NASA News

National Aeronautics and
Space Administration

Washington, D.C. 20546
AC 202 755-8370

For Release

IMMEDIATE

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RELEASE NO: 77-87

HEAO-A LAUNCH NOW SET FOR JUNE 30

NASA's first High Energy Astronomy Observatory, HEAO-A, is scheduled to be launched about June 30 from the Kennedy Space Center, Fla., aboard an Atlas Centaur rocket.

The launch had been postponed from an earlier scheduled date, April 15, due to problems with the observatory's gyroscope package. The malfunctioning rate gyros were removed from the spacecraft at the launch site and returned to the supplier for failure analysis, corrective action and re-test. The function of the four gyros is to provide attitude control for the observatory.

-more-

Mailed:
May 3, 1977

HEAO-A will inaugurate a three-mission program to study some of the most intriguing mysteries of the universe -- pulsars, quasars, exploding galaxies and black holes in space. HEAO-B and HEAO-C will be launched in 1978 and 1979.

The observatories -- the heaviest unmanned Earth-orbiting satellites ever launched by the United States -- will carry scientific instruments capable of detecting, with high sensitivity and resolution, X-rays emitted by stellar sources throughout the universe. Celestial gamma ray and cosmic ray data also will be collected.

The program is managed for NASA's Office of Space Science by the Marshall Space Flight Center, Huntsville, Ala.

-end-

NASA News

National Aeronautics and
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Ad A-3

May 17, 77

For Release

TUESDAY,
May 24, 1977

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RELEASE NO: 77-88

NASA TO LAUNCH GOES-B:NOAA ENVIRONMENTAL MONITORING SATELLITE

A new environmental monitoring satellite, to be positioned to keep watch over the eastern half of the United States and the Atlantic Ocean, is scheduled to be launched about May 28, just in time for this year's hurricane season.

The satellite, GOES-B, will be the latest in a series of Geostationary Operational Environmental Satellites to be operated by the National Oceanic and Atmospheric Administration (NOAA).

-more-

Mailed:
May 17, 1977

The spacecraft is set for launch about 6:15 a.m. EDT by NASA from Kennedy Space Center in Florida. It will be placed into an Earth synchronous orbit at an altitude of about 35,800 kilometers (22,300 miles) with a velocity which will keep it in position over the equator above South America. Once in orbit, the satellite will be known as GOES-2.

From that position, instruments aboard the satellite will let it "see" the development of hurricanes in the tropical Atlantic or Caribbean and follow any storm's movement. The satellite routinely transmits imagery back to Earth every half hour, day and night; more frequently when necessary.

GOES-B tentatively is expected to replace an earlier spacecraft of the same series in maintaining the East Coast watch. Another satellite of the series is positioned above the equator over the Pacific Ocean, watching the western half of the United States and the Pacific as far west as Hawaii.

While hurricane watch is an important mission of the satellite, it is far from the only responsibility, according to David S. Johnson, Director of NOAA's National Environmental Satellite Service.

Originally conceived as weather satellites, the geostationary spacecraft do provide a host of data of importance to weather forecasters. They use both visual and infrared imagery for severe storm evaluation and to analyze cloud cover, winds, ocean currents, fog distribution, storm circulation, snow melt and other environmental phenomena.

But other instruments on board enable the satellite to receive and transmit to earth information from data collection platforms on land and in the oceans; such information as water levels in rivers and reservoirs, ocean wave heights, rain and snowfall measurements and the like. Additionally, from digital data provided by the satellite, scientists are able to determine wind speeds and directions and cloud heights. Instruments also monitor solar "storms" by measuring X-rays and high energy particles emitted by the sun.

Since May 1974, when the first spacecraft of the series was launched, the use of data has rapidly expanded until today the information is used by such divergent interests as marine shipping companies, forestry officials and commercial fishermen.

Infrared radiometers provide Atlantic Coast and Gulf of Mexico shipping with precise information on the locations of the Gulf Stream and the Gulf Loop Current, enabling ships to utilize or avoid the currents in those waters. Gulf fishermen also use the information to find productive fishing grounds.

Both the Coast Guard and Civil Air Patrol use geostationary satellite data in their search and rescue efforts and current research projects indicate imagery and digital data provided by the spacecraft may be of use to agricultural interests by showing freeze lines, soil moisture content and the like.

Manufactured by Ford Aerospace and Communications Corp., as were the first three spacecraft in the series, GOES-B is expected to replace GOES-1 as the eastern satellite for NOAA at about 75 degrees west longitude. The earlier spacecraft will be moved to about 105 degrees west on stand-by basis, according to present plans.

Goddard Spaceflight Tracking and Data Network (STDN) will provide necessary support for the mission. The tracking stations include the Minitrack Network and stations at Guam; Orroral, Australia; Santiago, Chile; Quito, Ecuador; Rosman, N.C.; and Wallops Island, Va.

Goddard Space Flight Center, Greenbelt, Md., has contract and systems management responsibility for the spacecraft and performs in-orbit testing of the satellite until it is turned over to NOAA for operational use about 30 days after launch.

-end-

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RELEASE NO: 77-89

NASA AWARDS CONTRACT TO DEVELOP DC-10 STABILIZERS

The McDonnell Douglas Corp., Douglas Aircraft Co., Long Beach, Calif., has been awarded a $15.6 million NASA contract to develop and evaluate advanced composite vertical stabilizers for DC-10 transport aircraft.

Advanced composite materials offer high potential for reducing structural weight and direct operating costs of future commercial transport aircraft.

-more-

Mailed:
May 5, 1977

Composite materials are made up of filaments of boron or graphite arrayed in an epoxy, polyimide or aluminum matrix. Using composite materials rather than metal can decrease aircraft structural weight by about 25 per cent, reducing fuel consumption by 10 to 15 per cent. Composite materials are not only lighter than metal, but also are stronger.

Under the Aircraft Energy Efficiency (ACEE) Program, NASA is studying composite structures. The program is aimed at accelerating the use of composite structures in new aircraft by developing technology and processes for introduction of such structures into commercial transport aircraft.

Managed by NASA's Langley Research Center, the work required by this contract will be performed over a period of six and one-half years at the Douglas plant in Long Beach.

Costs of the definitive contract will be shared, with NASA contributing approximately $15.6 million and the contractor contribution approximately $1.7 million.

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RELEASE NO: 77-90

NASA ASKED TO TRACK BUOYS MONITORING NORTH SEA OIL SLICK

NASA has been requested by Norway's Det Norske Meteorologiske Institutt, Oslo, to use its Nimbus 6 satellite to track buoys dispersed in the huge oil slick resulting from the recent oil well blowout in the North Sea.

In a message to NASA's Goddard Space Flight Center, Greenbelt, Md., received May 2, the Norwegians said they intended to place five Random Access Measurement System (RAMS) drifting buoys in the oil slick beginning as early as May 4 with all five in place by about May 16. As they drift in the ocean, the buoys are designed to transmit various kinds of environmental information to the satellite.

-more-

Mailed:
May 5, 1977

They also can be accurately tracked by the same satellite -- in this case NASA's polar-orbiting Nimbus-6 meteorological satellite -- as it passes some 1,100 kilometers (680 miles) overhead several times a day. The buoys were originally designed by the Norwegians for research purposes.

William W. Conant, a Goddard RAMS engineer, said, "Because of the nature and importance of the request, we will support the effort and transmit locations of all the buoys on a twice daily basis for 30 days. We don't normally provide daily teletype information."

Conant said similar buoys were used earlier this year to assist the Coast Guard in tracking the oil slick resulting from the Argo Merchant oil spill off Nantucket Sound. He said the platforms provide an accurate, all-weather method of tracking, especially when aircraft can't be used. When they can be used, the position information tells aircraft where to go for visual observation.

The Norwegians have been working with the RAMS system for more than a year. For example, they have been using buoys to track ice drifting in the Spitzbergen region of the Barents Sea, north of Norway.

Nimbus-6, a multi-purpose weather and data collection satellite, was launched into polar orbit on board a Delta rocket June 12, 1975.

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RELEASE NO: 77-91

SATELLITES BEING TESTED TO PREDICT WESTERN WATER SUPPLY

Earth orbiting satellites may prove to be a new and valuable tool in the seasonal prediction of water supplies from snow in California's drought-stricken Sierra Nevada and other western mountains.

A major test of the satellites under operational conditions is currently underway in a joint project involving the water management agencies of Arizona, California, Colorado and Oregon.

-more-

Mailed:
May 6, 1977

The satellites include NASA's Landsat Earth resources satellites and the National Oceanic and Atmospheric Administration's (NOAA's) meteorological satellites.

"Positive results already have been obtained in previous research projects. The current four-year operational program is intended to test the concept under working conditions," Dr. Albert Rango, a research hydrologist at NASA's Goddard Space Flight Center, Greenbelt, Md., said.

The continuing drought in the West is a direct result of below normal snowfalls in the mountains, source areas for streamflow water supplies.

California is hardest hit, experiencing its second consecutive drought year with minimal snowfall in the Sierra Nevada. Runoffs from these mountains supply water for the whole central valley of the State of California. Many reservoirs on the western slopes of the mountains already are dry.

Landsat satellite imagery shows that the snowlines of the Sierras extend 610 meters (2,000 feet) less this year than 1975 which was a near normal year.

"Not only do we have less area of snowpack, but it is a thinner layer according to information from in-place snow sensors and ground measurements made by snow survey teams," said A. J. Brown, coordinator of California's Cooperative Snow Survey Program.

