NASA
National Aeronautics and Space Administration

GODDARD NEWS

Goddard Space Flight Center Greenbelt, Md. Volume 28 No. 10 May 25, 1981

Dynamics Explorer Spacecraft Preparing for Launch

The Dynamic Explorer spacecraft (DE-A & B) will be launched, stacked together, into polar orbits by a conventional Delta 3910 launch vehicle from the Western Test Range, Lompoc, California.

The DE spacecraft is shown here undergoing testing at the Magnetic Test Facility at GSFC.

Solar radiation and the solar wind have a dynamic impact on the near-Earth environment, the result of which affects the state of the atmosphere, ionosphere, magnetosphere and the more familiar phenomena, weather, auroral displays and radio disturbances.

Atmosphere Explorers have provided new information of solar radiation on the lower thermosphere and upper atmosphere. The ISEE (International Sun-Earth Explorer) program is providing new information on interactions between the solar wind and Earth's magnetic field, however, adequate knowledge does not exist on the interactions between the two regions. The Dynamics Explorer program is designed to supply such knowledge, specifically, the strong interactive processes coupling the hot, tenuous, convesting plasmas of the magnetosphere and the cooler, denser plasmas and gases co-rotating in Earth's ionosphere, upper atmosphere, and plasmasphere.

To accomplish this, the project will provide a central data processing and analysis system available to each Investigator of the Science Team; printing out meaningful geophysical data from all instruments.

According to Chuck Rhoads, Deputy Project Manager for DE, the program will also develop plans for multisatellite missions, data handling and sharing methods appropriate for shuttle-subsatellite operations. Polar, coplanar orbits are planned for the two satellites. One will have a perigee sufficiently low (350/km) for neutral composition, temperature and wind measurements.

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Goddard Investigators Discover Natural Laser on Mars

Investigators at NASA's Goddard Space Flight Center and the University of Maryland have discovered a natural infrared laser on Mars—an observation that could lead to the discovery of new planets in the universe and might force scientists to rewrite their books on general physics of the planetary atmosphere.

The discovery, reported in the April 3 issue of Science Magazine, was made by Dr. Michael J. Mumma, Dr. David Buhl, Dr. Gordon Chin, Dr. Drake Deming, Fred Espenak, and Dr. Theodore Kostiuk, all of Goddard, and Dr. David Zipoy, of the University of Maryland.

The scientists point out that since the invention of optical lasers some 50 years ago, they have proved extremely useful in scientific laboratories and in everyday life, where one of the most obvious uses has been the supermarket price scanners.

In theory, lasers occur when atoms or molecules are stimulated to release photons during their transition from higher-energy to lower-energy states.

This process was observed in the Mars atmosphere, composed almost entirely of carbon dioxide, between January and April, 1980, through the use of a new Goddard-developed device and the Kitt Peak Mc Math Solar Telescope in Arizona. The new device is an infrared heterodyne spectrometer.

In the case of this observation, sunlight was absorbed high in Mars' atmosphere by the carbon dioxide. In the absorption process, carbon dioxide is pumped to a higher energy state and builds into a laser state.

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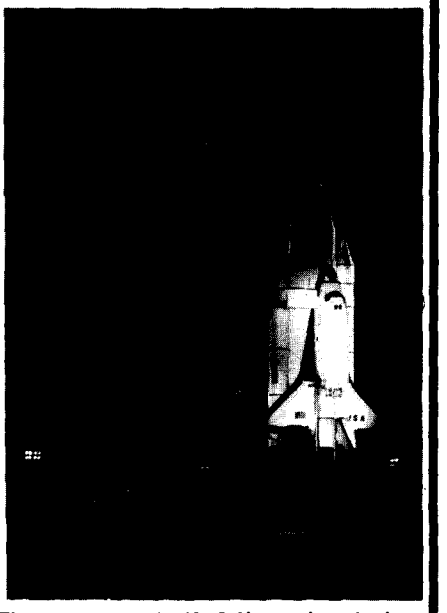
"That Magnificent Flying Machine"



The space Shuttle (STS-1) stands poised on Launch Pad A, Complex 39 at the Cape before its historic maiden flight into space.

