; Pt. VI,

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- 134
- Calibration of Minitrack; Pt. VII, The Telemetry System for Receiving and Recording Information From the Satellite Scientific Instrumentation.
- 1278
Naval Research Laboratory, Washington, D.C. PROJECT VANGUARD REPORT NO. 18, MINITRACK REPORT NO. 1 - PHASE MEASUREMENT, by C.A. Schroeder, C.H. Looney, Jr., and H.E. Carpenter, Jr., 28 p., figs., Jly. 26, 1957. (Rpt 4995)
- The "Minitrack" system for tracking an artificial earth satellite, which has been developed as a part of Project Vanguard, is described briefly, and the phase measurement portion of this system is described in detail.
- 1279
Naval Research Laboratory, Washington, D.C. PROJECT VANGUARD REPORT NO. 21, MINITRACK REPORT NO. 2 - THE MARK II MINITRACK SYSTEM, by R.L. Easton, 29 p., figs., Sept. 12, 1957. (Rpt. 5035)
- This document presents all aspects of design, construction, and calibration of the Mark II Minitrack System for the serious-minded amateur desiring to carry out radio observations of the satellite.
- 1280
Naval Research Laboratory, Washington, D.C. PROJECT VANGUARD REPORT NO. 23, MINITRACK REPORT NO. 3 - RECEIVER SYSTEM, by V.R. Simas and C.A. Barthelmeuw, 31 p., illus., Dec. 1957. (NR-5055)
- This report describes, with schematics, five units comprising a single channel, i.e., a pair of front ends, a signal adder, a combined i-f amplifier, a special local oscillator, and a calibration source.
- 1281
Naval Research Laboratory, Washington, D.C. THE SATELLITE LAUNCHING VEHICLE, by M.W. Rosen. 10 p., illus., June 15, 1957.
- Primary requirements; choice of configuration; description of the vehicle.
- 1282
NAVY IN SPACE - HOW AND WHY. All Hands 491:20-21, illus., Dec. 1957.
- Background for assignment of the Vanguard Project to the Navy.
- 1283
THE NAVY'S EARTH SATELLITE TRACKING STATIONS. Naval Comm. Bull. 52:6-7, illus., Winter, 1957.
- Brief article on plans for tracking the earth satellite and a list of locations of Minitrack stations.
- 1284
Neat, W.N. THE PROBLEM OF VARIABLE THRUST. Aeroplane 93:708-710, 1957.
- A paper presented at the 8th Congress of the International Astronautical Federation reveals the need for controlled rocket engines for manned flight into space. The effects of variable thrust on performance, chamber cooling and pressure are outlined and the control system pumps and valves are briefly discussed.
- 1285
Nesmeyanov, A.N. THE PROBLEM OF CREATING AN ARTIFICIAL EARTH SATELLITE. Pravda no. 152:2, June 1, 1957.
- In Russian.
- Translation appears in Rand Corporation, Santa Monica, Calif. A Casebook for Soviet Astronautics. Part II, by F.J. Krieger, p. 189-196, June 21, 1957. (RM-4922)
- 1286
THE NEW DIMENSION. THE LAUNCHING OF THE SOVIET EARTH SATELLITES. Interavia 42:1229-1232, illus., Dec. 1957.
- A diary of the days following the launching of Sputnik I; a comment on its weight and accuracy; details of configuration; description of the vehicle.
- 1287
NEW ERA IN THE HISTORY OF SCIENCE. THE SOVIET MOON. Grazhdansk Aviat. 14:13-14, Oct. 1957.
- In Russian. Not examined.
- 1288
New Mexico College of Agriculture and Mechanic Arts, Physical Science Laboratory, State College, Tex. Vol. I, QUADRALOOP ANTENNAS: Part I - THE DESIGN AND PERFORMANCE OF QUADRALOOP ANTENNAS; Part II - TELEMETERING QUADRALOOP ANTENNAS FOR PROJECT VANGUARD, by R.H. Duncan and H.W. Haas. 157 p., Dec. 1957. (Contract Nonr-2158(01))
- 1289
A NEW REALM OF FLIGHT. Flight 72:611-614, illus., Oct. 18, 1957.
- General discussion of the principles underlying the launching of the first man-made satellite, and quotations concerning the achievement.
- 1290
Newell, H.E., Jr. ARTIFICIAL EARTH SATELLITE PROGRAMME. In The Space Encyclopedia. p. 20-34, illus., London, Artemis Press, 1957.
- Including the rocket vehicle, launching, telemetering, satellite experiments and possible uses of future satellites.
- 1291
Newell, H.E., Jr. RESEARCH AT THE THRESHOLD OF SPACE. Radio & TV News 57:35-37, 112-115, May 1957.
- Electronics in the earth satellite and what we expect to learn from the "laboratory in space."
- 1292
Newell, H.E., Jr. THE SATELLITE PROJECT. In Scientific American. The Planet Earth, p. 155-168, New York, Simon and Schuster, 1957.
- Some advance details of Project Vanguard, originally published in 1955. See also Item 450 under Newell, 1955.
- 1293
Newell, H.E., Jr. SOME PREPARATIONS FOR THE INTERNATIONAL GEOPHYSICAL YEAR EARTH SATELLITE PROGRAM. Am. Geophys. Union. Trans. 38:450-456, Aug. 1957.
- Background; experiments selected by TPESP for performance; progress to date.
- 1294
Newell, H.E., Jr. SPACE FLIGHT - THE EARTH SATELLITE PROGRAM. In The Americana Annual 1957, p. 726-727, illus., New York, Americana Corp., 1957.
- Launching and tracking of the U.S. satellite.
- 1295
NEWS FROM MOONWATCH HEADQUARTERS. Smithsonian Astrophys. Obser. Bull. for Visual Observers of Satellites. no. 5:1-4, Feb. 1957.
- Insert in Sky and Telescope 16: between p. 180-181, Feb. 1957.
- Operation Moonwatch is a satellite vehicle tracking organization of amateurs.
- 1296
Noble, Keith. FOTOSCOPE. Am. Rocket News, p. 42-43, illus., Mar. 1957.
- Five photos of the U.S. satellite and its manufacture.
- 1297
NON-MAGNETIC BATTERIES FOR THE MAGNETOMETER SATELLITE. Army Signal and Eng. Labs. Res. & Develmt. Summary 4:2-3, Oct. 25, 1957.
- Evaluation of zinc-silver and cadmium-silver oxide batteries for satellite application.

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1298
Nonweiler, T.R. DESCENT FROM SATELLITE ORBITS USING AERODYNAMIC BRAKING. In Carter, L.J., ed. Realities of Space Travel, p. 87-104, London, Putnam, 1957.

Outlines the results of some theoretical studies of various aspects of the heat transfer problem at high speeds.

Also in Brit. Interplan. Soc. J. 10: 258-274, Nov. 1951.

1299
Nonweiler, T.R. SKIN HEATING DURING RE-ENTRY OF SATELLITE VEHICLES TO THE ATMOSPHERE. Brit. Interplan. Soc. J. 16:10-21, Jan./Mar. 1957.

Shows that particular attention to the flight plan and overall design can greatly simplify the problems of kinetic heating.

1300
North Atlantic Treaty Organization, Advisory Group For Aeronautical Research and Development. HISTORY OF GERMAN GUIDED MISSILES DEVELOPMENT. AGARD FIRST GUIDED MISSILES SEMINAR, MUNICH, GERMANY, APRIL, 1956, edited by Th. Benecke and A.W. Quick. 419 p., illus., Brunswick, Germany, Verlag E. Appelhans & Co., 1957.

According to the foreword, this subject was chosen because it covers a complete development program. "There are many lessons to be learned from the study of such a complete program, the difficulties encountered, and the methods by which these difficulties were overcome."

Of interest, since the missiles described are the forerunners of today's rockets and satellites.

1301
NOSE CONE WILL BE ARMY SATELLITE. Aviat. Wk. 67:77-79, Dec. 9, 1957.

According to Dr. W.H. Pickering of Jet Propulsion Laboratory, California

Institute of Technology, the Laboratory has assumed a role in the Army program equivalent to that played by the Naval Research Laboratory in the Vanguard program. Jet Propulsion will adapt the final two rocket stages to the satellite launching task and will codify the satellite instrument package to fire the rocket.

Further details are included.

1302
NOTE ON SATELLITE MONITORING. QST 41:13, illus., Dec. 1957.

Suggestions for identifying a satellite.

1303
NOVAIA ERA V ISTORII MIROVOI NAUKI - SOVETSKAYA LUNA. [A NEW ERA IN COSMIC AND SCIENTIFIC HISTORY - THE SOVIET MOON]. Grazhdansk Aviat. 14:13-14, Oct. 1957.

In Russian.

General description of the Sputnik I and of its development.

Also issued as Massachusetts Institute of Technology, Lincoln Laboratory, Trans. qd-2464.

1304
NOW COME THE POST MORTEM: VANGUARD'S FAILURE. Bus. Wk. Co. 48, 50, illus., Dec. 14, 1957.

1305
Oberth, Hermann. MAN INTO SPACE. NEW PROJECTS FOR ROCKET AND SPACE TRAVEL, translated by G.P.H. De Freville. 232 p., illus., New York, Harper, 1957.

"One of the earliest and most widely known of the rocket research pioneers gives here some of his theories regarding man's first ventures into space. He discusses rocket satellites, the equipment necessary for individual survival, and the construction of space stations and vehicles for exploration of the moon." Booklist 53:553, Jly. 1957.

1306
OBSERVATION OF ARTIFICIAL SATELLITES DURING THE INTERNATIONAL GEOPHYSICAL YEAR. Kridla Vlasti no. 20:620-621, Oct. 1957.

In Czech. Not examined.

1307
Odishaw, Hugh. THE IGY SATELLITE PROGRAM. Ciencia, 16:317-322, June 10, 1957.

The U.S. satellite program; paper presented at the Western Hemisphere IGY Conference, Rio, July 1956.

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Odishaw, Hugh. INTERNATIONAL GEOPHYSICAL YEAR. Think 23:3-5, illus., Jly. 1957.

Gives some idea of the vast scope of the IGY endeavor, and specifically explains why the satellite program is important.

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Odishaw, Hugh. SOVIET SATELLITE CARRIER ROCKET. Sci. 126:1334, Dec. 27, 1957.

Includes Russian letter of inquiry regarding the remnants of the first earth satellite rocket, thought to have fallen within the United States, and the American reply, in the negative.

1310
O'Keefe, J.A. AN APPLICATION OF JACOBI'S INTEGRAL TO THE MOTION OF AN EARTH SATELLITE. Astron. J. 62:265-266, Oct. 1957.

"It is shown that the speed, N , of the satellite referred to the surface of the earth can be related to the geopotential, V , by a modification of the Jacobi integral, so that $N^2 = 2V + \text{constant}$. This equation neglects the very small luni-solar perturbations, but includes the effects of the anomalies of terrestrial gravitation, which are more important. It is useful because it relates quantities easily measurable from the surface of the earth, and because it governs

the possible gravitational changes of the orbit over rather long times."

1311
O'Keefe, J.A. GEODESY COMES OF AGE WITH VANGUARD, BY PROVIDING A FRESH APPROACH TO CLASSICAL GEODETIC PROBLEMS, IT WILL BRING GREATER ADVANCES IN THE NEXT 18 MONTHS THAN IN PAST 50 YEARS. Astronautics 2:71-73, 92, illus., Aug. 1957.

Tracking the satellite from observation stations throughout the world will provide geologists with a three-dimensional approach to the problem of large-area surveys, and a new method of measuring intercontinental distance.

1312
O'Keefe, J.A. and Batchlor, C.D. PERTURBATIONS OF A CLOSE SATELLITE BY THE EQUATORIAL ELLIPTICITY OF THE EARTH. Astron. J., 62:183-185, Aug. 1957.

If the earth is triaxial, there will be a semi-diurnal motion of the node of a close satellite. The author finds an amplitude of 65" for the motion, as seen from the surface of the earth, assuming Jeffreys' value of the coefficient of $P_2^2 \cos 2\gamma$.

1313
Okhotsimskii, D.E. and Eneev, T.M. ON PLACING A SATELLITE IN ORBIT. Eng. 184:643, Nov. 22, 1957.

Paper presented at the International Astronautical Conference in Barcelona.

1314
Okhotsimskii, D.E., Eneev, T.M. and Taratynova, G.P. O PREDLENIE VREMENI SUSHCHESTVOVANIYA ISKUSSTVENNOGO SPUTNIKA ZEMLI I ISSLEDOVANIE VEKOVYKH VOZMUSHCHENII EGO ORBITY. (DETERMINATION OF THE LIFETIME OF AN ARTIFICIAL EARTH SATELLITE AND INVESTIGATION OF THE SECULAR PERTURBATIONS OF ITS ORBIT). Usp. Fiz. Nauk., 63(1a): 33-50, Sept. 1957.

In Russian.

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For the general case of an elliptic orbit, a rapid and accurate method of computing lifetime of satellite.

Translation also in The Russian Literature on Satellites, Part I, p. 48-73, New York, International Physical Index, Inc., 1958.

For translation, see also Item 944.

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Okhotsimskii, D.E. and Eneev, T.M. NEKOTORYE VARIATSIONNYE ZADACHI, SVIAZANNYE ZAPUSKOM ISKUSSTVENNOGO SPUTNIKA ZEMLI. (CERTAIN VARIATIONAL PROBLEMS CONNECTED WITH LAUNCHING OF AN ARTIFICIAL EARTH SATELLITE). Usp. Fiz. Nauk. 63(1a):5-32, Sept. 1957. In Russian.

Deals with problems of time variation of the thrust direction of rocket motors involved in the placing of a satellite in a pre-determined orbit with minimum fuel consumption. Discusses optimum modes of fuel consumption to achieve minimum initial weight. Considers both single and multi-stage rockets.

English version appears in Brit. Interplan. Soc. J. 16:263-294, illus., Jan./Feb. 1958; also in the Russian Literature of Satellites, Part I, p. 5-47, New York, International Physical Index, Inc. 1958.

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Oleson, M.W. and Blake, R.E. STUDIES OF RANDOM VIBRATION. Feb. 1957. Order from OTS. (PB-132841) \$1.80

For the Vanguard satellite project studies were made of problems dealing with random-vibration testing. Progress is reported on the following topics: whether peak-notch filters are needed to correct for limited output impedance of a vibration table; calculation of amplifier power required to produce random-vibration with an electromagnetic shaker; advantages of a swept-band random-vibration test; and a new "equivalent sinusoidal test" to simulate the effect of random vibration.

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ON TO THE MOON. Sci. Am. 197:58-59, Dec. 1957.

Introductory statement concerning acceptance of the age of space travel, followed by the official statement on the second Russian satellite issued through the Soviet news agency Tass.

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Oort, J.H. KUNSTMATIGE SATELLIETEN. (ARTIFICIAL SATELLITES). K. Ned. Met. Inst., Verspreide Opstellen 4:71-79, 1957.

In Dutch. Not examined.

From: Meteor. Office, London, Meteor. Bib., Jan. 1958.

1319

OPENING THE DOOR TO OUTER SPACE. FIRST EARTH SATELLITE SPARKS WORLD-WIDE ACTIVITY: NO CHANGE SEEN IN TIMETABLE FOR U.S. SATELLITE. Chem. & Eng. News 35:23-25, illus., Oct. 14, 1957.

Table indicates how U.S. Vanguard stacks up against Russia's Sputnik.

1320

OPERATION MOONBEAM. Sky and Telescope 17:73, Dec. 1957.

Brief item on plans of radio amateurs to track earth satellites by means of radio signals.

1321

OPERATION MOONWATCH. Jet Propul. 27:208-209, Feb. 1957.

Plans for optical tracking of the artificial satellite.

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OPTICIANS AID ELECTRONICS. Electron. Equip. 5:40-41, illus., Jly. 1957.

Concerns the Telescopic Photographic Recorder (TPR) used to test missiles in flight and miniaturized components used in the earth satellite program to aid in weather forecasting.

1323

ORBIT COMPUTATION. Sci. 125:109, Jan. 18, 1957.

Vanguard data handling.

1324

ORBIT OF THE ARTIFICIAL EARTH SATELLITE. Nature, 180:784, Oct. 19, 1957.

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ORBIT OF THE SECOND ARTIFICIAL EARTH SATELLITE. Nature 180:1026-1027, Nov. 16, 1957.

Conclusions, based on a few observations only.

1326

Ordway, F.I., III and Wakeford, R.C. 1957 RESEARCH ROCKET ROUND-UP. Missiles and Rockets 2:39-48, illus., Mar. 1957.

History and specifications of research rockets.

1327

Ordway, F.I., III. PROJECT VANGUARD - EARTH SATELLITE VEHICLE PROGRAM. CHARACTERISTICS, TESTING, GUIDANCE, CONTROL AND TRACKING. Astronautica Acta, 3:67-86, 1957.

An expansion of the article on the same subject. (See Item 706.)

1328

Ovenden, M.W. METEOR HAZARDS BEYOND THE ATMOSPHERE. In Bates, D.R. and Moore, Patrick, eds. Space Research and Exploration, p. 86-99, London, Eyre & Spottiswoode, 1957.

A discussion of the effect of meteors on the lifetime of artificial satellites.

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Ovenden, M.W. METEOR HAZARDS TO SPACE STATIONS. In Carter, L.J. ed. Realities of Space Travel, p. 217-230, illus., London, Putnam, 1957.

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Summarizes available information on this danger and examines possible limitations and inaccuracies which may be inherent in our present imperfect state of knowledge.

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Packard, M.E. MINIATURIZING MAGNETOMETERS. Mil. Electron. 3:22-24, illus., Nov. 1957.

Modern techniques enable equipment for measuring the earth's magnetic field to be made light enough to be carried as the payload of satellite vehicles.

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Parkin, C.M., Jr. and Madden, E.J. THE U.S. ARMY CORPS OF ENGINEERS SUPPORT VANGUARD AND THE IGY AND A DYNAMIC DISPLAY SYSTEM FOR PRESENTING SATELLITE TRACKING INFORMATION. New York, American Rocket Society, 1957. (ARS Preprint 426-57)

Paper given at ARS Spring Meeting, Washington, D.C., April 4-6, 1957.

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Partel, G.A. CONGRESSO INTERNAZIONALE ASTRONAUTICO DI BARCELONA - 6-12 OTTOBRE 1957. (INTERNATIONAL ASTRONAUTICAL CONGRESS AT BARCELONA - 6-12 OCTOBER 1957). Centro. Aero. Atom. Ital. no. 20: 12-26, Nov. 1957.

In Italian.

Survey of developments and discussion of the behavior of clocks during travel in the curved space time of the general theory of relativity, and analysis of the effects observable in journeys in the solar system or on earth satellites.

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Partel, G.A. GLI "SPUTNIK" I E II E I MISSILI INTERCONTINENTALI. (THE SPUTNIKS I AND II AND THE INTERCONTINENTAL MISSILES). Rev. Aero. p. 1515-1526, Dec. 1957.

In Italian.

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Discussion covering the development of intercontinental missiles and details of the Soviet Sputnik I and II satellites.

1334
Patterson, R.T. FEASIBILITY OF THE PHYSICAL RECOVERY OF SCIENTIFIC-RESEARCH PAYLOADS FROM VERY-HIGH-ALTITUDE NEAR-VERTICAL TRAJECTORIES. New York, American Rocket Society, 1957. (ARS Preprint 489-57)

Paper, 8th International Astronautical Congress, Barcelona, Oct. 6-12, 1957.

Useful payloads of 25 to 200 pounds in spherically nosed bodies between 1 and 2 feet in diameter falling vertically from altitudes of 2,000 miles and higher are considered. Entrance velocities range upward from 21,000 feet per second and useful payload must withstand deceleration of at least 109 g. The total heat input to the body ranges upward from 4,000 BTU and is accommodated by permitting a part of the payload to melt.

1335
PEILUNGEN DER RUSSISCHEN ERD-SATELLITEN MIT DEM NEUEN TELEFUNKEN-SICHTPEILER FUER KURZWELLEN. (MEASUREMENTS OF THE RUSSIAN EARTH SATELLITES WITH THE NEW SHORT WAVE RADIO RECEIVER-VISUAL DIRECTION FINDER). Telefunken Ztg., 30: No. 118:280-282, Dec. 16, 1957.

1336
PERFORMANCE OF LONG RANGE HYPERVELOCITY VEHICLES. Jet Propul. 27:1147-1151, Nov. 1957.

Satellite vehicles are located as a limiting case of the ballistic vehicles and attention is paid to the problem of re-entry and recovery.

1337
Persen, L.N. SATELLITEN SOM ET PROBLEM FRA DEN KLASSISKE MEKANIKK. (SATELLITES, A PROBLEM FROM THE POINT OF VIEW OF CLASSICAL MECHANICS).

Tek. Ukeblad, 104:1067-1072, Dec. 19, 1957.

In Norwegian.

"Discussion on satellite orbits against the background of Kepler's law on planet motion. Effect of friction on the orbit of a satellite. Calculations with the help of two simplified models." - Battelle Tech. Rev. Abs. 7:5473, Apr. 1958.

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Peterson, A.M. RADIO AND RADAR TRACKING OF THE RUSSIAN EARTH SATELLITE. Inst. Radio Engrs. Proc. 45:1553-1555, illus., Nov. 1957.

Reports observations from Stanford Research Institute.

1339
Peterson, A.M. ON THE TRACKING OF SATELLITES. Gen. Radio Exp. 31:3-6, Dec. 1957.

Discussion of a set of measurements similar to those which were applied to Sputnik I and II, and of certain refinements in handling data used for path and time of transit predictions by the local Moonwatch group.

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Peterson, J.B. NOTE ON "TAKE-OFF FROM SATELLITE ORBIT." Jet Propul. 27:1263-1264, Dec. 1957.

Concerns result arrived at by H.S. Tsien in his "Take-off From Satellite Orbit." (See Item 316).

1341
Petrov, V. ARTIFICIAL SATELLITE OF THE EARTH AND A WORLD TELEVISION CENTER. Zvezda 4:160-164, Apr. 1957.

In Russian. Not examined.

1342
Phalen, F.W. TELEMETERED DATA CHECKS VANGUARD FLIGHT. Electron. Indus. & Tele-Tech., 16:40-41, Jly. 1957.

Discussion of test instrumentation, data channels, and transducers to measure and record fuel temperature,

fuel pressures and skin temperatures.

1343
Pickering, W.H. PROJECT MOON-BEAM. THE RADIO AMATEUR AND THE IGY SATELLITE. QST 41:15, 182, Nov. 1957.

An invitation to qualified amateur groups to participate in the volunteer satellite tracking program now known as "Project Moonbeam."

1344
Pickering, W.H. SCIENTIFIC OBSERVATIONS OF THE IGY SATELLITE. Ciencia, 16:335-338, June 10, 1957.

The U.S. program of observations; paper presented at the Western Hemisphere IGY Conference, Rio, July 1956.

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PLODY NAUCHNOGO TVORCHESTVA. (THE FRUIT OF SCIENTIFIC CREATIVE LABOR). Pravda p. 1-2, Mar. 26, 1958.

In Russian.

A general review of scientific activity of the Academy of Sciences with special emphasis on the results of the research through the facilities of Sputniks.

1346
Pobedonostsev, Iu. A. LAWS OF MOTION OF AN EARTH SATELLITE. Priroda 1:19-25, 1958.

In Russian.

Translation available as Canada. Defense Research Board Rpt. T-283R.

Gives a general idea of the fundamental relationships and laws governing the launching of a satellite by a multistage rocket and its motion around the globe.

1347
Pobedonostsev, Iu. A. and Maliutin K. PATH TO THE COSMOS. Nov. Vrem. 15:9-10, Oct. 1957.

In Russian. Not examined. Concerns Russian satellites.

141

1348
Pobedonostsev, Iu. A. THE SECOND SPUTNIK. Nov. Vrem. 15:11-13, Nov. 1957.

In Russian. Not examined.

1349
Poincaré, Henri. LES METHODES NOUVELLES DE LA MECANIQUE CELESTE. (NEW METHODS OF CELESTIAL MECHANICS). 3 v., illus., New York, Dover Publications, 1957.

A republication of the volumes originally published in 1892, 1893 and 1899.

1350
Pokrovskiy, G.I. MEZHKONTINENTAL'NIYE RAKETI I DRUGIYE NOSITELI STRATEGICHESKOGO CROZHIIYA. (INTERCONTINENTAL ROCKETS AND OTHER BEARERS OF STRATEGIC WEAPONS). N. Sovetskii Patriot no. 73:1-6, Sept. 11, 1957.

In Russian.

Concerns military value of artificial satellites.

1351
PoJoskov, S.M. and Nazarova, T.N. ISSLEDOVANIJE TVERDOI SOSTAVLJAJUSHCHEI MEZHPLANNI-TNOGO VESHCHESTVA S FOMOSHCIIU RAKET I ISKUSSTVEN-NYKH SPUTNIKOV ZEMLI. (INVESTIGATION OF THE SOLID COMPONENTS OF INTERPLANE-TARY SPACE BY MEANS OF ROCKETS AND ARTIFICIAL SATELLITES). Usp. Fiz. Nauk. 63(1b): 253-265, Sept. 1957.

In Russian.

Discussion of the two most important problems which should be investigated: determination of the flow of meteor particles and study of the spectra.

1352
Porter, J.G. DIFFICULTIES OF SPACE NAVIGATION. In Bates, D.R. and Moore, Patrick, eds. Space Research and Exploration, p. 151-164, London, Eyre & Spottis-woode, 1957.

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1353

Porter, R.W. PROGRESS REPORT. U.S. EARTH SATELLITE PROGRAMME. Shell Aviat. News 230: 6-10, 1957.

Discussion of the experiments to be undertaken and methods by which the satellite will record information and transmit it to earth.

1354

Porter, R.W. ROLE OF THE EARTH SATELLITE IN FOUR IMPORTANT IGY EXPERIMENTS. Aero. Eng. Rev. 16:89-93, May 1957.

Tasks are: measurement of the solar ultraviolet radiation at 1216 A.; measurement of the earth's magnetic field; cosmic ray analysis; determination of the terrestrial energy balance.

1355

Porter, R.W. STATEMENT . ON EARTH SATELLITE PROGRAM. In U.S. Congress, 85th, First Session, House. Committee on Appropriations. Subcommittee on Independent Offices. Hearings. National Science Foundation, Report on International Geophysical Year, p. 68-73, Washington, U.S. Govt. Print. Off., 1957.

A discussion of various aspects of the satellite appears on p. 73-85.

1356

Porter, R.W. WHAT IS THE REAL CHALLENGE OF THE SATELLITE? Gen. Elec. Rev. 60:7, Nov. 1957.

Intensify effort on immediate projects, accelerate our over-all defense program, strengthen our educational system from grade through graduate levels--there are the three important moves to reinforce America's scientific and engineering achievements.

1357

POSITIONING PRECEDES SATELLITE SEND-OFF. Mach. Design 29:12, illus., Sept. 19, 1957.

Picture and brief description of firing stand for Vanguard.

1358

POSSIBLE FUELS FOR SPUTNIK II. HIGH-ENERGY PROPELLANTS? Eng. 184:644, Nov. 22, 1957.

This note, prepared by a fellow of the British Interplanetary Society, suggests that hydrazine or penta-borane with liquid oxygen may have been used.

1359

POWER ENGINEERING TAKES TO SPACE. Power Eng. 61:67-69, illus., Dec. 1957.

A revealing look at current space efforts and the significance of power engineering.

Vanguard vehicles propellants are also discussed.

1360

PRACTICAL ASPECTS OF EARTH SATELLITES. Eng. 184:484-486, illus., Oct. 18, 1957.

Discusses energy requirements, energies available, value of accuracy, satellite uses, research, and utilitarian advantages.

1361

PRELIMINARY SUMMARY OF USSR SATELLITE REPORTS. IGY Bull. 5:1-3, Nov. 1957.

Launching; and satellite characteristics.

1362

Preston-Thomas, H. INTERORBITAL TRANSPORT TECHNIQUES. In Carter, L.J. ed. Realities of Space Travel, p. 174-204, figs., London, Putnam, 1957.

Considers the formidable technical problems involved and alternative propulsion systems that are available.

1363

Prew, H.E. SPACE EXPLORATION - THE NEW CHALLENGE TO THE ELECTRONICS INDUSTRY. In American Astronautical Society. Proceedings, 3rd annual meeting, New York, December 6-7, 1956,

p. 17-29, diags., New York, The Society, 1957.

The challenge is to control remotely a space research vehicle. The paper discusses initial requirements, namely, hyper-range guidance and data links, operating with command control loops.

Also in J. Astronautics 4:9-11, diags., Spring 1957 and Inst. Radio Engrs. Trans. Prof. Group on Military Electronics 1:43-48, diags., Dec. 1957.

1364

Pritchard, J.L. THE DAWN OF AERODYNAMICS. Aero. 61:149-180, illus., Mar. 1957.

This paper is concerned with the flow of air over various shapes, and its effects as measured or observed by various experimenters before the year 1903. Included because of its review of developments which led to the first flight by the Wright Brothers.

Includes 71 references of historical value.

1365

PROBING SPACE. SYMPOSIUM ON HIGH ALTITUDE AND SATELLITE ROCKETS. Eng. 184:98-101, illus., Jly. 26, 1957.

Review of the British Interplanetary and Royal Aeronautics Society's Symposium on High Altitude and Satellite Rockets held at the College of Aeronautics, Cranfield, England, July 1957, including sections headed: Launching Vanguard; Skylark; Subjects Discussed; High Altitude Research; and Rockets and Satellites on Show.

1366

PROBLEMS OF SATELLITE FLIGHT. Flight 72:890, Dec. 6, 1957.

Highlights of speech on legal problems by J.C. Cooper.

1367

PROGRAM MOONBEAM FOR AMATEUR TRACKING OF IGY EARTH

143

SATELLITE. Frank. Inst. J. 264: 408, Nov. 1957.

Announcement of a program for volunteer radio tracking of the earth satellites. Naval Research Laboratory has been named to head the Moonbeam Project.

1368

PROGRAMS FOR FUTURE SPUTNIKS DETAILED BY RUSSIAN SCIENTISTS. Aviat. Wk. 67:32-33, Dec. 16, 1957.

Quotes several Soviet sources.

Also in Missile Eng. 2:10-11, Jan. 1958.

1369

PROGRESS ANNOUNCED IN PROGRAM AIMED AT LAUNCHING VANGUARD. TEST LAUNCHINGS SUCCESSFUL, MORE TO PRECEDE REAL THING. Mach. Design 29:26, 28, illus., Sept. 5, 1957.

Included on p. 24 is the first drawing officially released showing the satellite rocket's configuration.

1370

PROJECT VANGUARD. Senior Scholastic 71:18-19, 32, Oct. 25, 1957.

General article giving some details of the program and what the satellite is expected to contribute.

1371

PROJECT VANGUARD; LAUNCHING THE FIRST SPACE SATELLITE. Tool Engr. 38:133, illus., Feb. 1957.

Announcement of "Engineering Behind an Earth Satellite Launching" session of ASTE Houston meeting, Mar. 1957 and brief comment on Project Vanguard.

1372

PROJECT VANGUARD PAST, PRESENT AND PROSPECTS. Missiles and Rockets, 11:117-118, Jly. 1957.

1373

Prosser, William. THREE-STAGE ROCKET WILL LAUNCH SATELLITES. All Hands 49:12-15, illus., Dec. 1957.

144

Details of operation of the Vanguard rocket.

1374
Prosser, William. THEY'LL TRACK OUR NEW MOONS. All Hands 491: 16-19, illus., Dec. 1957.

Radio and optical tracking for the earth satellite.

1375
PROTOTYPE OF EARTH SATELLITE. All Hands 489:37, Oct. 1957.

Brief information on pre-launching study of the Vanguard rocket.

1376
Przybylski, A. THE SOVIET SATELLITE. Bur. Centr. Intern. Telegr. Astr. Circ. no. 1624, 1957.

Not examined.

1377
PUBLICIZED FAILURE. Commonweal 67:301, Dec. 20, 1957.

Refers to the great amount of publicity surrounding the Vanguard launching failure in December 1957.

1378
Pushkov, N.V. and Dolginov, S. Ch. ISSTEGOVANIE MAGNITNOGO POLYA ZEMLI NA ISKUSSTVENNIKH SPUTNIKAKH I RAKETAKH. (INVESTIGATION OF THE MAGNETIC FIELD OF THE EARTH ON ARTIFICIAL SATELLITES AND ROCKETS). Usp. Fiz. Nauk. 63:645-656, Dec. 1957.

In Russian.

Geophysical and technical aspects of geomagnetic measurements by means of rockets and satellites.

1379
Putik, J. A NEW DISEASE, "SATELLITIS." Lit. Nov. 6(44):12, Nov. 1957.

In Russian. Not examined.

1380
RADAR OBSERVATIONS OF THE FIRST RUSSIAN EARTH SATELLITE

AND CARRIER ROCKET BY STAFF OF THE JODRELL BANK EXPERIMENTAL STATION, UNIVERSITY OF MANCHESTER. Nature 180:941-942, illus., Nov. 9, 1957.

Figure I is a typical example of the echo from the rocket. Figure II gives typical values of detection ranges, signal noise ratios, and effective scattering cross-sections.

1381
Radiation, Inc. AUTOMATIC TELEMETERED DATA RECORDING AND REDUCTION FACILITY FOR PROJECT VANGUARD. 8 issues, 1956, 1957. (Mon. Prog. Rpt. 3, 4, 5, 6, 7, 9, 11, 15) (Contract Nonr-2193(00))

1382
Radio Technical Commission for Aeronautics, Washington, D.C. PROJECT VANGUARD, Papers presented at the Fall 1957 RTCA Assembly Meeting. p. A-1 - A-17, Sept. 1957. (Paper 180-57/AS-185)

1383
RADIO TO TRACK SATELLITE. Armed Forces Mgt. 3:37, May 1957.

Very brief description of plans for a Minitrack system.

1384
Raimond, J.J. SPOETNIK KUNSTMAAN NUMMER EEN. (SPUTNIK, ARTIFICIAL MOON NUMBER ONE). Hemel Dampkr. Haag 55:173-177, 1957.

In Dutch. Not examined.

1385
Rand Corp., Santa Monica, Calif. A CASEBOOK ON SOVIET ASTRONAUTICS - PART II, by F.J. Krieger. 203 p., June 21, 1957. (RM-1922) (See Item 733 for Part I)

Essentially a continuation of Rand Research Memorandum RM-1761 issued in June 1956.

The format is similar. Section I is a two-part bibliography of Russian books and periodicals dealing with various aspects of rocketry and astronautics. Section II is a series of complete translations of Russian

articles and papers showing the singleness of purpose in the Soviet space flight program.

1386
Rand Corp., Santa Monica, Calif. A RECOVERABLE SCIENTIFIC SATELLITE, by Carl Gazley, Jr. and D.J. Masson. rev. ed., 10 p., Feb. 27, 1957. (Rpt. 1844)

The uncontrolled descent of a satellite from its orbit involves a less severe heating problem than the reentry of a long-range ballistic missile because of the more gradual descent and consequent smaller deceleration of the satellite. The satellite descent is slow enough so that the thin skin attains the radiation equilibrium temperature corresponding to a given velocity and altitude.

1387
Rand Corp., Santa Monica, Calif. UTILIZATION OF A MOON-ROCKET SYSTEM FOR MEASUREMENT OF THE LUNAR MAGNETIC FIELD, by E.H. Vestine. 24 p., Jly. 9, 1957.

1388
Rand Corp., Santa Monica, Calif. VISUAL DETECTION OF LIGHT SOURCES ON OR NEAR THE MOON. 39 p., May 27, 1957. (RM-1900)

Considers possible visual detection devices for locating an unmanned vehicle en route to the Moon and for finding its point of landing.

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Razorenov, L. SOVIET ARTIFICIAL SATELLITES OF THE EARTH. Blok. Agit. 32:45-50, Nov. 1957.

In Russian. Not examined.

1390
Read, O. GEOPHYSICAL YEAR AND ITS SATELLITE. Radio & TV News 58:8, Jly. 1957.

Comments on what the American satellite will be like and what it will mean to individuals, indirectly.