Brown is Chief of the Snow Surveys Branch, California Department of Water Resources, Sacramento, one of the co-operating water management agencies involved in the satellite study.

Some areas are facing more severe drought conditions than others, depending largely upon whether it is the first or second year of the drought.

Colorado, for example, has 25 - 40 per cent normal snowpack in the Rocky Mountains. This state expects to fare reasonably well because of adequate reservoir storage from near normal 1976 mountain runoff.

The "big picture" capabilities provided by satellite are less expensive and faster than conventional aerial surveys. Satellites also allow the same snow cover area to be mapped repeatedly under a relatively constant viewing perspective.

"Used as an additional prediction tool in the hands of the operational water agencies, satellite imagery may help improve water availability forecasts. Advance warning of pending low water supplies is necessary for the most effective use of available water," Brown said.

The cooperating water management agencies involved in the satellite snow mapping project include:

U.S. Geological Survey, Phoenix, Ariz., and Tacoma, Wash.;
U.S. Soil Conservation Service, Denver, Colo.;
U.S. Bureau of Reclamation, Denver, Colo.;
Bonneville Power Administration, Portland, Ore.;
National Weather Service, Portland, Ore.;
California Department of Water Resources, Sacramento;
Arizona Salt River Project, Phoenix; and
Colorado Division of Water Resources, Denver.

Operational satellite weather service is provided by NOAA's National Environmental Satellite Service, Suitland, Md.

Photographs to illustrate this news release (see pages 5 and 6) will be distributed without charge only to media representatives in the United States. They may be obtained by writing or phoning: The Public Affairs Audio-Visual Office
Code FV/NASA Headquarters
Washington, D.C. 20546

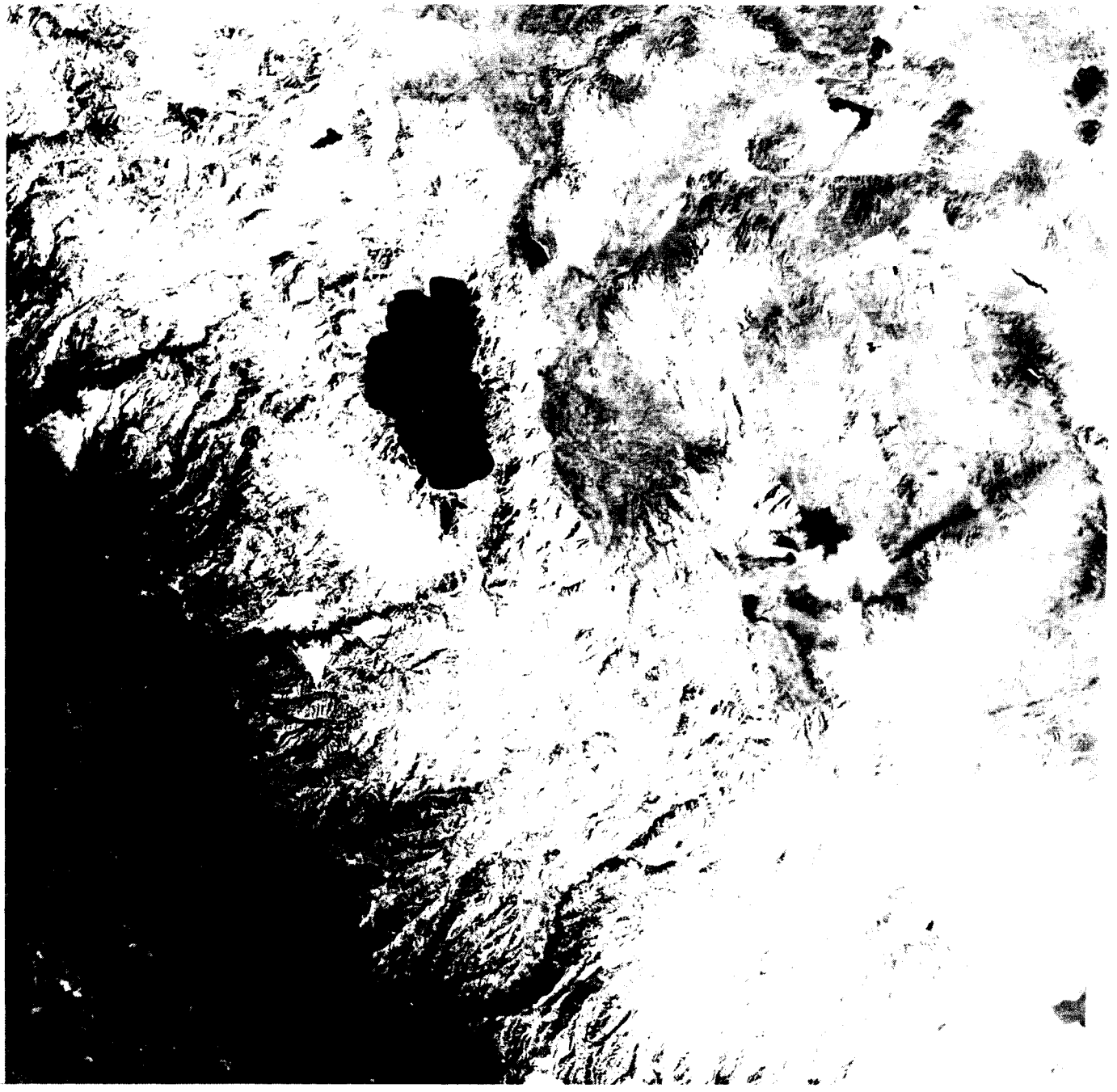
Telephone No: 202/755-8366 Photo Nos: 77-H-226
77-H-225

-more-

SNOW BARED SIERRA NEVADA IMAGED BY SATELLITE -- Clear evidence of the West's continuing drought is shown in this satellite scene of the snow bare Sierra Nevada mountains. Covering 13,225 square miles, the image was recorded by the Landsat satellite Feb. 14, 1977, and radioed to NASA's Goddard Space Flight Center, Greenbelt, Md. Measurements made from this image reveal that the snowline is 2,000 feet higher in 1977 than in a comparable 1975 image, a near normal snowfall year. Information from snow survey teams and in-place ground sensors confirms that the available snow in the Sierras not only covers less area but is thinner. Lake Tahoe can be seen in the photograph center.

NASA Photo: 77-H-226

-more-



SNOW LADEN SIERRA NEVADA IMAGED BY SATELLITE -- This satellite photograph of the Sierra Nevada mountains, covering a 13,225 square mile area, depicts a near normal snowpack Feb. 23, 1975. It was recorded by the Landsat satellite and radioed to NASA's Goddard Space Flight Center, Greenbelt, Md. Measurements made from this image reveal that the snowline is 2,000 feet lower than the snowline in a comparable 1977 Landsat image. Lake Tahoe can be seen in the photograph center.

NASA Photo: 77-H-225

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RELEASE NO: 77-92

AUSTRALIA CONSIDERS SITE FOR NEW NASA LASER INSTALLATION

Australia's Minister for Science, Senator J. J. Webster, announced today that consideration is being given to installing a NASA satellite tracking laser in Australia for geodetic research, mapping and use in earthquake prediction.

The Department of Science is studying the technical feasibility of a temporary laser installation for NASA and is seeking a suitable site in western Australia.

Webster said it is proposed that NASA operate the laser in western Australia for about a year, beginning about mid-1978. But no commitments have been made by the Australian or United States governments.

-more-

Mailed:
May 9, 1977

It would be part of a network of tracking lasers to be established for various periods at scattered locations around the world. The lasers are able to accurately measure the range of a satellite by determining the time it takes pulses of light to travel to the satellite and to be reflected back to Earth.

In conjunction with NASA's Seasat satellite and other lasers in the global network (together with existing tracking lasers such as the one at the Australian Orroral Valley Satellite Tracking Station near Canberra), the proposed laser in western Australia will provide measurements in support of geodetic research -- including refinement of the measurement of the shape of the Earth -- and mapping of the oceans.

Webster said it would also provide accurate information of great interest to geologists and geophysicists for possible use in earthquake prediction studies.

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For Release

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3 P.M., WEDNESDAY,
May 11, 1977

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RELEASE NO: 77-93

DOUGLAS AWARDED CONTRACT TO STUDY AIRCRAFT CONTROLS

The Douglas Aircraft Co., Long Beach, Calif., a division of the McDonnell Douglas Corp., has been awarded a $2.3 million NASA contract to investigate selected advanced aerodynamic and control concepts for future energy-efficient civil transport aircraft.

These concepts hold considerable promise for aircraft of the 1980s and would assist efforts to make future aircraft more energy conservative, quieter, safer and more comfortable.

-more-

Mailed:
May 11, 1977

With its Aircraft Energy Efficiency Program, NASA is developing technology to make future air transports up to 50 per cent more fuel efficient. Work under this contract involves development of several aircraft features to improve the aircraft's lift to air-drag ratio, allowing an airplane to use less fuel.

This would be accomplished by incorporating advanced aerodynamic features such as winglets (wing tip vertical fin-like devices) to improve wing efficiency and advanced active control systems that reduce weight and drag by reducing control surface areas.

Douglas will design and wind-tunnel test a high-aspect-ratio supercritical wing. A high-aspect-ratio wing has a long span relative to its width. Properly designed high-aspect-ratio wings increase an airplane's aerodynamic efficiency.

