

Goddard takes active role in space station development

Advanced methods of studying the Earth, the solar system and stars with pressurized environments and orbiting platforms are being defined at Goddard as NASA begins preparations for launch of the Space Station no earlier than 1991.

The Space Station program will offer scientists the ability to perform experiments in a pressurized Earth-like environment aboard the Station, to use instruments attached externally to the Space Station as well as aboard orbiting platforms. Goddard has responsibility for developing the external and orbiting instrument capabilities which, together with the pressurized Space Station core, will afford the most versatile space system to date for studying science from orbit.

The most recognizable component of the Space Station will be its habitable core of pressurized modules. The modules *continued on page 8*



GSFC'S SPACE STATION ROLE – Goddard Space Station spokesman Gerald Burdett (l) discusses station concept with Center Director Noel W. Hinners during a press conference Goddard held here last month to explain the Center's role in the \$8 billion project.

SPACE SPEAKING



SPACE SPEAKING – Mathew Bachinski (left) and Greg Tayman of Columbia, Maryland are shown at Goddard's Visitor Center and Museum talking to each other via a satellite over 22,000 miles above the Earth. Mathew and Greg are participating this summer in the Extended Nature Camp of the Columbia (MD) Association, a private organization which provides year-round before- and after-school care for children.

Orbiter Discovery's maiden voyage redefined, missions 41-D/41-F combined, to fly as 41-D

The next Space Shuttle flight will consist of payloads from previously scheduled flights 41-D and 41-F and will be launched from the Kennedy Space Center, Fla., no earlier than Aug. 29, 1984, NASA officials announced last month. The exact launch date will be set later.

The mission, aboard the orbiter Discovery, will retain the designation 41-D.

According to Jesse W. Moore, Acting Associate Administrator for Space Flight NASA Headquarters: "A decision to schedule the next launch in August is based on an intensive review of the 41-D abort as well as the requirements of our commercial customers. The cargo will remain essentially the same except that the Large Format Camera and Spartan will be replaced with the Satellite Busi-

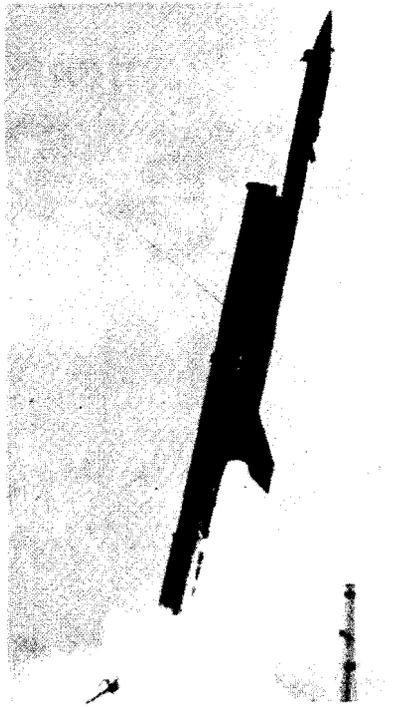
ness Systems and Telstar payloads currently scheduled for launch in the same time frame."

Mission 41-D was originally planned for June 25, 1984, but launch on that date was delayed following a computer malfunction. On the next day, June 26, the launch was further delayed because of a premature main engine shutdown.

"The Shuttle program is adaptable enough to meet the needs of our paying customers without risking lives, equipment or payloads," Moore said. "The abort we experienced demonstrated clearly that we are able to control the launch process down to the last split seconds; to launch when everything is right and to stop without danger to crew, ship or cargo when something is wrong.

continued on page 8

NASA continues plasma physics experiments from Wallops Island



ROCKET LAUNCH — A Black Brant sounding rocket lifts off from Wallops Island to study plasma physics.

A series of four rockets was launched last month, from Goddard's Wallops Island Facility to study electrical fields, aerosol particles and conductivity in the Earth's middle atmosphere, particularly between 40 kilometers (24 miles) altitude and 90 kilometers (54 miles).

These NASA rocketborne experiments, and similar tests conducted during the past several years, are part of a continuing study of middle atmosphere electrodynamics.

The purpose of the multi-rocket series is to investigate whether aerosol particles play a role in the generation of large electrical fields that have been observed in the middle atmosphere from previous rocketborne studies.

A "mother/daughter" experiment was carried onboard the largest rocket in the series, a Black Brant VB. The 614-kilogram (1354-pound) payload was programmed to separate into two sections called "mother and daughter." After nose cone ejection and the booms were unfolded, *continued on page 7*

SLDPF Honor Awards

Goddard personnel received two Group Achievement Awards, three Exceptional Service Medals and one Outstanding Leadership Medal at the Spacelab Honor Awards ceremony last month at the National Academy of Sciences, Washington, D.C.