1391
RED MOON. Mach. Design 29:22, Oct. 3., 1957.

145

Appraisal of reports of first satellite.

1392
Redstone Arsenal, Ordnance Missile Laboratories, Huntsville, Ala. RADIO OBSERVATIONS ON THE RUSSIAN SATELLITE AT REDSTONE ARSENAL, by J.E. Norman. 17 p., Oct. 31, 1957. (Rpt. 2M1F)

Observations of the radio signals emitted by the Russian satellite during October 5-10.

Photographs of the signal waveforms displayed on a CRO screen are included.

1393
RELATIONSHIP OF THE UNITED NATIONS TO OUTER SPACE. COMMISSION TO STUDY THE ORGANIZATION OF PEACE. In Strengthening the United Nations. p. 216-220, Harper, New York, 1957.

Includes recommendations for the international control of flights by artificial satellites.

1394
Riabchikov, E. EARTH SATELLITE. Ogonek 35:25-26, June 1957.

In Russian. Not examined.

1395
Richter, H.L., Jr., Sampson, W.F., and Stevens, Robertson. MICROLOCK: A MINIMUM WEIGHT RADIO INSTRUMENTATION SYSTEM FOR A SATELLITE. In National Telemetering Conference, Papers Presented at El Paso, Texas, May 27-29, 1957, p. V-A-1-1-V-A-1-15, New York, American Institute of Electrical Engineers, 1957.

The design, construction, and laboratory testing of a satellite-tracking system are described.

1396
Richter, H.L., Jr. MICROLOCK: A TRACKING RECEIVER FOR SATELLITE COMMUNICATIONS. Res. & Eng. 3:13-17, illus., Oct. 1957.

Describes an amateur club tracking receiver developed by the San Gabriel Valley Radio Club.

146

Also in QST 41:20-24, illus., Dec. 1957.

1397

Roberson, R.E. ORBITAL BEHAVIOR OF EARTH SATELLITES, I. Frank. Inst. J., 264:181-201, Sept. 1957.

Reviews some of the more recent contributions towards an analytical and integrated treatment of the orbit of an earth satellite with the requirements of satellite engineering rather than classical astronomy primarily in mind.

1398

Roberson, R.E. ORBITAL BEHAVIOR OF EARTH SATELLITES, II - ORBITS ABOUT AN OBLATE SPHEROID. Frank. Inst. J. 264:269-285, Oct. 1957.

Presentation of a method to (a) deduce the orbit geometry in the field of an oblate spheroid, as if no other external forces act; (b) calculate a rotating reference frame with respect to which the orbit is periodic; (c) relate the elements of the orbit to the kinematic and geometric initial conditions which exist when the orbit is established; and (d) develop the time behavior of the basic dependent variables which describe the orbit. The principal limitation of the analysis is its restriction to first order effects in the oblateness parameter.

1399

Roberson, R.E. TORQUES ON A SATELLITE VEHICLE FROM INTERNAL MOVING PARTS. Am. Soc. Mech. Engrs. Preprint 57 A-39. 5 p., 1957.

In a satellite vehicle small torques can be significant, even to playing a dominant role in the excitation of satellite attitude motions. This paper derives a complete expression for the attitude perturbation torque from this source, interpreting each of its terms. The attitude reference coordinate system is discussed. The nature of the torque is found for three simple cases.

1400

Robinson, F.M. SPUTNIK, FIRST EARTH SATELLITE. Sci. Dig. 42: 86, Dec. 1957.

Brief general article.

1401

Rochelle, R.W. EARTH SATELLITE TELEMETRY CODING SYSTEM USING TRANSISTORS AND MAGNETIC CORES. In National Telemetering Conference. Papers Presented at El Paso, Texas, May 27-29, 1957, p. 1-A-3-1-1-A-3-5, New York, American Institute of Electrical Engineers, 1957.

The different bandwidth requirements for the various inputs from the transducers in the Vanguard earth satellite led to a system which is a combination of time-sharing and frequency-sharing telemetry. To illustrate, a simple three-channel system is first described. This is then extended to cover the 48-channel system.

Also in Elec. Eng. 76:1062-1065, illus., Dec. 1957.

1402

ROCKET AND SATELLITE CONFERENCE. Sci. 126:933, Nov. 1, 1957.

Summary of international conference on rocket and earth satellite programs for the International Geophysical Year held in Washington from September 30 to October 5, 1957.

1403

ROCKET COMPUTER CENTER OPENS. Electron. (Bus. ed.) 30:25, July 20, 1957.

Describes the expected operation of the electronic computer center in Washington, D.C. that will serve as the brains for tracking the earth satellite in connection with the Vanguard project.

1404

ROCKET OF THE FIRST EARTH SATELLITE. Nature 180:944, Nov. 9, 1957.

147

1405

ROCKET TO THE MOON IS POSSIBLE NOW. INTERVIEW WITH A LEADING EXPERT ON SATELLITES, DR. S. FRED SINGER. U.S. News & World Rpt., 43:44-49, illus., Nov. 8, 1957.

Questions and answers relative to exploding an H-bomb on the moon, Russia's satellite, imaginative space projects that the U.S. can carry out, and an appraisal of Sputnik.

1406

ROCKETS AND SATELLITES AT GRANFIELD. THE PAPERS AND DISCUSSIONS SUMMARIZED. Flight 72:153-156, Aug. 2, 1957.

Brief summaries of papers given at the symposium on high-altitude and satellite rockets, July 18-20, 1957.

1407

ROCKETS AND SATELLITES: RADIO TRACKING SYSTEM. IGY Bull. 2:7-11, illus., Aug. 1967.

Information on radio tracking of the satellites extracted from reports on the subject by J.T. Mengel.

1408

ROCKETS FOR RESEARCH. Flight 72:886-888, Dec. 6, 1957.

Scientific exploration on the fringe of space via rockets.

1409

Roessler, E. DER USA - ERDSATELLIT. (THE USA - EARTH SATELLITE). Nachrtech. Z. 10:253, May 1957.

In German.

1410

Romick, D.C., Knight, R.E., and Black, S. METEOR JUNIOR. A PRELIMINARY DESIGN INVESTIGATION OF A MINIMUM-SIZED FERRY ROCKET VEHICLE OF THE METEOR CONCEPT. Paper given at the 8th International Astronautical Congress, Barcelona, 1957. New York, American Rocket Society, 1957. (ARS Preprint 504-57)

A previous paper outlined a concept for a large ferry rocket vehicle and manned earth-satellite terminal, designated Meteor. This paper presents a preliminary design investigation for a minimum-sized vehicle of the same concept. While exhibiting less load-carrying efficiency than the large vehicle, this smaller 500-ton vehicle could still carry a small operating crew and around a ton of payload.

1411

Rosen, M.W. DOWN-TO-EARTH VIEW OF SPACE FLIGHT. Res. Revs. (ONR), p. 8-13, Feb. 1957.

Discussion of the state of present space-flight research, the obstacles to be overcome, and the rewards to be reaped from such inquiry.

1412

Rosenstock, H.B. THE EFFECT OF THE EARTH'S MAGNETIC FIELD ON THE SPIN OF THE SATELLITE. Astronautica Acta 3:215-221, 1957.

It is expected that the earth satellite will spin about its axis several times per second at launching time. This is desired to make certain experiments feasible, as well as for aerodynamic stability. It has long been known that conductors rotating in a magnetic field will slow down; the purpose of this report is to review the results existing on this subject and to apply them to the case of the satellite moving in the geomagnetic field.

1413

Rougeron, Camille. A QUOI SERVENT LES SPOUTNIKS. (WHAT USE ARE THE SPUTNIKS). Sci. et Vie., p. 34-43, illus., Dec. 1957.

In French.

Comparison of the Russian and American satellites with a French artist's diagram of the possible construction and instrumentation of the second Russian satellite.

148

1414
Rousseau, Pierre. LES SATELLITES ARTIFICIELS. (THE ARTIFICIAL SATELLITES). Paris, Librairie Hachette, 192 p., diag., map, 1957.

In French.

Rockets, satellites and space travel; an insert printed after the launching of the first Russian satellite states that the satellite material is based largely on U.S. Project Vanguard data.

1415
Rowland, E.N. A NOTE ON SPACE TRAVEL IN A GRAVITATIONAL FIELD. Brit. Interplan. Soc. J., 16: 216-221, Oct./Dec. 1957.

The behavior of clocks during travel in the curved space-time of the general theory of relativity is discussed, and effects observable in journeys in the Solar system or on Earth satellites are examined.

1416
Royal Aircraft Establishment, Farnborough Staff. OBSERVATIONS ON THE ORBIT OF THE FIRST RUSSIAN EARTH SATELLITE. Nature 180:937-941, Nov. 9, 1957.

Interferometer measurements; doppler measurements; general features of satellite orbits; orbit of the first Russian earth satellite; and ionospheric phenomena.

1417
Royal Radar Establishment, Malvern Staff. THE 45-FT. RADIO TELESCOPE AT THE ROYAL RADAR ESTABLISHMENT, MALVERN. Nature 180:1225-1228, illus., Dec. 7, 1957.

The electrical and mechanical characteristics of an aerial designed for radio and radar astronomy at centimetric wavelengths are described. Specimen echoes from the first artificial satellite and from the moon are shown.

1418
RUNDOWN ON THE VANGUARD VE-HICLE. Astronautics 2:62-63, 402, illus., Aug. 1957.

An up-to-date report on the 10-minute trip through space of three-stage rocket that will place the earth satellite in orbit.

1419
Russell, O.J. SATELLITE OBSERVATIONS FOR AMATEURS. Wireless World 63:579-581, illus., Dec. 1957.

Use of frequencies of 20 to 40 Mc/s in the Russian satellites opened up the possibility of large-scale amateur observations with gear already at hand in most amateur stations.

1420
RUSSIA PICKS TOUGHER SATELLITE ORBIT. Aviat. Wk. 67:31-32, Jly. 29, 1957.

Summary of international Symposium on High Altitude and Satellite Rockets includes statement by Boris Petrov of the Soviet Academy of Sciences relative to choice of orbit.

1421
RUSSIAN EARTH SATELLITES AND THE INTERNATIONAL GEOPHYSICAL YEAR. Nature 180:1027, Nov. 16, 1957.

A note indicates that the Royal Society and not the Department of Scientific and Industrial Research is responsible for co-ordinating United Kingdom participation in the programme of the IGY.

1422
RUSSIAN SATELLITE TRANSMITS SOME DATA. Aviat. Wk. 67:27, Oct. 14, 1957.

1423
RUSSIANS PLAN N-S ORBIT FOR SATELLITE. Contr. Eng. 4:52, 54, Sept. 1957.

Brief summary of talks by Boris Petrov and Milton Rosen at the Symposium on High Altitude and Satellite Rockets at Cranfield, England, in July 1957.

1424
RUSSIANS TALK ABOUT ROCKETS AT IGY CONFERENCE. Astronautics 2:85-86, Nov. 1957.

A summary report on the IGY rocket and satellite conference sponsored by the National Academy of Sciences in Washington, D.C. the latter part of September 1957.

1425
RUSSIA'S MOON ROCKET PROGRAM. SOVIETS LEAP AHEAD AGAIN, SKIP BOMBER IN TEST STAGE. Missiles and Rockets 11:37-39, illus., Nov. 1957.

Includes statements relative to Russia's future plans given by Dr. Leonid Sedov during the Eighth Congress of the International Astronomical Federation in Barcelona, October 1957.

1426
Rzhiga, O. and Shakhovskoi, A. METODIKA NABLYUDENIU. (METHOD OF OBSERVATION [OF ARTIFICIAL EARTH SATELLITE SIGNALS]). Radio (USSR) no. 8:17-19, Aug. 1957.

In Russian.

Continuation of article by same authors in July issue of Radio. (See Item 1427)

Translation R-3209 available at Special Libraries Association Translation Center, Crerar Library, Chicago, Ill.

1427
Rzhiga, O. and Shakhovskoi, A. U.K.V. PRIEMNIK. (U.H.F. RECEIVER). Radio (USSR) no. 7:17-23, illus., Jly. 1957.

In Russian. For first part see Item 1426.

A receiver developed primarily for observation of the artificial earth satellite, characterized by high selectivity, high sensitivity, good stability of heterodyne frequency and minimum internal noise level. The fact that the signal at the receiving antenna will, at best, not exceed several microvolts per meter, and the Doppler effect involved in the reception of the signal from a satellite travelling at 8 km/sec, are both taken into account. A detailed circuit diagram and instructions for the construction, alignment, and placement of parts are contained in this article.

149

Translation R-3261 available at Special Libraries Association Translation Center, Crerar Library, Chicago, Ill.

1428
Sänger, Eugen. ENTWICKLUNGSSTAND 1957 DER UNBEMANNTEN FLUGKÖRPER, ÜBERSCHALL-FLUGGERÄTE UND RAUMFAHRTZEUGE. (THE 1957 STAGE OF DEVELOPMENT OF UNMANNED MISSILES, SUPERSONIC AIRCRAFT INSTRUMENTS AND SPACE VEHICLES). Forschungsinst. Phys. Strahlentriebe Mittelteil, 141 p., Oct. 12, 1957.

In German. Not examined.

Includes the military, commercial, technical, scientific and cultural aspects.

1429
Sänger, Eugen. GEMEINSAMKEIT UND BEFRIEDUNG DER LUFTFAHRT UND RAUMFAHRT-ENTWICKLUNG IM 20. JAHRHUNDERT. (AIR-TRAVEL AND SPACE-FLIGHT DEVELOPMENT IN THE 20TH CENTURY). Weltraumfahrt 8:1-6, chart, Feb. 1957.

In German.

Briefly surveys the history of aircraft and space-flight development and predicts, in considerable detail, possible future attainments. A prediction graph indicates that if increases in speed for manned or unmanned vehicles continue at the present rate, the speed of light will be theoretically approached rather closely by about the year 2000.

1430
Sänger, Eugen. TIME AND THE SPACE TRAVELER; WITH EDITORIAL COMMENT. Atlantic Mon. 200:153-155, Oct. 1957.

Postulates a space journey of 11 years which would be the same as 1000 years earth time. The apparent time difference is an observational phenomena on the part of the terrestrial observer.

1431
Santosuosso, J.J. WHAT ARE THE IMPLICATIONS FOR AMERICAN

150

EDUCATION OF THE SATELLITE PROPOSED IN IKE'S SPEECH OF JULY 29, 1955? Sci. Ed. 41:48-54, Feb. 1957.

Based on a workshop in public school education held during the summer of 1955.

1432 SATELLITE. Nasi Razgl. 6(no. 20): 478-479, Oct. 1957.

In Yugoslavian. Not examined.

1433 THE SATELLITE: CONSIDERATIONS OF SCALE. Eng., 184:456, Oct. 11, 1957.

Comparison of size of Vanguard and Sputnik.

1434 SATELLITE COMPUTING CENTER OPENED. Automatic Contr. 7:53-56, illus., Aug. 1957.

1435 SATELLITE DETAILS REVEALED AT ARS SPRING MEETING. Jet Propul. 27:444-448, illus., Apr. 1957.

Summary of paper on the design, fabrication and testing of the Vanguard satellite read at the American Rocket Society Spring meeting by R.C. Baumann.

1436 SATELLITE LAUNCHER. Steel 141: 204, Oct. 7, 1957.

Includes illustration of the firing stand which holds the Vanguard rocket, weighs fuel, and disconnects feed and instrument lines.

1437 SATELLITE LAUNCHER-STAINLESS STEEL IS KEY MATERIAL. Mat. Design Eng., 46:112-113, illus., Dec. 1957.

Describes basic components of the launcher.

1438 SATELLITE MAGNETOMETER TO MEASURE EARTH'S FIELD. Radio & TV News 58:158, Sept. 1957.

A Varian magnetometer, to be carried in the Vanguard satellite, will provide a record of the earth's magnetic field above the ionosphere and is expected to answer many questions concerning magnetic disturbances.

1439 SATELLITE OBSERVING TEST. Sci. 125:1077, May 31, 1957.

Cites primary goal of first nationwide test alert for satellite observers, May 17, 1957.

1440 THE SATELLITE PARADOX. Brit. Interplan. Soc. J. 16:109-112, Apr./June 1957.

Comments by Janusz Thor, C.A. Cross and D.G. King-Hele.

1441 SATELLITE POSTPONED. Discovery 18:310, Jly. 1957.

News of the postponed launching of the Vanguard satellite, with an account of the testing of the first and third stage rockets on May 1, 1957.

1442 SATELLITE PROGRAM TAKES TO THE AIR. Jet Propul. 27:190, Feb. 1957.

Vanguard launching program.

1443 SATELLITE RECOVERY PROPOSAL. Aviat. Wk. 67:101, illus., Nov. 18, 1957.

Picture illustrates proposal for bringing a satellite back to earth made by A.J. Eggers of the NACA. "Hemispherical, finned vehicle would encounter deceleration and heating within human capacity if re-entry was made at a small angle with the horizontal."

1444 SATELLITE REVIEW. Impulse 3:5-11, 1957.

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The Historical Perspective, by G.J. Whitrow; II. The Political Consequences, by W. Elliot; III. The Strategic Significance, by A. Buzzard.

1445 SATELLITE TELESCOPE BEING USED BY MOONWATCH GROUPS. Frank. Inst. J. 264:528, Dec. 1957.

Describes special wide-field viewer called the Moonwatch Satellite Telescope.

1446 SATELLITE TIMETABLE. Eng. 184: 582, Nov. 8, 1957.

Comment on paper read at the Barcelona conference by D.E. Okhotsimsky, T.M. Eneev and G.P. Taratynova entitled "Determination of the Lifetime of an Artificial Earth Satellite and Investigation of the Secular Perturbations of its Orbit."

For paper see Item 1314.

1447 SATELLITE TRACKING. QST 41:31, Sept. 1957.

Refers to progress in preparations for tracking the earth satellite and comments on Mintrack calibration by moon-bounce signals.

1448 SATELLITE WILL BE READY FOR LAUNCHING. Aviat. Wk. 67:71-72, Aug. 12, 1957.

Summary of remarks on the Vanguard satellite made by R.C. Baumann at a meeting of the Texas section of the Institute of the Aeronautical Sciences.

1449 SATELLITE WILL BLAST OFF WITH KEROSENE. Petrol. Ref. 36:335-336, illus., May 1957.

Fuel for Vanguard's first stage rocket is "direct but improved descendant of the oil that burned in grandfather's buggy lamp."

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1450 SATELLITES AND OUR SAFETY. STEPPING UP THE PACE. Newswk. 59:29-36, Oct. 21, 1957.

Administration views about Sputnik; remarks of Dr. Vannevar Bush; the military side of it; how we're running the race for supremacy in atoms, rocketry and now up into space; the "law" up above; the danger in Sputnik; the race for the moon, what it takes; space travel; and storing sky supplies (in space-stations).

1451 SATELLITES ROCKETS PASS TWO-STAGE TEST. Bus. Wk. no. 1445: 196, May 11, 1957.

Brief report of test of two stages of the three-stage rocket that will take the Vanguard satellite aloft.

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SATELLITES TO MULTIPLY. Discovery, 18:72, Feb. 1957.

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1453 Schaafsma, Will. DESIGN CONSIDERATIONS OF THE VANGUARD THIRD-STAGE ROCKET ENGINE. New York, American Rocket Society, 1957. (ARS Preprint 423-57)

1454 Schaefer, D.H. MAGNETIC CORE EVENT COUNTER FOR EARTH SATELLITE MEMORY. In National Telemetering Conference. Papers Presented at El Paso, Texas, May 27-29, 1957, p. I-A-4-1-I-A-4-5, New York, American Institute of Electrical Engineers, 1957.

This paper is a description of the counter circuitry being developed to record atomic particle and micro-meteorite hits.

1455 Schmidt, G.M. and Hanawalt, A.J. SKIN TEMPERATURES OF A

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- Brief report on the radio-tracking system.
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- The procedure would be applicable to the design of ballistic missiles and satellite vehicles.
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- Included among statements by various scientists before Senate Preparedness Subcommittee is that of H.E. Newell, Jr. In it he supports the idea of creating a National Space Establishment and lists some of the things that it could do in the fields of space exploration and research.
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1507

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Discussion of the two most important problems which should be investigated; determination of the flow

of meteor particles and study of their spectra.

1510

SOUNDS FROM SPACE. Electron (Bus. ed.) 30:14, Oct. 20, 1957.

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1511

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1512

Southworth, M.P. CUTTING COSTS IN THE 108-Mc CONVERTER. QST 41:16-17, illus., Dec. 1957.

Suggests communication receivers for general satellite monitoring.

1513

SOVIET MOON SPURS VANGUARD. Electron (Bus. ed.) 30:24, illus., Oct. 20, 1957.

First U.S. earth satellite expected to go into orbit may be 6.4-in. moonlet schedules for launching about May 1. Six full-scale 20-in. satellites will follow at six-week intervals, but pressure from Congress may speed up timetables.

1514

SOVIET SATELLITE MEASUREMENTS. Army Signal and Eng. Labs. Res. & Devlpmt. Summary 4:2, Oct. 25, 1957.

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1515

THE SPACE ENCYCLOPAEDIA: A GUIDE TO ASTRONOMY AND SPACE RESEARCH. 287 p., illus., New York, Dutton, 1957.

See also entry under Newell, Item 1290.

A comprehensive, authoritative, illustrated encyclopedia of astronomy, astronautics, missiles, and space travel.

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SPACE INSTRUMENTS DESCRIBED TO A.I.E.E. Midwest Engr. 9:21, Feb. 1957.

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1517

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Includes the following: Introduction, by P.A. Campbell, p. 479-480; The Propulsion Engineer's Views, by K.K. Dannenberg, p. 481-484; The Astronomer's Views, by W.O. Roberts, p. 484-487; The Astrophysicist's Views, by Heinz Haber, p. 487-492; A Test Pilot's Viewpoint, by A.S. Crossfield, p. 492-495; Instrumentation for Space Flight, by G.W. Hoover, p. 495-498; Some Survival Aspects of Space Travel, by A.M. Mayo; The Vanguard Project, by J.P. Hagen, p. 503-507; The Possibilities of an Inhabitable Extraterrestrial Environment Reachable From the Earth, p. 507-512.

1518

Spencer, J.R. THE EARTH SATELLITE - UNIQUE RESEARCH TOOL.

158

Philco Tech. Rep. Div. Bull. 7:3-9, illus., Sept./Oct. 1957.

Second part of an article on creation of the earth satellite. This part discusses construction, and the instrumentation that it will contain. See Item 1519.

1519
Spencer, J.R. PROJECT VANGUARD. Philco Tech. Rep. Div. Bull. 7:15-22, illus., Jly./Aug. 1957.

Describes some of the preparations for the launching of the first U.S. space satellite.

1520
Spilhaus, A.F. HEAVENLY VIEW OF THE HEAVENS. Res. & Eng., 3:14-17, June 1957.

A general article on the IGY with brief mention of Project Vanguard and how studies from rockets and satellites will provide new understanding of the earth and its atmosphere.

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Spincourt, J. LE PREMIER SATELLITE ARTIFICIEL. (THE FIRST ARTIFICIAL SATELLITE). Nature (Paris), p. 453, 1957.

In French. Not examined.

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Spitz, A.N. PROJECT MOONWATCH - VISUAL TRACKING OF IGY SATELLITES. In Am. Astronautical Soc. Proc. 3rd Annual Meeting, Dec. 6-7, 1956. p. 169-177, New York, The Society, 1957.

The visual tracking program for Project Vanguard is outlined. A general description of the amateur visual tracking program, Project Moonwatch, and the coordination of this worldwide effort under the sponsorship of the Smithsonian Astrophysical Observatory is presented.

1523
SPOTLIGHT ON SATELLITES. Astro-nautics 2:50, 79, illus., Nov. 1957.

Summary of American Museum-Hayden Planetarium's "Earth, Air and Space" symposium in New York.

1524
SPUTNIK. Sci. 126:739-740, Oct. 18, 1957.

Quotes comments of Joseph Kaplan and P.H. Wyckoff and the test of the first Soviet report.

1525
SPUTNIK. Sci. 197:66-68, Nov. 1957.

A review of the launching, the rocket, the satellite, the orbit, the tracking, results, and the first suggestion of sending up a man made satellite by Edward Everett Hale in an Atlantic Monthly article called "The Brick Moon" published in 1871.

1526
SPUTNIK AND MUTNIK PASSES SEEN HERE: HUGE RADAR POINTS SATELLITE POSITIONS. Mach. Design 29:5, Dec. 12, 1957.

Describes radar at Millstone Hill in Westford, Mass. developed by Lincoln Laboratory of Massachusetts Institute of Technology.

1527
THE SPUTNIK AND US - WORLD ROUNDUP OF SCIENTIFIC COMMENT. Prod. Eng. 28:23-24, Nov. 4, 1957.

Replies to queries put to foreign scientists and engineers.

1528
SPUTNIK FACTS COLLECTED. Sci. News Ltr. 72:358, Dec. 7, 1957.

Details of the first Russian Sputnik as summarized in the IGY Bulletin for November 1957.

1529
SPUTNIK IS RADIATING STRONG INFRARED SIGNAL. Aviat. Wk. 67:31, Nov. 4, 1957.

1530
SPUTNIK-MADE IN U.S.A. Senior Scholastic (Teacher ed.) 71:18-19, Dec. 13, 1957.

Brief mention of imminent launching of the U.S. earth satellite and how it will be fired and tracked.

1531
SPUTNIK MAKES ITS IMPACT ON BUSINESS AND ADVERTISING. Printers Ink 261:1-4, Oct. 8, 1957.

A forecast of effect on stocks and toys.

1532
SPUTNIK POSES QUESTION. Steel 141:68-69, illus., Oct. 14, 1957.

An attempt to answer the question as to why the Russians were first with a satellite; and what may develop as far as U.S. plans are concerned.

1533
SPUTNIK PROVES RUSSIANS HAVE BEST ROCKET ENGINES, FIRST-RATE GUIDANCE SYSTEM. Prod. Eng. 28:21, Oct. 21, 1957.

Comment on Sputnik fuel and guidance system.

1534
SPUTNIK SPURS EFFORT. Chem. Wk. 81:46, Oct. 12, 1957.

Brief note concerning speculation as to details of the propulsion system and implications of Sputnik, militarily, scientifically and economically.

1535
SPUTNIK II. N. Repub. 137:3-4, Nov. 11, 1957.

1536
SPUTNIK II. Sci. 126:965, Nov. 8, 1957.

Quotes comments by Kaplan; Hagen; Rinehart; Hynek; Teller; Bracewell and Masashi Miyaji.

1537
SPUTNIK II - A PRELUDE TO THE MOON? Chem. & Eng. News 35:27, Nov. 11, 1957.

Some vital statistics of Russia's artificial satellites.

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1538
SPUTNIK II AND PIONEER RIDER. Life 43:42-43, Nov. 18, 1957.

1539
SPUTNIK II MAY BE INDICATION SOVIETS HAVE NEW EXOTIC FUEL. Oil, Paint & Drug Rpt. 172:4, 79, Nov. 11, 1957.

Quotes various opinions as to "new source of power."

1540
SPUTNIK II: THE SURGE OF SOVIET SCIENCE. Newswk. 50:73-76, Nov. 11, 1957.

An assessment of Soviet science in the age of space and the atom.

1541
"SPUTNIK." WHAT ARE ITS TECHNICAL IMPLICATIONS? Electron Indus. & Tele. Tech. 16:70-71, 73, 149-150, Nov. 1957.

Sputnik history, propaganda value and what industry officials said about it. U.S. satellite experiments are reviewed and an indication given of what the U.S. scientific satellite will accomplish.

It is prophesied that the "satellite promises to profoundly affect the future of the electronic industry and the over-all defense effort."

1542
SPUTNIK ZEMLI. (SATELLITE OF THE EARTH). Natural Hist. 66:518-519, Dec. 1957.

This phrase is the Soviet name for its vehicle.

1543
SPUTNIKS AND BUDGETS. N. Repub. 137:3-5, Oct. 14, 1957.

An attempt at explaining why the United States lost the race to launch the first artificial moon in space.

1544
SPUTNIKS AND MOUSES. QST 41:9-12, illus., Dec. 1957.

160

A report on what some "Hams" did during Sputnik I's early travels.

1545
SPUTNIK'S ROCKET CALLED OFF SHOOT OF WORLD WAR II GERMAN V-BOMB. Oil, Paint & Drug Rpt. 172:3, 62, Oct. 14, 1957.

A discussion of fuel for satellite rockets.

1546
Stanford Research Institute, Antenna Systems Laboratory, Menlo Park, Calif. EFFECTS OF SATELLITE SPIN ON GROUND-RECEIVED SIGNAL, by J.T. Bolljahn. 22 p., illus., Aug. 1957. (Tech. Rpt. 6) (Contract DA 04-200-ORD-273)

This report is concerned with the effect of the satellite spin on the ground-received signal, assuming that the spin axis may be arbitrarily oriented with respect to the symmetry axis.

1547
Stanford Research Institute, Menlo Park, Calif. RUSSIAN EARTH SATELLITE 1957 ALPHA, RADIO AND RADAR DATA AND PRELIMINARY ANALYSIS OF SATELLITE ORBIT PREDICTION TECHNIQUES, by L.H. Rorden and W.E. Jaye. Dec. 1957.

Not examined.

1548
THE START OF THE INTERNATIONAL GEOPHYSICAL YEAR. Discovery 16:123-124, Jly. 1957.

Briefly mentions the Vanguard project.

1549
Stehling, K.R. SPACE FLIGHT. A \$2 BILLION-A-YEAR BUSINESS BY 1962. Aviat. Age 28:17-21, illus., Dec. 1957.

Cites "a whole new realm of engineering - in materials, electronics, electromechanics, optics, and chemistry" opened up by the Soviet satellites in the sky, for "on October 4, 1957, the age of space began."

1550

Stehling, K.R. U.S. SPACE FLIGHT R & D MAKES GOOD SHOWING AT IAF CONGRESS. Aviat. Age 28:76-81, Dec. 1957.

Reviews highlights of the International Astronautical Congress in Barcelona, October 6-12, and gives a complete list of the technical papers presented.

1551

Steier, H.P. SPACE COMMUNICATIONS TESTED WITH X-17. Missiles and Rockets, 2:121-122, Dec. 1957.

Reveals some tests connected with space ship communication problem.

1552

Steier, H.P. STRUCTURAL TESTS ON IGY SATELLITE NEAR. Am. Aviat. 20:50-53, Jan. 14, 1957.

1553

Steier, H.P. VANGUARD SATELLITE TRACKING CAMERA DEVELOPED. Missiles and Rockets 2:64-65, Jan. 1957.

Structural and operational details of the camera, including diagrammatic illustrations of the camera and of a satellite-tracking camera station.

1554

Sterne, T.E. CELESTIAL MECHANICS OF ARTIFICIAL SATELLITES. Sky and Telescope 17:66-68, illus., Dec. 1957.

Motion in an elliptical orbit; the orbit in space; perturbations of a satellite.

1555

Stewart, Peter. AFTER VANGUARD - WHAT? Roy. Air Force Flying Rev. 12:21, 32, illus., Jly. 1957.

Brief report of "dramatic developments" connected with space flight, which may follow the satellite launchings.

1556

Stine, G.H. EARTH SATELLITES AND THE RACE FOR SPACE SUPERIORITY. 191 p., diags., New York, Ace, 1957.

161

1562

Stsiapanau, B. THE EARTH SATELLITE. Biurozka 33:21-23, Dec. 1957.

In Russian. Not examined.

1563

STUDY RADIO TRANSMISSION FOR VAST REACHES OF OUTER SPACE. PAVE WAY FOR COMMUNICATION WITH MANNED SPACE SHIPS. Mach. Design 29:15, 22, Dec. 12, 1957.

Refers to studies under way at the new space communications laboratory, (Lockheed's Missile System Division) concerning effect of outer space's cosmic rays on radar and radio signals; radar pattern presented by various space vehicle and missile shapes; and effect of the ionosphere on such signals.

1564

Stuhlinger, Ernst. DESIGN AND PERFORMANCE DATA OF SPACE-SHIPS WITH IONIC PROPULSION SYSTEMS. Paper given at 8th International Astronautical Congress, Barcelona, 1957. New York, American Rocket Society, 1957. (ARS Preprint 509-57)

The relations between component masses and performance figures of electrically-propelled space vehicles can be derived if a few simplifying assumptions are made. Even though many of the technical details of electric drive systems have not been developed, it is possible to estimate the take-off mass and initial acceleration of a space ship as a function of its payload, total propulsion time and a few design parameters.

1565

Stuhlinger, Ernst. THE FLIGHT PATH OF AN ELECTRICALLY PROPELLED SPACE SHIP. Jet Propul. 27:410-414, 397, Apr. 1957.

Deals with the flight phases which are necessary and sufficient to achieve an expedition to Mars, and back with a low-thrust, electrically propelled space ship.

The author, who is a rocket engineer at White Sands Proving Ground, tells what artificial man-made satellites are, describes how they are made, and what kind of rocket ships can be used to reach the new satellites.

Ch. III is entitled Vanguard.

1557

Stine, G.H. ROCKET POWER AND SPACE FLIGHT. 182 p., illus., New York, Holt, 1957.

Technical details are translated into readable, simple terms to give the "inside" story of rocket operation and possibilities of space flight in the future.

1558

Stohl, J. ARTIFICIAL SATELLITES OF THE EARTH SHOULD CONFIRM THE THEORY OF RELATIVITY. Nasa Veda 4:60-63, Feb. 1957.

In Czechoslovakian. Not examined.

1559

Stone, Irving. FORD SUBSIDIARY SPEEDS SPACE STUDY. Aviat. Wk. 68:51, 53, 55, illus., Jan. 6, 1957.

Aeronutic Systems, Inc., Glendale, Calif., is funneling accelerated technical efforts into conception and detail design of devices for general space research and earth satellites; impacting on the moon; establishing moon satellites and interplanetary travel.

1560

Strong, James. PROJECT VANGUARD. Aeroplane 92:919-932, June 28, 1957.

An IGY program, Vanguard vehicle, earth satellite design, ascent into space, tracking the satellite, and research in space are discussed.

1561

Strong, James. ROCKETING INTO SPACE. REPORTS ON THE RECENT CONFERENCE AT CRANFIELD ON THE SUBJECT OF ROCKETS AND SATELLITES. Aeroplane 93:162-164, Aug. 2, 1957.

162

1566
Stuhlinger, Ernst. OUTLOOK TO SPACE TRAVEL. Sci. Mon. 85:281-287, Dec. 1957.

In this detailed account of a trip to Mars via space ship, use of a space station orbiting around the earth as a satellite, is indicated.

1567
Subotowicz, M. SATELLITES FOR CHECKING EINSTEIN'S RELATIVITY THEORY. Missiles and Rockets 2:57-59, Feb. 1957.

Discusses the artificial satellite of the earth and the possibility of new experimental verification of the general theory of relativity.

1568
Summerfield, Martin. PROBLEMS OF LAUNCHING AN EARTH SATELLITE. Astronautics 2:18-21, 34-37, 50-54, illus., 1957.

An examination of the engineering aspects.

1569
SUN BATTERIES FOR HELMET RADIO AND SATELLITE INSTRUMENTS. Elec. Eng. 76:947, Oct. 1957.

Experiments indicate that solar batteries would be the ideal power source to operate instruments in the earth satellite.

1570
SUN POWERS SATELLITE INSTRUMENTS. The Sun at Work 2:15, Sept. 1957.

"The U.S. Army Signal Engineering Laboratories, Fort Monmouth, N.J. proved during recent tests that the sun can supply the power necessary to operate the instruments on an earth satellite for an indefinite period. Solar batteries attached to the skin of an Aerobee-HH rocket fired by the Navy to a height of 190 miles at the White Sands Proving Ground, N.M. provided continuous electrical output from the time of firing until the rocket's radio ceased functioning upon re-entering the dense atmosphere. Tests will be

continued during some of the early satellite launchings." Entire item quoted.

1571
SUN RAYS TO POWER SATELLITE INSTRUMENTS. Signal 11:40, Aug. 1957.

The Signal Corps has proved that solar batteries may provide an ideal power source. Further tests are to be conducted during some of the early satellite launchings.