The supercritical wing, invented by Dr. Richard Whitcomb of NASA's Langley Research Center, Hampton, Va., has a flattened upper surface and curved lower surface which, when flying at near-sonic speeds of current transport aircraft, decreases air drag by delaying occurrence of shock waves on wing surfaces. The wing design also will incorporate high-lift devices.

Work under the cost-type contract is to be performed at the Douglas plant in Long Beach over approximately two years. The contract is managed by NASA's Langley Research Center.

-end-

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RELEASE NO: 77-94

NASA TO BEGIN ASSESS II SPACELAB SIMULATION FLIGHTS

Airborne Science-Spacelab Equipment System Simulation II (ASSESS II) simulation of a 1980s Spacelab mission using an aircraft packed with Spacelab-type hardware and experiments, gets underway May 16.

Spacelab is one of the major payloads for the Space Shuttle system being developed by NASA and the European Space Agency (ESA) to transport people and equipment on a routine basis between ground and Earth orbit.

-more-

Mailed:
May 12, 1977

Spacelab will have facilities and equipment similar to laboratories on the ground. It will provide a shirt-sleeve environment for experimenters and will afford the first opportunity for non-astronaut trained scientific personnel to fly in Earth orbit.

Flown from NASA's Ames Research Center, Mountain View, Calif., ASSESS II is a joint NASA/ESA mission consisting of nine six-hour flights by a specially-outfitted Convair 990 jet aircraft and involving four payload specialists and a mission specialist.

Four payload specialists, two from NASA and two from ESA, will perform experiments gathering valuable scientific data in the fields of Earth resources, medicine, atmospheric pollution monitoring and infrared astronomy. To fulfill experiment requirements, the aircraft will fly a different route each day, ranging over the Pacific Ocean, to the northern and southern borders of the U.S. and as far east as the Dakotas.

The ASSESS II mission is being flown in the "Galileo II," a Convair 990 four-jet transport aircraft converted to a sophisticated flying laboratory, and used by NASA for a variety of scientific missions.

Throughout the 10-day period, the payload specialists and the mission specialist will be confined to the aircraft and an adjacent mobile van. The van will be parked next to the aircraft after each flight and contains living quarters similar to those found on the Space Shuttle.

Operations for the mission include a Mission Control Center and a Payload Operations Control Center under the management of NASA's Johnson Space Center, Houston, Tex., and Marshall Space Flight Center, Huntsville, Ala., respectively. Mission management, principal investigators of each experiment, and backup payload and mission specialists will be stationed at Ames Center during the mission.

A prime objective of ASSESS II is to involve the ESA and NASA Spacelab management elements in the same roles they will have during an actual Spacelab flight. On the NASA side, these elements include NASA Headquarters in Washington, D.C.; Marshall Center, mission manager; Johnson Center, in charge of flight operations; and Kennedy Space Center, Fla., to handle integration similar to plans for Spacelab integration at Cape Canaveral.

Other objectives of the simulation include studies of payload management coordination between experiment operators (payload specialists) in Spacelab and principal investigators on the ground and development of minimum training requirements for Spacelab participants in carrying out experiment operations. A further objective is to evaluate a plan to include principal investigators as payload specialists.

Six simulated Spacelab flights have been conducted since the program began in 1972, with each mission designed to evaluate potential Shuttle-Spacelab operations in further detail. ASSESS II is the second set of flights to be conducted as a cooperative effort with ESA. The first, ASSESS I, was conducted in June 1975 and involved five flights over a six-day confinement period.

The series will be completed May 26. On May 30, the aircraft will be flown to Paris, where it will be exhibited as configured for the ASSESS II mission at the Paris Air Show. Following the air show, Galileo II will be flown to Cologne, Germany, where the ESA experiments will be removed.

David S. Billio and Robert T. Menzies, both of NASA's Jet Propulsion Laboratory, Pasadena, Calif., have been designated prime payload specialists by NASA. Leon Weaver, of Marshall Center, has been named backup to both.

ESA has selected Claude Nicollier of Switzerland as a prime payload specialist and Juergen Fein of Germany as his backup. The other payload specialist position will be shared by Michael Taylor of England, who will fly six flights, and Klaus Kramp of Germany, who will fly the other three.

Astronaut Karl Henize of Johnson Center is the mission specialist for the simulation. He will control and monitor aircraft (spacecraft) experiment support systems, coordinate payload specialist activities and provide interface between the payload specialists and the aircraft crew.

Robert Parker, another astronaut from Johnson Center who was a member of the ASSESS I simulation team, will serve as backup mission specialist.

Stan Reinartz, of the Marshall Center's Spacelab Payload Projects Office, is mission manager and Leon Weaver is his assistant.

-end-

ADA-3

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(X) used in May

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For Release
IMMEDIATE

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RELEASE NO: 77-95

"SATELLITE ON A STRING" STUDY PROPOSALS ASKED

"Trolling" a satellite, attached to an orbiting Space Shuttle by a cable up to 100 kilometers (85 miles) long, through the Earth's upper atmosphere to gain scientific data is one of several potential applications for NASA's tethered satellite system concept.

✓ A request for proposals on how to build a tethered satellite system was issued May 26 by NASA's Marshall Space Flight Center, Huntsville, Ala.

Parallel nine-month contracts will be awarded to two proposers in late September. Proposals are due at the Marshall Center on or before July 1.

- more -

Mailed:
June 1, 1977

The tethered satellite system was conceived to provide long-duration measurement time in the atmospheric region between 80 and 120 km (50 and 75 mi.), between the Space Shuttle and Earth.

A usual orbital altitude for the Shuttle in this concept would be approximately 260 km (160 mi.). Pull exerted by Earth's gravity, plus constant tension kept on the tether cable, would keep the captive satellite at the end of its "string" oriented toward Earth.

Atmospheric density of this region is not sufficient to support the flight of aircraft or balloons, yet it is too dense for free-flying satellites to remain for appreciable periods. Previous exploration attempts have been limited to minutes, with sounding rockets, and hours with low level satellites.

A typical scientific mission for the tethered satellite system would be global mapping of the Earth's magnetic and gravity fields or studies of atmospheric or plasma physics.

Other potential applications of the tethered system are: cargo transfer between two space vehicles, retrieval of satellites or debris without having to maneuver the Shuttle and transfer of large amounts of energy to a remote experiment or from a remote, possibly hazardous power source to a space station.

To enhance radio astronomy work, long tethered lines could be used as a dipole antenna deployed from opposite sides of an orbiting subsatellite. Low frequency emissions received by the dipole antenna would provide improved resolution capability over ground-based radio telescopes. Also, a free-flying tethered line deployed as a low frequency antenna could be used to improve communications with submarines.

During a typical Shuttle mission, a Shuttle crew member would initiate the satellite deployment sequence after the Shuttle cargo bay doors have been opened. The tether would be automatically reeled off a spool and the satellite would be maintained in a pre-programmed position by a computer. The computer would control the tether, measuring the length of line deployed, the rate of line deployment and the line tension.

The retrieval cycle would also be initiated by a Shuttle crew member. The system would automatically reel in the satellite, dock it to the deployment/retrieval boom and retract the hold-down adapter in the Shuttle cargo bay. The entire system could be reused on many missions.

Mounted on a pallet, the tethered satellite system would be a partial payload for a Shuttle mission.

Because deployment or retrieval of the satellite could take several hours, the system has three safety mechanisms which could be used if any emergency arose. Two of the mechanisms would sever the tether and the third mechanism would eject the entire package from the Shuttle's cargo bay.

The Marshall Center is managing the activity for the Office of Space Flight, NASA Headquarters.

- end -

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RELEASE NO: 77-96

NASA'S FILM "UNIVERSE" WINS TOP CHICAGO FILM FESTIVAL AWARD

The 10th Annual U.S. Industrial Film Festival has honored NASA's motion picture "Universe" this month with its Chairman's Special Award, "Best of Festival." The competition for this prize included 970 motion pictures from five nations. The three finalists were Smithsonian Institution's "To Fly," I.B.M.'s "Parade of the Tall Ships" and NASA's "Universe."

"Universe" produced for NASA by Graphic Films during 1977 has received a nomination for an Academy Award, won a CINE Gold Eagle rating, won a bronze medal at the 19th Annual San Francisco Festival and an award from the Golden Gate Festival.

-more-

Mailed:
May 16, 1977

It will represent the United States as an entry in scores of International Film Festivals during the year. The U.S. Industrial Film Festival in Chicago is rated as one of the five top U.S. film festivals.

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RELEASE NO: 77-97

SPACE PROPULSION SYSTEM CONSIDERED FOR COMET RENDEZVOUS

A unique, new propulsion system under study by NASA may be used to propel a spacecraft to a historic rendezvous with Halley's Comet when it returns in 1986.

Halley's Comet has been observed from Earth during 30 appearances since 467 B.C. A detailed study of the comet's composition is considered important in unraveling theories of the creation of the solar system.

-more-

Mailed:
May 17, 1977

Halley's is a large active comet that traverses most of our solar system. Since its next appearance represents an opportunity to improve man's knowledge of the origin of the solar system, a rendezvous mission to Halley's Comet is under consideration by NASA.

Three NASA installations are involved in studies which could lead to a Halley's Comet mission. They are: Marshall Space Flight Center, Huntsville, Ala.; Lewis Research Center, Cleveland, Ohio; and the Jet Propulsion Laboratory, Pasadena, Calif.

