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ABSTRACT

This periodical presents a summary of the Viking Mission to Mars, a listing of Skylab science films with the address for additional information; a schedule of exhibits at National Aeronautics and Space Administration visitor centers; space shuttle news; announcements of International Science Fair Awards; and an annotated bibliography of meteorites and comets. (SL)

NASA Report To Educators

National Aeronautics and Space Administration

Vol. 4 no. 3 October 1976

Mars — the Puzzles Begin

The photograph above is the first ever to be taken on the surface of planet Mars. Just minutes after Viking 1 landed in the early morning hours of July 20, the photograph began to be received at the Jet Propulsion Laboratory in Pasadena, California. That day, exactly seven years after man's first landing on the Moon, was proclaimed by President Gerald R. Ford as Space Exploration Day, 1976 (see the box on page 2 for the text of the proclamation).

Originally, Viking 1, launched exactly eleven months before, was scheduled to land on Mars on July 4, but that date came and went as scientists sought a smoother, thus safer, site. The original selection, on the southeastern edge of the huge Chryse basin, was found to look as turbulent as if it had been churned by rushing water. As the orbiter continued to relay photos of the surface, mission scientists sought a site "downstream" from the first site, where the hypothetical rushing water would have deposited sediments, perhaps smoothing the terrain. Such a site was found about 580 kilometers (360 miles) away, in the western part of the basin. And the lander was brought safely to the surface.

Early color photos indicated that the Red Planet is indeed red, or at least a rusty-orange, possibly from an iron oxide called limonite. The sky, too, has a pinkish-rust color from the surface particles suspended in the atmosphere.

On July 28, the scoop-like soil sampler reached out in a carefully chosen direction and shoveled up perhaps a tablespoon of Martian soil for the lander's miniature laboratories. Scientists quickly began getting data readings indicating high levels of oxygen being given off by the sample. Life? . . . or a chemical reaction of the soil? Later, the carbon-assimilation experiment revealed radioactivity counts that are more consistent with microorganisms than with inorganic particles. So the possibility of life on Mars remains open.

Viking 2 entered Martian orbit on August 7. Unlike Viking 1, which was promptly placed in an orbit that was synchronous with the initial landing site, the second craft entered a nonsynchronous orbit that would take it ranging across the whole planet, giving scientists full opportunity to explore the best landing sites. Twenty days later, the orbit was changed to make it synchronous over the selected landing site on the Utopian plains, 4600 miles from the first site. Scientists then inspected the region closely before the craft was landed safely on September 3. A few days later the first sample was taken.

All four Viking vehicles will rest for a month beginning early November when Mars goes behind the Sun, out of radio contact with Earth. Then the robot explorers will be restarted for another period of studying our neighbor, Mars.

NASA Report to Educators will bring its readers another report on Viking and its initial investigation of Mars in the December issue. ■

Space Exploration Day, 1976

A Proclamation

[illegible]

Gerald R. Ford

Single-Concept Science Films from Skylab

The Skylab space station may now be abandoned in orbit but films taken during its occupation by two groups of astronauts are now making an impact in high school physics classes. These films are demonstrations of physics principles in zero gravity environment, demonstrations that have never before been conducted by man.

Devised by scientist astronauts and other NASA personnel before the launch of Skylab, these demonstrations were conducted by the astronauts of Skylabs 3 and 4. The single-concept films were edited by Dr. Robert G. Fuller of the University of Nebraska, Lincoln, and Mr. Thomas C. Campbell, Illinois Central College. They are available with accompanying study guides from the American Association of Physics Teachers.

The twelve single-concept films are: 1) **Human Momenta:** the astronauts float through the orbital workshops; various initial conditions of motion are shown. 2) **Moving Astronauts:** a more elementary version of *Human Momenta,* showing additional scenes of the astronauts floating through the workshop. 3) **Acrobatic Astronauts:** a complex series of spins, turns, and half-flips looks easy in zero gravity. 4) **Games Astronauts Play:** Skylab recreation included darts, paper airplanes, weight lifting, and a balancing act. 5) **Reference Frames:** scenes of moving astronauts taken with a still camera and a movie camera are contrasted. 6) **Human Mass Measurement:** how do you measure your change in body mass in space? 7) **Collisions:** a sequence of colliding objects, from astronauts to water drops. 8) **Liquid Drops:** water constrained in shape only by surface tensions seems quite different from the water we know. 9) **Water Bridges:** water forms a bridge between two metal rods and illustrates a variety of unusual properties. 10) **Oscillations:** a bridge of water can oscillate and behave like a vibrating string. 11) **Soap and Water:** soap drops, not inhibited by weight, freely mix with water while remaining aloof from other soap drops. 12) **Gyroscopes:** The properties of gyroscopes are easily illustrated in a setting where gravitational forces are negligible.