1572
Sutton, G.P. EIN VERGLEICH MOEGLICHER ANTRIEBSSYSTEME FUER RAUMFAHRZEUGE. (A COMPARISON OF POSSIBLE PROPULSION SYSTEMS FOR SPACE FLIGHT). Raketentech. & Raumfahrtforsch. p. 73-75, Oct. 1957.

In German.

Discussion of the actual propulsion systems for space vehicles including liquid power plants, nuclear propulsion, free radical (atomic gases), heating through solar energy, and electrical discharge and Lorin propulsion.

1573
Svoren', R. V PERVIE DIN. (IN THE FIRST DAYS). Radio (USSR) no. 11:19, Nov. 1957.

In Russian.

1574
Swetnick, M.J. METEORIC ABRASION STUDIES PROPOSED FOR VANGUARD. In American Astronautical Society. Proceedings, 3rd Annual Meeting, December 6-7, 1956, p. 59-64, New York, The Society, 1957.

Discussion of two Vanguard methods, approved for inclusion in the satellite program, for studying meteoric abrasion of satellite skins.

Also in J. Astronautics 4:69-71, Winter 1957.

1575
SYMPOSIUM OF SOVIET RESEARCH ON ARTIFICIAL EARTH SATELLITES AND RELATED SUBJECTS.

Usp. Fiz. Nauk. 63(1a):1-144, Sept. 1957.

In Russian.

Translation available as U.S. Joint Publications Research Service, Wash., D.C., Translation JPPS/NY-187(Pt. 1)

Contains first 8 of 17 research papers presented by Soviet delegates at the Conference on Earth Satellites, held in Washington, D.C., October 2-5, 1957.

See also entries for Okhotsimskii, Taratynova, Iatsunskiy, Egerov, Ginzburg, Vavilov, and Vernov.

1576
SYMPOSIUM OF SOVIET RESEARCH ON ARTIFICIAL EARTH SATELLITES AND RELATED SUBJECTS. Usp. Fiz. Nauk. 63(1b):145-282, Sept. 1957.

In Russian.

Translation available as U.S. Joint Publications Research Service, Wash., D.C., Translation JPPS/NY-187(Pt. 2)

This issue covers the last nine of seventeen research papers presented by the Soviet delegates at the Conference on Earth Satellites, held in Washington, D.C., October 2-5, 1957.

See also entries under Vernov, Mandel'shtam, Mintov, Mikhnevich, Danilin, Gringauz, Zelikman and Poloskov.

1577
T., E.P. ANTENNAS FOR SATELLITE MONITORING ON 108 Mc. QST, 41:18-19, Dec. 1957.

Suggests revamping of a TV antenna for tracking Vanguard satellites.

1578
Tarantsov, A. NASH SOVYETSKI SPUTNIK. (OUR SOVIET SATELLITE). Radio (USSR) no. 12:3-5, Dec. 1957.

In Russian.

163

1579
Taratynova, G.P. O DVIZHENII ISKUSSTVENNOGO SPUTNIKA V NETSENTRAL'NOM POLE TIAGOTENIIA ZEMLI PRI NALICHII SOPROTVIIVLENIIA ATMOSFERE. (THE MOTION OF AN ARTIFICIAL EARTH SATELLITE IN THE ECCENTRIC GRAVITATIONAL FIELD OF THE EARTH WHEN ATMOSPHERIC RESISTANCE IS TAKEN INTO ACCOUNT. Usp. Fiz. Nauk., 63(1a):51-58, Sept. 1957.

In Russian.

Translation no. R-3057 available at Special Libraries Association, Translation Center, Crerar Library, Chicago, Ill. Also translated in The Russian Literature on Satellites, Part I, p. 74-88, New York, International Physical Index, Inc. 1958.

An account of a method for computing on a high speed computer the motion of an artificial earth satellite with the immediate calculation of the atmospheric resistance (on the condition that its motion is with the Earth's) and the deviation of the gravitational field from the central (field).

1580
TARGET, SPACE. Newswk. 50:57-58, Dec. 9, 1957.

Contrasts Sputnik and Vanguard.

1581
TEST SATELLITE OBSERVERS. Sci. News Ltr., 71:408, June 29, 1957.

Report on a practice run for satellite observers, using a mock satellite towed by a light plane at 7,000 feet.

1582
THEIRS AND OURS - A DISCUSSION OF SATELLITES. Res. Revs., (ONR), p. 1-5, illus., Nov. 1957.

A transcript of the informal exchange of questions and answers between Dr. Hagen and members of an audience at the National Press Club.

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1583
Thompson, G.V.E. ARTIFICIAL SATELLITES. *Aeronautics*, 35:42-43, Jan. 1957.

Reviews of papers on artificial satellites presented at the Rome Congress of the International Astronautics Federation, 1956.

1584
Thompson, G.V.E. PROGRESS TOWARDS SPACEFLIGHT. *Spaceflight*, 1:77-82, Jan. 1957.

A review of papers presented at the 7th International Astronautical Congress; a fourth of the papers relate to the IGY satellite program. These are reviewed in the sections entitled IGY, Artificial Satellites, Vanguard Satellite Tracking Programmes, and Other Satellite Projects.

1585
Thor, J. FIRST STEP IN THE COSMOS: ARTIFICIAL SATELLITE OF THE EARTH. *Nova Kultura* 8: (42):1, Oct. 4, 1957.

In Polish. Not examined.

1586
THREE ASPECTS OF THE SATELLITES. *Automation Prog.* 2:529, Dec. 1957.

Not examined.

1587
THREE-STAGE VANGUARD VEHICLES TO CARRY SPHERES IN TEST FIRING. *Aviat. Wk.* 67:86, Aug. 26, 1957.

Also in *Missile Eng.* 2:42, illus., Oct. 1957.

1588
TIG SHOWS WAY TO SPACE. *Weld. Engr.* 42:78, Sept. 1957.

Brief details of the Tig welding process which produced the spheres for the Vanguard earth satellite.

1589
Tilton, E.P. ANTENNAS FOR SATELLITE MONITORING ON 108 Mc. *QST* 41:18-19, Dec. 1957.

1590
TINY MOON BEARS BIG HOPES. *Electron. (Bus. ed.)* 30:20-21, Apr. 20, 1957.

Details of some of the "smallest telemetering and transmitting gear ever built."

1591
TO CATCH SATELLITE. *The Asahi Picture News (Tokyo)*. p. 8-9, illus., diagr., Jly. 21, 1957.

In Japanese, with English summary.

Picture story of Japanese satellite tracking team rehearsal.

1592
TOO MUCH TALK TOO SOON ADDS UP TO DISASTER. *Life* 43:25-29, Dec. 16, 1957.

1593
Toronto University, Institute of Aerophysics, Toronto, Canada. MOLECULAR APPROACH TO PROBLEMS OF HIGH-ALTITUDE HIGH-SPEED FLIGHT, by G.N. Patterson. 42 p., 1957. (Rev. Rpt. 10) (Contract AF 18(600)-1185)

In order to obtain a better understanding of the aerodynamics of high performance aircraft, it is necessary to investigate the effects of rarefaction and high temperature on the flow of gases. A review of these effects is presented and the increasingly important role played by the molecular structure of a gas is indicated.

1594
Tousey, R. OPTICAL PROBLEMS OF THE SATELLITE. *Opt. Soc. Am. J.* 47:261-267, Apr. 1957.

Some of the optical problems connected with an artificial satellite are: visibility, the photographic determination of the precise orbit, and the temperature that the satellite will reach through radiation exchange. These matters are discussed with particular reference to the plans for the satellites to be launched by the United States during the International Geophysical Year.

One of the first experiments to be flown will be the monitoring of the Lyman-alpha line radiation of hydrogen emitted by the sun and the measurement of intensity variations associated with solar flares.

1595
TRACKING DOWN THE SYNTHETIC SATELLITE. U.S. NAVY PROJECT VANGUARD. *Can. Mining J.* 78:82 illus., Jly. 1957.

Details expected use of a Varian magnetometer, a device which measures the earth's magnetic field.

1596
TRACKING THE EARTH SATELLITE (MINITRACK). *All Hands* 485:26, June 1957.

1597
TRACKING THE RED SATELLITE. *Electron Wk.*, 2:7-8, illus., Oct. 14, 1957.

Question-and-answer interview with W.H. Pickering on the first Russian satellite and on the lagging U.S. satellite program.

1598
TRANSISTOR INVERTERS POWER VANGUARD ROCKET. *Electron. (Eng. ed.)* 30:203-204, Apr. 1, 1957.

Incorporation of high-power transistors into power-supply design has made possible a 300-volt light-weight inverter for use with servos in the second-stage rocket for the Vanguard Project.

The block diagram is shown.

1599
DAS TRIEBWERK DER 1 "VANGUARD" STUFE. (THE DRIVE UNIT OF THE 1ST-STAGE VANGUARD). *Weltraumfahrt* 8:20, illus., Feb. 1957.

In German.

After testing the drive unit X405 for the first stage of the rocket satellite "Vanguard," GE has now delivered the first completed drive unit to the Glenn L. Martin Co., which is building the second stage rocket vehicle for the Vanguard satellite in

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Baltimore. The first pictures of the assembly and tests of the drive unit were released at the same time.

1600
TROUBLES BOOST VANGUARD COST. *Aviat. Wk.* 67:29, Aug. 26, 1957.

Quotes Rear Adm. Rawson Bennett on developmental troubles with first and second stage engines and the launching vehicle.

1601
TWO SATELLITES. *Times Sci. Rev.* 26:1-2, Winter 1957.

Comment on the Russian achievement of launching two satellites; and benefits possible from a proposed international commission on earth satellites.

1602
Uhl, E.G. THE CHALLENGE OF PROJECT VANGUARD. *Yale Sci. Mag.*, 31:15-20, diagr., May 1957.

International implications of the U.S. satellite.

1603
ULTRAENERGY PROPELLANTS. THE STEP BEYOND HIGH-ENERGY PROPULSION. *Chem. Wk.* 81:148-156, illus., Oct. 12, 1957.

The need for more power for space travel is emphasized in this article on the challenge of fission and fusion; free-radicals prospects; the promise of ions; and other ultra-energy sources.

1604
ULTRA-SENSITIVE RADIO TO TRACK SATELLITE. *Sci. Dig.* 41:85, June 1957.

Briefly describes operation of sensitive Minitrack radio-receiving systems built by Bendix Radio.

1605
USAF PUSHES PIED PIPER SPACE VEHICLE. *Aviat. Wk.* 67-26, Oct. 14, 1957.

Some details of Lockheed Aircraft Corporation's Pied Piper, an earth-circling reconnaissance satellite.

166

Also in *Missile Eng.* 2:12-13, Jan. 1958.

1606
U.S. ARMY'S JUPITER-C BECOMES SATELLITE CARRIER. *Missiles and Rockets* 2:57-59, Dec. 1957.

Includes illustration of Jupiter C alongside Jupiter satellite launcher (Jupiter plus three Sergeants, second stage, and one Sergeant, final stage).

1607
U.S. NAVY MISSILE POWER AND SATELLITE PROGRESS. *Missiles and Rockets* 2: Entire Issue, Jan. 1957.

A general review of the Navy's guided missile program and also of the earth satellite.

1608
U.S. PLANS TO LAUNCH "BABY" EARTH SATELLITE. *Sci. News Ltr.*, 71:83, Aug. 10, 1957.

Brief announcement of 6.4 inch satellite to be launched in Nov. 1957.

1609
U.S. SATELLITE: A MYTH EXPLODED. *U.S. News & World Rpt.*, 43:31-33, illus., Dec. 13, 1957.

Push-button defense, satellite's blow-up shows, is farther away than thought.

Includes an eyewitness report, When Vanguard Blew Up.

1610
U.S. SATELLITE TESTED. *Sci. News Ltr.* 72:375, Dec. 14, 1957.

Facts about the first U.S. artificial satellite.

1611
USSR LAUNCHES TWO "MOONS." *Sci. News Ltr.* 72:396, Dec. 21, 1957.

A brief review of developments in rockets, missiles and satellites during 1957.

1612
USSR Soviet IGY Committee. USSR ROCKET AND EARTH SATELLITE PROGRAM FOR THE IGY, submitted by I.P. Bardin, President, Soviet Committee. 5 p., June 10, 1957.

The program for investigation of the upper layers of the atmosphere with rockets and satellites.

1613
USE EARTH SATELLITE TO LOCATE ISLANDS. *Army-Navy-Air Force J.* 94:3, Feb. 9, 1957.

"Scientists of the Army Map Service, located on certain Pacific Islands, will introduce a new method of surveying during the International Geophysical Year by using radio data received from the earth satellite to pinpoint these islands on maps and navigation charts, heretofore in error as much as a mile."

1614
USES OF SATELLITES IN RESEARCH. *Times Sci. Rev.*, p. 6, 9, Summer 1957.

A report from the National Science Foundation.

1615
Vakhnin, V. ISKUSSTVENNIE SPUTNIKI ZEMLI. (ARTIFICIAL EARTH SATELLITES). *Radio (USSR)* 6:14-17, June 1957.

In Russian.
Includes information for radio amateurs taking part in the IGY program. General data regarding the orbit of the USSR satellite are given, its functions are outlined and the problem of signal reception from it is discussed.

Translation is available at Special Libraries Association Translation Center, Crerar Library, Chicago, Ill. Translation No. R-2361.

See also condensation in *QST* 41:22-24, 188, Nov. 1957, and *Wireless World* 63:574-578, Dec. 1957.

1616
Valva, G. d'A. IN GARA CON SPUTNIK LE LUNE U.S.A. (ON THE RACE BETWEEN SPUTNIK AND THE U.S. MOON). *Sci. e Vita*, 9:32-39, illus., Nov. 1957.

In Italian.

On the first Russian satellite and the U.S. Vanguard project.

1617
Van Allen, J.A. STATEMENT... ON USE OF INSTRUMENTS WITHIN EARTH SATELLITE. In U.S. Congress, 85th, 1st Session, House Committee on Appropriations. Subcommittee on Independent Offices. Hearings. National Science Foundation. Report on International Geophysical Year, p. 85-89, Washington, U.S. Govt. Print. Off., 1957.

A discussion on unique advantages of satellite follows on p. 89-98.

1618
VANGUARD COMPUTER. *Aviat. Wk.* 67:89, Aug. 19, 1957.

"Automatic recording and reduction facility (ARRF) to process flight information from each of the three stages of the test and satellite launching vehicles will be installed by early fall at Air Missile Tests Center near Coca Beach, Fla. Facility, which operates on the same principle as a high speed digital computer to produce vehicle performance data within 72 hours, is a joint development of the U.S. Naval Research Laboratory and Radiation, Inc."

1619
VANGUARD COMPUTING CENTER OPENED IN WASHINGTON. *Elec. Eng.* 76:825, illus., Sept. 1957.

Gives an idea of how the Center will function, where high-speed electronic calculations will predict future orbits of earth satellites.

The Center opened on July 2, 1957 at 615 Pennsylvania Ave. in Washington, D.C.

1620
VANGUARD COMPUTING CENTER WILL CALCULATE MOVEMENTS

OF EARTH SATELLITES. *All Hands* 489:56, Oct. 1957.

Brief information about the IBM computing center operating in Washington, D.C. under Navy contract. It has the complicated job of compiling "satellite ephemerides (timetables of the expected locations of the satellite at regular intervals during its future life)."

1621
VANGUARD ESSAY CONTEST WINNERS ANNOUNCED. *Elec. Eng.* 76:1018, Nov. 1957.

Winners of the top three Martin Company's essay contest, on September 26, 1957 were Theodore Lang (Cal Tech.) who wrote on "An Equilibrium Trajectory for a Satellite Powered by Solar Pressure;" R.L. Howell (MIT) who wrote on "A Satellite Beacon Station" and Eugene Mechtly (Penn State) whose paper was entitled "A Technique for Increasing a Satellite's Energy Weight Ratio."

Other lesser award recipients are also listed.

1622
VANGUARD - FROM ASSEMBLY TO FIRING. *Aviat. Wk.* 66:28-29, Apr. 8, 1957.

1623
VANGUARD INSTRUMENTATION. *Missiles and Rockets* 2:66-69, Jan. 1957.

Photographic illustrations with pertinent commentary pertaining to the instrumentation carried by the IGY satellite.

1624
VANGUARD PROGRAM MOVES TOWARD TV-4 LAUNCHING. *Aviat. Wk.* 67:54-55, Dec. 30, 1957.

Illustrations depict various instruments used during preliminary testing.

1625
VANGUARD SATELLITE MATERIALS DETAILED. *Aviat. Wk.* 67:28, Nov. 11, 1957.

167

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Mentions variety of materials ranging from asbestos phenolic to an alloy of magnesium and thorium.

1626
VANGUARD TAKES SHAPE; LATEST SPECIFICATIONS. Aviat. Wk. 66: 111, illus., June 24, 1957.

Specifications of length, diameter, propellants, thrust, velocities, ranges, altitudes, elapsed flight time, guidance system components and separation techniques.

1627
VANGUARD'S AFTERMATH: JEERS AND TEARS; NEWSPAPER HEADLINES. Time 70:12, Dec. 16, 1957.

1628
VANGUARD'S CENTER GETS REHEARSAL. Electron. 30:7-8, illus., Nov. 1, 1957.

Describes operation of the IBM Center, under contract to Vanguard, after the launching of the Soviet Sputnik on October 4, 1957.

1629
VARO TUNING FORK TO BE USED IN SATELLITE COSMIC RAY COUNT. Direction (IRE, Dallas, Tex.) 4:5, Nov. 1957.

A tuning fork manufactured by Varo Manufacturing Company will be used in one of the earth satellites to measure cosmic ray intensities.

1630
Varvarov, N.A. ISKUSSTVENNYE SPUTNIKI ZEMLI. (ARTIFICIAL EARTH SATELLITES). Nauka i Zhizn 2:17-21, 1957.

Available at Special Libraries Association Translation Center, Creer Library, Chicago, Ill., Trans R-1779.

Vanguard Project is mentioned, p. 6-8 of the translation.

1631
Varvarov, N.A. THE FIRST AND THE SECOND. Iunyi Tek. p. 33-39, Dec. 1957.

In Russian. Not examined.

1632
SOVETSKI ISKUSSTVENNYI SPUTNIK. (SOVIET ARTIFICIAL SATELLITE). Radio (USSR) 11:7-10, Nov. 1957.

In Russian.

1633
Vasilevskii, L. and Semenov, S. ISKUSSTVENNYI SPUTNIK ZEMLI. (ARTIFICIAL EARTH SATELLITE). Iunyi Tek., p. 31-32, illus., Jan. 1957.

In Russian.

Based largely on the U.S. satellite.

1634
Vavilov, V.S., Malovetskaya, V.M. et al. KREMNIEVI SOLNECHNI BATAKI KAK ISTOCHNIKI ELEKTRICHESKOGO NITANIYA ISKUSSTVENNIKH SPUTNIKOV ZEMLI. (SILICON SOLAR BATTERIES AS SOURCES OF ELECTRICAL ENERGY FOR CHARGING THE ARTIFICIAL SATELLITES). Usp. Fiz. Nauk. 63(1a):123-129, illus., Sept. 1957.

In Russian.

An English translation of this paper given at the International Geophysical Year, Rocket and Satellite Conference, Wash., D.C., Sept. 30 - Oct. 5, 1957, is available.

Discusses silicon solar batteries as sources of electric power for telemetering and research instruments in artificial earth satellites.

1635
Vernov, S.N. and Ginzburg, V.L., et al. ISSLEDOVANIE SOSTAVA PER-VICHNOGO KOSMICHESKOGO IZLUCHENIYA. (INVESTIGATION OF THE COMPOSITION OF PRIMARY COSMIC RADIATION). Usp. Fiz. Nauk., 63(1a):131-144, Sept., 1957.

In Russian.

Use of artificial earth satellites for investigating the nuclear components of cosmic radiation.

1636

Vernov, S.N. and Logachev, I.I., et al. ISSLEDOVANIE VARIATSII KOSMICHESKOGO IZLUCHENIYA. (INVESTIGATION OF VARIATIONS OF COSMIC RADIATION). Usp. Fiz. Nauk., 63(1b):149-162, Sept. 1957.

In Russian.

Discusses the problem of using the artificial earth satellite for studying the variations of cosmic radiation. Translation available from U.S. Joint Publications Research Service.

1637
Viktorov, I.A. THE "SPUTNIK" AND POLITICS. Nov. Vrem. 15:12-15, Oct. 1957.

In Russian. Not examined.

1638
VOLUNTEER PARTICIPATION IN THE IGY EARTH SATELLITE PROGRAM. IGY Bull. 6:1007-1009, Dec. 1957.

Indicates the four distinct ways in which volunteers can contribute to the IGY Earth Satellite Program.

1639
Von Braun, Wernher. PROGRESS TOWARD SPACE FLIGHT: SPACE TRAVEL AND OUR TECHNOLOGICAL REVOLUTION. Missiles and Rockets, 2:75-78, Jly. 1957.

1640
Von Braun, Wernher. THE ROCKET COMES OF AGE. Interavia 12:789-790, illus., Aug. 1957.

Some facts about rockets, their progress and their future potentialities.

1641
Von Braun, Wernher. SPACE FLIGHT AND OUR TECHNOLOGICAL REVOLUTION. New York, American Rocket Society, 1957. (ARS Preprint 398-57)

1642
VTOROI SOVETSKII ISKUSSTVENNYI SPUTNIK ZEMLI. (THE SECOND SOVIET ARTIFICIAL EARTH SATELLITE). Radio (USSR) 12:24-29, Dec. 1957.

In Russian.

Description of the second Soviet satellite, covering the orbit and its evolution, observation of artificial earth satellites, design of the second satellite, scientific data on the short-wave solar radiation, cosmic radiation, and study of biological phenomena in the environment of cosmic flight.

1643
WELDING THE VANGUARD ROCKET. Weld. Engr., 42:74, illus., May 1957.

With a brief description of the rocket's operation.

1644
Wendt, Gerald. MAN-MADE SATELLITE, THE FIRST STEP INTO OUTER SPACE. The UNESCO Courier, p. 30-34, illus., Sept. 1957.

Details of the U.S. satellite program and a review of what is known about the Russian program; with a photograph of a Russian upper-atmosphere rocket said to be similar to the rocket used to launch satellites.

1645
Wexler, Harry. THE SATELLITE AND METEOROLOGY. In American Astronomical Society. Proceedings, 3rd Annual Meeting, December 6-7, 1956. p. 5-15, New York, The Society, 1957.

The earth satellite will introduce a revolutionary chapter in meteorological science - not only by improving global weather observing forecasting, but by providing a better understanding of the atmosphere and its ways.

'Also in J. Astronautics 4:1-5, 8, illus., Spring 1957.

1646
Weyl, A.R. PROPOSALS FOR SPACE EXPLORATION. Aero. 37:130, 135, Sept. 1957.

The writer's monthly research summary deals with interplanetary flight, among other subjects.

169

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- 1647
WHAT POWERED SPUTNIK III?
Petrol. Engr. 29:E2-E3, Dec. 1957.
Not examined.
- 6148
WHAT'S BEHIND SPUTNIK? Electron.
(Bus. ed) 30:27, Nov. 10, 1957.
The satellite's beeps underlines Soviet advances in information theory that can pay off for all types of electronic communications.
- 1649
Whipple, F.L. EXPLORING THE UPPER ATMOSPHERE. Think 23:12-17, illus., Jly. 1957.
Ionosphere, rockets and satellite tracking.
- 1650
Whipple, F.L. and Hynek, J.A. OBSERVATIONS OF SATELLITE I. Sci. Am. 197:37-43, illus., Dec. 1957.
An account of how the first satellite's orbit was determined, and how our knowledge of this orbit can be applied.
- 1651
Whipple, F.L. THE SOVIET SATELLITE. Bur. Centr. Internation. Electr. Astr. Circ. no. 1621, 1957.
Not examined.
- 1652
Whipple, F.L. and Hynek, J.A. STAND BY FOR SATELLITE TAKE-OFF. Popular Mech. 108:65-70, 216, 224, 228, illus., Jly. 1957.
The satellite, its launching, instrumentation and tracking.
- 1653
WHO AND WHAT WILL WATCH VANGUARD? Electron. Wk. 2:5-6, illus., Apr. 8, 1957.
Drs. Whipple, Lautman and Hynek of the Smithsonian Astrophysical Laboratory discuss progress made in the satellite tracking program.
- 1654
WHO'LL RAISE THE MOON? Electron. (Bus. ed.) 30:42, Dec. 10, 1957.
Some details of the Martin Vanguard rocket and the Army's Jupiter C.

1655

- Widger, W.K., Jr. and Rougart, C.N. UTILIZATIONS OF SATELLITE OBSERVATIONS IN WEATHER ANALYSIS AND FORECASTING. Am. Meteorol. Soc. Bull. 38:521-533, Nov. 1957.
Meteorological data which can be expected; problems of observing and handling; deductions which seem possible; and an appraisal of probable value.
- 1656
WILL SATELLITES BE SHORT-LIVED? Astronautics 2:31, 52, illus., Oct. 1957.
Consideration of electrostatic drag may cause previous estimates of satellite lifetimes to be halved, according to NRL scientists R. Jastrow and C.A. Pearce.
- 1657
WILL SPACE TRAVEL LENGTHEN LIFE? Popular Sci. 171:103, Oct. 1957.
Refers to an advertisement in Time magazine by the Martin Company entitled "What is Time?" and asks why the Company should pose such an esoteric question.
"The reason is that the problem of speed vs time is no longer a matter for Einsteins. With rockets and satellites bristling all over, it becomes practical to know for sure whether time (hence life) is affected by speed."
According to a scientific experiment with a clock, or "a handy substitute the meson" explained in the article, "a meson in flight lives about 15 times longer than a meson at rest. You can indeed put the brakes on time."
(See Item 11 for scientific experiment.)
- 1658
Williams, Sears. SUPPORT REQUIREMENTS FOR THE VANGUARD SATELLITE LAUNCHING VEHICLE. n.p., New York, American Rocket Society, 1957. (Pre-print 425-57)

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Paper presented at ARS spring meeting, Washington, D.C., April 3-6, 1957.

1659

- Wilson, Jack. THE WORLD IN SPACE. Look 21:37-43, Jan. 8, 1957.
As a contribution to better understanding of the work to be undertaken during the International Geophysical Year, LOOK has collaborated in the development of a relief globe of the earth. This globe represents a new concept in three-dimensional map making. A section of the article describes and illustrates in color the flight of the earth satellite as it is launched from Cape Canaveral, Fla. and circles the earth.
- 1660
Winandy, E.B. LA CONQUETE DE L'ESPACE PAR LA PUISSANCE FUSEONAUTIQUE ET LA DOMINATION NOUVELLE DE LA TERRE A PARTIR DE L'AIR; LE SATELLITE NATUREL OU ARTIFICIEL ET SON CANAL AERIEN. (THE CONQUEST OF SPACE BY ROCKET POWER AND THE NEW DOMINATION OF THE EARTH BY AIR; THE NATURAL OR ARTIFICIAL SATELLITE AND ITS AERIAL FLIGHT). Fusées 2:167-170, May 1957.
In French.
Discussion of the legal aspects of space travel, international implications of artificial earth satellites, their role in natural-satellite investigation, and the need for an international legal body.
- 1661
Winterberg, F. ALLGEMEINE RELATIVITAETSTHEORIE UND KUENSTLICHE SATELLITEN. (RELATIVITY THEORY AND ARTIFICIAL SATELLITES). Physik. Verhand. Deut. 8:187, 1957.
In German. Not examined.
- 1662
Winternitz, P.F. THE PHYSICAL AND CHEMICAL FUNDAMENTALS OF SATELLITE FLIGHT. II - APPENDIX I, II, III - PERIOD OF REVOLUTION OF A SATELLITE MOVING

IN AN ELLIPTICAL ORBIT. J. Astronautics 4:65, 68-70, 80, Autumn/Winter, 1957.

Computation of the actual numerical values of the circular and escape velocities by replacing the simplifying assumption of constant gravitational force with Newton's law of gravitation, and analysis to determine the satellite's lifetime.

1663

- Winzen, O.C. BRIDGEHEAD IN SPACE. Interavia 12:1040-1041, Oct. 1957.
Summary account of a plastic balloon ascent into the stratosphere known as Project Man High of the U.S. Air Force and Winzen Research, Inc.
- 1664
Wittner, F. FUTURE SPUTNIKS MIGHT EXPLODE YOUR ADVERTISING THEMES. Adv. Agency Mag. 50:36-37, Nov. 8, 1957.
Not examined.
- 1665
WORLD-WIDE OBSERVATIONS GATHER DATA IN CO-OPERATIVE IGY PROGRAM. Elec. Eng. 76:1107-1109, illus., Dec. 1957.
Includes reports of tracking of the Soviet satellite.
- 1666
Wuerth, J.M. and Slater, J.M. SEARCH FOR A SATELLITE. Sky-line 15:4-9, illus., Summer 1957.
Tells of some of the developments in electronics and controls which make orbital satellites possible.

1667

- Yaffee, M.L. FILLING THE GAP. Astronautics 2:28-29, 72, illus., Dec. 1957.
Among the projects under way at the AF Cambridge Research Center is one connected with three different 1000-lb satellites.
- 1668
YEAR OF THE SATELLITE. Electron. Wk. 2:8-10, illus., Jly. 1, 1957.

172

- The U.S. satellite program summarized.
- 1669
YOU HOLD A ROCKET BY ITS TAIL.
Prod. Eng. 28:84-85, illus., Sept. 30, 1957.
- Design construction of the launching platform for Vanguard.
- 1670
Young, L.H. HOW THEY TRACKED SPUTNIK I. Contr. Eng., 4:22-24, 26, Dec. 1957.
- How the Minitrack system originally set up for Vanguard satellite tracking was revamped to handle Sputnik I.

1958

- 1671
AAS HOLDS LARGEST U.S. SPACE MEETING. Missiles and Rockets 3:176, Feb. 1958.
- Includes list of speakers and papers at the annual meeting of the American Astronautical Society, January 28 to 31, 1958, in New York.
- 1672
Abkowitz, Stanley. TITANIUM IN ROCKETS AND MISSILES. Light Metal Age 16:15, illus., Apr. 1958.
- It appears that the potential of titanium alloys in rocket and missile structures will be even wider than existed with jet aircraft structures.
- 1673
Adams, M.C. and Probst, R.F. ON THE VALIDITY OF CONTINUUM THEORY FOR SATELLITE AND HYPERSONIC FLIGHT PROBLEMS AT HIGH ALTITUDES. Jet Propul. 28:86-89, illus., Feb. 1958.
- Results of the study are applied to the re-entry problem and it is concluded that a continuum analysis, with no slip at the body surface, is valid for the flight conditions where heating is important.

- 1674
Adler, Irving. MAN-MADE MOONS. THE EARTH SATELLITES AND WHAT THEY WILL TELL US. 128 p., New York, Day, 1958.
- Written for teen-agers but suitable for an introduction to the subject for adults who wish general information about rocket propulsion, space immediately surrounding the earth, and what we can expect to learn further through the launching of earth satellites.

- 1675
ADVANCED PROPULSION RESEARCH SPEEDED. Aviat. Wk. 68:277, 279, 280, illus., June 16, 1958.

A brief rundown on some of the propulsion systems now receiving attention, such as nuclear energy; ion propulsion; metastable propulsion; solar propulsion; and photon propulsion.

- 1676
AEROJET DESIGNS 5-STAGE MOON VEHICLE. Aviat. Wk. 68:18, Mar. 10, 1958.

Concerns the Aerobee M.

- 1677
Aerojet-General Corp., Azusa, Calif. THE USE OF PLANETARY ATMOSPHERES FOR PROPULSION, by S.T. Demetriades and C. Kretschmer. 19 p., Apr. 14, 1958. (Tech Note 24) (Contract AF49(638)-111)

Preliminary design of a power plant to use a dissociated planetary atmosphere for propulsion of space ships.

- 1678
Air Force Air Research and Development Command, Andrews Air Force Base, Washington, D.C. CONTROL DATA SENSING AND INSTRUMENTATION FOR SPACE VEHICLES. n.p., Mar. 14, 1958.

Authority, objectives, requirements, and approach to problem concerning flight control data sensing and computation for space vehicles.

1679

- Air Force. Missile Development Center, Holloman Air Force Base, Alamogordo, New Mex. RELATIVISTIC TREATMENT OF ROCKET KINEMATICS AND PROPULSION, by P.F. von Handel and H. Knothe. 96 p., figs., Jan. 1958. (Tech. Rpt. 58-3)

General kinematics and space-vehicles propulsion are studied regarding theory of relativity. Reception and expulsion of particles and photons and their kinematical effects are examined. Optimization of vehicle's final velocity is determined as a parametric function of available energy and final mass (payload).

- 1680
Air Force. Missile Development Center, Holloman Air Force Base, Alamogordo, New Mex. VERTICAL DESCENT TRAJECTORIES INCLUDING RE-ENTRY INTO THE ATMOSPHERE, by R. Krause, and W.F. Haldeman. 81 p., Mar. 1958. (Tech. Rpt. 58-4)

Trajectories for bodies descending vertically through the atmosphere have been calculated for a wide range of initial altitudes and body characteristics to provide information required for design purposes. Parameters and equations used, as well as the method of calculation by means of an analog computer, are discussed. The results are plotted as velocity-versus-altitude and time-versus-altitude. A guide for using the graphs is included, and deceleration data are evaluated and plotted.

- 1681
AIR FORCE PLANS MANNED ORBIT FOR 1959. Aviat. Wk. 68:26-27, Apr. 7, 1958.

Gen. LeMay seeks funds to support ARDC program that would put primary emphasis on human factors.

- 1682
Allen, J.E. OVER TO ASTRONAUTICS. Aeroplane 94:194-196, Feb. 14, 1958.

173

Also in Flight 73:236-238, Feb. 21, 1958.

Review of the transformation from aviation to astronautics; includes some significant forecasts of developments gradually beginning to emerge from current world-wide effort in guided-missile and earth-satellite technology.

- 1683
Allward, Maurice. THE SPACE AGE IS HERE. Spaceflight 1:196-197, illus., Jan. 1958.

A few historic details of space exploration but mostly an announcement of the launching of Sputnik I and its significance.

- 1684
Al'pert, Ia. L. O METODE ISSLEDOVANIA IONOSFERY S POMOSHCHIU ISKUSSTVENNOGO SPUTNIKA ZEMLI. (METHODS OF INVESTIGATION OF THE IONOSPHERE BY MEANS OF THE ARTIFICIAL EARTH SATELLITE). Usp. Fiz. Nauk. 64:3-14, Jan. 1958.

In Russian.

Evaluation of methods for the investigation of the ionosphere by means of the artificial earth satellite. Includes discussion of the satellite orbit and velocity, the effect of ionospheric turbulence and ionization on measured data, and analysis of the results of measurements and their accuracy.

Also issued as Massachusetts Institute of Technology, Lincoln Laboratory, Trans. T-96; and Trans. no. R-3855, available from SLA Translations Center, Greer Library, Chicago, Ill.

Summary appears in Soviet Bloc Internat'l. Geophys. Jour. Info., p. 5-7, May 16, 1958. (PB 131632-14)

- 1685
AMATEUR ASTRONOMERS. SOME SATELLITE-OBSERVING STATISTICS. Sky and Telescope 17:182, Feb. 1958.

174

A summary of reports from the Astronomical Society of Western Australia and a number of places in the United States.

1686 ANALYTICAL CHEMISTRY AND THE SATELLITE, Anal. Chem. 30 (pt. 1): 15A-17A, 20A, 22A, 24A, 26A, illus., Apr. 1958.

Presents a panorama of analytical possibilities of the satellite program, as revealed by a close inspection of the many requirements of a project such as the Navy's Vanguard satellite program.

1687 Anderson, R.A. and Keay, C.S.L. A SIMPLE METHOD OF PLOTTING THE TRACK OF AN EARTH SATELLITE. Brit. Interplan. Soc. J. 16:355-360, Mar./Apr. 1958.