The Solar Electric Propulsion System (SEPS), proposed by Marshall Center, employs solar energy concentrated by reflectors onto conventional silicon solar cells to provide electrical power to operate eight ion engines. These engines and associated power processors have been under development and testing at the Lewis Center for several years.

This system would be capable of propelling a spacecraft to a rendezvous with Halley's Comet just prior to the time when the comet crosses Earth's orbit around Christmas Day, 1985. This arrival date would permit the spacecraft to be in the vicinity of the comet during its most active state -- as it passes near the Sun.

The spacecraft, being defined by NASA's Jet Propulsion Laboratory, would be equipped with a wide variety of scientific instruments, including an imaging system to transmit pictures of the comet to Earth. A separate probe might be carried to penetrate the tail of the comet and approach the nucleus to determine its physical characteristics.

Marshall Center engineers propose a launch between March and June 1982 aboard Space Shuttle. Once deployed in space by the Shuttle, the SEPS and spacecraft would receive a boost of escape speed from a twin stage Interim Upper Stage (IUS), under development by the Department of Defense with NASA coordination by the Marshall Center. When IUS stages complete their job, the SEPS would begin to propel the craft on a three and one-half year journey -- more than 600 million miles -- to the selected rendezvous point.

The spacecraft, propelled by SEPS, would rendezvous at a point just outside the "dust" cloud approximately 50,000 kilometers (31,069 miles) from the nucleus. The primary function of SEPS would be completed at this point but it would continue to maneuver the spacecraft and provide electrical power to help accomplish its science mission.

Marshall Center engineers hope to design SEPS as a potential standard propulsion system capable of accomplishing a wide variety of other planetary as well as Earth orbital missions. Missions to Mercury, Mars, Jupiter, Saturn, other comets and asteroids are considered as possibilities with SEPS.

Another concept for the Halley's Comet rendezvous mission, being researched by JPL, calls for development of a very thin plastic film which would be fashioned into a large "solar sail" propelled by solar radiation pressure.

NASA is scheduled to make a decision in August this year about which of the two concepts would be most desirable for a possible rendezvous with Halley's Comet in 1985.

-end-

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For Release

IMMEDIATE

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RELEASE NO: 77-98

NASA, SOVIETS AGREE ON FURTHER MANNED SPACE COOPERATION

NASA and the U.S.S.R. Academy of Sciences have agreed on further cooperation in the area of manned space flight.

The agreement was signed May 6, 1977, by Dr. Alan M. Lovelace, Acting Administrator of NASA, and May 11, 1977, by Anatoly P. Aleksandrov, the President of the Academy of Sciences of the Soviet Union.

The agreement is designed to provide continuity of the joint technical, scientific and operational capability developed through the highly successful Apollo-Soyuz rendezvous and docking mission conducted in July 1975. Three joint working groups will prepare recommendations for two new programs, one dealing with orbital manned flight activities and the other with a possible future international space station.

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Mailed:
May 17, 1977

The first working group will begin studies soon on scientific and applications programs that may be conducted in joint operations of the American Space Shuttle and the Soviet Salyut space station in the early 1980s. A second working group simultaneously will develop plans for these joint operations.

The two working groups will seek to define projects which might benefit from the flexible delivery capability and large capacity of the American Space Shuttle and the capability for longer stay-time in orbit represented by the Soviet Salyut. The emphasis will be on a "science first" program which will take advantage of these capabilities and fully justify the contemplated joint operation.

It is anticipated that the studies of the Shuttle/ Salyut program will be completed within 18 to 24 months, producing recommendations for consideration by both sides.

The agreement also establishes a third joint working group whose task will be to conduct a series of phased studies of an international space platform, or station. If such studies develop consensus on the objectives of future space stations, further studies would be undertaken to explore possible agreement on the conceptual design of the stations.

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Neither side is committed to steps beyond the initial studies and each reserves the right to proceed with its independent national space station interests. The agreement does, however, raise the possibility that the two sides may be able to concert their space station interests in some degree, thereby offering potential economies and efficiencies.

(Agreement between the U.S.S.R. Academy of Sciences and NASA is attached.)

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AGREEMENT BETWEEN THE USSR ACADEMY OF SCIENCES
AND THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
OF THE USA ON COOPERATION IN THE AREA OF MANNED SPACE FLIGHT

In accordance with the Agreement on Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes between the USSR and the USA, dated May 24, 1972, and taking into account the results of discussions held in Washington, October 19-22, 1976, between the delegation of the USSR Academy of Sciences, headed by the Chairman of the Intercosmos Council of the USSR Academy of Sciences, Academician B. N. Petrov, and the delegation of the National Aeronautics and Space Administration of the USA, headed by the NASA Deputy Administrator, Dr. A. M. Lovelace, the Academy of Sciences and NASA agree to undertake the following steps for further development of cooperation between the USSR and USA in the exploration and use of outer space for peaceful purposes.

I. Study of the Objectives, Feasibility and Means of Accomplishing Joint Experimental Flights of a Long-Duration Station of the Salyut-Type and a Reusable "Shuttle" Spacecraft (Salyut-Shuttle Program)

In view of the fact that the long orbital stay-time of the Salyut-type station and the capabilities of the Shuttle spacecraft commend their use for joint scientific and applied experiments and for further development of means for rendezvous and docking of spacecraft and stations of both

nations, the two sides agree to establish two joint working groups (JWGs) of specialists, charging them with studying the objectives, feasibility and means of carrying out a joint experimental program using the Soyuz/Salyut and Shuttle spacecraft:

-- a JWG for basic and applied scientific experiments.

-- a JWG for Operations.

Within 30 days after the Agreement becomes effective, the sides will inform each other of the initial leaders and composition of these JWGs. The work of both Joint Working Groups should begin simultaneously. The composition of the JWGs can be changed or enlarged at any time as necessary. Appropriate sub-groups can be formed.

In their studies, the JWGs should proceed on the assumption that the first flight would occur in 1981. The final date would be set in the course of the joint work.

First Phase of the Joint Working Groups' Activity

The following preliminary project documents should be prepared within 6-12 months after the agreement comes into effect:

-- preliminary proposals for scientific experiments;

-- preliminary technical proposals for carrying out the program;

-- preliminary schedules for implementing the program.

Second Phase of the Joint Working Groups' Activity

The JWGs should prepare the following definitive documents within one year of joint work in the second phase:

-- a technical description of the joint program and its realization;

-- a scientific program for the joint flight;

-- a schedule for conducting the joint work;

-- an organizational basis for implementing the program;

-- a list of additional joint technical documentation which may be required.

The sides will make the final decision on implementing the program at the end of the second phase of the JWGs' activity.

The working period of the JWGs in the first and second phases of their activities can be shortened.

Each side will consider the accommodation on its spacecraft of payloads proposed by the other side for flight in the Shuttle-Salyut program. Such accommodation will be undertaken where both sides agree that the payloads concerned are of mutual value and interest.

II. Consideration of the Feasibility of Developing an International Space Platform in the Future (International Space Platform Program)

Both sides recognize that no commitments are made at

this stage concerning the realization of any project for creating an international space platform.

The sides agree to establish a Joint Working Group of specialists for preliminary consideration of the feasibility of developing an International Space Platform on a bilateral or multilateral basis in the future.

The JWG will carry out its work on the basis of studies conducted by each side independently and also by the two sides jointly, proceeding from each of the following stages to the next as may be mutually agreed;

-- define at the first stage the scientific and technical objectives which would warrant the use of such a space platform.

-- consider possible configurations appropriate to the objectives identified.

-- formulate proposals on the feasibility and character of further joint work which may be desirable in this field.

At the first stage of its activity, the group will work in close coordination and contact with the JWGs set up to consider ways to realize the Salyut-Shuttle program.

The sides will appoint the initial leaders and members of the JWG for this program within two months after the Agreement goes into effect. This JWG should formulate preliminary proposals on possible scientific-technical objectives which could be achieved by an international station one year after beginning its work.

This Agreement comes into force at the moment it is signed by both sides.

For the USSR Academy of Sciences

A. P. Aleksandrov

For the National Aeronautics and Space Administration of the USA

A. M. Lovelace

NASA News

National Aeronautics and
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Washington, D.C. 20546
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Press Kit

Project INTELSAT IV-A

RELEASE NO: 77-99

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Mailed:
May 18, 1977

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RELEASE NO: 77-99

THIRD INTELSAT IV-A LAUNCH SCHEDULED

The third INTELSAT IV-A commercial communications satellite will be launched by NASA aboard an Atlas Centaur rocket from Kennedy Space Center, Fla., May 26, 1977.

The satellite, which weighs 1,480 kilograms (3,254 pounds) at launch, is intended for service in the Atlantic Ocean region.

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The 1,360 kg (1.5 ton) INTELSAT IV-A satellite will be placed in geostationary orbit over the Atlantic Ocean at 340.5 degrees East longitude, where it will provide international communications services to countries from Central America to Iran. The satellite has a seven year design life and the capacity to relay over 6,000 simultaneous telephone calls and two television programs.

The INTELSAT satellites are owned by the International Telecommunications Satellite Organization (INTELSAT). The Communications Satellite Corp. (COMSAT), the United States member, is also the management services contractor for the satellite system. NASA is reimbursed for all costs of the Atlas Centaur and launch services by COMSAT on behalf of INTELSAT, under provisions of a launch services agreement.