For further information, contact AAPT, Publications Dept., Graduate Physics Building, SUNY at Stony Brook, Stony Brook, New York 11794. ■

NASA Visitors Centers

This summer marked the opening of two new facilities for visitors to NASA centers, at Goddard Space Flight Center in Greenbelt, Maryland, and at Lewis Research Center, Cleveland, Ohio.

NASA Goddard is a world leader in space/earth science and applications and is the Agency's focal point for international cooperative projects as well as the hub of the NASA worldwide tracking, data acquisition, and communications network. Visitors can take part in a self-guided tour of the new Visitors Center and selected operational areas of Goddard. It takes visitors past the control hubs of the global tracking and communications networks, the electronic lifelines for manned and unmanned craft.

Visitors view an unusual map of Goddard's international activities. At left is a unique view of the sun during an artificial eclipse.

Currently the lawns around the Goddard Visitors Center are brightened by an exhibit of numerous 4 ft. x 8 ft. paintings portraying the history, present, and future of the space program. They were created by 55 junior and senior high school art projects in Prince Georges County, Maryland, in a cooperative Bicentennial project with the Goddard Educational Programs Office.

The Visitors Center at Goddard is open from 10:00 a.m. to 3:00 p.m. daily, Tuesday through Saturday. Groups wishing to visit should write or call in advance in order to select a day when the facilities are not overcrowded. Write or phone the Visitors Center, Goddard Space Flight Center, Greenbelt, Maryland 20771; area code 301-982-4101.

Lewis Research Center—The NASA Lewis Visitor Information Center opened July 4 after three years of planning. Lewis, originally the Aircraft Engine Research Laboratory for NASA, is involved with space propulsion and power, as well as energy sources and basic materials research. Lewis heads many of NASA's efforts in energy research to help solve man's problems on Earth.

The Visitor Information Center will feature nine program areas: practical uses of satellites, exploring the universe, aeronautics, electric power in space, ground-based energy sources, flight propulsion systems, spacecraft launch and propulsion, materials, and technology utilization. Many of the displays call for hands-on participation of the visitors.

The Lewis Visitor Center is unique in that it has areas set aside exclusively for use by teachers engaged in workshop activities or working on aerospace related curriculum projects in the educators' resource center.

The Visitor Information Center at Lewis is open from 9:00 a.m. to 4:00 p.m. Tuesday through Friday and from 10:00 a.m. to 3:00 p.m. on Saturdays. To plan for group visits or to arrange to carry out educational research, contact Visitor Information Center (M.S. 8-1), NASA Lewis Research Center, 21000 Brookpark Road, Cleveland, Ohio 44135, or telephone area code 216-433-4000, ext. 731. ■

Space Shuttle News

The first Space Shuttle Orbiter was rolled out of the Rockwell International Space Division manufacturing facility at Palmdale, California, on September 17, 1976. Preparation then began for flight testing the craft piggyback atop a Boeing 747 air transport.

NASA has put out a call for applications for candidates to be astronauts in the Space Shuttle transportation program of the 1980s. Both women and minorities are encouraged to apply as pilot candidates and mission specialist candidates. At least 15 in each category will be selected to report to Johnson Space Center at Houston for two years of training and evaluation beginning July 1, 1978. Pilot astronauts, who must have at least 1,000 hours first pilot time, and preferably more, before applying, will control the Shuttle during launch, orbital maneuvers and landings and be responsible for maintaining vehicle systems. Mission specialist astronauts, who may be flying biologists instead of physicists or engineers, will be responsible for the coordination of overall orbiter operations, especially in the realm of payload management. Shuttle crews could consist of as many as seven people—commander, pilot, mission specialist and up to four payload specialists, who need not be NASA employees.