A technique is described whereby interested persons may plot from limited information the track of a satellite in an orbit of low ellipticity and make short term predictions without recourse to complicated computing procedures. Simplicity and speed of application have been aimed at, rather than a high degree of accuracy.

1688 Anderton, D.A. RUSSIANS EMPHASIZE SPACE AT BRUSSELS. Aviat. Wk. 68:30-31, illus., Apr. 28, 1958.

The Russian exhibit at the Brussels World's Fair features full-sized mockups of Sputnik I and II, and cutting through the general noise level can be heard the recorded "beep...beep" of Sputnik I.

1689 Argyle, P.E. SPUTNIK I. Brit. Interplan. Soc. J. 16:309, Jan./Feb. 1958.

Includes three oscillographic records of beeps from Sputnik I as received October 6, 1957.

1690 Armagnac, A.P. WHAT WE'RE LEARNING FROM THE SATELLITES. Popular Sci. 172:84-87, 228-230, illus., May 1958.

A popular account of "messages from outer space" relating to temperature, cosmic rays and meteors.

1691 ARMY EXPLORER IN ORBIT. Army Info. Dig. 13:4-6, illus., Apr. 1958.

Brief details of launching of Explorer I.

1692 ARMY GAINING VITAL SPACE ASSIGNMENTS. Aviat. Wk. 68:137, 139, 141, 143-144, illus., June 16, 1958.

A history of the Army's interest in space, beginning with Project Orbiter in 1954.

1693 ARMY LAUNCHES EXPLORER II: ORBIT MAY HAVE BEEN MISSED. Aviat. Wk. 68:19, Mar. 10, 1958.

1694 ARMY LAUNCHES SATELLITE, BIDS FOR SPACE: VANGUARD FAILS. Aviat. Wk. 68:28-32, illus., Feb. 10, 1958.

1695 Army Signal Engineering Laboratories, Ft. Monmouth, N.J. DEVELOPMENT AND DESIGN OF SOLAR POWER SYSTEMS FOR THE IGY EARTH SATELLITES, by G. Hunrath, 3 p., Jan. 14, 1958. (PEB Memo 58.24)

For earlier reports see Items 881 (1957) and Item 514 (1956).

1696 Army Signal Engineering Laboratories, Ft. Monmouth, N.J. DEVELOPMENT AND DESIGN OF SOLAR POWER SYSTEMS FOR THE IGY EARTH SATELLITES, 4 p., Mar. 11, 1958. (PB Memo 58.36)

1697 ARMY'S MISSION IN SPACE IS EXPANDING. Aviat. Wk. 68:91-92, illus., June 16, 1958.

Present and future space projects are outlined.

175

1698 ARPA SHAPES MILITARY SPACE RESEARCH. Aviat. Wk. 68:83-85, illus., June 16, 1958.

Major points of the new Advanced Research Projects Agency's policies and objectives.

1699 ARS URGES NATIONAL SPACE FLIGHT PROGRAM. Astronautics 3:18-20, illus., Jan. 1958.

Space Flight Committee proposal for establishment of Astronautical Research and Development Agency to take over long-term planning is now under study.

1700 ARTIFICIAL EARTH SATELLITE, 1958 ALPHA. Nature 181:367-368, Feb. 8, 1958.

Concerns announcement of Explorer.

1701 ARTIFICIAL SATELLITE TEMPERATURES. Sky and Telescope 17:345, May 1958.

Highlight of paper given by R.H. Wilson, Jr. of NRL at the 99th meeting of the American Astronomical Society in December 1957.

See also Item 2260.

1702 ARTIFICIAL SATELLITES IN 1946. Sky and Telescope 17:181, Feb. 1958.

Refers to "an interesting forecast" of the uses of artificial satellites in a paper read before the Finnish Academy of Sciences on February 8, 1946 by Y. Vaisala, of Turku University.

The paper is available as Reprint no. 2 of the Astronomical Optical Institute of Turku University, Turku, Finland.

1703 Ashbrook, J., Schilling, G.F. and Sterne, T.E. GLOSSARY OF ASTRONOMICAL TERMS FOR THE DESCRIPTION OF SATELLITE ORBITS. Smithsonian Contrib. Astrophys.: 2:10, 211-217, 1958.

Simple explanations of astronomical terms, notations, and symbols frequently used to describe the orbital motions of artificial satellites.

1704 ASTRONAUTICS. New York Times Index, 1956 - to date.

Under this subject, in the index, may be found many references to articles on various happenings relative to the Vanguard project which appeared in the New York Times during the period specified.

1705 ASTRONAUTICS AND PHILATELY. Brit. Interplan. Soc. J. 16:314, Jan./Feb. 1958.

Includes illustration of postage stamp of Sputnik I issued by the Deutsche Demokratische Republik.

1706 AVCO PROPOSES MANNED RE-ENTRY SYSTEM. Missiles and Rockets 3:156, Feb. 1958.

AVCO Research Laboratory is said to have solved the design problems of the re-entry parachute and of the environmental capsule to carry a man many times around the earth and then protect him as he returns through the atmosphere. By parachute is not meant the cloth umbrella that people usually think of but a device more like a drag brake of metal.

1707 Bain, W.C. and Meadows, R.W. OBSERVATIONS OF BEARING AND ANGLE OF ELEVATION OF SATELLITE I. Inst. Elec. Engrs. Proc. 105B:91-93, diags., Mar. 1958.

Measurements were made of bearing and elevation of the satellite using a standard Adcock direction-finder with the object of obtaining information on ionospheric propagation. The variation of bearing with time is plotted at 20 and 40 Mc/s. Effects due to ionospheric refraction and to diffraction round the earth have been observed.

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1708 Baker, N.L. MILITARY ROCKETS CHEAPER FOR SPACE EXPLORATION. Missiles and Rockets 3:40, Mar. 1958.

A check into the economics of the Vanguard and Jupiter C projects and a comparison of the costs of the two.

1709 BATTERIES FOR SPUTNIKS. Metal Prog. 73:112, 114, Feb. 1958.

Possible use of solar batteries for satellites.

1710 Baumann, R.C. DESIGN, FABRICATION AND TESTING OF THE VANGUARD SATELLITE. Jet Propul. 28:244-248, illus., Apr. 1958.

Revised edition of a paper presented at the American Rocket Society spring meeting, April 4-6, 1957.

A comprehensive description of the Vanguard satellite.

1711 Baxter, A.D. SATELLITE ROCKET PROBLEMS. Engr. 205:236-238, illus., Feb. 14, 1958.

Discusses design requirements, mass ratio and reliability. A table indicates development in long-range rockets from 1942 to 1957.

1712 Bearey, D.J. ESCAPE FROM A CIRCULAR ORBIT USING TANGENTIAL THRUST. Jet Propul. 28:167-169, Mar. 1958.

Considers the problem of escape of a rocket from the gravitational field of a planet.

1713 Beresford, A.N. APPARATUS USED AT THE ROYAL AIRCRAFT ESTABLISHMENT. Inst. Elec. Engrs. Proc. 105B:85-88, diags., Mar. 1958.

Components are described of the interferometer used for radio observations of the Russian Sputniks.

1714 Berg, A.I. SOVETSKIE SPUTNIKI I RADIOELEKTRONIKA. (SOVIET SATELLITES AND RADIO ELECTRONICS). Radio (USSR), 1:3-5, illus., Jan. 1958.

In Russian.

1715 Bergquist, Erik. U.S. TO LAUNCH NINE SATELLITES BY 1959. ARMY GETS APPROVAL FOR FIVE MORE EXPLORERS: VANGUARD "GRAPEFRUIT" STILL BOGGED DOWN. Missiles and Rockets 3:37, Mar. 1958.

1716 Berger, W.J. CELESTIAL ICONOSPHERICS, THE ULTIMATE ASTRONOMY. Jet Propul. 28:337-338, May, 1958.

Introduces and defines celestial iconospherics and indicates that it has important uses in astronomy of the solar system, in cosmology, and in the possibility of interstellar radio communication.

1717 Berkner, L.V. EARTH SATELLITES AND FOREIGN POLICY. For. Affairs 36:221-231, Jan. 1958.

The satellite as a symbol of intellectual attainment that may dominate the period immediately ahead as the most powerful single instrument of national policy.

1718 Berkner, L.V. HOW CLOSE IS SCIENCE TO MADE-TO-ORDER WEATHER? INTERVIEW. U.S. News & World Rpt. 44:76-79, Jan. 10, 1958.

In this interview Berkner explains some uses of the artificial satellite, among them mapping of the earth's "entire cloud system."

1719 Berkner, L.V. MAN'S SPACE SATELLITES. Bull. Atomic Sci. 14:106-111, Mar. 1958.

What is a satellite for; what is it; what sort of orbit; what do satellites

mean to meteorology; what about solar radiation; what can we learn about the exosphere; what else can satellites tell us; what about space technology; who should control U.S. space plans?

1720 Bernhardt, Allan. REPORT OF TECHNICAL SESSIONS - 26th ANNUAL MEETING, IAS. Aero. Eng. Rev. 17:58-61, illus., Apr. 1958.

A review by session chairman. Includes brief notes on the following sessions: Earth Satellites, by Joseph Kaplan; and Space Propulsion, by K.A. Ehrlicke.

1721 Bernstein, M., Cougoulis, G.H. and others. SATELLITE DOPPLER MEASUREMENTS. Inst. Radio Engrs. Proc. 46:782-783, Apr. 1958.

Frequency measurements of signals transmitted from the Soviet satellite no. 1 made, beginning October 5, 1957, by the Frequency Control Branch, U.S. Army Signal Engineering Laboratories.

1722 Besserer, C.W. MISSILE ENGINEERING HANDBOOK. 600 p., illus., Princeton, N.J., Van Nostrand, 1958. (Principles of Guided Missile Design, series ed., by Grayson McOrill)

Includes space flight data and a glossary of space flight terms.

1723 THE B.I.S. SATELLITE PROGRAM. Spaceflight 1:195, Jan. 1958.

Outlines organization of the British Interplanetary Society for visual observation of satellites under IGY auspices.

1724 Blackwell, D.E. THE TRANSITION FROM THE IONOSPHERE TO INTERPLANETARY SPACE. Nature 181:1237-1238, May 3, 1958.

Summary of a Geophysical Discussion held in the rooms of the Royal

Astronomical Society on February 21, 1958.

Dr. K. Weekes discussed the deductions about the outer ionosphere that may be made from observations of artificial earth satellites.

1725 Boyd, R.L.F. RADIO OBSERVATIONS ON THE RUSSIAN SATELLITES. Inst. Elec. Engrs. Proc. 105B:81-115, illus., Mar. 1958.

A number of short contributions presented at a meeting of the Radio and Telecommunication Section on November 22, 1957 and describing the part played by radio in observing the behavior of the Russian earth satellites.

1726 Brice, P.J. and Parker, P.N. RADIO OBSERVATIONS ON THE SIGNAL CHARACTERISTICS OF SATELLITE I. Inst. Elec. Engrs. Proc. 105B:101-104, diags., Mar. 1958.

Field strength records of the 20 and 40 Mc/s transmissions are illustrated for various different days and times of day.

1727 BROOKS AND PERKINS IN THE SATELLITE PROGRAM. Mag. Magnesium, p. 15, Feb. 1958.

About the firm that manufactures the U.S. Vanguard satellite sphere and frame.

1728 Brownlow, Cecil. NAVY DETAILS NEEDS FOR SPACE MISSION. Aviat. Wk. 68:37-38, 41, Mar. 24, 1958.

Primary and most immediate areas in which the Navy has space requirements are in the fields of reconnaissance, communication relay and all-weather navigation. Navy officials also foresee the possibility of using satellites as anti-submarine weapons, monitoring stationary sonar buoys, and as platforms for mapping ship and aircraft movements.

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"Artificial star" satellites, it is said, could give the commander of a Polaris submarine a precise fix on the location of his vessel in relation to its intended target.

1729
Budenholzer, R.A. and Ritter, Alfred. SPACE FLIGHT THERMODYNAMICS. Aviat. Age 28:44, 46-49, figs., Mar. 1958.

Thermodynamic and heat transfer problems are considered.

1730
Burdick, D.G., Wood, P.I. and D'Abusco, J.S. MISSILEBORNE AUXILIARY POWER. INDUSTRY WORKS TO MEET EXACTING REQUIREMENTS. Missile Design & Devlpmt. 4:16-18, Feb. 1958.

Includes a brief discussion of auxiliary power needs of artificial satellites.

1731
Burgess, Eric. SATELLITES AND SPACEFLIGHT. 160 p., illus., New York, MacMillan, 1958.

A factual survey of developments in the field of rocket propulsion, interplanetary travel and the establishment of satellite bodies.

1732
Bussard, R.W. CONCEPTS FOR FUTURE NUCLEAR ROCKET PROPULSION. Jet Propul. 28:223-227, diags., Apr. 1958.

A discussion of the possibilities and limitations of the application of fusion energy to rocket propulsion, which concludes with this prophetic statement: "What is really needed... is a conceptually new, and light-weight, method of producing shaft power of electrical power from fusion. The efficient production of electricity directly from nuclear processes would at last provide the key to space travel and the practical exploration of our solar system."

1733
Butz, J.S., Jr. CONTROLLED FUSION STUDIES OPEN SPACE ENGINE

FIELD. Aviat. Wk. 68:50-51, 53, 55, 57, May 19, 1958.

Magneto-hydrodynamics as applied to space vehicles and other practical applications such as boundary layer control and providing electrical drag for re-entry from orbit vehicles.

1734
Butz, J.S., Jr. ORBITAL RE-ENTRY WILL INTENSIFY DEMANDS ON STRUCTURES. Aviat. Wk. 68:50-51, 53, 55, 57, 59, Apr. 21, 1958.

Outlines main structural problems faced in proposals for Dyna Soar, an orbital bomber.

1735
Butz, J.S., Jr. RADICAL CONFIGURATIONS MAY FIND ROLE IN PUSH TOWARD SPACE FLIGHT. Aviat. Wk. 68:48-49, 51, 52, illus., Feb. 24, 1958.

Wedge-shaped fuselages and biplane and triplane wing arrangements may be used at hypersonic speeds, such as those that might be attained in re-entry from space, to raise lift-drag ratios to acceptable values.

1736
Butz, J.S., Jr. VANGUARD'S SUCCESS FORESTALLS ITS CRITICS. Aviat. Wk. 68:21-23, illus., Mar. 24, 1958.

A review of the Vanguard program and its potentialities.

1737
C.A.P. SATELLITE DATA. QST 42: 59, Apr. 1958.

Regions, frequency channels, and information concerning satellites to be broadcast daily by the Civil Air Patrol.

1738
Cain, B. GROUND SUPPORT. Aviat. Age, 28:98-101, Mar. 1958.

Satellite vehicle equipment.

1739
California Institute of Technology, Jet Propulsion Laboratory, Pasadena,

Calif. CATALOG OF RADIO SIGNALS FROM SPUTNIK I, (JPL COLLECTION), by B.L. Basore, 29 p., Jan. 29, 1958. (Publ. 120) (Contract DA-04-495-ord-18)

The catalog attempts to list not only the definitive factors, such as place and time of intercept, but also observed anomalies in the record that might be indicative of intelligence impressed on the transmitted signals.

1740
California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif. WHY SPACE TECHNOLOGY - THE UNKNOWN COSMOS, by H.G. Stever. 6 p., Jan. 1958. (Eng. X461-ABC, Space Technology, Lecture 1B, Jan. 13, 14, 15, 1958)

1741
California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif. TRAJECTORY OPTIMIZATION OF POWERED FLIGHT, by B.D. Fried. 6 p., Jan. 1958. (Eng. X461-ABC, Space Technology, Lecture 2B, Jan. 20, 21, 22, 1958)

1742
California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif. FLIGHT PERFORMANCE OF A ROCKET IN STRAIGHT-LINE MOTION, by M. Summerfield. 10 p., Jan. 1958. (Eng. X461-ABC, Space Technology, Lecture 2B, Jan. 20, 21, 22, 1958)

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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif. EARTH SATELLITES AND RELATED ORBIT AND PERTURBATION THEORY, by Samuel Herrick. 10 p., Jan. 1958. (Eng. X461-ABC, Space Technology, Lecture 3A, Jan. 27, 28, 29, 1958)

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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif. THE VANGUARD IGY EARTH

SATELLITE LAUNCHING TRAJECTORIES, by J.W. Stry. 11 p., Jan. 1958. (Eng. X461-ABC, Space Technology, Lecture 3B, Jan. 27, 28, 29, 1958)

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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif. LUNAR FLIGHT, by R.W. Buchheim. 6 p., Feb. 1958. (Eng. X461-ABC, Space Technology, Lecture 4A, Feb. 3, 4, 5, 1958)

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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif. INTERPLANETARY OPERATIONS, by K.A. Ehricke. 9 p., Feb. 1958. (Eng. X461-ABC, Space Technology, Lecture 4B, Feb. 3, 4, 5, 1958)

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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif. POWER LIMITED FLIGHT IN FIELD FREE SPACE, by D.B. Langmuir. 12 p., Feb. 1958. (Eng. X461-ABC, Space Technology, Lecture 5A, Feb. 17, 18, 19, 1958)

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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif. POWER-LIMITED FLIGHT--OPTIMIZATION IN GRAVITATIONAL FIELDS, by J.H. Irving. 16 p., Feb. 1958. (Eng. X461-ABC, Space Technology, Lecture 5B, Feb. 17, 18, 19, 20, 21, 1958)

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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif. RECOVERY DYNAMICS--HEAT TRANSFER AT HYPERSONIC SPEEDS IN A PLANETARY ATMOSPHERE, by L. Lees. 25 p., Feb. 1958. (Eng. X461-ABC, Space Technology, Lecture 6A, Feb. 24, 25, 26, 27, 28, 1958)

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RECOVERY DYNAMICS, by A.L. Eggers, Jr., 8 p., Feb. 1958. (Eng. X461-ABC, Space Technology, Lecture 6B, Feb. 24, 25, 26, 1958)
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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif.
TIME DILATION EFFECTS IN SPACE TRAVEL, by H.C. Corben. 6 p., Feb. 1958. (Eng. X461-ABC, Space Technology, Lecture 5C, Feb. 17, 18, 19, 1958)
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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif.
FUNDAMENTAL PRINCIPLES OF ROCKET PROPULSION, by H.S. Seifert, 9 p., Mar. 1958. (Eng. X461-ABC, Space Technology, Lecture 7A, Mar. 3, 4, 5, 6, 7, 1958)
- 1753
California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif.
PROPULSION SYSTEMS - LIQUID ROCKET ENGINES, by G.P. Sutton. 16 p., Mar. 1958. (Eng. X461-ABC, Space Technology, Lecture 7B, Mar. 3, 4, 5, 6, 7, 1958)
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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif.
ILLUSTRATIONS ONLY, by J.I. Shafer. 12 p., Mar. 1958. (Eng. X461-ABC, Space Technology, Lecture 8A, Mar. 10, 11, 12, 13, 14, 1958)
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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif.
FUTURE NEW PROPULSION SYSTEMS, by R.W. Busaard. 17 p., Mar. 1958. (Eng. X461-ABC, Space Technology, Lecture 8B, Mar. 10, 11, 12, 13, 14, 1958)
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Extension, Berkeley, Calif.
PHILOSOPHY AND APPLICATION OF INTEGRATED DESIGN, by M.V. Barton. 5 p., Mar. 1958. (Eng. X461-ABC, Space Technology, Lecture 9A, Mar. 17, 18, 19, 20, 21, 1958)

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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif.
SPACE COMMUNICATIONS - FEASIBILITY, by E. Rechin. 16 p., Mar. 1958. (Eng. X461-ABC, Space Technology, Lecture 10A, Mar. 24, 25, 26, 27, 28, 1958)

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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif.
SPACE COMMUNICATION - IMPLEMENTATION PROBLEMS, by F.W. Lehan. 10 p., Mar. 1958. (Eng. X461-ABC, Space Technology, Lecture 10B, Mar. 24, 25, 26, 27, 28, 1958)

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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif.
RADIO GUIDANCE, by W.H. Pickering. 8 p., Apr. 1958. (Eng. X461-ABC, Space Technology, Lecture 11A, Mar. 31, Apr. 1, 2, 3, 4, 1958)

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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif.
MIDCOURSE AND TERMINAL GUIDANCE, by A.D. Wheelon. 22 p., Apr. 1958. (Eng. X461-ABC, Space Technology, Lecture 12B, Apr. 7, 8, 9, 10, 11, 1958)

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California University. Engineering Extension. Physical Sciences Extension, Berkeley, Calif.
OBSERVATIONS WITH SATELLITE BORNE APPARATUS, by J.A. Van Allen. 14 p., Apr. 1958. (Eng. X461-ABC, Space Technology, Lecture 14B, Apr. 21, 22, 23, 24, 25, 1958)

1762
Campbell, Leon, Jr. MOONWATCH OBSERVATIONS. Smithsonian Astrophys. Observ. Bull. for Visual Observers of Satellites 8:3, Mar. 1958.

Lists U.S. stations which reported observations of Sputnik I and II and the total number of productive observations through December 31, 1957.

This Bulletin also appears in Sky and Telescope 17: insert between p. 238-239, Mar. 1958.

1763
CANAUVERAL SUPPORTS SPACE EXPLORATION. Aviat. Wk. 68:187, 189, 191, 193, 195, illus., June 16, 1958.

Describes facilities and role of the satellite launching site in Florida.

1764
Cassidy, G.J.A. RADIO DOPPLER MEASUREMENTS ON THE RUSSIAN SATELLITES AT THE NATIONAL STANDARDS LABORATORY. Inst. Radio Engrs. (Australia) Proc. 19:105-109, figs., Mar. 1958.

A description is given of the methods used to obtain information on the position of the Russian satellites by use of the doppler effect on the 40 Mc/s transmissions from the satellites, as observed at one receiving station. Values for the period and other orbit parameters deduced for the first two satellites are given.

1765
Castruccio, P.A. GUIDANCE AND CONTROL. Aviat. Age 28:64-68, illus., Mar. 1958.

The author of this article contends that inflight path corrections are more practical than orbit aiming; the manned vehicle will use both onboard and external guidance; communication faster than the speed of light will be needed for inter-stellar trips.

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Castruccio, P.A. INTERPLANETARY COMMUNICATION AND NAVIGATION. Westinghouse Engr. 18:88-92, illus., May 1958.

Deals with a few of the anticipated problems of space travel within our solar system.

1767
CERAMIC COATINGS AID "EXPLORER" IN OUTER SPACE. Ceramic Age 71:47, Mar. 1958.

The coating, Norton's Rokide A, was sprayed on in strips along the outside of the instrument vehicle from the nose cone down to the fourth-stage rocket section. This aluminum oxide coating assists in controlling the temperature.

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Chapman, Seville. SATELLITE SUMMARY. Res. Trends (Cornell Aeronaut. Lab.) 5:1-7, illus., Winter 1958.

Inert, instrumented, and manned satellites; calculating an orbit; launching; how and when to see a satellite; space travel; and the significance of satellites.

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A CHART FOR FINDING A SATELLITE'S DISTANCE AND ELEVATION. Smithsonian Astrophys. Observ. Bull. for Visual Observers of Satellites 8:7, illus., Mar. 1958.

This Bulletin also appears in Sky and Telescope 17: insert between p. 238-239, Mar. 1958.

1770
Christian, G.L. BLUNT STAINLESS STEEL NOSE CONE INDICATES SATELLITE HEATING PROBLEM. Aviat. Wk. 68:36-37, illus., Mar. 10, 1958.

Illustrations show how the stainless steel nose cone of Explorer I was formed by Pluturn cold rolling method.

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1771
Clark, Evert. ARMY LAUNCHES EXPLORER II; ORBIT MAY HAVE BEEN MISSED. Aviat. Wk. 68:19, Mar. 10, 1958.

1772
Clark, Evert. CONVAIR PLANS FOUR-MAN SPACE STATION. Aviat. Wk. 68:26-28, illus., Apr. 28, 1958.

Article based on proposals reported by K.A. Ehrlicke and Dr. Arthur Kantrowitz, gives details involving a station that could be put into a 400-mile orbit in five years at a cost of about \$500 million.

1773
Clark, Evert. INDECISION BLOCKS PROMPT MOON STRIKE. PENTAGON IS SWAMPED BY PROPOSALS TO SEND EXISTING HARDWARE TO MOON; BOTTLENECK IS IN HIGH ECHELON. Aviat. Wk. 68:26-27, Feb. 10, 1958.

1774
Clark, Evert. USAF STUDIES HIGH-THRUST SPACE ENGINE. Aviat. Wk. 68:27, Feb. 24, 1958.

USAF has initiated development of a single-chamber rocket engine that would produce 1,000,000 lb. of thrust and another whose units could be manifolded together to produce more than 1,500,000 lb. for use with future space vehicles.

1775
Clark, Evert. NAVY BALLOON FLIGHT AIDS SPACE RESEARCH. Aviat. Wk. 68:30-31, May 12, 1958.

Among other contributions the sixth manned balloon flight in the Navy's Stratolab series provided the first yield test of a telemetry-telephone system that probably will be used to return physiological data from the first orbiting manned space vehicles.

1776
Clark, Evert. U.S. SCIENTISTS FEAR MAKESHIFTS IN SPACE. Missile Eng. 2:17, Jan. 1958.

Indicates feeling expressed at meeting of American Rocket Society in

New York during January 1958. Also mentions ARS proposal for a national space flight program.

1777
Clark, Evert. VANGUARD COMPONENTS TO GET WIDE USE. Aviat. Wk. 68:131-133, 135-136, illus., June 16, 1958.

Details contribution of the Vanguard satellite to the nation's space programs; indicates program proposed using the Army's Jupiter IRBM topped by the upper two stages of Vanguard; relates earlier space efforts beginning in 1942; mentions the Viking program; describes 1958 Beta orbits; briefly mentions the Vanguard tracking system; and designates cost of Vanguard.

1778
Clarke, A.C. THE MAKING OF A MOON. THE STORY OF THE EARTH SATELLITE PROGRAM. rev. ed., 205 p., illus., New York, Harper, 1958.

Satellite prehistory; the inception of Project Vanguard; and some technical details and plans.

1779
Cleaver, A.V. INTERPLANETARY FLIGHT. In Gatland, K.W., ed. Project Satellite, p. 134-162, New York, British Book Center, 1958.

Reveals the prospects of interplanetary flight now scientifically feasible in the light of recent developments.

1780
COLLISIONS IN SPACE. Eng. 185:164, Feb. 7, 1958.

Summary of paper by N.H. Langton given at a meeting of the British Interplanetary Society.

It dispels the impression that the main hazard to space vehicles is from puncture by large particles.

1781
Colorado University, High Altitude Observatory, Boulder, Colo. SCIENTIFIC REPORT NO. 10, by J.W. Warwick, 52 p., Apr. 30, 1958. (Contract AF19(604)-1491).

Analysis of 20 Mc/s radio observations of Russian satellites 1957a2 and 1957, 1.

1782
CONGRESS AND SPACE. Aviat. Wk. 68:17, Mar. 31, 1958.

Announces appointments to Senate Special Committee on Space and Astronautics.

1783
CONTROL WIRING FAILED VANGUARD. Electron (Bus. ed.) 31:35, Feb. 21, 1958.

A broken wire or connector in Vanguard's electronic control system is believed to have been the cause of failure in flight February 5. Preliminary findings indicate a wiring defect somewhere between the automatic pilot in the second-stage rocket and the hydraulic servo system in the first stage.

1784
Conway, E.A. OUTER SPACE AND PEACE. Commonweal 67:374-378, Jan. 10, 1958.

An appeal for an international space agency.

1785
Cooper, J.C. FLIGHT SPACE AND THE SATELLITES. Astronautics 3:32-33, 68, 70, Mar. 1958.

With the launching of the first man-made "moons" international air law has entered one of its periods of major development. Immediate action is thought to be needed to determine the answers to the many legal problems they pose.

1786
Cornell University. School of Electrical Engineering, Ithaca, N.Y. STUDIES ON PROPAGATION IN THE IONOSPHERE. 23 p., figs., Mar. 31, 1958. (Contract DA36-039 sc-74903)

Phase scintillations of artificial satellite signals, p. 1-2.

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1787
COSMIC RAYS STUDIED FROM SPUTNIK II. Missiles and Rockets 3:58, Jan. 1958.

Quotes from article entitled "An Automatic Laboratory in Space," by V. Mikheevich, published in Krasnaya Zvezda.

1788
Cox, Donald and Stoike, Michael. SPACEPOWER. 260 p., illus., Philadelphia, Winston, 1958.

Discusses in detail Sputnik's and Mutnik's impact on the world; why go into space; where we are at present; the social impact of satellites; spacepower; the international control of outer space; a philosophy of space power; organization of the U.N. space force; and importance of the moon as a stepping-stone to space.

1789
Croome, Angela, comp. THE INTERNATIONAL GEOPHYSICAL YEAR MONTH BY MONTH. Discovery 19:29-31, illus., Jan. 1958.

British observations of Sputnik I and II; mechanical features of Sputnik II.

1790
Croome, Angela, comp. THE INTERNATIONAL GEOPHYSICAL YEAR MONTH BY MONTH. Discovery 19:75-77, illus., Feb. 1958.

Vanguard and afterguard; Sputniks past and future.

1791
Croome, Angela, comp. THE INTERNATIONAL GEOPHYSICAL YEAR MONTH BY MONTH. Discovery 19:118-121, Mar. 1958.

A brief report on the launching of Explorer 1958a including an illustration of components and a table of orbit comparisons with Sputnik I and II.

A notation for 1957 satellites is recorded in accordance with the

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suggestion by Smithsonian Astrophysical Observatory (the coordinating body for Moonwatch activities).

1792 Croome, Angela, comp. THE INTERNATIONAL GEOPHYSICAL YEAR MONTH BY MONTH. Discovery 19:162-165, illus., Apr. 1958.

Includes information about length of life of Sputnik II, and Explorer; and effects of a solar flare in mid-February.

1793 Croome, Angela, comp. THE INTERNATIONAL GEOPHYSICAL YEAR MONTH BY MONTH. Discovery 19:206-209, illus., May 1958.

Comment on preliminary findings from Explorer I's instruments. It is stated that "the Americans have only succeeded in winning back 3% of the information being continuously radioed from the Army's Explorer I."

Mention is made of the important novelty contained in Vanguard I, namely the transmitter powered exclusively from the sun making use of the 6 silicon solar converters developed by the U.S. Army Signal Corps.

1794 Cullen, Tom. BRITONS HELPED THE COMMUNISTS WIN THE SATELLITE RACE. Am. Mercury 86:29-32, Feb. 1958.

An article about the Russian, Dr. Peter Kapitsa, who designed Sputnik and got it off the ground. He is a Cambridge graduate and spent 14 years at Cambridge's Cavendish Laboratory.

1795 Cushman, R.H. VANGUARD CONTROL DEMONSTRATES MINIMUM HARDWARE APPROACH. Automatic Contr. 8:26-33, illus., June 1958.

The control system is described in terms of its function in the five-minute powered trajectory and the following five minutes of coasting flight.

1796 Davis, J., Evans, J.V. and others. RADAR OBSERVATIONS OF THE RUSSIAN EARTH SATELLITES AND

CARRIER ROCKET. Inst. Elec. Engrs. Proc. 105B:105-107, illus., Mar. 1958.

Characteristics of the Jodrell Bank radio telescope when used to obtain echoes at 36 and 120 Mc/s are described and a photograph showing the amplitude and range of the echo from the carrier rocket is given.

1797 Dempewolf, R.F. FORECAST: A SKY FULL OF SATELLITES. Popular Mech. 109:138-141, 262, 264, illus., Jan. 1958.

Describes some of the projects underway.

1798 DESIGN MOON SPACE SHIP. Sci. News Ltr. 73:213, Apr. 5, 1958.

Summary of paper given by K.A. Ehrlicke at the Air Force Association's third annual Jet Age Conference in which he outlined preliminary designs for a nuclear-powered, non-stop space liner. His proposal would eliminate the intermediate satellite station traditionally conceived as a necessary stepping-stone to interplanetary travel.

1799 Dillaway, R.B. PROPULSION SYSTEMS FOR SPACE FLIGHT. Aero. Eng. Rev. 17:42-49, figs., Apr. 1958.

Typical designs for chemical, nuclear, and ion rocket engine systems are described, and available information on radiation, particles, and external (gravitational) force effects in outer space is reviewed in terms of effects on propulsion systems.

1800 DIRECTORY OF ULTRA-LONG LENSES FOR MISSILE OR SPUTNIK TRACKING. Indus. Photo. 7:64-65, 80, Feb. 1958.

1801 Dorrance, W.H. BUSINESS IMPLICATIONS OF FUTURE SPACE FLIGHT SYSTEMS. Aero. Eng. Rev. 17:20-23, illus., Feb. 1958.

An analysis of military, scientific and commercial applications of space-flight systems from the point of view of assessing their business implications for the airframe industry.

1802 Dorrance, W.H. HYPERSONIC AERODYNAMIC FACTORS IN PERFORMANCE, GUIDANCE, AND CONTROL. Aero/Space Eng. 17:30-33, 43, illus., May 1958.

Possible effects of dissociation and ionization behind strong shock waves on stability and guidance of hypersonic vehicles are discussed. The requirements for dynamic and static stability for certain classes of hypervelocity atmospheric entry bodies are described, using examples. A hypervelocity glide vehicle configuration is presented as an illustration of possible future airframe configurations.

1803 Douglas, H.T. REINFORCED PLASTICS IN OUTER SPACE. Plastics Tech. 4:62, Jan. 1958.

The writer suggests that extensive use of reinforced plastics in the construction of satellites may be "decidedly advantageous."

1804 Drummeter, L.F. and Schach, M. SATELLITE TEMPERATURE CONTROL. U.S. Naval Res. Lab. Rpt. NRL Prog., p. 1-7, May 1958.

Reviews problems in temperature control for satellite vehicle components. Emphasis is on the approach used for Project Vanguard, but many elements are applicable to satellites in general.

1805 Dryden, H.L. DRYDEN FORESEES NASA-INDUSTRY TEAMS. Aviat. Wk. 68:37-39, June 23, 1958.

A forecast of cooperative effort in solving space flight problems.

1806 Dryden, H.L. SPACE TECHNOLOGY AND THE NACA. Aero. Eng. Rev. 17:32-34, illus., Mar. 1958.

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Policy statement presented at annual meeting of the Institute of the Aeronautical Sciences, Jan. 27, 1958.

See also Astronautics 3:84, Mar. 1958.

1807 Eastman, Ford. CIVIL SPACE AGENCY BILL PASSES HOUSE. Aviat. Wk. 68:24-25, June 9, 1958.

Legislation to create a national space agency is outlined, with House amendments and major provisions.

1808 Eastman, Ford. SCIENTISTS URGE STRONG CIVIL SPACE UNIT. Aviat. Wk. 68:29, Apr. 28, 1958.

Summary of testimony before the new House Committee on Astronautics and Space Exploration.

1809 Eastman, Ford. SERVICE OFFICIALS BACK NASA SPACE PLAN. Aviat. Wk. 68:28-29, Apr. 21, 1958.

Summary of statements made at hearings of the House Committee on Astronautics and Space Exploration.

1810 Edson, J.B. ASTRONAUTICS AND THE FUTURE. Bull. Atomic Sci. 14:102-103, Mar. 1958.

Reviews astronautic concepts and forecasts development of the art. Also indicates two rewards to be derived from occupation of the moon.

1811 Ehrlicke, K.A. OUR PHILOSOPHY OF SPACE MISSIONS. Aero/Space Eng. 17:38-43, illus., May 1958.

The underlying philosophy expressed in this article is based on the phrase which is quoted, "Do not undertake vast projects with half-vast ideas."

1812 ELECTRONICS IN SPACE. Electron (Bus. ed.) 31:35, Mar. 21, 1958.

Brief review.

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1813
ELECTRONICS IN THE LUNAR AGE: OUTER SPACE THE TARGET AS "MOON" FUNDS GET OKAY. *Elec-tron Wk.* 3:8-10, illus., Apr. 14, 1958.