The Atlas Centaur 39 launch vehicle is expected to place the INTELSAT IV-A in a highly elliptical orbit of 548 by 35,787 kilometers (341 by 22,237 miles). After reorientation of the satellite, a solid propellant rocket motor aboard the spacecraft will be fired to circularize the orbit at synchronous altitude 35,787 km (22,237 mi.) over the equator. At that altitude, because the speed of the spacecraft in orbit matches the rotational speed of the Earth, the satellite remains in position over one spot.

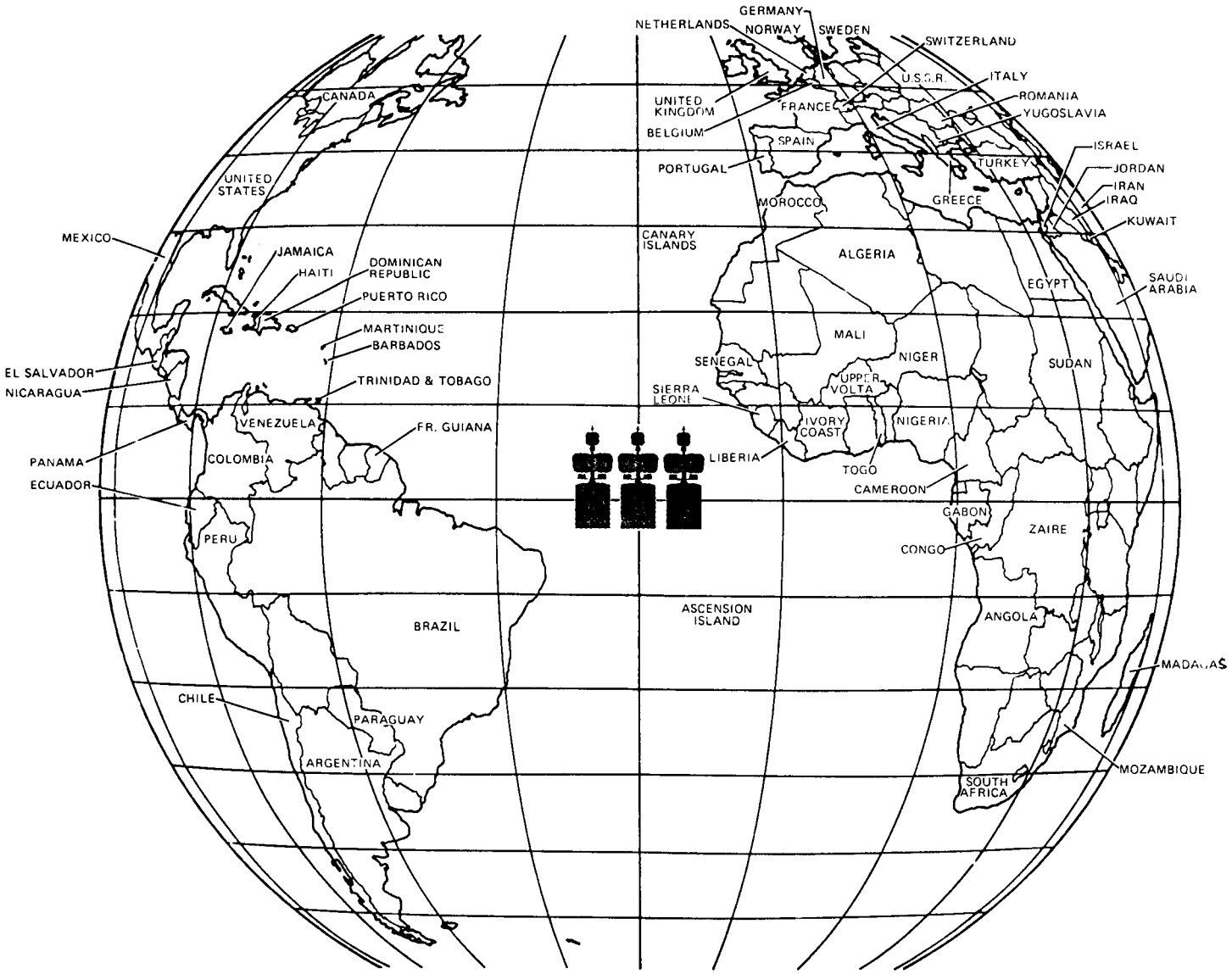
The launch of INTELSAT spacecraft aboard Atlas Centaur rockets requires the coordinated efforts of a large government and industry team. NASA's Lewis Research Center, Cleveland, Ohio, has management responsibility for the Atlas Centaur development and operation. NASA's Kennedy Space Center is assigned vehicle checkout and launch responsibility once the vehicle reaches Cape Canaveral.

The INTELSAT IV-A satellites, built by Hughes Aircraft Co., El Segundo, Calif., are 6.98 meters tall (about 23 feet) and weigh 1,515 kg (about 3,340 lb.) at liftoff and 825.5 kg (1,820 lb.) after apogee motor firing.

The INTELSAT IV-A program represents an investment by 95 nations exceeding $295 million (U.S.). Each launch costs approximately $49.1 million -- $23.5 million for the satellite and $25.6 million for the Atlas Centaur launch vehicle.

(END OF GENERAL RELEASE. BACKGROUND INFORMATION FOLLOWS.)

INTELSAT IV-A COVERAGE



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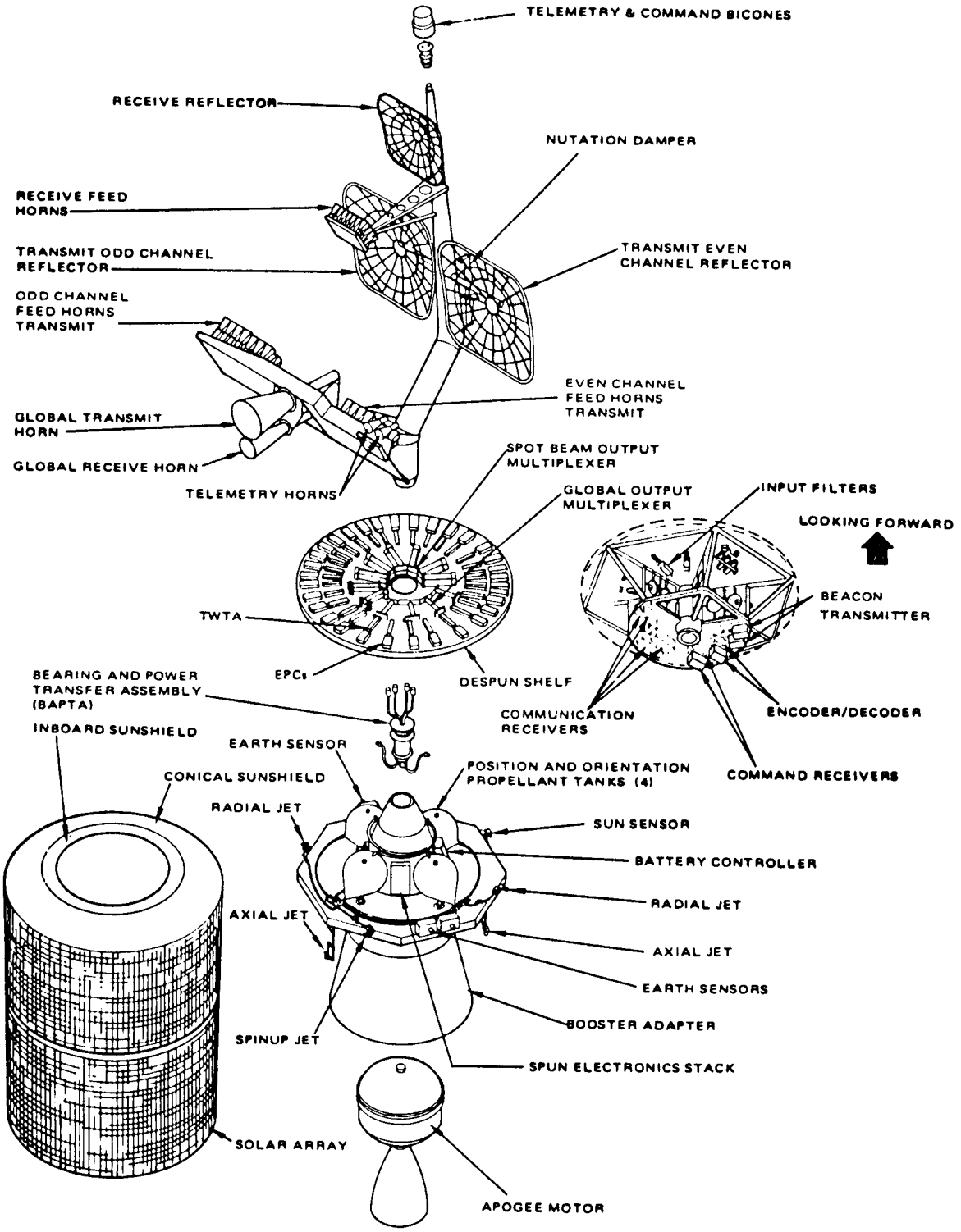
SPACECRAFT DESCRIPTION

The INTELSAT IV-A spacecraft has an overall height of 7 meters (23 feet) and a diameter of 2.4 m (8 ft.). The height of the solar panel is 2.8 m (9 ft.). Liftoff weight is approximately 1,515 kilograms (3,340 pounds), and in-orbit weight after apogee motor firing is 825.5 kg (1,820 lb.).