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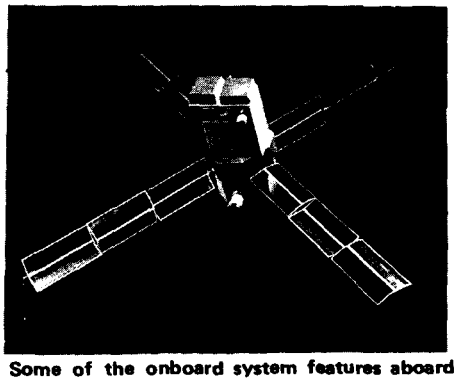
Goddard spinoff technology used in medical applications

Spacecraft technology developed at NASA's Goddard Space Flight Center, Greenbelt, Maryland, and proven over a decade (1962-1972) of space exploration has been transferred by Johns Hopkins scientists to medical applications that could revolutionize treatment of pain, involuntary motion and nervous disorder.

Utilizing miniaturized microcircuitry design criteria from the 400 pound Small Astronomy Spacecraft-C, third in a series of X-Ray seeking surveyers exploring the celestial sphere above Earth's atmosphere, engineers at the Johns Hopkins Applied



Some of the onboard system features aboard the SAS-C spacecraft (shown here in an artists' conception) were reduced to microminiature proportions by engineers and incorporated into the Tissue Stimulator design.

Physics Lab, Howard County, Maryland, reduced the spacecraft system to deck-of-cards size which permits surgeons to implant the plastic encapsulated electronic device in patients suffering from neurological disorder or damage.

In the manner of spacecraft ground controllers sending radio commands to a satellite, neurosurgeons are able to address the implanted Tissue Stimulator with an electronic digital signal. These signals are the doctor's prescription in the form of pulses to the problem area for the desired stabilizing result.

Engineers. . .reduced the spacecraft system to deck of card size which permits surgeons to implant the plastic encapsulated electronic device in patients suffering from neurological disorder or damage.

The SAS spacecraft series (A-B-C) revealed the existence of such phenomena as Quasars, Pulsars, and Black Holes, while carrying out their missions of seeking information in the gamma-ray, ultraviolet, visible and infrared spectral regions both inside and outside our galaxy. Because of the required compactness of onboard systems, Goddard spacecraft designers produced advanced state-of-the-art electrical power sources, telemetry uplink-downlink methodology and secure logic techniques not previously flown.

Other features, such as the Nickle Cadmium batteries developed by Goddard designers specifically for the SAS series, CRAM (Charge Regulator and Monitor) for the batteries, and the Secure Logic circuitry allowing NASA ground controllers to store commands in the spacecraft memory for functions to be performed beyond ground station control range, were reduced to microminiature (100-tol ratio) proportions by the APL engineers and incorporated into the Tissue Stimulator design.

Compression of this proven technology into modern neurological surgical techniques provides a unique, discrete and direct new approach to the relief of intractable pain, uncontrollable tremors and neurological disorder.

Goddard Awards Contracts to Pennsylvania Minority Firm

Participating in the signing of the largest technical support contracts ever awarded by Goddard under the 8-A minority small business program are: (sitting L-R) Lillian E. Walker, Goddard contracting officer; Paul Browne, from SBA headquarters; and David Huggins, president, Republic Management Systems. (standing L-R) Dr. George F. Pieper, director Sciences Directorate; A. Thomas Young, center director; Benita A. Sidwell, director, Management Operations Directorate; and Dr. Leslie H. Meredith, director, Applications Directorate.

Goddard has awarded two support service contracts to Republic Management Systems of Trevose, PA.

The contracts—a $3.5 million, 2-year agreement for computer support services and a $6.7 million, 3-year program for operational support services—are the largest technical support contracts ever awarded by Goddard under the 8-A minority small business program, according to NASA officials. The contracts will be managed by the company's operation in Landover, MD.

The $3.5 million, 2-year contract is for on-site computer support of the Sciences Directorate's Orbiting Satellites Project, its Laboratory for High Energy Astrophysics, its Science and Applications Center, and its Laboratory for Extraterrestrial Physics. While the basic contract for this work is for 2 years, option opportunities are provided in the agreement that could lead to three one-year extensions, amounting to an additional $6.5 million.

The $6.7 million agreement provides for support services for the operations of the Atmospheric and Oceanic Information Processing System in the Center's Applications Directorate and for the programming and engineering support to three other elements of that Directorate.

Under the agreement, there is a $2.1 million basic contract for one year with two firm one-year options. The first year option is for $2.2 million, and the second year option is for $2.4 million, for a total three-year contract of $6.7 million.

Since 1975, the NASA Space Flight Center has reached or exceeded NASA 8-A goals topping out NASA's all-time high for any Center at $16 million in 1978.