With President proposing space agency and Senate Committee pondering Cabinet level science, electronics faces unique challenges.

1814
Engel, R. and Bödewadt, U.T. DIE SATELLITEN-TRÄGERRAKETEN GEDANKEN ZUM SPUTNIK UND VANGUARD. (DISCUSSION OF SATELLITE-LAUNCHING ROCKETS INCLUDING SPUTNIK AND VANGUARD). *Raketentech. u. Raum-fahrtforsch.* 2:23-25, Jan. 1958. In German.

1815
EQUATORIAL LUNAR BASE. *Aviat. Wk.* 68:28, Apr. 28, 1958.

Quotes K.A. Ehrlicke as indicating that the Christmas Islands in the Pacific are favorably located for a base from which to launch lunar and interplanetary vehicles.

Also mentions Ehrlicke's call for an International Astrophysical Decade, possibly from 1965 to 1975.

1816
Erhard, Tom. EXPLORER I AND THE PUBLIC SCHOOL. *Natl. Educ. Assn. J.* 47:175, Mar. 1958.

Gives school background of the "16 brilliant young scientists from the JPL" who were largely responsible for the Army satellite project. Many are products of the public schools of California.

1817
Evans, D.S. EXPLORER (SATELLITE 1958a) OVER AFRICA. *Nature* 181: 1173-1174, Apr. 26, 1958.

Tables record observations at Cape Town, Johannesburg, Bloemfontein, and Pretoria.

1818
EVERYBODY HAS AN OPINION ON SATELLITES. *Astronautics* 3:64, Feb. 1958.

American Institute of Public Opinion poll questions and answers.

1819
Ewing, Ann. BLUEPRINT FOR SPACE TRAVEL. *Sci. News Ltr.* 73:234, Apr. 12, 1958.

The blueprint for space travel has been drawn: future satellites may orbit for thousands of years and remote-controlled science stations may explore the planets.

1820
Ewing, Ann. SPOT HURRICANES FROM "MOONS." *Sci.* 127:362-363, illus., June 7, 1958.

Several satellites equipped with TV-like "eyes" could spot birth of a tropical storm and keep its changing path under constant surveillance, improving predictions of its course.

1821
EXPLORER. *Sci.* 127:330-331, Feb. 14, 1958.

A review of the earth satellites, Explorer, Sputniks and Vanguard.

1822
"EXPLORER" AND WHAT IT MEANS. *Electron. Indus. & Tele-Tech.* 17: 56-57, 126, illus., Mar. 1958.

The information being telemetered from America's first earth satellite will lead to more reliable radio communication and improved air navigation, and set the stage for the first manned aircraft to invade space.

1823
EXPLORER. FURTHER DETAILS OF THE U.S. ARMY'S SATELLITE. *Flight* 73:234, illus., Feb. 21, 1958.

1824
"EXPLORER" IN ORBIT. *Engr.* 205: 195, Feb. 7, 1958.

Concerns Sputnik, Explorer, Vanguard and prestige.

1825
"EXPLORER" NOSE COLD FORMED FROM 430 STAINLESS. *Iron Age* 181:113-115, illus., Mar. 6, 1958.

A piece of auto-trim grade stainless steel is the nose cone for the Army's Explorer satellite. This article tells how it was produced for its journey.

1826
EXPLORER NOSE CONE TEMPERATURES FALL INTO NORMAL EARTH RANGES. *Aviat. Wk.* 68:19-20, Mar. 24, 1958.

Details of the Army's first satellite were revealed, along with other topics, at the Joint Aviation Conference of the American Rocket Society and the American Society of Mechanical Engineers.

1827
EXPLORER I. *Astronautics* 3:20-23, 83-87, illus., Apr. 1958.

A special article, prepared by the Jet Propulsion Laboratory, providing complete details on the launching vehicle, instrumentation, and flight mechanics used to orbit the satellite Explorer.

1828
EXPLORER III ORBIT. *Aviat. Wk.* 68:27, Mar. 31, 1958.

Announces launching of the Army's third satellite.

1829
FACTS ABOUT THE SCIENTIFIC EARTH SATELLITE PROGRAM. *Mag. Magnesium*, p. 10-14, illus., Feb. 1958.

The U.S. Vanguard program.

1830
THE FALL OF THE SPUTNIK LAUNCHER. *Spaceflight* 1:224, Jan. 1958.

Brief report of recorded remarks by Mr. Khrushchev and Prof. Lovell at the time of the fall of the launcher

on December 1, 1957 after 878 complete circuits of the earth.

1831
"55 DECISION BLOCKED ARMY SATELLITE TRY. *Missiles and Rockets* 3:44-45, Mar. 1958.

Traces decision to back Vanguard instead of Project Orbiter to the so-called Stewart Committee.

1832
FILLING UP FOR A TRIP TO THE MOON. *Prod. Eng.* 29:16, Apr. 21, 1958.

Brief note concerning the amount of fuel required for a trip to the moon.

1833
Finlay, W.H. LAUNCHING IGY SATELLITES. *Inst. Radio Engrs. Proc.* 46:357, Jan. 1958.

Cites advantages of site at Port Pegasus, Stewart Island, New Zealand.

1834
Fiorio, Franco. HOW TO TRAVEL OUTSIDE OUR SOLAR SYSTEM. *Missiles and Rockets* 3:89-90, 93, illus., Apr. 1958.

Speeds near that of light are one requirement.

1835
THE FIRST DAYS OF SPUTNIK I. *Spaceflight* 1:198-202, illus., Jan. 1958.

Includes the following reports: Visual Observations of the First Russian Satellite Rocket, by V.C. Reddish (Royal Observatory, Edinburgh); Observations of Sputnik I Made at the Mullard Radio Astronomy Observatory, Cambridge, by Martin Ryle; First Observations from Jodrell Bank, by a Member of the Research Team; Radio Observations of the Satellite, by H.V. Griffiths (BBC Measurement and Receiving Station, Tatsfield, Surrey); Observations by the B.A.A. and the R.S.G.B. by John Heywood; The Russian "Moonwatch" Program.

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1836
FIRST SATELLITE RESULTS ARE IN.
Astronautics 3:50, 79, illus., Jan.
1958.

Preliminary scientific reports on
Soviet satellites.

1837
FIRST U.S.-IGY SATELLITE. IGY
Bull. 9:1-3, Mar. 1958.

Launching; instrumentation; obser-
vations; and orbit of Explorer I.

1838
FIRST U.S. "MOON" REPORT. Sci.
News Ltr. 73:291, May 10, 1958.

A mysterious radiation has been
discovered through the scientific
probing of Explorers I and III,
along with important findings in
space temperature and atmospheric
density.

1839
THE FIRST VANGUARD LAUNCHING.
Spaceflight 1:205, Jan. 1958.

Brief announcement of failure of
attempted launching on December 6,
1957.

1840
FORMING THE EXPLORER'S NOSE.
Steel 142:106-107, Mar. 24, 1958.

Steps in making the satellite nose
cone by a cold rolling process known
as Floturning.

1841
FOUR OBJECTS REPORTED IN
SPUTNIK ORBIT. Aviat. Wk. 68:28-
29, illus., May 26, 1958.

Objects believed to be in the Sputnik
III orbit are: instrumented satellite;
final-stage rocket engine; nose cone;
and one and possibly more light-
weight bodies with a minimum area
of several square feet.

1842
Frankel, C. THIRD GREAT REVOLU-
TION OF MANKIND. N.Y. Times
Mag., p. 11, Feb. 9, 1958.

How and why the satellites symbol-
ize a new "age of acceleration."

1843
Friedman, B.D. CORRECTIONS TO
"COMMENTS ON THE POWERED
FLIGHT TRAJECTORY OF A SAT-
ELLITE." Jet Propul. 28:342-344,
May 1958.

Refers to error, "an understandable
one, stemming from a common
misinterpretation of 'centrifugal
force'" in article by T.N. Edelbaum
(See Item 1024).

1844
Friedman, Herbert. SOVIET SATEL-
LITE INSTRUMENTATION. Astro-
nautics 3:32-33, 82, illus., Feb.
1958.

Comparison of Russian and U.S.
techniques reveals different ap-
proaches to the problem of measur-
ing solar X-ray and ultraviolet
radiation.

1845
FUEL PUSH GETS SATELLITE OFF
GROUND. ROARING SKYWARD
WITH FIRST U.S. EARTH SATEL-
LITE IS ARMY'S JUPITER C MIS-
SILE. Chem. Wk. 82:30-31, illus.,
Feb. 8, 1958.

Concerns the relative merit of solid
and liquid fuels.

1846
Fusca, J.A. ALTITUDE DATA AIDS
WEAPON DESIGN STUDY. Aviat.
Wk. 68:71, 73, 76-77, table, Mar. 31,
1958.

The second of two articles relative
to effect of environment on vehicle
types, including satellites. For
first part, see Item 1851.

1847
Fusca, J.A. IGY DATA ADDS TO
EARTH, SPACE THEORIES. Aviat.
Wk. 68:75-76, Feb. 3, 1958.

Gleanings from a report by Hugh
Odtshaw covering the first six
months of IGY indicate that as a
result of measurement of the rates
at which Sputnik I and II were slowed
by friction, atmospheric density is
higher than was expected.

1848
Fusca, J.A. POWER SOURCES FOR
SPACE EXPLORED. Aviat. Wk.
68:235, 237, 239, 241, June 16, 1958.

Methods under investigation includes
nuclear reactors, radioactive iso-
topes, thermocouples, fuel cells and
solar batteries. Other unconven-
tional, and less successful methods
are also mentioned. A chart indi-
cates performance of unconventional
power sources.

1849
Fusca, J.A. RESEARCH REVEALS
NEW PROBLEMS IN SPACE. Aviat.
Wk. 68:76, illus., June 16, 1958.

Suggests that three most interesting
considerations to emerge from the
present intensive scientific study of
the space environment are: earth-
sun relationship; magnetohydro-
dynamic theory; and earth's mag-
netic field.

1850
Fusca, J.A. SPACE COMMUNICA-
TIONS TECHNIQUES READY. Aviat.
Wk. 68:229-230, 233, illus., June 16,
1958.

Satellite uses; phase-lock demodula-
tion; space trends; and first steps in
developing an understanding of space
communications are discussed.
Navy's use of the moon as a passive
reflector for long-range, point-to-
point communications is mentioned
as an indication that similar use
could be made of man-made satel-
lites.

1851
Fusca, J.A. USAF SEEKS WEAPON
ENVIRONMENT DATA. Aviat. Wk.
68:73, 75-76, illus., Mar. 24, 1958.

Gives an indication of studies of
natural and induced environmental
conditions encountered at very high
altitudes (called hyper-environ-
ments).
Satellite vehicles are among those
tested.
See also Item 1846.

1852
FUTURE EARTH SATELLITE TO BE
SELF-SERVICED. In Hearings,
Select Comm. Astronaut. & Space
Exploration, H.R. 11881, p. 370, 1958.

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F.L. Whipple's statement describing
a "telepuppet" built into a satellite
which could duplicate what the oper-
ator's hands were doing on the
ground through telemetry.

1853
Fyodorov, E.K. THE IGY AND THE
ARTIFICIAL EARTH SATELLITES.
SOME SOVIET CONTRIBUTIONS.
London Times Sci. Rev. 27:5, 1957.

Not examined.

1854
Garfinkel, Boris. ON THE MOTION
OF A SATELLITE OF AN OBLATE
PLANET. Astron. J. 63:88-96,
Mar. 1958.

The author constructs what he be-
lieves to be, without any loss of
accuracy, the simplest possible
orbit which incorporates the princi-
pal features of the actual motion.
The orbit is unique in the sense that
the motion in the gamma coordinate is
identical in form with that in a cer-
tain Keplerian ellipse.

1855
Garwin, R.L. SOLAR SAILING - A
PRACTICAL METHOD OF PRO-
PULSION WITHIN THE SOLAR
SYSTEM. Jet Propul. 28:188-190,
figs., Mar. 1958.

It is shown that commercially avail-
able metallized plastic film can be
used as a solar radiation pressure
sail for propulsion of space vehicles
within the solar system. The
method of propulsion is of negligible
cost and is perhaps more powerful
than many competing schemes.

1856
Gatland, K.W. FOUR STEPS TO OR-
BIT. Eng., 185:262-264, Feb. 28,
1958.

Concerns launching of Explorer.

1857
Gatland, K.W. LUNAR LANDING.
Roy. Air Force Flying Rev. 13:24-
26, illus., Apr. 1958.

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Some ideas, on performing an un-manned landing on the moon, are set forth.

1858
Gatland, K.W. NEW SATELLITES IN ORBIT. Eng. 185:462-463, illus., Apr. 11, 1958.

Details of the Vanguard satellite and a table indicating comparisons of Sputnik I and II, Explorer I and II, Vanguard TV-4, and Viking II.

1859
Gatland, K.W. ORBITING LABORATORY. SPACE TO SPARE IN SPUTNIK THREE. Eng. 185:722-723, June 6, 1958.

Comment on Sputnik III, a completely outfitted research laboratory capable of dealing with nine major research tasks.

1860
Gatland, K.W., ed. PROJECT SATELLITE. 169 p., illus., New York, British Book Center, 1958.

Outstanding scientists describe the planning, launching, instrumentation and tracking of satellites. See entries under Von Braun, Gatland, Ross and Cleaver.

1861
Gatland, K.W. RUSSIA'S SECOND SATELLITE. Spaceflight 1:204-205, Jan. 1958.

An appraisal of the techniques necessary to establish half a ton of research equipment in orbital motion round the earth.

1862
Gatland, K.W. THE SATELLITE PROJECT. In Gatland, K.W. ed. Project Satellite, p. 50-104, New York, British Book Center, 1958.

Details of American and Russian satellite programs.

1863
General Electric Co. Technical Military Planning Operation, Santa Barbara, Calif. HUMAN FACTORS REQUIREMENTS OF A MANNED

SPACE VEHICLE, by A. B. Nadel. 36 p., Apr. 10, 1958. (Rpt. RM 58TMP-10)

Discusses the physical environment and psychological requirements (the perceptual system, and information processing).

1864
George, Frank. A SIMPLE GRAPHICAL SOLUTION FOR SATELLITE ORBITS. Inst. Nav. J. 11:98-101, Jan. 1958.

The method indicates the time of a transit or near transit, the quarter of the sky in which the satellite is to be found and whether it will be high or low in the sky.

1865
"GIANT" ENGINE GAINS CITED AS SPACE NEED. Aviat. Wk. 68:29, Feb. 17, 1958.

Quotes from speech at an Institute of Aeronautical Sciences meeting by J.L. Sloop.

1866
Godson, W.L. METEOROLOGICAL APPLICATIONS OF EARTH SATELLITES. Roy. Astron. Soc. Can. J. 52:49-56, Apr. 1958.

Outlines various proposed experiments to indicate the tremendous potential value for the science and practice of meteorology.

1867
Graf, C.R. METEOR "PING" FROM SPUTNIK II. QST 42:47, illus., Mar. 1958.

Letter to the editor relative to meteor signals from satellites.

1868
Graham, Richard. VANGUARD 108: TWO-TUBE 108-MC CONVERTER. Radio-Electron. 29:101-103, illus., Jan. 1958.

Suggests tracking the Vanguard satellite with a "simple two-tube 108 mc converter which also has other uses."

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Grant, Gordon. DETERMINATION OF ORBITAL CHARACTERISTICS OF AN EARTH SATELLITE FROM SINGLE-STATION RADIO-TRANSIT OBSERVATIONS. Nature 181:900-901, Mar. 29, 1958.

Letter to the editor.

Information attainable from meridian observations at a single station, the Sohio Research Laboratories east of Cleveland, Ohio.

1870

Greenwood, S.W. DATA FROM A FIXED POINT IN SPACE. Aeroplane 94:118-119, 1958.

Notes on the possible uses of an aircraft that would operate under a fixed point in space are given for (a) high altitude meteorological work; (b) research on cosmic and solar radiation; (c) continuous astronomical observation of a chosen region in the heavens; and (d) crew testing and training under confined operating conditions for long periods.

1871

Greenwood, S.W. THE RAMJET IN ASTRONAUTICS. Spaceflight 1:211-215, 219, illus., Jan. 1958.

Principles; range of application; possible application to astronautics.

1872

Grey, Jerry. PROPULSION. Aviat. Age 28:36-37, 39-43, illus., Mar. 1958.

Considers approximate performance of various power plants for space flight. The ion rocket is among "best bets" for interplanetary travel.

1873

Griswold, W.S. TV SATELLITE TO WATCH THE WORLD. Popular Sci. 172:105-109, illus., Feb. 1958.

Some assumptions based on questions and answers concerning a reconnaissance satellite girdling the globe every hour and a half at a height of 500 miles, which will be equipped to take pictures of the whole world. This "seeing-eye"

satellite is officially called Pied Piper, but is unofficially known as Big Brother.

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Groves, G.V. EFFECT OF THE EARTH'S EQUATORIAL BULGE ON THE LIFE-TIME OF ARTIFICIAL SATELLITES AND ITS USE IN DETERMINING ATMOSPHERIC SCALE-HEIGHTS. Nature 191:1055, Apr. 12, 1958.

Considers the effect of the equatorial bulge on perigee air-density.

1875

Gustavson, John. WHERE WILL ELECTRIC POWER COME FROM IN SPACE SHIPS? Aviat. Age 29: 186-189, diags., Apr. 1958.

A discussion of the three most likely sources for power: chemical batteries; atomic batteries; and thermocouples.

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Haley, A.G. THE COMMERCIAL IMPLICATIONS OF MISSILES-SATELLITE-SPACE AGE. 8 p., 1958.

Reprinted from the Commercial and Financial Chronical, Mar. 13, 1958.

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Haley, A.G. INTERNATIONAL CO-OPERATION IN ASTRONAUTICS. For. Serv. J., p. 1-4, Apr. 1958.

Reviews means of communication among early rocket pioneers; notes the establishment in 1957 of the "first active forum for astronauts;" and the development of organizations and societies.

1878

HAM PARTICIPATION IN IGY. Radio & TV News, 59:8, 142, Jan. 1958.

Indicates the importance of amateur radio operators in observing artificial satellites and helping to determine orbits. Several projects planned by amateur clubs are mentioned and details of Moonwatch and Mark II Minitrack systems are given.

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Hampton, D.E. ANALYSIS OF DOPPLER DATA FROM EARTH SATELLITES. *Inst. Elec. Engrs. Proc.* 105B:99-100, diags., Mar. 1958.

A method of analyzing data obtained from Doppler frequency measurements to obtain good estimates of satellite speed, minimum distance and electrical path length from satellite to receiver is given. Ionospheric corrections to be applied, obtained by taking simultaneous measurements at 20 and 40 Mc/s are outlined.

1880
Hancock, J.H. ANALOG COMPUTERS. U.S. Naval Res. Lab. Rpt. NRL Prog., p. 32, Jan. 1958.

Relates to revisions in calculations of trajectory and lifetimes made as a result of information provided by the earth satellites placed in orbit by the Russians.

1881
Hanel, R. and Stampf, R.A. AN EARTH SATELLITE INSTRUMENTATION FOR CLOUD MEASUREMENT. *Inst. Radio Engrs. Proc.* 46:645, Mar. 1958.

Abstract of paper given at IRE convention, New York, March 1958.

1882
Harris, I. and Jastrow, R. A SHORT PROGRAM FOR SATELLITE ORBIT PREDICTION. U.S. Naval Res. Lab. Rpt. NRL Prog., p. 1-8, Feb. 1958.

The program described is designed for the rapid production of an approximate satellite ephemeris from a small number of Minitrack observations, in a form convenient for the use of Minitrack stations and tracking radars.

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Harris, I. and Jastrow, R. UPPER ATMOSPHERE DENSITIES FROM MINITRACK OBSERVATIONS ON SPUTNIK I. *Sci.* 127:471, Feb. 28, 1958.

A figure shows curves representing density distributions adjusted for

simultaneous agreement with the rocket measurements and the $\alpha 2$ data. A dashed curve is the ARDC model atmosphere.

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Harris, W.B. LITTON SHOOTS FOR THE MOON. *Fortune* 57:114-119, 206, 208, 210, 212, illus., Apr. 1958.

Space laboratory research at Litton Industries of California.

1885
Hawkes, Russell. MILITARY SPACE GOALS STIR CONTROVERSY. *Aviat. Wk.* 68:22-23, Mar. 31, 1958.

Summary of papers given at the Western Space Conference of the Los Angeles Chamber of Commerce, in March 1958. Quotes L.A. Dubride, Lt. Gen. C.S. Irvine, W.H. Pickering, Rear Adm. J.F. Monroe, C.S. Gross, and Wernher Von Braun.

1886
Hawkes, Russell. VITAL ROLE SET FOR NEW MISSILE RANGE. *Aviat. Wk.* 68:197, 199-200, 205-206, 209, illus., June 16, 1958.

Pacific Missile Range is expected to be site of launching of polar orbit satellites.

1887
Hayden, E.C. TRACKING SPUTNIK'S ROUTE. *Instrumentation* 11:29-30, May/June 1958.

Tells of use of a Honeywell Visicorder oscillograph in recording signals transmitted from the first Russian satellite.

1888
Heard, J.F. VISUAL OBSERVATIONS OF ARTIFICIAL SATELLITES. *Roy. Astron. Soc. Can. J.* 52:57-59, Apr. 1958.

Considers movement of a satellite over the earth's surface and factors which make it visible at some times and not at others.

1889
Herrick, Samuel and Baker, R.M.L. Jr. ORBITS. *Aviat. Wk.* 28:70-71, 73-77, illus., Mar. 1958.

Gravitational and aerodynamic forces are considered.

1890
Hertzfeld, N.K. WAY SPUTNIK LOOKED TO THE CATHOLIC PRESS. *America* 98:541-543, Feb. 8, 1958.

A round-up of opinion expressed in diocesan newspapers.

1891
Hey, J.S. OBSERVATIONS AT THE ROYAL RADAR ESTABLISHMENT. *Inst. Elec. Engrs. Proc.* 105B:107-108, diag., Mar. 1958.

Observations of the Russian satellites were made using a radio telescope of 45-ft. diameter at a wavelength of 10-cm. using a peak power of 2 MW and a pulse length of 5 μ sec. A radar echo from the carrier rocket is illustrated.

1892
Hilton, W.A. and Crawford, R.C. EXPLAINING RADIO DETECTION OF THE EARTH SATELLITE. *Am. J. Phys.* 26:129, Feb. 1958.

Procedure, with illustration, for explaining to students the principle and operation of a radio interferometer for tracking an earth satellite.

1893
Holahan, James. LOW TEMPERATURE STUDIES CREATE NEW BRANCH OF THE ART: CRYOGENIC ELECTRONICS. *Aviat. Wk.* 28:174-176, 178, 180, 182-183, 185, 187, Mar. 1958.

Outer space may be ideal for cryogenic units.

1894
Horsfall, R.B. STELLAR-INERTIAL GUIDANCE REDUCES ERROR. *Aviat. Wk.* 68:73, 75-76, 79, illus., Mar. 17, 1958.

Combination of stellar and inertial navigation techniques in a hybrid system offers an attractive means of obtaining the accuracies required for guidance of long-range supersonic

aircraft and cruise missiles, and for space travel.

1895
Hotz, Robert. NACA SHIFTING TO SPACE AGENCY ROLE. *Aviat. Wk.* 68:79-82, illus., June 16, 1958.

Includes a chart depicting organization of the proposed National Aeronautics and Space Agency; indicates several fundamental changes that will be required of NACA as it steps into full responsibility for the space program; suggests cooperating agencies; and lists main problems in aerodynamics and space mechanics.

1896
Hotz, Robert. NACA TO SPEARHEAD U.S. SPACE DRIVE. *Aviat. Wk.* 68:28-29, Apr. 7, 1958.

Refers to national space technology program proposed to Congress by President Eisenhower. The new agency would be designated the National Aeronautics and Space Agency and would absorb the National Advisory Committee for Aeronautics.

1897
Hotz, Robert. PERSPECTIVE FOR THE SPACE AGE. *Missile Eng.* 2:27, Jan. 1958.

Concerns speech by Air Force Chief of Staff, Gen. Thomas White, relative to the military importance of space control.

1898
Hotz, Robert. VANGUARD'S REAL SUCCESS. *Missile Eng.* 2:49, Jan. 1958.

An editorial of the opinion that Vanguard's failure in December can be an educational success.

1899
House, C.B. FM RECEIVER CONVERSION FOR U.S. SATELLITE SIGNALS. *Radio & TV News* 59:160-161, Mar. 1958.

An inexpensive FM tuner kit can be adapted to permit monitoring of the

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108 mc. amplitude-modulated signals.

1900
HOW MICROLOCK WORKS. *Astronautics* 3:25, 41-42, illus., Mar. 1958.

Transmitter-receiver system of type used in Explorer described.

1901
Hull, Seabrook. SELLING SPACE SHIPS. *Missiles and Rockets* 3:75, illus., Apr. 1958.

Points out some of the difficulties for designers, sellers and buyers of space ships.

1902
Hynek, J.A. A MESSAGE TO MOON-WATCHERS. *Smithsonian Astrophys. Observ. Bull. for Visual Observers of Satellites*, 8:1-2, Mar. 1958.

Instructions to amateurs relative to locating a satellite with relative accuracy.

This Bulletin also appears in *Sky and Telescope* 17: insert between p. 238-239, Mar. 1958.

1903
IGY SATELLITE PANEL PROPOSES NATIONAL SPACE FLIGHT PROGRAM. *Astronautics* 3:132, May 1958.

Recommendations for a five-year program costing about \$150 million annually include projects "centering on biological experiments crucial to the eventual attainment of space flight; investigations of lunar gravity or mass, magnetic field and atmosphere; planetary and interplanetary probes; determination of the astronomical unit (A.U.) now estimated to be 92,900,000 miles; determination of planetary masses and their effects of the path of nearby space vehicles; and observation of an instrumented re-entry body as it plunged into the planet's atmosphere."

1904

IKE WANTS SPACE AGENCY CREATED OUT OF NACA. *Prod. Eng.* 29:22, Apr. 21, 1958.

1905

IMPROVE TRACKING SYSTEM FOR MOON AND SATELLITES. *Sci. News Ltr.* 73:214, Apr. 3, 1958.

Briefly outlines a system, operating on punched cards and devised by O.A. Guzmann of the U.S. Army Signal Corps Engineering Laboratories, which is considered to be 25 times more accurate than previous methods.

1906

INSIDE OUR SATELLITE. *Electron.* (Bus. ed.) 31:48, Feb. 21, 1958.

Some details of the 11-lb payload of Explorer I, how the data is gathered, what it means and something about the electronic circuits.

Illustration contrasts beeps from Russia's Sputnik and those telemetered from Explorer I. A chart shows comparisons of weight, size, instrument compartment, transmitter and apogee height.

1907

INSIDE OUR WEATHERBIRD SATELLITE. *Popular Sci.* 172:74-76, June 1958.

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IONOSPHERIC STUDIES USING EARTH SATELLITES. *IGY Bull.* 7:11-16, Jan. 1958.

Refers to conference on November 5, 1957 at the Central Radio Propagation Laboratories of the National Bureau of Standards, Boulder, Colo. which brought together groups that had spontaneously initiated ionospheric experiments utilizing radio transmissions from satellites launched by the USSR.

A table lists observations of signal strength, doppler data, interferometric and other phase-difference data, and direction finding and radar data.

Also in *Am. Geophys. Union Trans.* 39:169-174, Feb. 1958.

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Isakov, P. LIFE IN SPUTNIK. *Astronautics* 3:38-39, 49-50, illus., Feb. 1958.

A Russian biologist examines problems involved in keeping a living organism alive in space and reveals Soviet approaches.

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Jennings, R.E. FATHER OF ROCKETRY. *Space J.* 1:5-9, illus., Spring 1958.

Some pictures and information concerning Robert H. Goddard never before made available.

1911

Johns Hopkins University, Applied Physics Laboratory, Silver Spring, Md. THEORETICAL ANALYSIS OF DOPPLER RADIO SIGNALS FROM EARTH SATELLITES, by W.H. Guier, and G.C. Weiffenbach. 58 p., Apr. 1958. (Bumblebee Series Rpt. 276) (Contract NOrd-7386)

Describes a method of determining the orbit of an artificial satellite from measurement of the Doppler shift of its radio signals.

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Jones, A.L., Burhans, R.W. and others. DETERMINATION OF ORBITAL CHARACTERISTICS OF AN EARTH SATELLITE FROM SINGLE-STATION RADIO-TRANSIT OBSERVATIONS. *Nature* 181:900-901, Mar. 29, 1958.

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Kallander, J.W. DESIGNING MINIMUM WEIGHT MAGNETIC CORES. *Elec. Mfg.* 61:118-123, illus., Feb. 1958.

Magnetic cores are being used widely in airborne and naval equipment in which weight is of importance, as typified by the Vanguard satellite. This article describes a design procedure.

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1914

Kansas State College. Engineering Experiment Station, Manhattan, Kans. DESCRIPTION AND USE OF A SATELLITE APPARENT POSITION CALCULATOR, by P.G. Kirmsner, and I. Wakabayashi. 23 p., 1 position calculator with 8 overlays, May 1, 1958, (Bull. 86, vl. 42, no. 7)

The calculator is the product of a project to determine the orbits of the Russian satellites alpha and beta 1957.

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Karshan, Don. A TEST AND LAUNCHING STAND FOR THE VANGUARD ROCKETS. *Spaceflight* 1:253-257, illus., Apr. 1958.

Describes some of the design problems and solutions involved in the production of a combination test and launching stand.

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Kennedy, W.V. MISSILES; AN AWAKENING. *America* 98:387, Jan. 4, 1958.

Suggests that the lesson to be learned from Vanguard's failure in December 1957 was that "missiles are no more a panacea for our defense problems than was the airplane."

1917

King-Hele, D.G. PROGRESS OF SPUTNIK 2 (1957). *Nature* 181:738-739, Mar. 15, 1958.

1918

Kitchen, F.A., Billam, E.R. and others. SOME DIRECTION-FINDING OBSERVATIONS ON THE 20 Mc/s SIGNAL. *Inst. Elec. Engrs. Proc.* 105B:89-91, Mar. 1958.

Equipment used was of the type described by Earp and Godfrey (Radio Direction-Finding by the Cyclical Differential Measurement of Phase, *Inst. Elec. Engrs. J.* 94 (IIA): 705, 1947) and enables bearing and elevation to be obtained. From this data together with doppler measurements the track information is

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derived. The results are tabulated. Reception was obtained up to distances of several thousand miles. Possible mechanisms of such long-distance transmissions are suggested.

1919
Klass, P.J. SPACE AVIONICS CHALLENGES DESIGNERS. Aviat. Wk. 68:23, Mar. 31, 1958.

Summary of seven-man panel discussion at IRE meeting on electronics in space. A challenging problem of designing microminiature size and ultra-reliable communication-navigation equipment for space travel will be complicated by the relatively miniscule amount of electric power available in the vehicle.

1920
Klass, P.J. SPACE NAVIGATION CHALLENGES DESIGNERS. Aviat. Wk. 68:217, 219-220, 225, illus., June 16, 1958.

Some of the problems are indicated.

1921
Klass, P.J. SPACE TO SPARK AVIONICS REVOLUTION. Aviat. Wk. 68:243, 245, 246, 249, 253, 256, 258, 263, illus., June 16, 1958.

Molecular circuitry is described as a new approach to meet the needs of space vehicles.

1922
Koelle, D.E. DER MESSSATELLIT EXPLORER I (1958a). (THE RESEARCH SATELLITE EXPLORER I (1958a)). Raketentech. u. Raumfahrtforsch. 11:62-64, Apr. 1958. In German.

1923
Koelle, D.E. DIE MESSSATELLITEN DER USA UND UdSSR. (THE EARTH SATELLITES OF THE USA AND THE USSR). Raketentech. u. Raumfahrtforsch. 2:25-28, Jan. 1958. In German.

Survey of data on the development of U.S. satellites and USSR Sputnik I and II.

1924
Köelle, H.H. UEBER EINE NAEHERUNGSMETHODE ZUR BERECHNUNG VON KREISBAHNRAKETEN. (AN APPROXIMATE METHOD OF CALCULATING CIRCULAR ORBITS OF ROCKETS). Raketentech. u. Raumfahrtforsch. 2:8-12, Jan. 1958.

In German.

"Development of an approximate analytical method for the calculation of circular orbits of rocket vehicles. The method permits the determination, with a relatively small time expenditure, of design and performance parameters of a multistage rocket for flight missions which lead from the earth's surface into a circular orbit at arbitrary altitude around the earth. This method also leads to another simplified method for the calculation of long-range rocket vehicles. As an illustrative example, the case of a three-stage circular-orbit rocket is treated." Aero Eng. Rev. 17:94, Mar. 1958.

1925
Kopituk, R.C. MATERIALS FOR ROCKET ENGINES. Metal Prog. 73:79-84, June 1958.

Rocket engine components are subjected to high stresses at high temperatures. Since the fuels are often corrosive, the materials, both metallic and ceramic, must have great endurance. Selection and fabrication of materials for both regenerative and non-regenerative rocket engines are discussed.

1926
Kramer, S.B. SCIENTIST COMPARES U.S. - RED SATELLITES. Aviat. Wk. 68:50-51, 53, 55, 59, illus., May 26, 1958.

Results of a survey on satellites now in orbit.

Tables give common parameters, Explorer I instrumentation, and a comparison of Vanguard and Sputnik. Orbit lifetimes of Vanguard and Sputnik are calculated and weight estimates are also figured.

1927
Kraus, J.D. DETECTION OF SPUTNIKS I AND II BY CW REFLECTION. Inst. Radio Engrs. Proc. 46: 611-612, Mar. 1958.

Describes a simple experiment which indicates the feasibility of detecting artificial satellites by reflection of cw signals from a high-frequency radio station (in this case WWV).

1928
Kraus, J.D. THE LAST DAYS OF SPUTNIK I. Inst. Radio Engrs. 46: 612-614, Mar. 1958.

The break-up of Sputnik I was witnessed from the record of burst of WWV signal reflections.

1929
Kraus, J.D. and Albus, J.S. A NOTE ON SOME SIGNAL CHARACTERISTICS OF SPUTNIK I. Inst. Radio Engrs. Proc. 46:610-611, Mar. 1958.

Comments on abrupt change in signal characteristics on the morning of October 13, 1957, and offers possible explanation.

1930
LAMINATED BITS TO GATHER SATELLITE WEATHER INFORMATION. Elec. Eng. 77:196, Feb. 1958.

Refers to four pieces of laminated plastic, each smaller than a dime, which meet severe weight, temperature, and dimensional stability requirements when used as insulating spacers in an earth satellite instrument that will measure radiation reflected by the earth's cloud layer.

The instrument is part of the "Weather-Eye" experiment which is further described.

1931
LaPaz, Lincoln. THE EFFECTS OF METEORITES UPON THE EARTH (INCLUDING ITS INHABITANTS, ATMOSPHERE, AND SATELLITES). In H.E. Lansberg and J. Van Meighem, eds., Advances in Geophysics, vl. 4, p. 217-350, New York, Academic Press, 1958.

Includes list of 202 references to the literature.

1932
Laws, R.J. GROUND SUPPORT: A MUST FOR SPACE. Missiles 3:80-81, Apr. 1958.

Ground support is defined as all items of a system other than the flight unit itself.

1933
Lear, John. GHOST WORLDS. Sat. Rev. 41:47-50, Apr. 5, 1958.

Remarks concerning the value of the Vanguard satellite; misinformation about Explorer II; introducing a new scale of values by considering meteorites formed ages ago, and now drifting through space; helping man to keep track of new moons of his making; and a report of use of meteor trails by J.D. Kraus of Ohio State University in tracking Sputnik.

1934
Lear, John. MR. SMITHSON'S SPACE STATION. Sat. Rev. 41:37-40, May 3, 1958.

A review of the development of thinking and planning for space flight which indicates why the Smithsonian Institute "has every right to be called 'Mr. Smithsonian's Space Station.'"

1935
Lear, John. MUSEUM MOON. Sat. Rev. 41:33-34, Jan. 4, 1958.

Comment on the failure of Vanguard's highly publicized test with stress on the need of the press to report accurately and to stress the fact that science "is no one-shot wonder-worker."