Although it has the same basic structural design as its predecessor, the INTELSAT IV-A spacecraft incorporates new antenna technology to yield about 6,250 two-way voice circuits plus two television channels in the system configuration in which it will be used. This is two-thirds greater than the communications capacity of the INTELSAT IV series satellite. The increased capacity is made possible by a new antenna design which provides coverage of land masses on both sides of the Atlantic basin, using shaped beams. The eastern and western beams are sufficiently isolated to allow the frequency spectrum to be used twice -- once in the east and once in the west direction -- thus doubling the use of the frequency spectrum and increasing the communications capacity of the satellite.

EXPLODED VIEW OF AN INTELSAT IV-A SATELLITE



ATLAS CENTAUR LAUNCH VEHICLE

The Atlas Centaur is NASA's standard launch vehicle for intermediate weight payloads. It is used for the launch of Earth orbital, Earth synchronous and interplanetary missions.

Centaur was the nation's first high-energy, liquid-hydrogen/liquid-oxygen propelled rocket. Developed and launched under the direction of NASA's Lewis Research Center, it became operational in 1966 with the launch of Surveyor 1, the first U.S. spacecraft to soft-land on the Moon's surface.

Since that time, both the Atlas booster and Centaur second stage have undergone many improvements. At present, the vehicle combination can place 4,530 kg (10,000 lb.) in low Earth orbit, 1,880 kg (4,150 lb.) in a synchronous transfer orbit and 900 kg (2,000 lb.) on an interplanetary trajectory.

The Atlas Centaur, standing approximately 40.8 m (134 ft.) high, consists of an Atlas SLV-3D booster and Centaur D-1AR second stage. The Atlas booster develops 1,920 kilonewtons (431,300 lb.) of thrust at liftoff using two 822,920-newton (185,000-lb.) thrust booster engines, one 266,890-N (60,000-lb.) thrust sustainer engine and two vernier engines developing 2,890 N (650 lb.) thrust each. The two RL-10 engines on Centaur produce a total of 133,450 N (30,000 lb.) thrust. Both the Atlas and the Centaur are 3.048 m (10 ft.) in diameter.

Until early 1974, Centaur was used exclusively in combination with the Atlas booster. Now it is also used with a Titan III booster to launch heavier payloads into Earth orbit and interplanetary trajectories.

The Atlas and the Centaur vehicles have been updated over the years. Thrust of the Atlas engines has been increased about 222,400 N (50,000 lb.) since its debut in the space program in the early 1960s.

The Centaur D-1AR has an integrated electronic system that performs a major role in checking itself and other vehicle systems before launch and also maintains control of major events after liftoff. The new Centaur system handles navigation and guidance tasks, controls pressurization and venting, propellant management, telemetry formats and transmission and initiates vehicle events. Most operational needs can be met by changing the computer software.

The Centaur D-1AR also incorporates a redundant hydrogen peroxide attitude control system that is tolerant of a peroxide "engine out" situation.

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TYPICAL LAUNCH VEHICLE CHARACTERISTICS

Liftoff weight including spacecraft: 147,885 kg (326,030 lb.)

Liftoff height: 40.8 m (134 ft.)

Launch Complex: 36A

	Atlas Booster	Centaur Stage
Weight (with propellants)	130,317 kg (287,300 lb.)	17,781 kg (39,200 lb.)
Height	21.3 m (70 ft.)	19.5 m (64 ft.) with payload fairing
Thrust	1,919 kn (431,300 lb.) at sea level	133,447 N (30,000 lb.) in vacuum
Propellants	Liquid oxygen and RP-1	Liquid oxygen and liquid hydrogen
Propulsion	MA-5 system two 822,921-N (185,000 lb.) thrust booster engines, one 266,893-N (60,000-lb.) thrust sustainer engine, two 2,891-N (650-lb.) thrust vernier engines.	Two 66,723-N (15,000-lb.) thrust RL-10 engines, 12 small hydrogen peroxide thrusters.
Velocity	8,970 kmph (5,574 mph) at booster engine cutoff (BECO), 12,987 kmph (8,070 mph) at sustainer engine cutoff (SECO).	33,336 kmph (20,714 mph) at spacecraft separation.
Guidance	Preprogrammed profile through BECO. Switch to inertial guidance for sustainer phase.	Inertial guidance.

LAUNCH PREPARATIONS

NASA's John F. Kennedy Space Center and its Expendable Vehicles Directorate play key roles in the preparation and launch of Atlas Centaur 39 carrying the INTELSAT IV-A spacecraft into orbit.

The INTELSAT IV-A spacecraft was received by Kennedy Center Feb. 9 and underwent preliminary checkout in Hangar AM.

The Atlas and Centaur stages were erected on Pad A at Launch Complex 36 at Cape Canaveral Air Force Station in late February.

In addition to providing necessary spacecraft support services during final launch preparations, the Expendable Vehicles Directorate is responsible for mating the spacecraft and payload fairing with the Atlas Centaur rocket. Mating of the spacecraft with AC-39 was scheduled for May 18.

In providing launch operations, Kennedy Center handles scheduling of test milestones and review of data to assure that the launch vehicle has met all its test requirements and is ready for launch.

All launch vehicle and pad operations during the launch countdown are conducted from the blockhouse at Complex 36 by a joint government-industry team.

TYPICAL LAUNCH SEQUENCE FOR INTELSAT IV-A

Flight Events	Program Time	Earth Relative Velocity		Range		Altitude	
	Seconds	Km/hr	Mph	Kilometers/Miles		Kilometers/Miles	
Liftoff	0	0	0	0	0	0	0
BECO	139.3	8,970	5,574	80.1	49.8	57	35.4
Booster jettison	142.4	9,069	5,635	87.2	54.2	60.1	37.3
Insulation panel jettison	184.3	10,285	6,391	191.5	89.9	97.7	60.7
SECO/VECO	247.1	12,988	8,070	383.8	238.5	144.3	89.7
Centaur separation	249.0	12,990	8,072	390.2	242.5	145.6	90.5
Centaur MES (1)	258.6	12,934	8,037	423.5	263.2	151.7	94.3
Nose fairing jettison	270.6	13,141	8,165	547.7	340.3	158.6	98.5
Centaur MECO (1)	620.6	28,029	17,416	2,274.4	1,413.2	189.2	117.5
Centaur MES (2)	1,493.0	26,542	16,492	8,604.9	5,346.9	558.2	346.9
Centaur MECO (2)	1,578.3	33,866	21,043	9,245.5	5,744.9	626.1	389.0
Spacecraft separation	1,713.3	33,336	20,714	10,360.9	6,438.0	804.6	500.0
Reorient Centaur	1,718.3						
Start blowdown	1,883.3						
End blowdown	2,133.3						

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F. R. Schmidt	Manager, Atlas Centaur

Lewis Research Center

Dr. Bruce T. Lundin	Director
Andrew J. Stofan	Director of Launch Vehicles
Richard E. Orzechowski	INTELSAT Mission Project Engineer

Kennedy Space Center

Lee R. Scherer	Director
Dr. Walter J. Kapryan	Director, Space Vehicles Operations
George F. Page	Director, Expendable Vehicles
John Gossett	Manager, Centaur Operations
C. A. Terhune	Chief Engineer, Atlas Centaur
James N. McKnight	Spacecraft Coordinator

INTELSAT TEAM

COMSAT

Dr. Joseph V. Charyk	President
Eugene T. Jilg	Assistant Vice President, Engineering
Allan M. McCaskill	Manager, Launch Vehicle Systems

Hughes Aircraft Co.

A. T. Owens	INTELSAT IV-A Project Manager
Don Thompson	INTELSAT IV-A Spacecraft Manager

CONTRACTORS

General Dynamics/Convair San Diego, Calif.	Atlas Centaur launch vehicle
Honeywell Aerospace Division St. Petersburg, Fla.	Centaur guidance inertial measurement group
Pratt and Whitney West Palm Beach, Fla.	Centaur RL-10 engines
Teledyne Northridge, Calif.	Digital computer unit/PCM telemetry

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NASA News

National Aeronautics and
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For Release

IMMEDIATE

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RELEASE NO: 77-100

NASA ENGINEERS STUDY SPIN, STALL PROBLEMS FOR LIGHT PLANES

NASA aeronautical engineers are conducting intensive research on the problems of spins and stalls in light general aviation airplanes. The NASA Research and Technology Advisory Council (RTAC) Panel on General Aviation Technology sees stalls and spins as the most important safety problems facing light plane designers, since they account for 30 per cent of all fatalities in light planes.

In response to requests for expanded, aggressive research on the problem, NASA's Langley Research Center, Hampton, Va., has formulated a program fashioned after highly successful research programs conducted for military designs such as recent fighter airplanes.

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Mailed:
May 18, 1977

Langley has traditionally been a leader in research to solve or minimize stall-spin problems. The research at Langley dates back to the 1930s, when a 15-foot spin tunnel was put into operation. The tunnel was enlarged to 20 feet in 1941, and has been used since to test more than 400 airplane designs. Today it is the only operational spin tunnel in the United States.

Langley's program objectives include determining aerodynamic characteristics of aircraft designs at high angles of attack, concepts for stall avoidance or "stall proofing," developing emergency spin recovery systems and establishing design guidelines for insuring satisfactory spin characteristics. Development of test techniques, such as radio-controlled models which can be used by the general aircraft industry and consultation services for industry are included.

The program will study several low and high wing designs, as well as single and twin engine configurations. Specialized testing techniques developed at Langley in recent years will augment this research. Free flight tests in the full scale wind tunnel, drop model tests and piloted simulator studies will be performed.