Viking and College Students

Fifty-eight college students from across the nation have spent part of this summer working with Viking scientists at the Jet Propulsion Laboratory in the Viking Undergraduate Intern Program. The program, designed to involve undergraduate students with a strong interest in planetary science, is the idea of Thomas Mutch, a professor at Brown University and leader of the Viking imaging team. Dr. Carl Sagan of Cornell University assisted in the detailed planning. Each of the Viking interns was assigned for his or her 30-day experience to one of the major Viking areas of activity, such as Lander Imaging, Water Vapor Mapping, or Biology. ■

NASA Officials Named

President Ford has named Dr. Alan M. Lovelace as Deputy Administrator for NASA. Lovelace has been with NASA since September 1974 when he became Associate Administrator for Aeronautics and Space Technology. Prior to that he held various research management positions in the Defense Department. From 1954 he served at the Air Force Materials Laboratory at Wright Patterson Air Force Base, working as Director of the laboratory from 1967 to 1972. In that year he moved to Andrews Air Force Base as Director of Science and Technology with the Air Force Systems Command. In the year prior to joining NASA, Lovelace served as Acting Deputy Assistant Secretary of the Air Force (Research and Development).

Lovelace

Newman

Joining NASA at the end of July as Assistant Administrator for Public Affairs was Robert A. Newman. Formerly Vice President of Community Affairs for TRW, Inc., and President of the TRW Foundation, Newman will be responsible for all the information services of NASA except for technical publications. ■

ATS-6 at Work While Returning to the West

Applications Technology Satellite-6, which completed its year-long sojourn over East Africa where it was used in India's Satellite Instructional Television Experiment, is on its way back to the Pacific Ocean for another year of activity in American educational and health-care direct-broadcast experiments. During the four-month-long move, the satellite is being used in a special diplomatic demonstration of the potential of Space Age Technology for developing countries. NASA is assisting the U.S. Agency for International Development (AID) as part of a broad new U.S. initiative described by Secretary of State Kissinger at the U.N. Conference on Trade and Development in Kenya last May. He noted the vital role played by technology in improving the standard of living in developing countries and expressed America's commitment to transfer a wide range of useful technologies as quickly and effectively as possible.

ATS-6 was used in August in a set of demonstrations for eleven Mid-East nations and one international conference. The powerful satellite broadcast direct to simple, low-cost receivers set up in each country. After an initial greeting by President Ford, the demonstration featured three films created especially for the program. The first showed the uses of communications technology for national development. The second showed space satellites used for environmental monitoring, mapping, land surveys and other natural resources studies. A third discussed technologies useful for disaster prediction, assessment and relief. Following the films, the host country held a live presentation on the role of science and technology in its development. This was followed by a two-way video discussion between U.S. officials and host-country representatives. Starting in late September, another group of countries to receive the demonstrations will include 15 nations in Africa, Central America, South America, and the Caribbean.

About December, ATS-6 will again become available for projects in the United States. Final selections among the projects proposed for the craft's third year in orbit have not yet been made, but some of the experiments conditionally accepted include various aspects of satellite science, an experiment demonstrating the feasibility of conducting emergency medical services training programs via the satellite, a second phase of the Appalachian education project begun in 1974, an evaluation of the use of satellites for providing a computer managed instruction system at remote sites, and a continuation of the Indian Health Service project in Alaska. ■

1976 International Science and Engineering Fair

At the International Science and Engineering Fair held in Denver, Colorado, May 10-15, 1976, eight students received NASA awards in recognition of creative scientific endeavor in aerospace research. Each student received a Certificate of Merit signed by Dr. James C. Fletcher, NASA Administrator, and Mr. E. G. Sherburne, Jr., Director of Science Service, sponsor of the ISEF. The students also received an expenses-paid visit to the Goddard Space Flight Center with their teachers. The trip was scheduled so that the group could attend the ribbon-cutting ceremony of the National Air and Space Museum in Washington, D.C., on July 1st and enjoy a tour of the new museum before it was opened to the public on July 2.

The award-winning students, their teachers, and their research were as follows:

Eric C. Beck, Lampeter-Strasburg High School, Lampeter, Pennsylvania; Mr. William Lauris; "Computer System Design"

Gregory A. Dale, Swanson Junior High School, Arlington, Virginia; Mr. Merlyn E. Hyers; "Infrared Beam Tripping Device"

Paul M. Embree, Muhlenberg Township High School, South Temple, Pennsylvania; Mr. Ronald M. Fabian; "Frictional Losses of an Autoregulated Magnetic Suspension"

Earl Goodrich II, Marshall High School, Marshall, Michigan; Mr. John Malinowski; "Anatomy of a Computer"