1936
Lear, John. WILL WE TRAVEL TO MARS ON MAGNETIC POWER? Sat. Rev. 41:37-38, Mar. 1, 1958.

Discusses magnetic manipulation of plasma in fusion experiments and in making "star-stuff in the sky itself and then subjecting it to magnetic

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force as a means of propelling us through interplanetary space much faster."

1937

Leavitt, William, Loosbrock, J.F., Skinner, R.M. and Witze, Claude. THE SPACE FRONTIER. AF Mag. 41:43-52, 55-58, illus., Mar. 1958.

A conception of flight in the vast reaches of the solar system and beyond.

1938

Leitmann, G. OPTIMUM PAY-LOAD-RATIO RELATION FOR MULTIPLE-STAGE ROCKETS. Am. J. Phys., 26:28-30, Jan. 1958.

The principle of the multiple-stage rocket is reviewed. It is shown that the burn-out velocity of a multiple-stage rocket is higher than that of a single-stage rocket of the same over-all mass ratio. It is also shown that the over-all pay-load ratio of a multiple-stage rocket required to reach a given velocity is minimum when the pay-load ratios of all stages are equal. Departure from this equality is demonstrated to have little effect on the over-all pay-load ratio.

1939

Lequeux, James and Mowbray, Lionel. LES ÉTUDES GÉOPHYSIQUES AU MOYEN DES FUSÉES ET DES SATELLITES. (GEOPHYSICAL STUDIES BY MEANS OF ROCKETS AND SATELLITES). Nature (Paris), p. 24-34, illus., Jan. 1958. In French.

A two-part article on American rocket research as of the beginning of the IGY and on the American Vanguard satellite program.

1940

Leslie, D.C.M. LIFE-TIME OF AN ARTIFICIAL EARTH SATELLITE. Nature 181:403-404, Feb. 8, 1958.

Comment on simple lifetime estimating methods of Fejer and Scott, and further statistical analysis.

1941

Letaw, Harry, Jr. THE ELECTRONIC MATERIALS FRONTIER. Astro-nautics 3:25-27, 106, illus., May 1958.

While filling requirements for present-day weapon systems, electronic engineers are engaged in an all-out effort to determine the exact specifications for materials designed for use in tomorrow's space vehicles.

1942

Levitt, I.M. TIMETABLE TO THE MOON. Popular Sci. 172:102-106, 246, illus., May 1958.

A five-step proposal to the first conquest of space would culminate in the landing of a manned vehicle on the moon in 2000 A.D.

1943

Lewin, J.S. THIN PRESSURIZED SHELLS LOOK BEST FOR SPACE STRUCTURES. Aviat. Age 29:178-179, 181-185, diag., Apr. 1958.

High among new design problems are rigid safety factor requirements and shielding against cosmic rays.

1944

Ley, Willy. MAN INVADES SPACE AND THE INTERNATIONAL GEO-PHYSICAL YEAR. In Information Please Almanac 1958, p. 22-37, illus., New York, Macmillan, 1957.

Satellites, space stations, and the IGY in general; with a map of stations in the Antarctic.

1945

Ley, Willy. ROCKET TO LONDON. Rotarian 92:40-43, illus., Jan. 1958.

A forecast of space travel "point-to-point" from one point of earth to another as a ballistic missile flies, going through space in the process.

1946

Ley, Willy. WHAT WILL "SPACE PEOPLE" LOOK LIKE? Sci. Dig. 43:61-64, Feb. 1958.

From This Week Magazine, Nov. 10, 1957.

With certain assumptions in mind, the author paints a portrait of the man from Planet X.

1947

Lunnell, R.D. VERTICAL RE-ENTRY INTO THE EARTH'S ATMOSPHERE FOR BOTH LIGHT AND HEAVY BODIES. Jet Propul. 28:329-330, May 1958.

A solution for the velocity of a body during vertical re-entry into the earth's atmosphere is presented.

1948

Longden, G.B. ESTIMATING THE HEIGHT OF THE FIRST SATELLITE FROM RADIO INTERFEROMETER RECORDS. Inst. Elec. Engrs. Proc. 105B:93-95, diags., Mar. 1958.

Describes the method of calculating the height, bearing and passing distance of the satellite using an interferometer. Results are tabulated and observations are compared with the values obtained from a digital computer using an assumed set of parameters.

1949

LONGEST CONTACT WITH SATELLITE. Signal 12:72, Jan. 1958.

What is believed to have been the longest continuous contact with Soviet earth satellite was reported desolate ice island near the North Pole. They are assigned there for the U.S. Army Signal Radio Propagation Agency.

1950

Los Alamos Scientific Laboratory, Los Alamos, N. Mex. OPTIMIZATION OF ROCKET ORBITS. Part I. IDEALIZED CALCULATIONS, by K.W. Ford. 33 p., Feb. 10, 1958. (Rpt. 2166) (Contract W-7405-eng-36)

Thrust programs for several kinds of rocket orbit optimization are derived and discussed in the idealized flat earth approximation.

1951

LOT MORE "EXPLORERS" AND "VANGUARDS" ON THE WAY. U.S. News & World Rpt. 44:48-49, illus., Mar. 14, 1958.

The line-up of U.S. satellites; information about Explorer II which was "a near miss, not a complete flop" a question about the possibility of getting a man into space; and some indication of Russia's activity.

1952

Lovell, A.C.B. RADIO ASTRONOMY AND THE JODRELL BANK RADIO TELESCOPE. Radio & TV News 59:35-38, 166, Jan. 1958.

Details of the powerful new tool that has been making headlines tracking the Soviet satellite. It is the great steerable radio telescope built at Jodrell Bank in Cheshire, England.

1953

McVittie, G.C. DISTANCE AND RELATIVITY. Sci. 127:501-505, Mar. 7, 1958.

Gives the amount of motion in space of the planet Mercury's point of closest approach to the sun as 43 seconds of arc per terrestrial century and the corresponding figure for an artificial earth satellite as 1324 seconds of arc in a century.

1954

MAGNETICS MAY AID RETURN OF SATELLITES. Rockets and Missiles 3:148, Mar. 1958.

The new science of magneto-aerodynamics was referred to in a speech by W.R. Sears.

1955

MAKE-READY FOR SATELLITE LAUNCHING. Astronautics 3:28-30, illus., Feb. 1958.

A step-by-step picture story of Vanguard TV-3 from the time it arrived in Cape Canaveral until the moment it was fired, suggests the magnitude of the job.

1956

Mallan, Lloyd. SPACE SATELLITES. 144 p., illus., Greenwich, Conn., Fawcett Publications, 1958.

199

200

A profusely illustrated story of the beginning of the earth satellite, its launching, tracking, the Vanguard computing center, and what all this means to mankind, personally and economically.

1957
Manchester, Harland. HOW WE TRACK THE SATELLITES. Readers Dig. 37:149-150, 152, 154, May 1958.

Radio ears, human eyes and telescopic cameras are charting the road maps to space.

1958
MAN'S NEW WORLD. III. INTO THE FAR FRONTIERS BEYOND EARTH. MAN MAKES HIS START TOWARD SPACE FLIGHT. Life 44:52-66, illus., Jan. 6, 1958.

A pictorial story concerning new fuels, eerie perils to overcome, automatic guidance to planetary goals, rigors of re-entry, ships for exit and return and vehicles for outer space.

1959
MAN'S SCIENTIFIC ROLE IN SPACE DEBATED. PANEL AFOSR ASTRONAUTICS SYMPOSIUM QUESTIONS WHETHER MAN WILL BE USEFUL OR MERELY "ADD NOISE." Aviat. Wk. 68:26-29, illus., May 5, 1958.

Excerpts from various papers given at the Air Force Office of Scientific Research Astronautics Symposium in Denver, Colorado in April 1958.

1960
Marshack, Alexander. THE WORLD IN SPACE. THE STORY OF THE IGY. 176 p., illus., New York, Nelson, 1958.

Includes discussion of rockets and satellites.

1961
Martin Co., Baltimore, Md. VANGUARD, SUMMARY OF DESIGN DATA. 37 p., Jan. 15, 1958. (Contract Nonr-1817(00))

1962
Martinsen, Dick. HOW WE CRACKED THE SPUTNIK CODE. Official

Detective Stories 27:8-11, 63, illus., Feb. 1958.

Details of the method used to crack the code by associates of the University of Houston.

1963
Masevich, A.G. and Lozinski, A.M. OPTICAL TRACKING METHODS FOR THE FIRST ARTIFICIAL SATELLITES. Astron. Soc. Pac. Publ. 70:79-82, illus., 1958.

Two tracking methods used in the U.S.S.R. are outlined. They are visual tracking by amateur teams with special Moonwatch telescopes and photographic tracking at observatories with the aid of wide-angle cameras and telescopes.

1964
Massachusetts Institute of Technology. Instrumentation Laboratory, Cambridge, Mass. PRELIMINARY CONSIDERATIONS ON THE INSTRUMENTATION OF A PHOTOGRAPHIC RECONNAISSANCE OF MARS, by J.H. Laning, E.J. Frey and M.B. Trageser. 29 p., Apr. 1958. (Rpt. R-174) (Contract AF 04(645)-9)

A discussion of the present technical feasibility of an unmanned photographic reconnaissance flight to the planet Mars. Topics covered are trajectory considerations; analysis of navigation accuracy; general design of a space vehicle; and the stages involved in such an experiment.

1965
Massey, H.S.W. BRITISH ROCKET AND SATELLITE RESEARCH. Bull. Atomic Sci. 14:112-114, Mar. 1958.

The British rocket program and work on satellite observation.

1966
Massey, H.S.W. ROCKETS AND SATELLITES IN SCIENTIFIC RESEARCH. Endeavor 17:85-89, Apr. 1958.

Considers what has been achieved and the likely course of future developments. Stresses fact that

satellites and vertical sounding rockets are not competitive but complementary.

1967
Massey, H.S.W. and Boyd, R.L.F. SCIENTIFIC OBSERVATIONS OF THE ARTIFICIAL EARTH SATELLITES AND THEIR ANALYSIS. Nature 181:78-80, Jan. 11, 1958.

Summary of discussion meeting called by the Royal Society on November 29, 1957, to discuss the wide range of techniques employed.

1968
Matthews, Whitney, Rochelle, R.W. and others. CYCLOPS CORES SIMPLIFY EARTH-SATELLITE CIRCUITS. Electron (Eng. ed.) 31:56-63, illus., Feb. 28, 1958.

A four-part discussion of satellite electronics which serves as an introduction to the so-called Lyman-alpha environmental satellite of Vanguard with emphasis on the telemeter encoder, memory and meteor counter.

1969
Matthews, Whitney. HAMS CAN AID IN SPACE STUDY. Electron (Bus. ed.) 31:38-39, illus., Mar. 21, 1958.

Directions for amateurs for monitoring and recording telemetry signals. Table gives satellite telemetry channel assignments.

1970
Matthews, Whitney. RECEIVING U.S. SATELLITE SIGNALS. Radio & TV News 59:35-38, 154-158, illus., Mar. 1958.

A description of a fully instrumented satellite; the radio signals that the U.S. satellite Vanguard will broadcast; scientific experiments, and suggestions for participation of amateurs in receiving, collecting and interpreting data.

1971
Matthews, Whitney and Ludwig, G.H. SCIENTIFIC TELEMETRY FOR USNC-IGY. QST, 42:41-45, 160-162, 164, illus., Jan. 1958.

201

How amateur recordings can aid in the satellite program.

1972
Medaris, J.B. BEYOND THE AIR AGE. Frank. Inst. J. 265:363-370, May 1958.

A discussion of the compelling reasons which, in the speaker's opinion, dictate a national program which has the mastery of space as its ultimate goal.

A lecture delivered on February 5, 1958 at a joint meeting of the Franklin Institute and the Philadelphia Section of I.R.E.

1973
Medaris, J.B. A STEP INTO THE AGE OF SPACE. Sperryscope 14:2-6, illus., First Quarter 1958.

The launching of Explorer, its mission, varied participation in preparing it, and significance.

1974
Melin, Marshall. OBSERVING THE SATELLITE. Sky and Telescope 17:458-459, illus., Jly. 1958.

Launching, instrumentation and dimensions of Sputnik III. Includes a table of characteristics of 1958's satellites.

1975
Mengel, J.T. and Herget, Paul. TRACKING SATELLITES BY RADIO. Sci. Am. 198:23-29, illus., Jan. 1958.

The fastest, most reliable way to detect an artificial satellite and initially to determine its orbit is by radio. A far-flung system called Minitrack has been established for this purpose.

1976
Michael, D.N. SOCIETY AND SPACE EXPLORATION. Astronautics 3:20-22, 88-90, illus., Feb. 1958.

A psychologist examines the obstacles standing in the way of putting a man in space and points out that we may be expecting more in the way of support from the man-in-the-street than he is ready to give.

1977
Michelson, Louis. POWER IN A PEANUT. GENERAL ELECTRIC'S X-405 VANGUARD ENGINE-- WHERE IT IS AND HOW IT GOT THERE. Aviat Age 29:139, 141, 142, 144, 147, illus., May 1958.

1978
Miller, L.S. LOADED-LENS ANTENNA TRACKS MISSILES. Electron (Eng. ed.) 31:44-46, illus., Mar. 28, 1958.

Telemetry data is gathered automatically from long-range missiles and space satellites by an automatic tracking telemetry system designated the TLM-18.

1979
Miller, W.O. VANGUARD - LONG COUNTDOWN SUCCEEDS. Missiles and Rockets 3:40, Apr. 1958.

Some remarks about pre-launching difficulties; the successful St. Patrick's Day launching; and information to be sought in future satellite trials.

1980
Millman, P.M. SATELLITE PERIODS AND VELOCITIES. Roy. Astron. Soc. Can. J. 52:61-64, Apr. 1958.

Some basic concepts for understanding the relations among the height, velocity and period of a small earth satellite.

1981
MINITRACK STATION OF THE SOHIO MOONBEAM GROUP. QST 42:48-49, illus., Apr. 1958.

A brief description of the installation and personnel of the group which was one of the first to report reception of signals from Explorer.

1982
MISSILE RE-ENTRY MAY BE ROUTINE, DUE TO PLASTICS. Sci. News Ltr. 73:278, May 3, 1958.

"Haveg compounds," new materials which are produced and formed like plastics, but incorporate the strength of metals and heat resistance of ceramics are able to function in areas

where all other known materials break down.

Compounds that will withstand re-entry runs of 20 seconds at 12,000 degrees Fahrenheit have been developed.

1983
MISSILES CHALLENGE TELEMETRY. Electron (Bus. ed.) 31:13-14, illus., June 27, 1958.

Heavier demands are being placed on telemetry equipment as information-seeking vehicles are getting farther into space, deeper into the sea, and in and over forbidding areas of the earth.

1984
MOON-TALKIE. Prod. Eng. 29:49, Apr. 21, 1958.

"Want to hear a satellite? You can-- for just \$1100. Motorola has modified its 'Handie Talkie' telephone to produce a sensitive portable telemetering receiver that will receive on the standard US-IGY satellite frequencies, maintain phase-lock to a carrier signal that is more than 20 db below the receiver noise level, and can indicate relative signal frequency plus doppler shift. The unit weighs 20 lb, is less than 12 in. long."

1985
"MOONS" FOR MANY NATIONS. Sci. News Ltr. 73:387, June 21, 1958.

Small earth satellites could be launched by other nations not participating in the satellite race. Money and adequate launching sites are among the chief deterrents.

1986
MORE SATELLITE TALK. Sky and Telescope 17:222-223, 233, illus., Mar. 1958.

Topics discussed are: first American satellite; fall of Sputnik I sphere recorded by radio; and changes in Sputnik orbits.

1987
MOSCOW BRIEFS. Missiles and Rockets 3:183, Feb. 1958.

Includes items from Soviet newspapers relative to satellites, plans for interplanetary travel, space flight and the like.

1988
"MOST ACCURATE" RADARS TRACK EXPLORER LAUNCHING. Missiles and Rockets 3:53, Mar. 1958.

RCA announces radars specifically designed for guided-missile range instrumentation.

1989
Munro, G.H. and White, R.B. OBSERVATIONS IN AUSTRALIA OF RADIO TRANSMISSIONS FROM THE FIRST ARTIFICIAL EARTH SATELLITE. Nature 181:104, Jan. 11, 1958.

Report of theoretical examination and detailed computation by the Radio Research Laboratories in Sydney, Australia.

1990
NAA HYDYNE FUEL BOOSTED EXPLORER I. Missiles and Rockets 3:40, Mar. 1958.

A Rocketdyne liquid propellant rocket engine, burning a new high-energy fuel compound and liquid oxygen provided the first-stage power.

1991
NACA ESTABLISHES SPACE COMMITTEE. Missiles and Rockets 3:150, Feb. 1958.

Dr. H. G. Stever, associate dean of engineering, MIT, has been selected as Chairman of the new Special Committee on Space Technology.

1992
Nagey, T.F. INTERPLANETARY TRAVEL WILL REQUIRE NUCLEAR PROPULSION SUCH AS THE CONVENTIONAL NUCLEAR ROCKET, ATOMIC RECOIL PROPULSION, OR THE IONIC DRIVE. Soc. Automotive Engrs. J. 66:79-80, May 1958.

Several forms of nuclear propulsion are briefly described.

1993
National Academy of Sciences. U.S. National Committee for the International Geophysical Year. Technical Panel on the Earth Satellite Program. BASIC OBJECTIVES OF A CONTINUING PROGRAM OF SCIENTIFIC RESEARCH IN OUTER SPACE. 31 p., Washington, National Academy of Sciences, Feb. 14, 1958.

Briefly outlines proposed light-weight satellite and advanced satellite experiments, lunar investigations, planetary and interplanetary investigations; and finally, manned space flight.

Also in Sci. 127:793-802, Apr. 11, 1958.

1994
National Academy of Sciences. National Technical Processing Center, Washington, D.C. 1958 DELTA II EPHEMERIS. (Extension through 13 June 1958) 14 p., June 6, 1958.

1995
National Advisory Committee for Aeronautics, Washington, D.C. AN APPROXIMATE ANALYTICAL METHOD FOR STUDYING ENTRY INTO PLANETARY ATMOSPHERES, by D.R. Chapman. 101 p., diags., May 1958. (Tech. Note 4276)

Study is made of the decelerations, heating rates, and total heat absorbed for entry into Venus, Earth, Mars, and Jupiter.

1996
National Advisory Committee for Aeronautics, Washington, D.C. PRELIMINARY SURVEY OF PROPULSION USING CHEMICAL ENERGY STORED IN THE UPPER ATMOSPHERE, by L.V. Baldwin and P.L. Blackshear. Appendix D: HEAT TRANSFER AND FRICTION DRAG, by J.F. Schmidt. 73 p., diags., May 1958. (Tech. Note 4267)

The study indicates that the recombination ramjet might be useful for sustaining a satellite at an altitude of about 60 miles.

204

1997
National Science Foundation.
SEVENTH ANNUAL REPORT FOR
THE FISCAL YEAR ENDED JUNE
30, 1957. 279 p., Washington, Gov-
ernment Printing Office, 1958.

Earth satellite, p. 92-94.

1998
A NATIONAL SPACE FLIGHT PRO-
GRAM. *Astronautics* 3:21-28, Jan.
1958.

A report by the Space Flight Techni-
cal Committee of the American
Rocket Society.

1999
Naval Research Laboratory, Washing-
ton, D.C. EFFECT OF LENGTH OF
OBSERVING TIME ON EARTH SAT-
ELLITE VISIBILITY, by W.D.
Garvey and J.B. Henson. 9 p., figs.,
Feb. 14, 1958. (Rpt. 5094)

Describes an investigation to deter-
mine the extent to which an observ-
er's ability to detect a satellite
through a telescope is reduced, after
protracted periods of search rang-
ing from 5 to 120 minutes. Results
indicate ability is reduced after as
little as 5 minutes and recommen-
dations are made for Moonwatch
station personnel.

2000
Naval Research Laboratory, Washing-
ton, D.C. MINITRACK SYSTEM
TRAINING MANUAL, by J.T. Mengel.
1 in. thick, 1958.

Includes sections on antenna system,
receiver system, time standard
system, phase measurements, cali-
bration, Minitrack.

2001
Naval Research Laboratory, Washing-
ton, D.C. PROJECT VANGUARD,
RPT. 24. SATELLITE TELE-
METRY RECEIVER SYSTEM, by
V.R. Simas. 17 p., diags., Jan. 1958.
(Rpt. 5065) (Minitrack Rpt. 4)

Scientific information from the arti-
ficial earth satellites will be trans-
mitted to the telemetry systems
located at each of the Minitrack sta-
tions. The telemetry receiver will

amplify the received signals with the
addition of a little receiver noise
as possible and convert the informa-
tion to a form which permits demod-
ulation and subsequent analysis.
The receiver is of the double-
conversion type with crystal-con-
trolled local oscillators. Three pre-
detection bandwidths are available
which provide a means of increasing
the output signal-to-noise ratio for
those experiments in which the in-
formation bandwidth is less than the
maximum. Grounded-grid pream-
plifier circuitry is employed to
achieve stability and a low noise
figure.

2002
Naval Research Laboratory, Washing-
ton, D.C. PROJECT VANGUARD
REPORT 25. FIRING TIME OF
SATELLITE LAUNCHING VEHICLE
FROM CAPE CANAVERAL, FLOR-
IDA, AS RELATED TO SOLAR
ILLUMINATION AND SATELLITE
VISIBILITY, by J.W. Stry, R.H.
Wilson, Jr., M. DeNovens, M.P.
Hann and E.L. Lady. 63 p., figs.,
Mar. 5, 1958. (Rpt. 5066)

Exact theoretical relations of the
time of day and day of the year to
satellite conditions of (a) optical
acquisition at White Sands, New
Mexico, by sunlight illumination;
(b) solar observing by instruments
near the satellite equator; and (c) the
percentage of time in sunlight are
derived and explained.

2003
Naval Research Laboratory, Washing-
ton, D.C. SATELLITE LAUNCHING
TRAJECTORY CALCULATIONS.
GENERAL DESCRIPTION OF
NAREC PROGRAMS FOR THE TWO-
DIMENSIONAL CASE, by J.L.
Hammersmith. 10 p., diags., Apr. 2,
1958. (Rpt. 5086)

Describes the common characteris-
tics of programs used to calculate
satellite launching vehicle trajec-
tories on the Naval Research Labo-
ratory's electronic digital computer
(NAREC). Equations of motion and
auxiliary formulas are given along
with a description of program or-
ganization. The formulations are
two-dimensional ones and are

largely concerned with powered
flight for the first two stages.

2004
NAVY MOVES TO ESTABLISH SPACE
MISSION. *Aviat. Wk.* 68:89-90,
illus., June 16, 1958.

Space needs listed by the Navy in-
clude reconnaissance, communica-
tions relay and navigation aids.
Uses of a navigation satellite are
mentioned as well as a satellite in-
strumented to study the nature of
the sea.

Possible roles in space program are
indicated for BuAer, BuOrd, ONR
and the Naval Observatory.

2005
NAVY TO ESTABLISH MOON-RELAY
RADIO COMMUNICATIONS SYS-
TEM. *Aviat. Wk.* 68:32-33, May 12,
1958.

Mention is made of use of man-made
satellites for communication pur-
poses both as passive reflectors and
as active relay stations. Another
possibility is to store data in a sat-
ellite, then play it back on command
when the satellite is over another
portion of the earth.

2006
NBS RADIOTELESCOPES TRACK
SATELLITE'S SIGNALS. *Elec. Eng.*
77:110, Jan. 1958.

Describes crash program set up at
Table Mesa, near the NBS Boulder,
Colorado, Laboratories to learn
more about the ionosphere via the
Soviet satellites.

2007
"NEAT SCIENTIFIC TRICK:" SPUT-
NIK III IN ORBIT. *Missiles and
Rockets* 3:44-45, illus., June 1958.

Includes news release regarding the
Russian satellite; and operational
chart; a diagram of Sputnik III com-
ponents; and an illustration of the
separation of Sputnik III from the
last stage.

2008
Neckel, Heinz. A PHOTOGRAPHIC
OBSERVATION OF THE SATELLITE

1957 BETA LEAVING THE EARTH'S
SHADOW. *Nature* 181:257-258,
illus., Jan. 25, 1958.

Photograph taken at the Warner and
Swasey Observatory of the Case In-
stitute of Technology, Cleveland,
Ohio, on December 15 is used to de-
rive the distance of the satellite
from the earth's surface.

2009
NEEDED: FACTS ON SPACE AGE
METALS. *Steel* 142:102-104,
June 16, 1958.

Includes a briefly outlined program
for space age research on new ma-
terials and a chart indicating where
we are today with metals for high-
temperature use.

2010
A NEW THIRD-STAGE ROCKET.

Mentions a new solid-fueled third-
stage rocket built by the Allegheny
Ballistic Laboratory (Hercules
Powder Company) for use in future
Vanguard shots.

2011
NEW TRANSMITTER FOR U.S. SAT-
ELLITE. *Radio & TV News* 59:82,
June 1958.

Tiny 3-oz. 3-transistor unit pro-
duces 1/2 watt with only 1/5th bat-
tery power needed for tube-type
circuit.

2012
Newell, H.E., Jr. and Stehling, K.R.
BLUEPRINT FOR SPACE RE-
SEARCH. *Aviat. Age* 28:28-29, 106,
illus., Mar. 1958.

Outlines the scope of the research
effort and gives a timetable for its
successive stages - from the rela-
tively simple satellites to gigantic
manned observatories in space.

2013
Newell, H.E., Jr. SPACE FLIGHT -
THE EARTH SATELLITE PRO-
GRAM. In *Americana Annual 1958*,
p. 715-718, illus., New York,
Americana Corporation, 1958.

205

206

Facts about the U.S. satellite program; also the Soviet satellites.

2014
Newell, H.E., Jr. SPACE RESEARCH - A CHALLENGE TO MANKIND. Bull. Atomic Sci. 14:177-179, May 1958.

Gives some conception of the challenge of space research either by remote control or direct exploration by manned expeditions; describes the Vanguard type rocket as an illustration of the vehicles which can be utilized; mentions the electronics systems, logistics and operations; and finally summarizes proposals made for organized effort for space research.

2015
Newton, R.R. LIFETIMES OF ARTIFICIAL SATELLITES. Jet Propul. 28:331-333, May 1958.

Reports examination of assumptions in I.C. Henry's article, "Lifetimes of Artificial Satellites of the Earth" with conclusion that the first assumption is quite accurate but that the second leads to an error which, for Sputnik I, amounts to about 40 per cent in the lifetime.

2016
Nicholson, T.D. COMMUNICATIONS IN THE U.S. SATELLITE PROGRAM. Bell Tel. Mag. 37:25-36, Spring 1958.

A review of communication facilities for the Vanguard satellites.

2017
Nicolet, Marcel. HIGH ATMOSPHERE DENSITIES. Sci. 127:1317-1320, June 6, 1958.

To explain satellite observations, models of the thermosphere must allow for diffusion and other factors.

2018
1957-1958. Christian Cent. 75:6-7, Jan. 1, 1958.

Psychological reaction to the launching of the Russian satellites.

2019
1958 ALPHA. Time 71:46, 49-50, 52, illus., Feb. 10, 1958.

2020
1958 ALPHA - MADE IN U.S.A. Astronautics 3:22-24, illus., Mar. 1958.

Rundown on the Explorer, accompanied by pictures.

2021
Nolan, R.M. DETAILS OF JUPITER-C GUIDANCE SYSTEM REVEALED. Missiles and Rockets 3:183-185, illus., Mar. 1958.

2022
Nolan, R.M. REDUCED-SIZE SATELLITE TRANSMITTERS COMING. Missiles and Rockets 3:152-153, illus., Apr. 1958.

Research along the lines of ultra-miniaturized transmitters and smaller power packs by the Naval Research Laboratory and the DuKane Corporation of St. Charles, Ill. has resulted in a design which should play an important part in future orbiting payloads and also in moon-orbiting or impact payloads.

2023
Nonweiler, T.R. ENTERING THE ATMOSPHERE. Spaceflight 1:238-240, diags., Apr. 1958.

Comment on the return to earth of a space vehicle.

2024
Nonweiler, T.R. PERTURBATION OF ELLIPTIC ORBITS BY ATMOSPHERIC CONTACT. Brit. Interplan. Soc. J. 16:368-379, tables, Mar./Apr. 1958.

States the problem as applied to the determination of the orbital geometry, then in the determination of the density variation with height.

2025
NOW - INTO THE SPACE AGE. Mod. Plastics 35:105-110, 218-220, illus., June 1958.

Temperatures up to 30,000° F are endured by new combinations of materials resulting from research costing hundreds of millions of dollars.

A review of the needs of today's new rocket age; the role of phenolic resin in the "hot arena;" and some of the firms engaged in hot temperature plastic research.

Includes a "space age glossary."

2026
NRL SPEEDS SATELLITE PROGRAM. Anal. Chem. 30 (Pt. 1):59A-61A, Apr. 1958.

A general description of the role played by the analytical chemist in a comprehensive research program. Mention is made of use of vacuum fusion equipment for Vanguard satellite components.

2027
NUMBER THREE: EXPLORER. Sci. Am. 198:52, Mar. 1958.

2028
Nunn, Joseph. THE SATELLITE TRACKING CAMERA. Paper given at 26th annual IAS meeting, January 1958. 9 p., New York, Institute of Aeronautical Sciences, 1958. (IAS Preprint 794)

Performance and general characteristics of the camera developed to track a satellite representing a specularly reflecting sphere, approximately 20 inches in diameter, with 6/10ths reflectivity.

2029
OBSERVATION OF SPUTNIK I BY NEW TELEFUNKEN DIRECTION FINDER. German Sci. Bull. 22:37, Jan. 1958.

Brief article relative to a newly developed short-interval direction finder which was successfully used to detect and track Sputnik I through its entire course.

2030
OBSERVING INSTRUMENT MODIFICATIONS. Sky and Telescope 17:279, Apr. 1958.

Tracking satellites.

2031
Odishaw, Hugh. INTERNATIONAL GEOPHYSICAL YEAR. Sci. 127:113-128, illus., Jan. 17, 1958.

Rockets and satellites, p. 118-121.

Condensed version appears in IGY Bull. 8:179-187, Feb. 1958.

2032
Odishaw, Hugh. INTERNATIONAL GEOPHYSICAL YEAR 1957-58. In Britannica Book of the Year 1958, p. 349-354, illus., Chicago, Encyclopedia Britannica, Inc., 1958.

The program by disciplines with references to related subjects in the same volume.

2033
OHIO STATE RECORDS DEATH OF SPUTNIK I. Missiles and Rockets 3:158, 160, Feb. 1958.

The radio telescope at Ohio State University, using a new system of radio reflection, recorded the final flight of Russia's first satellite.

2034
OPTICAL TRACKING OF EARTH SATELLITES. IGY Bull. 12:16-18, illus., June 1958.

Report on the US-IGY program for optical tracking of earth satellites by means of the high-precision Baker-Nunn tracking cameras.

2035
ONE WATT POWER ENOUGH TO SEND SPACE MESSAGES. Mil. Electron. 4:28, June 1958.

Brief article referring to broadcasts from the moon, 248,000 miles away, using a one watt electric power, or one sixteenth the power requirements of a light bulb.

207

208

2036
ORBITING OF BETA '58 A TEST
"BONUS." Electron. Wk. 3:5-6,
illus., Mar. 24, 1958.

Vanguard's second-stage rocket tests are an unqualified success. Circling satellite marks triumph of scientific method as "baby" joins brute-force method's Explorer I.

2037
ORDNANCE IN OUTER SPACE,
ARMY TEAMWORK IS RESPONSIBLE FOR THE LAUNCHING OF
EXPLORER I. Ord. 42:787, Mar./
Apr. 1958.

Connected with this article is a page of photographs of men on the Army satellite team, p. 786; and a picture story of the launching of our first satellite, p. 788-789.

2038
Ordway, F.I., III and Wakeford, R.C.
MANY UNKNOWNNS MAKE ONE
ANSWER CLEAR: MAN ON THE
MOON? - PROBES DUE FIRST.
Missiles and Rockets 3:69-74, illus.,
Apr. 1958.

Includes a bibliography on the moon.

Considers proposals for reaching the moon; navigation problems; moon satellite; AF moon rockets; possible approaches; Russian moon programs; automatic landing; moon conditions; moon basis; permanent base.

2039
Ordway, F.I., III. A SURVEY OF
ASTRONAUTICAL PERIODICALS.
Sky and Telescope 17:169-171,
illus., Feb. 1958.

Surveys the leading periodicals, arranged by country, that are devoted primarily to rocketry and astronautics. Many include space flight and artificial satellite material.

2040
Ordway, F.I., III. WILL RUSSIAN
SCIENTISTS BEAT US TO THE
MOON? Am. Mercury 86:20-28,
Feb. 1958.

A review of Russian preparations for the launching of an earth satellite, including mention of early scientists and their writings.

2041
Orr, W.A. and Tucker, J.W. DEVEL-
OPMENT OF MANNED SPACE
FLIGHT. Aviat. Age 28:14-20,
Mar. 1958.

A visual summation of the many factors determining the development of manned space flight.

2042
Orr, W.A. and Tucker, J.W. GETTING
MAN INTO SPACE. Aviat. Age 28:
30-31, 102-105, illus., Mar. 1958.

An overall view of the problems involved in space flight.

2043
OUTER SPACE BASE? NAVY-
SUPERVISED BASE READIES AT
POINT ARGUELLO. Missiles and
Rockets 3:50, Apr. 1958.

Points out advantages of the west coast site.

2044
OUTERSPACE PHENOMENA MEAS-
URED WITH SILICON TRANSIS-
TORS. Mil. Electron. 4:31, May
1958.

Brief explanation of the value of studies of soft x-rays.

2045
Ovenden, M.W. NEW MOON AND OLD
MOON. Sci. Prog. 46:63-68, Jan.
1958.

The value of the first satellite to science and the problems that it has posed to the astronomer.

2046
P., B.G. SATELLITES. Inst. Elec.
Engrs. J. 4:82-83, 110, illus., Feb.
1958.

Summary of discussions at a meeting of the Radio and Telecommunications Section, I.E.E. for the purpose of considering results of observations of the Russian satellites.

2047
Paetzold, H.K. EINIGE ERGEBNISSE
AUS DEN BEOBACHTUNGEN DER
ERSTEN RUSSISCHEN ERDSATEL-
LITEN. (SOME RESULTS FROM
OBSERVATIONS OF THE RUSSIAN
EARTH SATELLITES). Raketen-
u. Raumfahrtforsch. 11:50-54, Apr.
1958.

2048
Paiewonsky, B.H. TRANSFER BE-
TWEEN VEHICLES IN CIRCULAR
ORBITS. Jet Propul. 28:121-123,
figs., Feb. 1958.

A simple method is developed for calculating the angular relationship required between vehicles desiring to use Hohmann orbits for orbital transfer.

2049
Parkyn, D.G. CALCULATION OF THE
LIFE-TIME OF A SATELLITE.
Nature 181:1156, 1157, Apr. 19, 1958.

Refers to three recent discussions of the effect of friction on a satellite and contends that greater accuracy should be sought in correction for the lack of spherical symmetry of the atmosphere.

2050
Parry, Albert. SOVIET CITIES ON
THE MOON? Sci. Dig. 43:29-35,
Feb. 1958.

Information upon which this article is based was obtained from Russian newspapers and periodicals.

2051
Pearson, Roy. MENACE IN THE
MIRROR'S IMAGE. Christian Cent.
75:10-12, Jan. 1, 1958.

Psychological reaction to the Russian Sputniks'.

2052
Pennsylvania State University, Iono-
spheric Research, University Park,
Pa. AERONOMIC CONDITIONS IN
THE MESOSPHERE AND LOWER
THERMOSPHERE, by M. Nicolet.
89 p., Apr. 1, 1958. (Sci. Rpt. 102)
(AFGRC-TN-58-400) (Contract
AF19(604)-1304)

209
Outlines a study of the aeronomy of the atmosphere between 50 and 100 km; namely the mesosphere and the lower thermosphere. After an analysis of the pressure measurements below 100 km, a reasonable model showing that there is a deep temperature minimum at the mesopause, is presented. Calculations are based upon experimental data obtained from recent observations of the American and Soviet rockets.