In one new project, researchers are attempting to determine the effects of tail design on spin characteristics. A representative low wing, single engine design has been modified to accommodate several tail configurations for both full scale and model airplane tests.

Four separate tail configurations have been designed and fabricated at Langley, based on extensive spin tunnel model tests. Spin characteristics of the airplane with these four tails will be fully tested, along with changes in loading and mass distribution in wings and fuselage.

Since some of these configurations will have unrecoverable spins (by normal recovery methods), a spin recovery parachute has been designed and built at Langley and is fitted to the airplane. Its first high speed deployment test, conducted in March, was successful.

Following two inflight test deployments and local documentation and checkout flights, spin testing on the first tail configuration will begin at NASA's Wallops Flight Center, Wallops Island, Va., in June.

The test airplane is fully instrumented to record control forces and positions, angles of attack and sideslip, angles of pitch and bank, rates and accelerations about all axes, airspeed, altitude, engine power and other parameters. Some of the more critical parameters will be telemetered for real time observation on the ground.

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RELEASE NO: 77-101

NASA TO BUY SOLID UPPER STAGES FOR USE WITH SHUTTLE

NASA has decided to purchase six spinning solid upper stages (SSUSs) to permit delivery of spacecraft from an orbiting Space Shuttle to higher Earth orbits. This marks initiation of the agency's first procurement action following agreements earlier this year with two aerospace firms, permitting them to design, test and manufacture the upper stages and market them independently.

A request for proposals was issued May 13 by NASA's Marshall Space Flight Center, Huntsville, Ala., for six SSUS-A vehicles to place Intelsat V type spacecraft into stationary orbits, with an option for purchasing an additional two. The "A" designation indicates the vehicle's capability to deliver payloads of the size now being launched by the expendable Atlas/Centaur rockets.

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Mailed:
May 19, 1977

Bids on the procurement action will be limited to two firms, McDonnell Douglas Corp., Huntington Beach Calif., and Boeing Aerospace Co., Seattle. Both companies entered into agreements with NASA, committing them to develop the stages with private funds. This is the first time NASA has procured rockets or rocket stages in this manner. Normally the agency incurs development and production costs as part of the procurement agreement.

The purchase of six SSUS-A upper stages will include all the hardware, analyses, logistics and services necessary to accomplish the successful injection of the spacecraft into its proper transfer orbit after the Space Shuttle orbiter has placed the SSUS and its spacecraft into the proper injection position and orientation.

Under terms of the proposed contract, the contractor will have responsibility for production of the vehicles, the services and safe and proper operations of the SSUS-A systems.

The first of the six SSUS-As is to be delivered to NASA for a launch in December, 1979, for a demonstration flight. Three other stages will launch Intelsat Vs, Comsat advanced communications spacecraft. The remaining two will be held in reserve for other mission assignments.

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For Release
IMMEDIATE

RELEASE NO: 77-102

SPACE TECHNOLOGY MAY LEAD TO EARLY DETECTION OF BREAST CANCER

Every year thousands of women are subjected to screening procedures for breast cancer which use potentially harmful X-rays. Many of these women go through the physical and emotional anguish of radical surgery in the treatment of this disease.

Repeated X-rays have often been considered necessary because developing stages of breast cancer are sometimes undetectable by doctors who examine the earliest breast X-rays, making early diagnosis more difficult and sometimes allowing cancerous tissues to multiply until massive surgery is the only solution.

Mailed:
May 20, 1977

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For two years engineers in the Data Analysis Facility at NASA's John F. Kennedy Space Center, Fla., have been working on the problem. The experimental process involves techniques similar to those originally developed to analyze imagery transmitted from Landsat satellites. By applying these space techniques to the medical field, engineers have developed a method which may enable doctors to detect early stages of breast cancer and to determine the likelihood that a woman will ever develop breast cancer.

This experimental technique for early cancer detection is a product of X-ray enhancement -- the ability of computers to enhance or make more visible information from X-rays not ordinarily detectable by the human eye.

Trained radiologists who examine X-rays work with a built-in handicap -- the human eye. The eye has difficulty in detecting small density changes or changes in the gray shades of the intensity spectrum's upper density region. Most X-ray data is within this upper density region.

The human eye -- even the most highly trained one -- can detect about 32 different shades of gray at best. For radiologists this means that much of the information contained on an X-ray is invisible to them.

The need is for a method of putting these undetectable shades of gray in a better perspective --enhancing them so they are easily visible.

This is where the Data Analysis Facility steps in with its General Electric "Image 100" multi-spectral image analyzer. It is a computer-controlled system which extracts and classifies information about an image much better than can be done by human means.

Shades that were previously invisible to a doctor's eyes are now analyzed in much more detail. This makes significant information visible much earlier, improving prospects for an earlier diagnosis.

The special optical tool that begins this process is called a microdensitometer. Far superior to the human eye, it can detect 256 shades of gray with great accuracy.

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The microdensitometer scans a photographic image - such as an X-ray and then puts the information into computer language. The information is then fed into the Image 100 with instructions to enhance the low visibility gray shades. After classifying the gray shades which make up an image, the computer displays them in a way that is more meaningful to the radiologist.

Robert L. Butterfield, an electronics engineer at the Data Analysis Facility, has been working with the Image 100 and a Titusville, Fla., radiologist, Dr. William L. Walls, for two years on a process in which mammograms (breast X-rays) can be automatically analyzed to detect early stages of breast cancer before radical surgery is needed.

The current goal is to try to develop a computerized method of separating those women who are in a low risk group (least possibility of developing breast cancer) from those in a high risk group (high possibility of developing breast cancer). If this method becomes feasible, it should reduce the need for repetitive screening-type mammograms.

The new X-ray analyzing system, if the development effort is successful, may allow separation of women into low, medium and high risk groups, allowing radiologists to concentrate on the mammograms from the high risk group.

Medical persons and engineers hope that some day this method may lead to techniques that would allow detection of very early breast cancer. Depending on the rate of change in X-ray gray shades, the yardstick doctors use to diagnose various stages of breast cancer, the computer may yield information enabling the radiologist to determine if very early indications of breast cancer are present.

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NASA News

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Ada-3

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For Release:
IMMEDIATE

RELEASE NO: 77-103

NASA RECEIVES 119 PROPOSALS FOR SPACE PROCESSING EXPERIMENTS

A total of 119 proposals for materials processing experiments to be performed on flights of Space Shuttle and Spacelab have been received from researchers by NASA's Marshall Space Flight Center, Huntsville, Ala.

The proposals, in response to an announcement issued several weeks ago by NASA's Office of Applications, include applied and basic research projects in branches of materials science where weightlessness and ultra-high vacuum obtainable in orbital flight can be exploited to unique advantage.

The initial goal of NASA's Space Processing Program is to demonstrate the value of space for materials processing by achieving significant scientific results or developing specific useful materials and products.

- more -

Mailed:
May 19, 1977

Over a longer period it is expected to lead to privately-funded research and manufacturing operations in orbit.

An engineering and business evaluation of the 119 proposals has been performed by a team at Marshall Center and the Office of Applications is expected to announce the chosen projects--probably numbering between 10 and 20--by the end of July. Projects relevant to eventual development of useful applications of space flight will be given priority.

Marshall is the lead NASA center for the Spacelab program, a cooperative venture between NASA and the European Space Agency, and has been assigned project management responsibility for the first three Spacelab payloads.

Shuttle missions will begin in 1979 and will accomplish a phased buildup of the Space Transportation System's capabilities during the first few years of operations.

- end -

NASA News

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For Release
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3:45 p.m.

RELEASE NO: 77-104

VIRGINIA FIRM AWARDED KENNEDY CENTER SUPPORT CONTRACT

NASA has selected Computer Sciences Corp., (CSC) Falls Church, Va., for the award of a contract for communications and instrumentation support services at the John F. Kennedy Space Center, Fla. RCA is expected to be a major subcontractor to CSC.

Kennedy Center is NASA's launch site for the Delta, Atlas and Titan expendable launch vehicles and will be the major launch site for the Space Shuttle manned hts scheduled to begin in 1979.

Services to be performed embrace two separate categories. The first category, covering a three year period, is for the modification, installation, operation and maintenance of the operational intercommunications system, the operational television system and the checkout, control and monitor subsystem.

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Mailed:
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The second category, covering one year with options for two additional years, is for communications, measurements, telemetrics, computer services, data storage and retrieval, program planning and reliability and quality assurance. Most of the work will be accomplished at the Kennedy Space Center.

The value for the first three years of the cost-plus-award-fee contract beginning June 1, 1977 is approximately $41 million.

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EARLY ASTEROID BOMBARDMENTS MAY HAVE AIDED EVOLUTION OF LIFE

Does man owe his evolutionary existence to a barrage of huge asteroids that struck the Earth, the Moon and the other inner planets in the solar system some four billion years ago?

Are the modern ocean basins the product of giant impact craters that formed early in the history of this planet?

If so, what are the consequences for life elsewhere in the universe?

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These are some of the questions raised by a paper to be presented June 2 at the Washington meeting of the American Geophysical Union by Dr. Herbert Frey, a NASA-University of Maryland scientist working at NASA's Goddard Space Flight Center, Greenbelt, Md.

Information returned from Apollo lunar landings and photographic evidence from spacecraft studies of the Moon, Mercury and Mars seem to show that all of these planets experienced an intense bombardment by asteroids 50 kilometers (30 miles) or more in diameter four billion years ago. This catastrophic cratering must also have affected the early Earth.