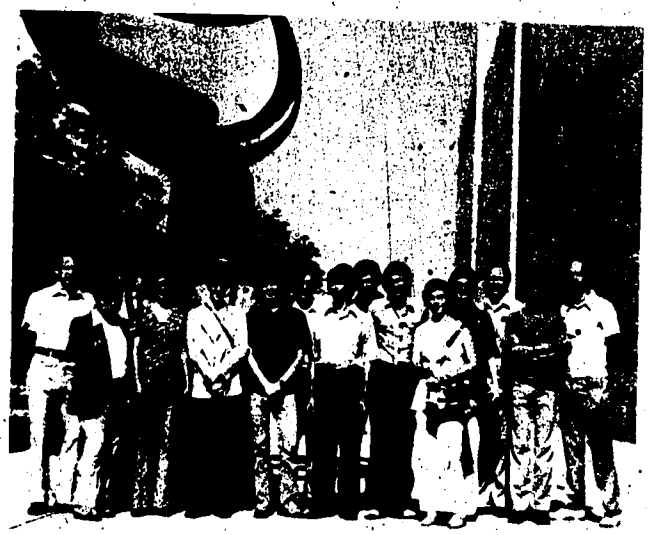
Kreg A. Martin, Peterson High School, Sunnyvale, California; Mr. Dan Baer; "Computer for Cellular Simulations"

William M. Rojas, Mainland Senior High School, Daytona Beach, Florida; Ms. Marlene Cooper; "Central Processing Unit"

Jeff D. Smith, Martinsville High School, Martinsville, Indiana; Mrs. Julia Oliver; "Cybernetics"

Diane Holland Wooden, T. S. Wootton High School, Rockville, Maryland; Mr. George Rossano; "Extinction in the Dark Nebula Lynds 1295"

In addition, eleven students were awarded Honorable Mention, with each student receiving a mounted photograph of the Viking lander signed by Dr. Fletcher and the Viking Program team. The Honorable Mention winners were: **Maile Jean Apau,** The Kamehameha Schools, Honolulu, Hawaii; **John William Belliveau,** Woodside Priory School, Portola Valley, California; **Bradley Gene Burgess,** Castleberry High School, Fort Worth, Texas;



The 1976 winners of the International Science and Engineering Fair at the National Air and Space Museum.

Mikel Steven Crook, Lander Valley High School, Lander, Wyoming; **Kirk A. Dunkelberger,** Merrillville Senior High School, Merrillville, Indiana; **Randy C. Elliott,** Duncan Senior High School, Duncan, Oklahoma; **Christopher John Hanak,** Notre Dame High School, Lawrenceville, New Jersey; **Peter Haslett Kelly,** Ferguson High School, Newport News, Virginia; **Franklin T. Reynolds,** Evans Junior High School, Ottumwa, Iowa; **Peter A. Sandborn,** Fort Collins High School, Fort Collins, Colorado; and **William W. Wehner II,** Assumption High School, Davenport, Iowa. ■

Science Talent Search Finalists at NASA

Two of the forty finalists in the annual Science Talent Search sponsored by Westinghouse Electric Corp. and Science Service carried out their research and prepared their scientific projects at NASA field installations.

Diane H. Wooden (one of the Science Fair winners mentioned above) of Rockville, Maryland, won a $6,000 scholarship for her study of galactic dust. Her work was accomplished using a 36-inch reflecting telescope at Goddard Space Flight Center.

James E. Black of Fremont, California, worked at Ames Research Center on the development of methods by which pure chlorine dioxide might be produced and stored. The chemical, produced from chlorine dioxide, is required by scientists for study because of its suspected role in the ozone-destroying reaction believed to be caused by Freon propellants. ■

Bibliographies

These annotated bibliographies were prepared by Dr. Bevan French, Chief, Extraterrestrial Materials Research, Division of Lunar and Planetary Programs, Office of Space Sciences, NASA. They are for the use of laymen as well as aerospace educators.

Meteorites and Comets

Heide, Fritz. **Meteorites.** English translation by Edward Anders and Eugene DuFresne. The University of Chicago Press (Phoenix Science Series), 1964. $1.95 paperback. An introductory textbook for nonspecialists that covers the basic information about meteorites: their nature, chemistry, mineral composition, history, how they are used as probes to detect cosmic rays, and the craters they make if they fall to earth. A good book for the general reader.

Krinov, E. L. **Giant Meteorites.** English translation by J. S. Romankiewicz. 397 p., Pergamon Press, 1966. $20.00. A detailed textbook, written by a prominent Russian authority, which describes both ancient terrestrial meteorite craters and modern falls of large meteorites. An excellent source of information on little-known Russian meteorite falls, and the section describing the investigation of the 1908 Siberian explosion is a fascinating adventure story in itself.