2053
THE PENTAGON'S NEW MISSILE AND
SPACE PROJECTS. Interavia 13:
257, illus., Mar. 1958.

Announces the establishment of the Advanced Research Projects Agency and the appointment of R.W. Johnson as Director; also announces a series of new weapons.

2054
Perry, J.H. COMPOSITE CIRCUIT
LAYOUT GUIDES SATELLITE
ASSEMBLY. Electron. (Eng. ed.)
31:92, illus., Apr. 25, 1958.

Unusual and time-saving methods employed to make the printed wiring cards used in the earth satellite developed at the Naval Research Laboratory.

2055
Petrov, V.P. SPUTNIK NOT SO
SECRET. Missiles and Rockets
3:82, Mar. 1958.

Refers to articles in Soviet Radio.

2056
PHOTOTRACK. IGY Bull. 9:3-8,
illus., Mar. 1958.

Program for volunteer photographic observations of earth satellites endorsed by USNC-IGY and now designated "Phototrack." It is actively supported by the Society of Photographic Scientists and Engineers.

Similar item appears in Sky and Telescope 17:387, June 1958.

2057
PLAN NEW SPACE AGENCY. Sci.
News Ltr. 73:229, Apr. 12, 1958.

210

Brief summary of President Eisenhower's proposal for a National Aeronautics and Space Agency.

2058
Pobodonoscev, I.A. LAWS OF MOTION OF AN EARTH SATELLITE. Priroda p. 19-25, Jan. 1958.
In Russian. Not examined.

Also issued as Canada. Directorate of Scientific Information Service Trans. 283 R; and as Trans. no. R-3742, available from SLA Translation Center, Crerar Library, Chicago, Ill.

2059
Pokrovskii, G.I. OT AERODINAMICHESKOGO POLETA - K KOSMICHESKOMU. (FROM AERODYNAMIC TO COSMIC FLIGHT). Vest. Vozd. Flota p. 53-58, Jan. 1958.
In Russian. Not examined.

"Analysis of the relation between aerodynamic and cosmic flight, including the atmosphere and related problems, space vehicles, as well as problems of conventional aviation." Aero/Space Eng. 17:101, June 1958.

2060
Pollard, Frank. U.S. SATELLITES (FAILURE AND SUCCESS), ARTIFICIAL METEORS AND PROJECT FARMSIDE. Spaceflight 1:231-237, illus., Apr. 1958.

2061
Poole, Lynn. YOUR TRIP INTO SPACE. 224 p., illus., New York, McGraw, 1958.

The author predicts humans will fly to the moon within 50 years and indicates that some day there will be space travel for the millions. Tells something about the science of space travel, astronomy and survival in outer space.

This book, first issued in 1953, is brought up-to-date with the inclusion of data on man-made satellites and space-travel research.

2062
PORTABLE RECEIVES SATELLITE SIGNALS. Electron. (Eng. ed.) 31: 76, illus., Apr. 25, 1958.

Description of a recently announced Motorola portable receiver which can tape-record either 108-mc Microlock or 108.03-mc Minitrack signals from U.S. satellites.

2063
Power, T.S. TECHNICAL CHALLENGES OF THE SPACE AGE. West. Aviat. p. 7-9, Feb. 1958.

Discussion of three important areas of the space age - electronics, physical sciences, and space technology.

2064
PREDICT "MOON" RECOVERY. Sci. News Ltr. 73:398, June 21, 1958.

A three-part recovery procedure outlined by Richard Hoglund and J. Thale of Cook Research Laboratories at an American Rocket Society meeting in Los Angeles.

2065
PRESIDENT DETAILS NACA SPACE MISSION. Aviat. Wk. 68:51-53, Apr. 14, 1958.

Complete text of President Eisenhower's message to Congress recommending creation of a National Aeronautics and Space Agency.

A similar article headed "President's message on Space" appears in Sci. 127:864-865, Apr. 18, 1958.

2066
President's Science Advisory Committee. INTRODUCTION TO OUTER SPACE. AN EXPLORATORY STATEMENT. 10 p., Washington, D.C., Mar. 1958.

A report by the committee headed by Dr. J.R. Killian, Jr.

Excerpts appear in U.S. News & World Rpt. 44:50-51, Apr. 4, 1958; also in Bull. Atomic Sci. 14:186-189, May 1958.

2067
Proell, Wayne and Bowman, N.J. A HANDBOOK OF SPACE FLIGHT. 2nd ed., 458 p., diags., Chicago, Perastadion Press, 1958.

This is a reference book bringing together data and ideas from divergent disciplines which are pertinent to space flight.

In addition to many tables, formulas, equations and diagrams, there are listed job opportunities; companies which build rockets; notable space flight research men; known societies devoted to rockets and space flight; glossary of words; and a bibliography.

2068
PROJECT PHOTOTRACK. Space 7: 2-3, diags., Apr. 1958.

Outlines project supported by the Society of Photographic Scientists having to do with tracking satellites by photography.

2069
PROPOSE NUCLEAR BATTERIES. Sci. News Ltr. 73:338, May 31, 1958.

Summary of remarks on the use and advantages of nuclear batteries for satellite and space vehicles given by Harold Zahl at the Symposium on the Possible Uses of Earth Satellites for Life Sciences Experiments, Washington, D.C., 1958.

2070
Purdue University, School of Aeronautical Engineering, Lafayette, Ind. GENERAL VARIATIONAL THEORY OF THE FLIGHT PATHS OF ROCKET-POWERED AIRCRAFT, MISSILES AND SATELLITE CARRIERS, by A. Miele. 7 p., figs., Jan. 1958. (Rpt. A-58-2) (Contract AF18(603)-69)

An attempt to introduce a broad unified theory of the flight programming for rocket-powered vehicles.

2071
Pursglove, David. SPACE AGE ART. Sci. News Ltr. 73:314, May 17, 1958.

The rockets launched from test-firing sites are decorated with black, white and colored designs that have no meaning as art, but add significant scientific meaning to firings.

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2072
PT. MUGU MAY BECOME U.S. SPACE BASE. Aviat. Wk. 68:21, Mar. 17, 1958.

One of advantages over Cape Canaveral is that polar orbits can be established by satellites fired from Pt. Mugu. Canaveral has to fire for generally east-west orbits. Advantage of a polar orbit is that a reconnaissance satellite could map almost all the earth's surface in one day's time from an altitude of 1,000 mi. plus, due to the earth's rotation beneath a satellite vehicle.

A monitoring system similar to the present north-south Minitrack range will be constructed later which could monitor and control satellite and space vehicles following a polar orbit as well as ICBM and IRBM firings.

2073
PUTTING IT TOGETHER. Chem. & Eng. News 36:24-25, illus., Feb. 10, 1958.

Picture story of Explorer.

2074
PUTTING SPUTNIK TO WORK. Electron. (Bus. ed.) 31:32-33, Jan. 10, 1958.

Quotes predictions of D.K. Manayev and I.B. Rumer of Radio Moscow concerning radio navigation signals beamed by the Sputniks.

2075
THE RACE INTO SPACE. Astronautics 3:34-35, 86-87, illus., Jan. 1958.

Technical sessions at American Rocket Society annual meeting review recent advances in U.S. rocket and missile technology; highlight some significant advances.

2076
RADAR ANTENNA AWAITING FIRST U.S. SATELLITE. Missiles and Rockets 3:153, illus., Jan. 1958.

A general news item about the five parabolic radio telemetry antennas,

212

weighing 35 tons each featuring an aluminum reflector measuring 60 feet in diameter, to be used for tracking. Location, design, and manufacturer are mentioned.

2077
RADARS USED TO TRACK SATELLITE LAUNCHING. Frank. Inst. J. 265:336, Apr. 1958.

Quotes A.L. Malcarney, of RCA, regarding "two of the most accurate tracking radars in the world."

2078
RADIO OBSERVATIONS OF EARTH SATELLITES. Natl. Res. Council. Canada. Radio Elec. Eng. Div. Bull. 8:20-21, illus., Jan./Mar. 1958.

Figures give (1) period of Sputnik I as obtained from 40-Mc/s radio observations; (2) estimated right ascension of ascending node versus time; (3) actual bearing versus time recording of Sputnik I on 20 Mc/s.

2079
RADIO OBSERVATIONS OF EARTH SATELLITES. Natl. Res. Council. Canada. Radio Elec. Eng. Div. Bull. 8:6-7, illus., Jly./Sept. 1958.

Explains arrangements for unattended recording of the 40,002-mc/s signals of the first Russian earth satellite as it passed near Ottawa, Canada.

2080
RADIO TECHNIQUE TRACKED SPUTNIK DURING FINAL DISINTEGRATION PERIOD. Aviat. Wk. 68:37, Jan. 27, 1958.

Technique developed to count meteor trails tracked Sputnik I, according to scientists of Ohio State University's Radio Observatory.

"From the time that its 20 and 40 mc. transmitters failed, Sputnik I was tracked by detection signals transmitted on 20 mc. by WWV, National Bureau of Standards station near Washington, (Ohio) that were reflected from the ionization column generated as the satellite sped through the relatively thin upper atmosphere."

2081
Rand Corp., Santa Monica, Calif.
EVOLUTION AND NATURE OF THE LUNAR ATMOSPHERE, by E.H. Vestine. 49 p., Jan. 29, 1958. (Res. Memo. 2106)

The study is concerned with estimating the extent and nature of the lunar atmosphere and surface and internal temperatures.

2082
RECENT GERMAN OBSERVATIONS OF IGY EARTH SATELLITES. German Sci. Bull. 27:17-21, June 1958.

A review of work performed and results at a number of German universities. Includes reports on both American and Russian satellites.

2083
RECOVERABLE CAPSULE FOR SATELLITE. Aviat. Wk. 68:20, Mar. 31, 1958.

Lockheed's reconnaissance satellite WS-117L will, according to the company's annual report, include a recoverable capsule, the main purpose of which will be to determine whether equipment can be returned to earth at a selected place.

2084
Reddish, V.C. VISUAL OBSERVATIONS OF THE FIRST RUSSIAN SATELLITE ROCKET. Spaceflight 1:198-202, Jan. 1958.

2085
Redstone Arsenal. Ordnance Missile Laboratories, Huntsville, Ala.
ASYMMETRICAL AGING IN SPACE TRAVEL, by J.R. Haskins. 15 p., Feb. 15, 1958. (Rpt. 2R26F)

The author concludes that it seems correct to say that the general theory of relativity of Einstein does predict asymmetrical aging but that the part of the theory enlisted in proving asymmetrical aging has not been proven (nor disproven) by experiment.

2086
Redstone Arsenal. Ordnance Missile Laboratories, Huntsville, Ala.

213

QUARTERLY RESEARCH REVIEW NO. 16. 85 p., Mar. 1, 1958. (Rpt. ZA16)

Satellite tracking station, p. 67-69.

2087
RE-ENTRY SATELLITE PREDICTED FOR '60. Aviat. Wk. 68:31, May 12, 1958.

Dr. H.F. York, chief scientist of Defense Department's Advanced Research Projects Agency believes that the U.S. should be able to recover earth satellites in 1959 or 1960 and launch vehicles weighing several tons into orbit in the early 1960s.

2088
Reid, J.W. THE PLASMA JET: RESEARCH AT 25,000 F. Mach. Design 30:22-24, illus., Feb. 6, 1958.

A roaring blast of gas and ionized water - at temperatures over twice those at the sun's surface - is one of the newest research tools for probing the thermodynamics of missile and rocket flight. Future possibilities range from ion propulsion drives for space ships to commercial application in metal cutting, welding or plating.

2089
REPORT ON THE SOVIET EARTH SATELLITE. Radio & TV News 59: 124, chart, Feb. 1958.

Summary of radio observations and instrumentation employed in man's first artificial earth satellite.

2090
RESEARCH BASED ON SPUTNIKS I AND II REPORTED BY SOVIETS. Sci. 127:1378-1381, June 13, 1958.

Excerpts from article in Pravda, April 27, 1958.

2091
Rinehart, J.S. OPTICAL TRACKING OF EARTH SATELLITES. Am. Phys. Soc. Bull. Ser. 2, 3:290, June 19, 1958.

Abstract only.

"Responsibility for optical (both visual and photographic) tracking of earth satellites is assigned to the Smithsonian Astrophysical Observatory. The program provides for (1) establishment, when necessary to supplement radio tracking, of preliminary orbital parameters through amateur teams of observers (Moonwatch); (2) precise photographic observations from twelve widely scattered stations using at each station a specially designed, complex tracking camera which incorporates in its design a 31-inch Schmidt-type mirror; and (3) a data processing and computation center. Russian launchings of earth satellites have considerably accelerated and reshaped the program. The bulk of the observational data has come from Moonwatch and other volunteer observers."

2092
Ripani, D. RECEIVING "EXPLORER'S" RADIO SIGNALS. Radio & TV News 59:98, May 1958.

Some puzzling aspects concerning signals from the first U.S. satellite are cleared up here.

2093
Ritchey, H.W. ROCKET MAIL TO THE MOON. Space J. 1:17-20, illus., Spring 1958.

Specifications and costs for mail rocket to the moon based on current propulsion technology.

2094
Ritchey, H.W. SOLID PROPELLANTS AND THE CONQUEST OF SPACE. Astronautics 3:39-41, 75-77, illus., Jan. 1958.

Orients the reader with respect to the present status of solid propellant rocket technology. The best way to achieve very high thrust needed to lift heavy loads associated with space flight, says the author, is by scaling up a single solid engine for the first stage.

2095
Roberson, R.E. AIR DENSITY DETERMINATION BY OBSERVATION

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- OF A SATELLITE. *Jet Propul.* 28: 330-331, May 1958.
- Previous results on the relationship between orbital eccentricity and radius for a satellite affected by air drag are applied to the problem of inferring air density as a function of altitude.
- 2096
Roberson, R.E. EFFECT OF AIR DRAG ON ELLIPTIC SATELLITE ORBITS. *Jet Propul.* 28:90-96, figs., Feb. 1958.
- Variation of parameters and the Krylov-Bogoliuboff approximation method are used to find simple approximate expressions for the decay of eccentricity with radius, the decay of radius with true anomaly and the growth of true anomaly with time. The special case of spiral orbits and the effect of asphericity and rotation of the earth's atmospheric shell are discussed.
- 2097
Roberson, R.E. GRAVITATIONAL TORQUE ON A SATELLITE VEHICLE. *Frank. Inst. J.* 265:13-22, Jan. 1958.
- Purpose of the paper is to derive the torque components along the principal axes of inertia of the satellite.
- 2098
Roberson, R.E. TORQUES ON A SATELLITE VEHICLE FROM INTERNAL MOVING PARTS. *J. Appl. Mech.* 25:196-200, diags., June 1958.
- This paper develops the effective attitude-excitation torques on a satellite vehicle which arise from the motion of internal parts.
- A Supplement appears on p. 287-288, of *J. Appl. Mech.*
- Paper presented at ASME annual meeting, New York, Dec. 1-6, 1957.
- Abstract in *Mech. Eng.* 80:119, Mar. 1958.
- 2099
Robinson, F.M. "EXPLORER"--FIRST AMERICAN MOON. *Sci. Dig.* 43:63, Apr. 1958.

- Summary of U.S. and Russian accomplishments in satellites to the end of Jan. 1958.
- 2100
ROCKETS, MISSILES AND SPACE VEHICLES. *Interavia* 13:150-151, illus., Feb. 1958.
- Includes mention of the U.S. Army satellite program.
- 2101
ROCKETS, MISSILES AND SPACE VEHICLES. *Interavia* 13:243-245, illus., Mar. 1958.
- A review of developments in the United States.
- 2102
ROCKETS, MISSILES AND SPACE VEHICLES. *Interavia* 13:343, illus., Apr. 1958.
- Mentions research and study contract awarded to the Rocketdyne Division of the North American Aviation Company for work on a nuclear-powered rocket motor which will permit a hundredfold increase in present-day space vehicle payloads.
- 2103
Rogers, G.L. DIFFRACTION MICROSCOPE AND THE IONOSPHERE: USE OF A SATELLITE. *J. Atmos. & Terr. Phys.* 12:220-221, 1958.
- Indicates that the possibility of using diffraction microscopy in ionospheric studies now appears to be good, due to demonstration of a satellite capable of carrying a continuously emitting transmitter.
- Six reasons are given for this possibility.
- 2104
Romick, D.C., Belfiglio, R.A. and Sandgren, F.B. RECOVERABLE BOOSTERS ARE STUDIED TO CUT MANNED SPACE FLIGHT COST. *Missiles and Rockets* 3:95-96, 98, 100, illus., Apr. 1958.
- Explains concept known as METEOR employing manned recoverable

boosters, analyzed and studied under sponsorship of Goodyear Aircraft Corporation.

- 2105
Ross, H.E. ORBITAL BASES. In Gatland, K.W. ed. *Project Satellite*, p. 105-133, New York, British Book Center, 1958.
- Discusses various proposals and some design embodiments as possible evolutionary successors of the present instrumented satellites.
- 2106
ROTI PHOTOS INDICATE TUMBLING SPUTNIK II'S SIZE. *Aviat. Wk.* 68:30, illus., May 19, 1958.
- Photo sequence of Soviet Sputnik II satellite was taken by an optical tracking telescope at Air Force Missile Test Center, Patrick Air Force Base, Florida.
- 2107
Rous, W.C., Jr. IN THE MISSILE ERA MATERIALS BUILD A NEW TECHNOLOGY. *Missiles and Rockets* 3:91-92, 95-96, 98, 100, illus., Mar. 1958.
- Importance of operational stress and temperature histories of structure and materials for artificial satellites, rockets and missiles.
- 2108
RUBBER IN ROCKETS. A REVIEW OF RECENT DEVELOPMENTS. *Rubber J. & Internatl. Plastics* 134: 284, Feb. 22, 1958.
- Examines the contribution of the rubber industry to the development of rocket technology. Refers to several articles, one of which mentions the role of rubber in the Vanguard satellite program.
- 2109
THE RUSSIAN LITERATURE OF SATELLITES, PART I. 181 p., New York, International Physical Index, Inc., 1958.
- Contains translations of articles by D.E. Okhotsimskii and T.M. Eneev; D.E. Okhotsimskii, T.M. Eneev and G.P. Taratynova; G.P. Taratynova;

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- I.M. Iatsunskii; V.A. Egorov; and V.L. Ginzburg. See entries for these authors under section for 1957.
- 2110
RUSSIANS FIND ORBIT WITH DOPPLER. *Electron. (Bus. ed.)* 31:21, May 2, 1958.
- "Parameters of earth satellite orbits have been determined with the aid of the doppler effect by Soviet scientists. Alexander Topchiyev, scientific secretary of the USSR Academy of Sciences, said that use of the Doppler effect was part of the Soviet program of Sputnik observation. A 40-mc frequency was used for maximum Doppler effect and minimum ionospheric interference." Entire item quoted.
- 2111
RUSSIANS LAUNCH FIRST MAN-MADE SPACE SATELLITES. In *World Almanac and Book of Facts* 1958, p. 44, New York, New York-World Telegram, 1958.
- 2112
Sandorff, P.E. STRUCTURES AND MATERIALS. *Aviat. Age* 28:50-53, 59-60, 62-63, Mar. 1958.
- A functional diagram shows important role of structural considerations in design of rocket-powered space vehicles and the projected trend of the structural factor vs vehicle size and initial load factor.
- 2113
SATELLITE "BUBBLE" TEST-LAUNCHED. *Sci. News Ltr.* 73:291, May 10, 1958.
- Reports successful launching to a 50-mile height of a 12-foot "bubble" of air such as will be put into an earth-circling orbit from an Explorer satellite.
- 2114
SATELLITE TALK. *Sky and Telescope* 17:129-131, illus., Jan. 1958.
- A description and photographs of Sputnik II.

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2115
SATELLITE TELEMETRY. IGY Bull.
8:13-18, Feb. 1958.

Based on material furnished by
Whitney Matthews and G.H. Ludwig.
Also in Am. Geophys. Union. Trans.
39:187-192, Feb. 1958.

2116
SATELLITE TRANSMITTER USES
TRANSISTORS. Electron. (Bus. ed.)
31:26, illus., Apr. 4, 1958.

Transistors that operate as oscil-
lators and amplifiers on 108-mc may
increase satellite transmitter life
1-1/2 to 4 times. The transistors
developed by the DuKane Corpora-
tion have been incorporated in a 500-
mw version of the NRL's 100-mw
satellite transmitter.

2117
SATELLITES. Inst. Elec. Engrs. J.
4:82-83, 110, Feb. 1958.

Summary of meeting on Radio Ob-
servations on the Russian Satellite
held on November 22, 1957.

2118
SATELLITES AND SPACE RESEARCH.
Sky and Telescope 17:332-333,
illus., May 1958.

A review of satellite activities dur-
ing March 1958; mention of the long-
range program for scientific re-
search in outer space presented to
the National Academy of Sciences,
prepared by the Earth Satellite
Technical Panel; and a report of
photographic tracking stations.

2119
SATELLITES, ARTIFICIAL. In Van
Nostrand's Scientific Encyclopedia.
3rd ed., p. 1452, 1454, Princeton,
N.J., Van Nostrand Co., Inc.,
1958.

Includes research uses of an artifi-
cial satellite, an illustration of the
essential arrangement of MOUSE
and a picture of the model of the
Vanguard satellite.

Brief details of the size, weight,
etc. of Sputnik I and II are also
given.

2120
SATELLITES EYE NEEDS TV
RETINA. Electron. (Eng. ed.) 31:8,
12, May 9, 1958.

Indicates that telescopic observa-
tion of the heavens from a satellite will
require extensive TV camera re-
search.

2121
SATELLITES FOLLOWED WITH
TRANSPARENT EARTH-SKY
GLOBE. Frank. Inst. J. 265:82,
Jan. 1958.

Establishing the orbit of a satellite
on the earth-sky globe is done in
three simple steps with equipment
available from a commercial source.

Details are given as well as price.

2122
SATELLITES TO SING LONGER. Mil.
Automat. 2:62, Mar./Apr. 1958.

Development of a 500-milliwatt 108-
mc transmitter, weighing only 3 oz.
and capable of transmitting 1-1/2 to
4 times as long on the same battery
power as former tel-emitters, has
been announced.

2123
Schaaf, S.A., Talbot, Lawrence and
Edson, Lee. ULTRA-HIGH ALTI-
TUDE AERODYNAMICS. Sci. Am.
198:36-42, illus., Jan. 1958.

The behavior of flying objects in
rarefied air as discovered in ex-
periments by NACA at Berkeley,
Calif. At low altitudes the air
streaming past a flying object be-
haves as a true fluid, but at altitudes
above 40 miles the object is struck
by individual atoms and molecules.

Quantitative data such as is being
provided by experiments is valuable
to designers of rockets and satel-
lites.

2124
Schaefer, D.H. MAGNETIC CORE
EVENT COUNTER FOR EARTH
SATELLITE MEMORY. Elec. Eng.
77:52-56, illus., Jan. 1958.

Description of the counter circuitry
being developed to record micro-
meteorite bombardment of artificial
earth satellites.

2125
Scholze, Oscar. EINFLUSSGRÖSSEN
BALLISTISCHER FERNFLUG-
KÖRPER. (DIMENSIONAL EFFECTS
OF BALLISTIC LONG-RANGE MIS-
SILES). Raketentech. u. Raumfahrt-
forsch 2:2-8, Jan. 1958.

In German.
"Investigation of trajectory charac-
teristics of missiles, rocket air-
craft and satellite-carrying rockets
shows that trajectories of all three
are similar and therefore could be
produced by the same type of pro-
pulsion. Study includes dimensional
effects, the effects of acceleration,
number of stages or boost units, and
air resistance. Current develop-
mental problems are briefly sum-
marized."

2126
Schriever, B.A. BALLISTIC MIS-
SILES, SPRINGBOARD TO SPACE.
AF Mag. 41:73-75, illus., Mar. 1958.

Excerpt from an address given at an
Astronautics Symposium, San Diego,
Calif., February 1957.

Cites implications of the USAF bal-
listic missile program in the U.S.
conquest of space.

2127
Schwartzman, A. DOPPLER EQUA-
TION FOR EARTH SATELLITE
MEASUREMENTS. Inst. Radio
Engrs. Proc. 46:915-916, May 1958.

Offers further background and deri-
vation data for the equation defining
minimum slant range (ro) of the
satellite.

2128
SCIENTIST WARNS OF SPACE EF-
FORT PITFALLS. Aviat. Wk. 68:
53, 55, Apr. 28, 1958.

Summary of talk given by R.E.
Roberson in which probing, payload
on Mars, space environment and
space reliability are discussed.

2129
Searle, Leonard. THE PERTURBA-
TIONS OF AN EARTH SATELLITE.
Roy. Astron. Soc. Can. J. 52:65-67,
Apr. 1958.

The purpose of this note is to give
an elementary account of phenomena
concerning precession of the orbital
plane and the decrease in period.

2130
Sears, W.H. ELECTRONS MAY
SOLVE RE-ENTRY PROBLEM.
Electron. (Bus. ed.) 31:26-27,
Mar. 7, 1958.

Similar article, with title New
Science May Permit Acceleration of
Rockets appears in Mach. Design
30:38, 40-41, Mar. 6, 1958.

2131
SECOND AND THIRD US-IGY SATEL-
LITES. IGY Bull. 11:13-16, illus.,
May 1958.

Launching, characteristics, orbit
and instrumentation of 1958 Beta and
1958 Gamma.

2132
SECOND U.S. MOON UP. Sci. News
Ltr. 73:197, illus., Mar. 29, 1958.

The United States has launched its
second earth satellite, this one a
small test satellite, powered by the
Navy's Vanguard rocket, that is
circling higher than any other
"moon."

Includes illustration of the satellite
transmitter, and a table in which the
satellites are compared.

2133
Shakeshaft, J.R. OBSERVATIONS AT
CAMBRIDGE. Inst. Elec. Engrs.
Proc. 105B:83-84, diags., Mar. 1958.

Radio observations of the Russian
satellites were made using an inter-
ferometric aerial consisting of two
horizontal full-wave dipoles at 40
Mc/s, separated along an east-west
line by a spacing of four wavelengths.

217

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2134
Shinn, D.H. RADIO OBSERVATIONS OF ARTIFICIAL SATELLITES. Marconi Rev. 21:1-2, 1958.

Comment on information to be obtained from satellites.

2135
Shklovskii, I.S. and Shcheglov, P.V. OPTICAL OBSERVATIONS OF ARTIFICIAL EARTH SATELLITES. Usp. Fiz. Nauk 64:417-424, Mar. 1958.
In Russian. Not examined.

2136
Shternfeld, A.A. ARTIFICIAL SATELLITES OF THE EARTH. (Rpt. 191), 168 p., Jan. 26, 1958.

Trans. no. R-3670 available from SLA Translation Center, Crerar Library, Chicago, Ill.

2137
Skrotzki, B.G.A. POWER FOR SPACE. Power 102:84-86, diags., Apr. 1958.

2138
Slater, A.E. THE BARCELONA CONGRESS. Spaceflight 1:206-209, illus., Jan. 1958.

A summary of "the more relaxing" features. No papers.

2139
Slee, O.B. RADIO SCINTILLATION OF SATELLITE 1958x. Nature 181: 1610-1612, figs., June 7, 1958.

An Australian scientist reports that U.S. satellites scintillate in the same way that stars twinkle.

Summary of this article appears in Sci. News Ltr. 73:387, June 21, 1958 with title, "Satellite's Radio Signals Scintillate Like Starlight."

2140
Smith, E.T.B., comp. TECHNICAL REVIEW. Brit. Interplan. Soc. J. 16:295-305, Jan./Feb. 1958.

Includes reference to articles on Sputnik I and II, Project Parside, Other Vehicles, and Radio Telescopes, Propulsion and Radio Techniques.

2141
Smith, F.A. THE SATELLITE TELESCOPE. Brit. Interplan. Soc. J. 16:361-367, Mar./Apr. 1958.

Some of the factors affecting the design of satellite telescopes are discussed, and a suggested layout for such a telescope is presented.

2142
Smith, L.P. and Patrick, R.M. TOMORROW'S NEW HORIZONS? MAGNETOHYDRODYNAMICS. Electron. (Eng. ed.) 31:17-18, Jan. 24, 1958.

2143
Smithsonian Institution, Astrophysical Observatory, Cambridge, Mass. BASIC ORBITAL DATA FOR SATELLITE 1957 BETA ONE, by L.G. Jacchia, 7 p., Feb. 21, 1958. (Spec. Rpt. 9)

Summarizes results of an analysis of approximately 1100 optical and radio observations of satellite 1957 B1 received at the Observatory.

2144
Smithsonian Institution, Astrophysical Observatory, Cambridge, Mass. MISCELLANEOUS INFORMATION ON THE ARTIFICIAL EARTH SATELLITES, by J.A. Hynek and G.F. Schilling, 45 p., Apr. 30, 1958. (Spec. Rpt. 12)

Includes the following contributions stemming principally from the optical satellite tracking program, Ch. I, The U.S.S.R. Satellites, Soviet Orbit Information for Satellite 1957 Beta, by J.B. Clarke and D.L. O'Hara, p. 1-13; Moonwatch Observations of the Fall of Satellite 1957 Beta One, by E.P. Bullis and L. Campbell, Jr., p. 14-15; A Precision Measurement of the Brightness of Satellite 1957 Alpha One, by G.S. Hawkins, p. 16-19; Note on the Mass-Area Ratios of the USSR Satellites by G.F. Schilling and J.S. Rinehart, p. 20-23.

Ch. II, The U.S. Satellites, Moonwatch Catalogue, by E.P. Bullis and L. Campbell, Jr. p. 24-28; The Acceleration of Satellites 1958 Alpha and 1958 Gamma, by C.A. Whitney, p. 29; The Secular Perturbations and the Orbital Acceleration of Satellite 1957 Beta Two, by L.G. Jacchia, p. 30-33; Improvements in the Prediction. Program for Crossings of

Given Latitude Parallels, by R.M. Adams, p. 34-36; Ch. III, Satellite Characteristics and Scientific Results, Densities of the Upper Atmosphere derived from Satellite Observations, by G.F. Schilling and T.E. Sterne, p. 37-43; Technical Parameters of the Artificial Satellites, by G.F. Schilling, p. 44-45.

2145
Smithsonian Institution, Astrophysical Observatory, Cambridge, Mass. PROCESSED OBSERVATIONAL DATA FOR USSR SATELLITES 1957 ALPHA AND 1957 BETA, by R.M. Adams and N. McCumber and others. 120 p., Mar. 1, 1958. (Spec. Rpt. 10)

2146
Smithsonian Institution, Astrophysical Observatory, Cambridge, Mass. SOVIET ORBIT INFORMATION FOR USSR SATELLITES 1957 ALPHA TWO AND BETA ONE, by G.F. Schilling, 14 p., Jan. 31, 1958. (Spec. Rpt. 8)

Revolutions and path distances; periods and heights; final orbit decay; data obtained; zones of visibility.

2147
Smithsonian Institution, Astrophysical Observatory, Cambridge, Mass. STATUS REPORTS ON OPTICAL OBSERVATIONS OF SATELLITES 1958 ALPHA AND 1958 BETA, edited by G.F. Schilling. 41 p., Mar. 31, 1958. (Spec. Rpt. 11)

Contents: Ch. I, Preliminary Results From Optical Tracking of the U.S. Earth Satellites; Ch. II, Optical Satellite Observations; Ch. III, Scientific Results; Ch. IV, Use and Distribution of Satellite Predictions.

2148
Smyth, M.J. PHOTOGRAPHIC OBSERVATIONS OF ARTIFICIAL EARTH SATELLITES. Spaceflight 1:247-251, illus., Apr. 1958.

Suggests photography as the most suitable method for British observers. Technique, timing, measurement, and data centers are considered.

2149
SOME SATELLITE NOTES. Sky and Telescope 17:278-279, Apr. 1958.

219

Includes note by L.G. Jacchia on The Erratic Orbital Acceleration of 1957 Beta; Explorer I Radio Signals, by R.H. McCracken; and Observing Instrument Modifications.

2150
SOME SATELLITE STUDIES. Sky and Telescope 17:398-399, June 1958.

Summary of primary results from Explorer I reported to the National Academy of Sciences and the American Physical Society on May 1.

2151
SOVIET IGY PROGRAM FOR ROCKETS AND ARTIFICIAL SATELLITES. Soviet Bloc Internat. Geophys. Year Info., p. 1-6, Feb. 14, 1958. (OTS-PB 131632-1)

A full translation of the "Program of Investigations with the Aid of Rockets and Artificial Earth Satellites Planned by the Soviet Union for the IGY" as detailed in the official Soviet IGY Information Bulletin.

2152
SOVIET PROPOSAL ON OUTER SPACE. Bull. Atomic Sci. 14:185-186, May 1958.

Portions of a statement by the Soviet Foreign Ministry.

2153
SOVIET UNION AND THE IGY. Eng. J. 41:84, Jan. 1958.

Brief review of news about the first Russian satellites.

2154
SPACE AGENCY NEEDED. Sci. News Ltr. 73:22, Jan. 11, 1958.

Members of the independent Rocket and Research Panel cite ten goals that could be achieved with a unified program.

2155
SPACE AGENCY URGED. IKE CALLS FOR CIVILIAN-RUN UNIT PATTERNEED ON NACA TO HELP SPEED U.S. SPACE-AGE PROGRESS. Chem. & Eng. News 36:23-24, illus., Apr. 14, 1958.

2156
SPACE NEEDS SPUR AVIONIC CREATIVITY. Aviat. Wk. 68:215, June 16, 1958.

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Challenging space technology problems include reducing size, weight, and improving reliability.

2157
SPACE PROGRAM OFFERED BY KILLIAN ADVISORY COMMITTEE. *Sci.* 127:803-805, Apr. 11, 1958.

Summary of report released by President Eisenhower on March 26, 1958.

2158
SPACE SENTRY AIDS EXPLORER SATELLITE TRACKING. *Elec. Eng.* 77:378, Apr. 1958.

The "Space Sentry" is a giant new radio transmitter of the U.S. Army Signal Corps.

2159
SPACE TRAVEL POSSIBLE WITH INERTIAL GUIDANCE. *Mil. Elec.* 4:15, June 1958.

Brief mention of techniques for interplanetary navigation by Dr. Bernard Litman of American Bosch Arms Corporation.

2160
SPITZ, A.N. A SATELLITE SIMULATOR. *Smithsonian Astrophys. Observ. Bull. for Visual Observ. of Satellites* 8:5, illus., Mar. 1958.

Describes a satellite-simulating device, built by J.A. Wegener which can be used for training purposes among Moonwatch teams.

This Bulletin also appears in *Sky and Telescope* 17: insert between p. 238-239, Mar. 1958.

2161
SPUTNIK I AND II: TEXTS OF SOVIET ANNOUNCEMENTS OCTOBER 4 AND NOVEMBER 3, 1957. *Curr. Hist.* 34:48-50, Jan. 1958.

2162
SPUTNIK II THROUGH RUSSIAN EYES. *Astronautics* 3:48-49, 62, illus., Jan. 1958.

Although silent on launching vehicle and means of propulsions, translations

from the Soviet press offer hitherto unreleased data on structure of the satellite and the biological experiments performed.

2163
SPUTNIK II'S RETURN. *Aviat. Wk.* 68:25, Apr. 21, 1958.

Estimates size and weight of the artificial satellite which returned to earth in pieces, the major portion falling in the Atlantic Ocean near Barbados B.W.I. the week of April 14, 1958.

2164
SPUTNIK III. *Sci.* 127:1328, June 6, 1958.

A report on the variety and complexity of the instruments aboard the third Soviet satellite, based on remarks at a news conference by IGY member Evgeni Federov.

2165
SPUTNIK I TRACKED BY MILLSTONE RADAR. *Missiles and Rockets* 3: 154, Jan. 1958.

Brief description of operations and observations by the Millstone Hill radar of Lincoln Laboratory, Westford, Mass.