Building on the work of other scientists -- including that of Goddard's Dr. Paul Lowman's studies of crustal evolution -- Frey suggests this early destructive bombardment may be responsible for the first ocean basins formed on the Earth.

Giant impacts would trigger subsurface melting, leading to vast outpourings of lava that would flood the huge craters caused by the impacts.

Frey further suggests that these conditions make possible a very early beginning of plate tectonics, in which large rigid crustal blocks can shift position on the surface of the Earth. Such movements are the cause of earthquakes and volcanic eruptions today.

Formation of these basins flooded by basaltic lavas is necessary for plate motion to occur. According to Frey, "Crustal uplift and rifting were probably initiated in the thinned crust of the Earth's mare basins. Loading of these basin margins by sediments encouraged subduction, which initially was probably confined to the continent-ocean (highland-mare) interface. With subduction (sinking of crustal plates) established, sea-floor spreading at mid-mare ridges could begin the long process of oceanic crustal reworking, which, after several cycles, would eventually generate the young oceanic crust of the modern plate-tectonics period."

Four billion years ago the Earth would have looked much like the Moon does today. The Moon never had plate tectonic motions, because it cooled too rapidly.

Had there been no asteroidal bombardment four billion years ago, evolution of life on the Earth would have been very different from what it has been over the history of Earth in Frey's opinion.

For example, the Earth might well have been covered with a global ocean, with no continents and no islands. Nothing but water. Or it might have been mostly dry land, with only a few patches of water here and there.

In either case evolution of life would have been far different because the environment would have been radically different from that which we know has existed over eons. It is likely that many of the higher life forms, including man would not have evolved Frey believes.

Origin of continents and ocean basins has long been a problem in geologic research. The most likely explanation is asteroidal bombardment, according to Frey: "It is obvious that the Moon, Mercury and Mars were struck by hundreds of huge objects approximately four billion years ago. There is no way the Earth could have escaped such a pounding as well. My calculations show that more than 50 per cent of the Earth's original crust would have been converted into ocean basin topography based on the number, diameter and depth of the observed lunar basins."

If asteroidal bombardment is responsible for the original ocean basins of the Earth, then intelligent life elsewhere in the universe may also depend on such a catastrophic event. Frey says, "There is no reason to believe that similar events would have occurred in the same time frame on other Earth-like worlds in other star systems." Timing of the bombardment is critical. If too early, they would impact molten crust and no traces would remain. If much later, after life had formed, evolution would be seriously affected. Intelligent life forms might not have time to evolve.

Planets which suffered no asteroidal bombardment of this type would probably not have moving plates, as does the Earth. The dense crust of the ocean floors is necessary for subduction (a crustal plate being pushed back into the deeper parts of the Earth). Without such sinking of the plates, only limited plate movement is possible. Atlantic-type oceans such as occur on the Earth would not exist.

Here's how Frey pictures the asteroid bombardment and its effect:

After the formation of the planets four and one-half billion years ago, there was still a large amount of mass left over in the form of asteroids located throughout the solar system.

These objects had their paths changed by the gravitational force of the large planets, especially Jupiter. For reasons that are still not clear, a large number of these asteroids were deflected into the inner solar system about four billion years ago.

As a result, all of the inner plants (Mercury, Venus, Earth and Moon, and Mars) were pounded by the 50-km (30-mi.) diameter rocks. On the Earth, such impacts produced gigantic craters (basins) more than 1,000 km (620 mi.) across, and 10 to 20 km (8 to 12 mi.) deep.

Over one-half of the Earth's original crust became low basins; the rest remained as high-standing continents.

Lava from below the fractured crater floors poured up into the basin and flooded the low-lying areas with basaltic material. These deep basins provided natural drains into which the water of the Earth would collect.

Below the new ocean basins the molten Earth was moving, causing uplift of the basin floor. The floor rifted apart, and new lava welled up along the rift. The crack widened, and seafloor spreading pushed apart the newly formed plates on either side.

Near the edge of the basins the greater weight of the basaltic lava crust sank below the continental edge as subduction responded to the pressure from the spreading ridge.

Modern ocean crust is formed in this way, by the welling up of lava from huge mid-ocean ridges. Frey suggests that this process began early on the Earth. "It seems likely that a kind of plate tectonic activity -- but with very small plates and very rapid motions -- was occurring on the Earth perhaps as long ago as three and one-half billion years."

Are there more of the giant asteroids still around in the solar system? And what are the chances that they will hit the Earth?

"The best modern example are the Apollo asteroids," says Frey, "which have orbits that cross the orbit of the Earth. None of these are likely to hit the Earth in the forseeable future."

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SOLAR CELLS POWER DUST STORM WARNING SYSTEM

Solar energy soon may be powering 40 dust storm warning signs on Interstate Routes 10 and 8 in central Arizona.

An array of solar cells that convert sunlight into electricity was recently installed to store power in batteries operating a highway sign near Casa Grande as part of a joint experiment by the Arizona Department of Transportation (ADOT) and two federal agencies to demonstrate the practicality and benefits of solar cell energy.

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ADOT is working with NASA's Lewis Research Center, Cleveland, Ohio, which is managing part of the photovoltaic tests and applications project for the Energy Research and Development Administration (ERDA).

With success of the first installation demonstration, ADOT plans to hook up solar arrays to the other 39 signs in the dust warning system, replacing propane-fueled, 60-watt generators previously producing power for charging the batteries.

"With solar energy, we anticipate cutting operating costs of the present system by about 50 per cent," Dave Olivarez, ADOT Traffic Operations Engineer said.

"Right now it's costing $24,000 a year, including $9,000 for fuel, to run the network of signs," he said. "Using solar power for all 40 signs we estimate would reduce our operating costs to about $12,400 yearly."

Electricity powers the lighting, changeable message feature and radio communications for each sign.

When dust storms strike, the warning system is activated by a radio control link from a Department of Public Safety dispatcher in Phoenix.

The sign message is changed to read: "DUST STORM ALERT RADIO 550/620/910." In normal mode, the signs display directional information for motorists.

Radio stations on the listed frequencies broadcast dust storm alert instructions to motorists.

The system covers an 80-mile area on I-10 between Phoenix and Tucson and west on I-8 near Casa Grande.

ADOT devised the system to help motorists avoid accidents from low visibility conditions often existing in the region as a result of blowing dust.

Now with increasing fuel costs, ADOT is seeking alternative methods of powering the signs.

Solar cell arrays appear to offer an economical solution. Although the present initial cost is relatively high, maintenance is minimal and no fuel is required for operation.

Solar cells were developed originally for powering satellites in outer space and are now being used for a variety of applications on Earth.

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RELEASE NO: 77-107

DR. ROBERT A. FROSCH NOMINATED FOR NASA ADMINISTRATOR'S POST

President Carter today announced the nomination of physicist Dr. Robert A. Frosch, 49, to become Administrator of the National Aeronautics and Space Administration. Frosch presently is Associate Director for Applied Oceanography at the Woods Hole Oceanographic Institution on Cape Cod, Mass., a position he has held since 1975.

Frosch, if confirmed, will succeed Dr. James C. Fletcher, who resigned May 1, after six years' service as NASA's Administrator.

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From 1973 to 1975, Frosch was Assistant Executive Director of the United Nations Environment Programme, holding the rank of Assistant Secretary General of the United Nations. Previously, from 1966 to 1973, he was Assistant Secretary of the Navy for Research and Development. In earlier years, he served in various posts involving government research and development projects.

Frosch's professional career began in 1951 with the Hudson Laboratories of Columbia University, where he worked on Naval research projects. There he progressed from Research Scientist to Director of the Laboratories, becoming Director in 1956 and remaining in that post until 1963.

Frosch, a native New Yorker, earned his A.B., A.M. and Ph.D. degrees at Columbia University. He is a member of Phi Beta Kappa and Sigma Xi. He received the Arthur S. Flemming Award in 1966 and the Navy Distinguished Public Service Award in 1969. Frosch is a member of some nine scientific professional societies and the author of numerous scientific publications. He is a member of the National Academy of Engineering.

He and his wife, Jessica, are the parents of two teenaged daughters. They presently reside in Falmouth, Mass.

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NASA AWARDS CONTRACT TO DEVELOP L-1011 COMPOSITE STABILIZERS

The Lockheed California Co., a division of Lockheed Aircraft, Burbank, Calif., has been awarded a $15.7 million contract to demonstrate composite technology for vertical stabilizers for the L-1011 aircraft. The contract is one of several being established with commercial transport manufacturers as part of NASA's Aircraft Energy Efficiency Program (ACEE). The ACEE program is aimed at application of advanced technologies that will increase by up to 50 per cent the fuel efficiency of future civil transports.

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One of the technologies being developed is the use of composite materials. Composite materials consist of high strength filaments embedded in a polymeric matrix. Aircraft structures made from composites are much lighter than conventional metal aircraft structures. This weight saving will result in lower fuel consumption.

Under this contract, an extension of a program that began two years ago, Lockheed will develop advanced manufacturing methods suitable for production of composite structures. All analysis and testing required to meet Federal Aviation Administration requirements for the adequacy of composite aircraft structures will be performed.

Costs of this contract will be shared, with NASA contributing $15.7 million and the contractor contributing $1.7 million. Managed by NASA's Langley Research Center, Hampton, Va., the work required by this contract will be performed over a period of six and one-half years.

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