Mason, Brian. **Meteorites.** 274 p., Wiley, 1962. $8.95. A basic textbook on the minerals and chemistry of meteorites, suitable for more advanced readers but considerably dated by the flood of meteorite research during the last ten years.

Nininger, Harvey H. **Arizona's Meteorite Crater: Past, Present and Future.** 232 p., World Press, 1956. $3.75. A detailed description of the world's best known and most-visited meteorite crater, its history, and the information it has yielded about meteorites and their collisions with Earth.

———. **Find a Falling Star.** 254 p., Paul S. Eriksson, 1971. $8.95. A fascinating autobiography of a "meteorite hunter" whose research career began when meteorites were only curiosities and continues into the present when they have become objects of intense and important scientific studies to decipher our solar system.

———. **Out of the Sky: An Introduction to Meteorites.** 336 p., Dover Books, 1952. $1.85 paperback. One of the first textbooks on meteorites and still an excellent introduction to all facets of meteorite research, including the chemistry and mineralogy, the search for ancient and modern falls, and the nature of impact craters.

Richardson, Robert S. **Getting Acquainted with Comets.** 306 p., McGraw-Hill, 1967. $7.50. A well-written and readable description of the nature, origin, and history of comets and how scientists study them.

Watson, Fletcher S. **Between the Planets.** 224 p., Doubleday/Anchor Books, 1962. $1.25 paperback. A well-written and well-illustrated general survey of the "leftover" material in the solar system: the asteroids, comets, and meteorites. Provides a good description of the relationships of meteorites to other small bodies of the solar system.

Wood, John A. **Meteorites and the Origin of Planets.** McGraw-Hill. (Earth and Planetary Science Series), 1968. $2.95 paperback. A good introductory textbook about meteorites that covers current research and describes what meteorites tell us about the solar system.

The following books are collections of detailed information for the scientist or specialized reader:

Mason, Brian, editor. **Handbook of Elemental Abundances in Meteorites.** 555 p., Gordon and Breach, 1971. $20.10 paperback; $50.50 hardbound. A complete summary of the chemical data obtained from the study of all the different types of meteorites.

Nagy, Bartholemew. **Carbonaceous Meteorites.** 747 p., Elsevier Scientific, 1975. $80.95. A complete encyclopedia on the history, nature, minerals, chemistry, and organic compounds of the unusual carbon-bearing meteorites which are our best samples of primordial solar system material containing clues to the origin of life.

Wasson, John T. **Meteorites.** 316 p., Springer-Verlag, 1974. $31.20. A thorough and up-to-date textbook covering all aspects of meteorite research and the role of meteorites in understanding the past and present solar system.

NASA Publications of General Interest

These books can be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Cortright, E. M., editor. **Apollo Expeditions to the Moon.** NASA SP-350, 1975. $8.90. Written by the astronauts and officials involved, this impressively illustrated book tells in fascinating detail the story of the Apollo Program: the decision to go to the Moon, the building of the machines, the Earth-based network that supported the men on the Moon, the lunar discoveries, and the heritage that the Apollo Program has left us.

Fimmel, R. O., W. Swindell, and E. Burgess. **Pioneer Odyssey: Encounter with a Giant.** NASA SP-349, 1974. $5.50. The story of the Pioneer 10 mission which sent an automated spacecraft far out into the solar system to swing around the giant planet Jupiter and then become the first man-made object to leave our solar system. This well-illustrated book also contains details of the close-up scientific discoveries made about Jupiter.

Hartman, W. H., and O. Raper. **The New Mars: the Discoveries of Mariner 9.** NASA SP-337, 1974. $8.75. A beautifully illustrated textbook that combines the early discoveries about Mars with the new scientific studies made with the Mariner 9 close-up pictures. Carefully selected photographs highlight separate chapters that describe different features of Mars. Photographs compare similar features on Mars and Earth.

Mars as Viewed by Mariner 9. NASA SP-329, 1974. $8.15. A detailed "picture book" of Mars as seen through the cameras of Mariner 9, this document contains several hundred captioned illustrations of the craters, volcanoes, canyons, dunes, clouds, and ice caps that make Mars a complex and fascinating planet, partly like Earth and partly like the Moon.

Nicks, W. O., editor. **This Island Earth.** NASA SP-250, 1970. $6.00. An early collection of color pictures of our own world as seen through the eyes of the first orbiting astronauts. The text and captions provide details about one of the most exciting discoveries of the space program—a new vantage point from which to explore and understand our own planet.