2166
SPUTNIKS AND SPACE SHIPS. BREAKING THROUGH THE BIOLOGICAL CARRIER. *USSR* no. 4: 17-19, illus., 1958.

A general article which covers the physiology of cosmic flight; overcoming hazards of space; how much speed can the body endure; weightlessness and acceleration; altitude and survival; and the space age.

2167
SPUTNIKS UNDERSCORE MAN'S SCIENTIFIC PROGRESS. *USSR* no. 15:1-2, illus., 1958.

General article relating to the launching of the first earth satellite.

2168
STAND DER TECHNIK DER LENK- WAFFEN UND RAKETENGESCHOSSE IN OST UND WEST - DIE

SPUTNIKS IHRES GEHEIMNISSES ENTKLEIDET. (STATE OF TECHNOLOGY OF GUIDED MISSILES AND ROCKET PROJECTILES IN THE EAST AND WEST - SPUTNIKS: THEIR SECRETS REVEALED). *Flugwelt* p. 81-101, Feb. 1958.

In German.

Survey of: rockets, guided weapons, and satellites; Soviet guided weapons and ballistic missiles (surface-to-surface, surface-to-air, air-to-air), missiles for meteorological research, Soviet rockets and satellites, and performance data and characteristics of guided weapons and ballistic missiles of the West. Data include silhouette diagrams, dimensions, and propulsion.

2169
STANDARD'S C.A.D.F. TRACKED SPUTNIK. *Brit. Comm. & Electron.* 5:171-173, Mar. 1958.

Equipment; recording methods; and results of Standard Telephones and Cables, Ltd., to track the first satellite with a C.A.D.F. (Commuted Antenna Direction Finder).

2170
Stanesby, H. PRECISE FREQUENCY MEASUREMENTS ON FIRST RUSSIAN SATELLITE. *Inst. Elec. Engrs. Proc.* 105B:96-99, diags., Mar. 1958.

Equipment used for frequency measurement at 20 and 40 Mc/s is illustrated. Doppler curves measured at different times are shown and their characteristics discussed. A graph of the long-term frequency variation of the satellite transmitter over a period of a fortnight is given which shows a gradual decrease. Possible causes of this variation are suggested.

2171
Stanford Research Institute, Division of Engineering Research, Menlo Park, Calif. STUDY OF CERTAIN ASPECTS OF ANTENNA SYSTEMS. 15 p., Feb. 11, 1958. (Bi-Mon. Prog. Rpt. 3) (Contract DA-04-200-(Ord)-674)

221

The case of a satellite passing directly over one pair of antennas is considered.

2172
Stanford Research Institute, Division of Engineering Research, Menlo Park, Calif. STUDY OF CERTAIN ASPECTS OF ANTENNA SYSTEMS. 11 p., Apr. 1, 1958. (Bi-Mon. Prog. Rpt. 4) (DA-04-200-(Ord)-674)

Includes Analyses of Ground Antenna System for Tracking Earth Satellites Circularly Polarized Corner Reflector Antenna, by W.E. Scharfman.

2173
Stehling, K.R. ASPECTS OF VANGUARD PROPULSION. *Astronautics* 3:44-47, 68, illus., Jan. 1958.

Previously established techniques as well as new approaches have been used to find the answers to major technical problems, many encountered in the past, but never at one time or of such a degree of complexity.

2174
Stehling, K.R. BALLOON-LAUNCHED VEHICLE MAY BE FIRST ON THE MOON. *Aviat. Age* 28:32-35, illus., Mar. 1958.

Shows how balloon-launching techniques can be extended to satellites and even moon vehicles.

2175
Stehling, K.R. ION PROPULSION ELECTRIC POWER FOR SPACE FLIGHT. *Aviat. Age* 28:38-40, 42-43, illus., Jan. 1958.

Ion rocket looks like the first practical power plant using charged particles.

2176
Stehling, K.R. MOON LOOKS PROMISING AS MANNED SPACE STATION. *Aviat. Age* 29:22-23, 18v, May 1958.

Explains why a lunar station would in many ways be more preferable than a man-made one.

222

2177 Stehling, K.R. "SUBLIMATION" MAY LICK RE-ENTRY PROBLEM. Aviat. Age 28:27-29, illus., Feb. 1958.

Noses or shells that sublimate, or turn from solids directly into gas, look like a promising answer. This article analyzes how this method would work in the specific case of an orbital vehicle.

2178 Steier, H.P. CHALLENGE TO INDUSTRY: SPACESHIP TELEMETRY COMMUNICATION WITH MOON VEHICLES FEASIBLE NOW? Missiles and Rockets 3:105-108, 110, illus., Feb. 1958.

Gives some details of space telemetry designs worked out by Hans Charla-Nielsen and others.

2179 Sterne, T.E. AN ATMOSPHERIC MODEL AND SOME REMARKS ON THE INFERENCE OF DENSITY FROM THE ORBIT OF A CLOSE EARTH SATELLITE. Astron. J. 63:81-87, Mar. 1958.

The author has extended the U.S. Air Force model (of over 540,000 meters of altitude) to still greater heights and suggests the employment of the resulting model for inferring the air density from observations of the orbit of a close earth satellite.

2180 Sterne, T.E. THE GRAVITATIONAL ORBIT OF A SATELLITE OF AN OBLATE PLANET. Astron. J. 63: 28-40, Jan. 1958.

Suggests an unperturbed solution which may be sufficiently accurate for the finding-ephemeris of an artificial satellite.

2181 Steurer, W.H. ROCKETS AND SPACESHIPS - THEIR DEVELOPMENT AND THEIR METALLURGICAL PROBLEMS. Metal Prog. 31: 25, Apr. 1958.

Summary, by J.H. McMinn, of speech given at meeting of Chattanooga Chapter, American Society of Metals.

2182 Stine, G.H. STORY BEHIND THE SATELLITES. Sci. Dig. 43:69-74, Jan. 1958.

A review of V-2 rocket development in Germany during World War II and post-war rocket development leading to the earth satellite program including Vanguard. A portion of the author's book "Rocket Power and Space Flight" is quoted.

2183 Stone, Irving. PROBES WILL EXPLORE CISELUNAR SPACE. Aviat. Wk. 68:165, 167, 169-173, illus., June 16, 1958.

Plans for lunar probes to be launched by the Air Force and Army which will mark the first long reach into space and set the stage for manned exploration of the moon.

2184 Stone, Irving. USAF DIRECTORATE BACKS SPACE STUDY. Aviat. Wk. 68:50-55, 58, 61-62, illus., Apr. 7, 1958.

In this review of research sponsored by the Directorate of Advanced Studies, Air Force Office of Scientific Research, in the following areas - space environment exploration; space vehicle components; and high vacuum conditions; mention is made of Project Farside; magnetic variations; ion rocket research; supplemental thrust; and magneto-hydrodynamics.

2185 Stong, C.L. THE AMATEUR SCIENTIST, MOSTLY ABOUT HOW TO STUDY ARTIFICIAL SATELLITES WITHOUT COMPLEX EQUIPMENT. Sci. Am. 198:98-100, illus., Jan. 1958.

2186 Strouse, William. SATELLITE "EYES" TO VIEW EARTH WEATHER CONDITIONS. Missiles and Rockets 3:72-75, illus., June 1958.

Both the Stratoscope telescope and the Vanguard Weather Eye, described in this article, provide examples of the types of problems encountered in the design and construction of optical systems for operation in the upper atmosphere and space.

2187 Strughold, Hubertus. MAN-CARRYING SATELLITE? Sci. Dig. 43:inside back cover, Feb. 1958.

Physiological aspects.

2188 Strughold, Hubertus. SPATIOGRAPHY: GEOGRAPHY FOR SPACE. Aviat. Age 29:106, 108, illus., May 1958.

The astronaut needs as a guide, a "geography of space," or spatio-graphy, based essentially on ecological considerations concerning space itself and the planets.

2189 SUCCESS!!! ARMY LAUNCHES EXPLORER USING PRODUCTION-TYPE ROCKETS; NEW HIGH ENERGY FUEL A SUCCESS. Chem. & Eng. News 36:23, illus., Feb. 10, 1958.

2190 SUN MAY POWER SATELLITE. Sci. News Ltr. 73:6, Jan. 4, 1958.

Refers to studies by Dr. Gerald Oster of Brooklyn Polytechnic Institute on a sun-powered chemical battery that, when using acridine dyes, would last as long as the satellite containing it.

2191 SURFACE COATING FOR VANGUARD SATELLITE. Aircraft & Missiles Mfg., 1:62-63, illus., Jan. 1958.

Description of the coating applied to the U.S. satellite sphere.

2192 Swarm, H.M. "EXPLORER" AIDS RADIO PROPAGATION RESEARCH. The Trend in Eng., p. 5, Apr. 1958.

Details activity in connection with satellite tracking at the Radio Propagation Research Group of the

Electrical Engineering Department, University of Washington.

2193 Sweeney, Richard. PILOT OUTLINES ORBITAL TEST PROGRAM. Aviat. Wk. 68:51-52, illus., Apr. 28, 1958.

Summary of a paper by A.W. Blackburn in which is outlined a four-phase program for flight testing an operational vehicle system proposed to place a manned aircraft in orbit. Design and performance parameters are taken from von Braun's Mars project and scaled down.

2194 Sweeney, Richard. SPACE MONOPOLES CONTROL STUDY. Aviat. Wk. 68:34-35, Feb. 10, 1958.

It was indicated at a USAF Control-Display Integration Symposium in early February that space flight technology study proposals would be along the following lines: reference and coordinate systems; acceleration control; and flight path reference.

2195 TECHNICIANS READY VANGUARD TO PLACE SATELLITE IN ORBIT. Aviat. Wk. 68:40-41, illus., Mar. 31, 1958.

Pictures only.

2196 TELEMETERING FROM EXPLORER. Electron. Indus. 17:58-59, 124, illus., Mar. 1958.

A description of the Vanguard telemetry package used, with some modifications, in Explorer. It is a "marvel" of miniaturization, operating on only 4 ma at 2.7 volts and it weighs only 3.2 ounces.

2197 A TELESCOPIC VIEW OF A SATELLITE ROCKET. Sky and Telescope 17:182, Feb. 1958.

Refers to observation on November 24, 1957, reported in the December issue of Star Dust, published by the National Capital Astronomers, Washington, D.C.

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2198
Ten Dyke, R.P. COMPUTATION OF ROCKET STEP WEIGHTS TO MINIMIZE INITIAL GROSS WEIGHT. *Jet Propul.* 28:338-340, diags., May 1958.

The technique of dynamic programming is applied to the problem of finding optimum step weights of multistage rockets.

2199
TEST FIRINGS FOR PIED PIPER DUE SOON. *Aviat. Wk.* 68:145, 147, 149-150, 152, illus., June 16, 1958.

First test firing in USAF's greatly accelerated earth reconnaissance satellite program is expected in the Fall of 1958, although launching a complete satellite is considered to be more than two years away.

2200
Thompson, G.V.E. CAN WE BRING BACK A SATELLITE? *Sci. Dig.* 43:6-10, June 1958.

2201
Thompson, R.J., Jr. ROCKET PROPELLANTS. *Chem. & Eng. News* 36:64-67, illus., June 23, 1958.

Discusses liquid propellants employed in large pump-fed rockets such as those utilized in the high-thrust booster stage in the satellites which have been launched to date.

2202
Topchiyev, A.V. PERVIE NAUCHNII ITOGI POLETA SOVETSKIKH SPUTNIKOVA. (THE FIRST SCIENTIFIC RESULTS OF THE FLIGHT OF SOVIET SPUTNIKS). *N. Izvestiya* no. 73, p. 3, Mar. 26, 1958. In Russian.

Deals with findings on the atmospheric density, radiation of cosmic rays and behavior of a living organism (the dog "Laika") in conditions of a cosmic flight.

2203
TOWARDS ASTRONAUTICS. PROBLEMS OF A SIGNIFICANT TRANSITION PERIOD. *Flight* 73:236-238, illus., Feb. 27, 1958.

Summarizes paper by J.E. Allen before Manchester Branch of the Royal Aeronautical Society, on January 22, 1958.

The first part of the paper contains a review of current high-altitude aircraft, guided weapons, high-altitude rockets and satellites; the second section is devoted to future design trends and some immediate targets in space flight.

2204
TRACKING THE VANGUARD. *Ord.* 42:643-645, illus., Jan./Feb. 1958.

Minitrack stations to receive radio signals, plus visual observation teams, have been set up to feed information from the satellite to a complex computing network to determine the orbit and collect data.

2205
TRANSISTOR TRANSMITTER DEVELOPED FOR SATELLITE RADIO. *Elec. Eng.* 77:472, May 1958.

Future U.S. satellites can continue broadcasting outer space data to Earth 1-1/2 to 4 times as long as is presently possible, as a result of the development of a new transmitter by engineers of the DuKane Corporation, St. Charles, Ill. under contract to the Naval Research Laboratory.

A similar article appears in *Radio & TV News* 59:82, June 1958.

2206
Troitskaya, V.A. INTERNATIONAL GEOPHYSICAL YEAR ACTIVITIES IN THE SOVIET UNION. *Bull. Atomic Sci.* 14:173-176, May 1958.

Artificial earth satellites, p. 175-176.

2207
Truax, R.C. WE CAN'T CONQUER SPACE WITH MISSILES. *Astronautics* 3:20, 91-95, June 1958.

A plea for an integrated national space flight program under the direction of an agency with space conquest as its sole mission, and backed up by a national determination

to achieve a position of leadership in astronautics.

2208
UNEXPECTED COSMIC RADIATION COULD RAISE SPACE FLIGHT PROBLEM. *Aviat. Wk.* 68:39, May 5, 1958.

In the first official report on analysis of data obtained from two U.S. International Geophysical Year satellites it was revealed that telemetered data received from geiger counters aboard Explorer I and III suggests that cosmic ray count of 30-40 per sec. experienced at 200-300 mi. altitudes reached 35,000 per sec. at altitudes above 1,000 mi.

Further information is given on lifetime of Explorer I; atmosphere density, and micrometeorite intensity.

2209
"Ursus." BLEEP. *Spaceflight* 1:203, Jan. 1958.

"Less famous" aspects of the Sputnik launching i.e. mix-ups in reporting; comments of the Astronomer Royal, Dr. R. van der Riet Woolley; and the Flat Earth Society; and other humorous happenings.

2210
U.S. ACCELERATES MOON PLANS. *Missile Eng.* 2:33, Jan. 1958.

Refers to various proposals.

2211
USAF, ARMY GET MOON ROLES. *Aviat. Wk.* 68:17, Mar. 31, 1958.

Announces the "first real space projects" under the direction of the Advanced Research Projects Agency. They include three Air Force moon probes, one and possibly two Army moon probes, and two or three more Army earth satellites.

2212
USAF PLANS MOON STRIKE WITHIN MONTHS. PAYLOAD TO MOON TO BE TRIED WITH THOR, TWO STAGES OF VANGUARD, REDSTONE TO EXPLORE NUCLEAR BLASTS. *Aviat. Wk.* 68:26-27, illus., Jan. 20, 1958.

225

2213
USAF SPACE EFFORT BASED ON RESEARCH. *Aviat. Wk.* 68:86-88, illus., June 16, 1958.

Outlines the varied program of research and development.

2214
U.S. Congress, 85th. Senate. Committee on Armed Services. Preparedness Investigating Subcommittee. INQUIRY INTO SATELLITE AND MISSILE PROGRAMS. HEARINGS, Part I, November 25-27, December 13, 14, 16, 17, 1957 and January 10, 13, 15-17, 20-24, 1958. 1377 p., Washington, U.S. Government Printing Office, 1958.

Testimony of Dr. J.P. Hagen, Director, United States Navy Project Vanguard, p. 142-191.

2215
U.S. EARTH SATELLITE GOT HELP FROM CERAMIC STRIPES. *Mat. Design Eng.* 47:11, illus., May 1958.

An aluminum-oxide coating sprayed on in stripes along the outside of the instrument-carrying section (from nose cone to fourth-stage rocket motor) is performing the essential task of controlling temperatures inside the Explorer earth satellite.

2216
U.S. IGY PROGRAM TO DATE. *Astronautics* 3:21, Mar. 1958.

Achievements in field of rocketry during first five months of IGY are outlined in a report by U.S. National Committee.

2217
U.S. MISSILES IN THE NEWS. *Missiles and Rockets* 3:49, illus., Feb. 1958.

Concerns the ill-fated attempt to launch an earth satellite with the Vanguard rocket.

2218
U.S. - RUSSIAN JOINT EARTH SATELLITES? *Electronics* (Bus. ed.) 31:16, May 30, 1958.

N.A. Varvarov has suggested the possibility of joint aerial inspection

226

of the earth via satellite-borne TV and other instrumentation. He said, "There is no doubt that if the great powers were to embark jointly upon its implementation today, the problems of world television broadcasting would be solved within the next few years."

2219
USSR TALKS UP SPACE PLANS.
Electronics (Bus. ed.) 31:17, May 30, 1958.

Refers to newspaper accounts indicating that instrumentation plays vital role in Soviet research rockets as a space race for men's minds shapes up. Pravda chides "microscopic" satellites, boasts of new data from tons of instruments sent to record heights. Instruments to test Einstein's theories reported.

2220
U.S.S.R. USING NEW METHOD TO PHOTOGRAPH EARTH SATELLITES.
Aero/Space Eng. 17:29, June 1958.

Refers to article in a Soviet newspaper which indicates that the new photographing method utilizes an oscillating plate which has been adapted to the large meniscus telescope in use at an observatory. Some details are given.

2221
Van Allen, J.A. EXPLORER'S NEWS FROM SPACE. Life 44:51-54, illus., Feb. 17, 1958.

The scientist who planned the instruments tells what they tell.

2222
VANGUARD (ANALYSIS OF U.S. AND U.S.S.R. SATELLITE DATA). U.S. Naval Res. Lab. Rpt. NRL Prog., p. 26, Apr. 1958.

A study of atmospheric densities indicates, so far, a density approximately forty times greater than typical values for the same altitude in previous models of the atmosphere.

2223
VANGUARD DESIGNERS DETAIL SECOND STAGE. Aviat. Wk. 68:68, 73, May 5, 1958.

Fabrication of second-stage Vanguard rocket engine.

2224
THE VANGUARD FIZZLES AGAIN.
Life, 44:36-37, illus., Feb. 17, 1958.

Color photographs of the second unsuccessful launching of the American Vanguard satellite rocket.

2225
VANGUARD GEAR IN EXPLORER. ARMY'S GLOBE-CIRCLING SATELLITE CARRIES NAVY CIRCUITS.
Electron. (Eng. ed.) 31:8, Feb. 14, 1958.

Explorer I is investigating three areas: cosmic rays, density and size of micrometeorites; and temperatures both inside and outside the satellite's shell.

Vanguard I is primarily concerned with ultraviolet radiation.

2226
VANGUARD I. Sci. 127:688, Mar. 26, 1958.

Announces the launching on March 17, 1958; the rocket assembly; visual tracking; and radio transmission.

2227
VANGUARD PROGRAM KNOWN TO ONLY 20%. Missiles and Rockets 3:147, Feb. 1958.

"Researchers at the Survey Research Center of the University of Michigan have revealed that a survey made in April 1957 showed that 54 percent of the people in this country never heard of the Vanguard program, satellites, plans to launch satellites, or any other phase of the IGY program. Only 20 percent of the persons interviewed had any real idea of what the program was expected to accomplish although many had heard it in a general way." Entire item quoted.

2228
VANGUARD REQUIRES ADVANCED CONNECTORS. Missiles and Rockets 3:158, Jan. 1958.

Electrical connectors, developed by the Titeflex Company, that must withstand extreme temperatures and be highly acid-resistant are being used for electrical continuance between the first and second stages of the Vanguard satellite launching vehicles.

2229
"VANGUARD" SATELLITE LAUNCHED. Engr. 205:419, Mar. 1, 1958.

Brief details.

2230
VANGUARD... THE U.S. MISSILE IN THE NEWS. Missiles and Rockets 3:42-43, illus., Apr. 1958.

Purpose, cost, and comparison with other satellites.

2231
VANGUARD, WIND TUNNEL COVERED AT TWO MEETINGS.
Aero. Eng. Rev. 17:58, Feb. 1958.

Refers to talk on "The Vanguard Earth Satellite Program" given by R.H. Wilson.

2232
Vargo, L.G. CRITERIA FOR ORBITAL ENTRY. Jet Propul. 28:54-55, Jan. 1958.

Points out need for separate analysis of orbital entry problems when both vehicle and trajectory criteria are considered.

2233
Vassiliev, M. SPUTNIK INTO SPACE. 147 p., illus., London, Souvenir Press, Toronto, Ryerson Press, 1958.

Not examined.

A review by G.V.E. Thompson in Brit. Interplan. Soc. J. 16:386-387, Mar./Apr. 1958, says "a brief glance through the table of contents is sufficient to reveal that the major part of the book is not directly concerned with the sputniks, but is the usual popular account of astronautics."

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2234
Veis, George. REGIONS OF VISIBILITY OF A SATELLITE AFTER LAUNCHING. Smithsonian Astrophys. Observ. Bull. for Visual Observ. of Satellites 8:4-5, Mar. 1958.

This Bulletin also appears in Sky and Telescope 17: insert between p. 238-239, Mar. 1958.

2235
Vertregt, M. INTERPLANETARY ORBITS. Brit. Interplan. Soc. J. 16:326-354, diags., Mar./Apr. 1958.

Basic equations under simplified conditions for interplanetary flight are derived. For a voyage from planet to planet an unlimited number of orbits is possible. In order to give a clear survey of these possible orbits a diagram is developed from which the approximate energy requirements, the duration, and other particulars of a voyage can be easily found.

2236
VOLUNTEER SATELLITE TRACKING BY RADIO. IGY Bull. 10:15-16, Apr. 1958.

Information concerning two tracking systems, Minitrack Mark II, and the Microlock, used in the volunteer program, Moonbeam.

2237
Von Braun, Wernher. THE ACID TEST. Signal 12:5-6, 19, 72, Mar. 1958.

Men and nations must choose between doing what must be done to face the Soviet challenge or continuing in their comfortable illusions and risking the elimination of freedom. A plea for support of U.S. efforts to win recognition in space exploration.

Also in Chem. & Eng. News 36:52-56, illus., Mar. 3, 1958, with title "Can We Withstand the Acid Test?", and in Space J. 1:31-36, Summer 1958.

2238
Von Braun, Wernher. FROM SMALL BEGINNINGS. In Gatland, K.W. ed.

228

Project Satellite, p. 19-49, New York, British Book Center, 1958.

The writer describes his own personal experiences as a German rocket pioneer during the late twenties; details of the establishment of the famous rocket station at Peenemunde where the V-2 was developed; and early plans for satellite launchings.

2239 Von Braun, Wernher. THE STORY BEHIND THE "EXPLORERS." This Wk. Mag., p. 8-9, 36-38, illus., Apr. 13, 1958.

What did it take to get the U.S. into space? Skill, daring - and a little "bootlegging," a famous scientist reveals. Here, for the first time, he gives his own report on our satellites.

2240 VOYAGE OF THE EXPLORER. Time 71:15-18, illus., Feb. 10, 1958.

2241 W., D.G. SPUTNIK AND EXPLORER, TWO MOONS OVER MOSCOW. Indus. & Eng. Chem. 50(Pt. 1):22A, Mar. 1958.

Commercial silicone paint helps keep Explorer satellite cool.

2242 Walters, L.G. PROBLEMS IN SPACE NAVIGATION. COMPLEX MATHEMATICS, DESIGN OF VEHICLE INVOLVED IN SOLUTION. Missiles and Rockets 3:76-79, illus., Apr. 1958.

2243 Warren, C.S., Rumble, W.G. and Helbig, W.A. TRANSISTORIZED MEMORY MONITORS EARTH SATELLITE. Electron. (Eng. ed.) 31: 66-70, illus., Jan. 17, 1958.

Telemetered data from the U.S. earth satellite will be decoded by transistor-operated magnetic-core memory. Circuits required to numerically translate input information and present modified output information use alloy-junction transistors as current drivers,

gated-impulse amplifiers, voltage amplifiers, high-speed switches and flip-flops. Memory storage capacity is 64,000 bits arranged as 256 characters of 25 bits each.

2244 WEATHER SATELLITE. Time 71:44, Jan. 6, 1958.

Mentions instruments to be carried in future satellites which may help to interpret basic mechanics of the weather.

2245 Webster, R.A. A RECOVERABLE SPACE VEHICLE FOR COSMIC RAY RESEARCH. New York, American Astronautical Society, 1958. (Preprint 57-32)

Paper presented at 4th annual meeting, New York, January 29-31, 1958.

2246 Weckler, A.N. WHO WILL RUN OUR SPACE PROGRAM? Aviat. Age 28:24-25, Mar. 1958.

2247 Wehner, G.K. METAL SPUTTERING BY ION BOMBARDMENT. Missiles and Rockets 3:195-197, Mar. 1958.

Metal sputtering by ion bombardment duplicates high-velocity bombardment of satellites in space by atoms and molecules.

2248 Wehrli, R.L. ACCESSORIES. Aviat. Age 28:90-92, 94-96, Mar. 1958.

Accessories include auxiliary power devices, (electric, solar and nuclear) life-supporting and safety units, instruments, and general purpose accessories.

A nuclear power plant is discussed at length.

2249 Welch, J.D. and Shih, S.L. THE DYNAMICS AND CERTAIN ASPECTS OF CONTROL OF A BODY RE-ENTERING THE ATMOSPHERE AT HIGH SPEED. Paper presented at 26th annual IAS meeting, Jan. 27-30, 1958. New York, Institute of

Aeronautical Sciences, 1958. (Preprint 818)

2250 Weller, A.E., Jr. and Bagby, F.L. SPACE VEHICLES AS THERMODYNAMIC SYSTEMS. Battelle Tech. Rev. 7:3-8, table, May 1958.

The authors discuss the thermodynamic characteristics of space vehicles in relation to their environment and consider the refinements in basic thermodynamic concepts required to cope with problems of space flight.

2251 Wells, H.W. UNUSUAL PROPAGATION AT 40 MC FROM THE USSR SATELLITE. Inst. Radio Engrs. Proc. 46:610, Mar. 1958.

Figure indicates reception of Sputnik I at 40,002 mc at Carnegie Institute of Technology, Experimental Laboratory, Derwood, Md.

2252 Wentink, R.S. BOOSTER PROPULSION FOR SPACE VEHICLES. Presented at 26th annual meeting, IAS, New York, Jan. 27-30, 1958. 15 p., New York, Institute of Aeronautical Sciences, 1958. (Preprint 828)

Analysis which concludes that it is possible to provide a propulsion system for a "booster" vehicle for space flight, designed for flight between the earth and a permanent satellite space station, at the current state of the art.

2253 Weyl, A.R. TOWARDS SPACE FLIGHT. Aero. 38:32-35, Mar. 1958.

Summarizes world news on satellites, their tracking, use, re-entry problems, materials, rocket thrust and space journeys to Mars.

2254 WHAT DOES IT TAKE TO GET INTO THE SPACE FLIGHT BUSINESS? Aviat. Age 28:26-27, 107-108, 111-112, illus., Mar. 1958.

In an interview, J.R. Dempsey, Manager of Convair Astronautics, gives answers to many pertinent questions concerning present and future space flight problems.

2255 WHAT'S NEW ABOUT EXPLORER III. Electron. (Bus. ed.) 31:35, Mar. 21, 1958.

Principle revisions to take care of miniature tape recorder are indicated in a diagram. There will also be different uses of two transmitters.

2256 Whipple, F.L., Boyd, L.G., Hynek, J.A. and Schilling, G.F., comp. ORBITAL DATA AND PRELIMINARY ANALYSES OF SATELLITES 1957 Alpha and 1957 Beta. Smithsonian Inst. Astrophys. Observ. Smithsonian Contr. Astrophys. 2:189-346, tables, 1958.

Includes the following: Preliminary Orbit Information for U.S.S.R. Satellites 1957 a₁ and a₂ by G.F. Schilling and T.E. Sterne, p. 191-198; Additional Orbit Information for U.S.S.R. Satellites 1957 a₁ and b₁, by J.S. Rinehart and G.F. Schilling, p. 199-205; Some Preliminary Values of Upper Atmosphere Density From Observations of U.S.S.R. Satellites, by T.E. Sterne and G.F. Schilling, p. 207-210; Glossary of Astronomical Terms for the Description of Satellite Orbits, by J. Ashbrook, G.F. Schilling and T.E. Sterne, p. 211-217; Soviet Orbit Predictions and Orbital Information for Satellites 1957 a₁, a₂ and Beta, by G.F. Schilling and E.S. Ferguson, p. 219-244; Visual Observations of Satellite 1957 a₁ Made by Moon-watch Stations, by L. Campbell, Jr. and J.A. Hynek, p. 245-274; An Interim Model Atmosphere Fitted to Preliminary Densities Inferred From U.S.S.R. Satellites, by T.E. Sterne, B.M. Folkart and G.F. Schilling, p. 275-279; Soviet Orbit Information for Satellites 1957 a₂ and b₁, by G.F. Schilling, p. 281-284; Basic Orbital Data for Satellite 1957 b₁, by L.G. Jacchia, p. 285-286; Processed Observational Data

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for U.S.S.R. Satellites 1957 Alpha and 1957 Beta, by R.M. Adams, N. McCumber and M. Brinkman, p. 287-337; Successive Revisions of Orbital Elements for Satellite 1957 Beta, by L.G. Jacchia, p. 339-341; A Chart for Finding a Satellite's Distance and Elevation, by J.W. Slowey, p. 343-344.

2257 White, W.D. ELECTROMAGNETIC ANALOGS FOR THE GRAVITATIONAL FIELDS IN THE VICINITY OF A SATELLITE. Inst. Radio Engrs. Proc. 46:920-922, May 1958.

Includes Appendix giving derivation of equations of motion.

2258 Whitfield, G.R. TRACKING THE RED MOONS: RADIO OBSERVATIONS OF THE RUSSIAN EARTH SATELLITES AT THE MULLARD RADIO ASTRONOMY OBSERVATORY, CAMBRIDGE. Aeroplane 94:178-179, Feb. 7, 1958.

2259 Wilson, E.E. GOVERNMENT OF SPACE. Ord. 42:980-982, May/June 1958.

The principles of international law which governed the conduct of nations for many years must be re-established on the earth and extended to regulate the actions of man as he explores the universe.

2260 Wilson, R.H., Jr. TEMPERATURE OF A CLOSE EARTH SATELLITE DUE TO SOLAR AND TERRESTRIAL HEATING. Sci. 127:811-812, Apr. 11, 1958.

Considers heat received from terrestrial reflection and re-radiation. Comment, entitled "Satellite Temperatures Yield Earth's Heat" appears in Sci. News Ltr. 73:262, Apr. 26, 1958.

2261 Wisconsin University, Mathematics Research Center, Madison, Wisc. THEORY OF THE MOTION OF ARTIFICIAL SATELLITES, by

Z. Kopal, 2 nos., Feb., Mar. 1958. (TSR-19, 23) (Contract DA-11-022- (ord)-2059)

First and second of a series of reports, the aim of which is to explore conditions under which air densities can be determined from the perturbations of motion of the center of gravity of an artificial satellite.

"It will be shown," says the author, "that if the effects produced by atmospheric drag likely to be met at altitudes of the order of 100-1000 km on the motion of the satellite are to be successfully separated from those produced by the distribution of mass inside the terrestrial spheroid, it is necessary to include in the equations of motion not only the effects of the squares (and probably the cubes) of the terrestrial oblateness, but also the terms due to the lunisolar tides (and, possibly, their cross-products with the rotational distortion); and this has, so far, never been done."

2262 Witkin, Richard, ed. THE CHALLENGE OF THE SPUTNIKS. 96 p., Garden City, N.Y., Doubleday, 1958. (Headline Pubs. 1)

First reactions of the Russian Sputnik and the beginnings of long-range planning for space flight are surveyed, as they affected the United States.

Original material, magazine articles, newspaper editorials, public documents and commentator's opinions are combined.

2263 Woodbury, D.O. AROUND THE WORLD IN 90 MINUTES: THE FABULOUS TRUE STORY OF THE MAN-MADE MOONS, INCLUDING SPUTNIK. 248 p., illus., New York, Harcourt, 1958.

A comprehensive, lively explanation of the space age, of scientific difficulties in launching rockets and satellites, what science expects to accomplish and what significance these satellites and space travel have for the future of the world.

2264

WORK ON PIED PIPER ACCELERATED: SATELLITE HAS CLAM-SHELL NOSE CONE. Aviat. Wk. 68:78-79, June 23, 1958.

Pied Piper reconnaissance satellite will be launched with Thor IRBM booster soon after pad is completed at Cooke AFB. Some details are given.

2265

Woyk-Chvojekova, E. DETERMINATION OF RADIO-PROPAGATION ELEMENTS DUE TO AN ARTIFICIAL EARTH SATELLITE. Nature 181:1195-1196, Apr. 26, 1958.

Presents a formula for expressing the length of a radio path between a satellite and the recorder and for determining the virtual position of the radiating body relatively to the real one.

2266

Wuerth, J.M. and Slater, J.M. NAVIGATION IN SPACE. Automation Prog. 3:4-6, illus., Jan. 1958.

Directs attention to the considerable problems in automatic navigation and control which have to be solved.

2267

Yaffee, Michael. IGY RESEARCH INTO SPACE CONTINUES. Aviat. Wk. 68: 153, 155-156, 158-159, illus., June 16, 1958.

Summary of report prepared by the Earth Satellite Panel formally titled "Basic Objectives of a Continuing Program of Scientific Research in Outer Space."

2268

Yates, D.N. MISSILE FLIGHT TESTS ARE LABORATORY EXPERIMENTS TO DETERMINE FLAWS. SUCCESSFUL "FLOPS" ARE STEPS ON THE ROAD TO PERFECTION. Soc. Automotive Engrs. J. 66:34-35, illus., May 1958.

Vanguard Project tracking by radar is cited as illustration.

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2269

Young, L.H. THE CHANGE AT CAPE CANAVERAL. Contr. Eng. 5:79-85, illus., June 1958.

A report on some of the new technical developments by instrument engineers to test and track missiles and satellites. The need for a "global range" is indicated. Some of the problems involved are listed.

2270

Young, L.H. PUTTING A SATELLITE INTO OUTER SPACE. Contr. Eng. 5:99-102, illus., Jan. 1958.

"Complete control of space vehicles is still an unsolved problem. Launching a satellite takes a combination of on-board control instrumentation and command signals from the ground. Here is a look at satellite control problems for the present and the future."

Vanguard control is included in the discussion.

2271

Zable, W.J. OMNI-DIRECTIONAL TRACKING SYSTEMS. Astronautics 3:34-35, 46-47, illus., Mar. 1958.

Combination of distance and angle measuring equipment permits instantaneous location of exact point in space of any missile within 200 miles. This new approach to tracking is used at the satellite launching center, Cape Canaveral, Fla.

2272

Zaehring, A.J. INTERNAL DANGERS THREAT IN SPACE. Missiles and Rockets 3:82, Apr. 1958.

Control of a synthetic atmosphere and the rocket power plant hazard are briefly discussed.

2273

Zaehring, A.J. MISSILES OF THE U.S.S.R. RUSSIAN INTERESTS IN ROCKETS AND SPACE FLIGHT GOES BACK TO 1903, AND RECENT DISCLOSURES OF SATELLITES AND GUIDED MISSILES SHOW THAT

THE SOVIETS HAVE MODERN WEAPONS UNDER DEVELOPMENT AND IN MASS PRODUCTION. Ord. 42:639-642, Jan./Feb. 1958.

This article is said by the author to be based on a careful collection, screening and analysis of the Soviet missile developments, including earth satellites.

2274
Zarankiewicz, K. WARSAW CONFERENCE ON ROCKET TECHNIQUE AND ASTRONAUTICS. Spaceflight 1:210, illus., Jan. 1958.
Brief summary report on conference held in Warsaw on May 23-25, 1957, and organized by the Polish Astronautical Society.

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