NAEA Gets Executive Director

As of July 1, Dr. Bobby Wicker was appointed executive director of the National Aerospace Education Association by Louis Michot, president of NAEA. Dr. Wicker, formerly of the Louisiana State Department of Education, will be concentrating his efforts on the development of a program of state directors, increase in membership at the local level, and fund raising. Dr. Wicker will remain in Louisiana and can be reached at 1466 Cloverdale, Baton Rouge, LA 70808; telephone 504-387-3489.

Miller Lanier, acting director since NAEA's move to Tennessee last year, will continue as an advisor to the National Headquarters. All normal business of the association should be directed to the headquarters, Middle Tennessee State University, Box 59, Murfreesboro, TN 37130; telephone 615-890-1500. Educators who join the organization now may still receive the last of the Aerospace Personality Series materials on the Wright brothers, Robert Goddard, and Charles Lindbergh. ■

School Year Launches

Perhaps the major launch of which educators should be aware during this coming school year is the launch, probably in April 1977, of HEAO-A, the first High Energy Astronomy Observatory. Its 1,300 kg (2,950 pound) payload of scientific instruments will study some of the most intriguing mysteries of the universe—very energetic radiation from space, X-rays, gamma rays, and cosmic rays. It will investigate the evidence gained from sounding rockets and smaller satellites that supernovae and pulsars are X-ray sources and that X-rays are linked with radio galaxies and quasars. HEAO may begin to change our concept of the universe.

Five communications satellite launches are projected, all reimbursable: for RCA in October, a Marisat for Comsat Corp. in December, Intelsats in December and May, and an Operational Technology Satellite for the European Space Agency in May. Meteorological satellite launches include an ITOS in September, GOES-B in January and GEOS-B in April. In addition, a SIRIO satellite will be launched for Italy in January. ■

Cub Scout-NASA Project

The January 1977 theme suggested by the Cub Scouting Division, Boy Scouts of America, for their membership is "The World of Tomorrow." During the month, the Cub Scouts and their den leaders will have an opportunity to participate in a cooperative project with NASA. Den activities may include creating original pictures, literary compositions, or models on aerospace-related subjects.

Cub Scouts will receive recognition for their creations through a competition conducted at all levels from den to region. A select number of the boys' projects and leaders' descriptions of the activities they sponsored, submitted to the Cub Scouts, will be included in a NASA publication, which will be available for the Cub Scout leadership, adult leaders of similar youth groups, and teachers of the upper primary grades. ■

Recent NASA Publications

Orders of Magnitude, A History of NACA and NASA 1915-1976, by Frank W. Anderson, Jr., is a fully illustrated paperback sketching the development of the National Advisory Committee for Aeronautics and its successor, NASA. SP-4403. $2.20.

Aeronautics and Space Report of the President—1975 Activities is the second annual report of the President to the Congress describing the accomplishments of calendar year '75. Not a NASA publication but available from GPO for $1.85. Stock # 033-000-00649-1. Also covers space related activities of Defense, Commerce, ERDA, Interior, Agriculture, National Science Foundation, EPA, and other departments and agencies.

Available from your nearest NASA Center (see p. 8):

Questions about Aeronautics and Space—a small pamphlet answering some current questions.

What if?—excerpts from a speech by NASA Administrator Dr. James Fletcher on the value of curiosity.

Fuel-saving Aircraft—a brief look at some of the programs directed toward development of fuel conservative aircraft.

Space Benefits: NASA Films and Publications—a brief directory of NASA materials dealing specifically with earthly benefits from space.

Where to Write for Services

NASA publications should be ordered from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Publication lists, film lists, and information about other services are available from the Educational Office at the NASA center serving your state. See the list below.

NASA Ames Research Center
Moffett Field, California 94035
Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington, Wyoming

NASA George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812
Alabama, Arkansas, Iowa, Louisiana, Mississippi, Missouri, Tennessee

NASA Goddard Space Flight Center
Greenbelt, Maryland 20771
Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont

NASA John F. Kennedy Space Center
Kennedy Space Center, Florida 32899
Florida, Georgia, Puerto Rico, Virgin Islands

NASA Langley Research Center
Langley Station, Hampton, Virginia 23365
Kentucky, N. Carolina, S. Carolina, Virginia, West Virginia

NASA Lewis Research Center
21000 Brookpark Road, Cleveland, Ohio 44135
Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin

NASA Lyndon B. Johnson Space Center
Houston, Texas 77058
Colorado, Kansas, Nebraska, New Mexico, N. Dakota, Oklahoma, S. Dakota, Texas

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