Goddard's Spacelab Data Processing Facility (SLDPF) Support Team and TDRSS/SL-1 Preparation Team received group awards; Ellen Herring, code 564.2, Angelita Kelly, 564.2 and Anthony Maione, 536, were awarded Exceptional Service Medals; and SLDPF Project Manager Bill Barnes was honored with an Outstanding Leadership Medal.

The groups and individuals were cited for their outstanding support of the STS-9/Spacelab 1 mission (11/28/83 — 12/8/84). The SLDPF accumulated some six trillion bits of information from Spacelab during the 10-day flight and operated near perfectly throughout the mission.

Spacelab 1, a spaceborne laboratory for conducting experiments, supported four scientist-astronauts during STS-9, while they performed more than 70 experiments in biology, physiology, astronomy, materials science, Earth observations and atmospheric studies.

NASA Administrator James M. Beggs and NASA Deputy Administrator Hans Mark presented the awards to teams and individuals from NASA field centers, from the European Space Agency and from contractors who supported the mission.

From April, 1979 to June, 1980, Harris was the product manager for the Cosmic Background Explorer (COBE) instrument module. He became DPM for the GRO in June, 1980 and also served as a member of the Source Evaluation Board, and as chairman, Technical Advisory Committee for the Earth Radiation Budget Experiment (ERBE) Satellite, until October, 1981.

Harris worked on the nuclear airplane development program at General Electric Co., Cincinnati, Ohio from 1959 to *continued on page 7*

Dale Harris named TDRS project manager

Dr. Dale W. Harris has been named project manager (PM) for the Tracking and Data Relay Satellite (TDRS).

Harris served as deputy project manager (DPM) for the Gamma Ray Observatory (GRO) Project from June, 1980, until his current appointment.

He succeeds Ronald K. Browning, who has been named Goddard's Deputy Director for Space Station, Flight Projects Directorate.

Harris joined Goddard in 1963 as an aerospace engineer in the Advanced Power Sources Section. From 1963 to 1972, he worked on the application of nuclear power supplies to spacecraft, the development of solar arrays, and studied the radiation damage to solar arrays.

In 1972, he became head, Power Systems Design Section and served in that slot until 1976. From 1976 to 1979,

he was head, Space Power Technology Branch. Harris also had additional duties from late 1974 to 1979 as manager of the Modular Power Subsystem (MPS) for the Multi-Mission Modular Spacecraft (MMS). He managed the development of the first MPS, flown on Solar Max.



Dr. Dale W. Harris

Get Away Special Symposium

Goddard News employee profile

Cosmic Ray Upset Experiment results presented

Upsets of memory circuits by cosmic rays first were predicted seven or eight years ago. Since then, a number of flight anomalies in NASA and Department of Defense spacecraft systems have been attributed to this phenomenon.

In particular, cosmic ray upsets are believed to have caused anomalies in the Tracking and Data Relay Satellite and Solar Maximum Mission, according to Goddard's John W. Adolphsen, principal investigator for the Cosmic Ray Upset Experiment (CRUX).

"To definitely ascribe a cause to an upset experienced in flight is difficult," Adolphsen reported, "because many sources of noise, interference power line fluctuation, or spacecraft discharge, could result in the same anomalies."

Upsets, or changes in the logic state of a memory cell, can result from a single, highly-energetic particle passing through a memory cell. In doing so, it deposits energy in the memory cell, and — if enough energy is deposited in sensitive volumes within that memory cell — the cell can change logic state.

In some technologies, enough energy can be lost to cause another effect, called "latchup," which can result in the device destroying itself by drawing excessive current.

Results from a Get Away Special pay-



GAS SYMPOSIUM — Left to right: GSFC Get Away Special Technical Liaison Officer Clarke Prouty; Frank Miles, Independent Television Network, London, England; Donna Miller, manager, GAS, NASA HQ; Christopher Trump, Spar Aerospace Limited, Canada, and GSFC Project Manager Jim Barrowman. The group is discussing the GAS concept during the GAS Symposium here August 1-2.

load designed to resolve questions about upsets caused by single particles shows no upsets occurred in Harris 6504 RAM's (Random Access Memory) during the 10 days the CRUX was flown in a GAS canister on STS-8 and 11.

The results were disclosed by Adolphsen, as he addressed an audience here at the first GAS User's Symposium August 1-2. The symposium provided a forum for exchanging information on the first two years of payload operation and flight of GAS canisters on the shuttle — 21 payloads have flown aboard shuttle missions.

"This CRUX was designed for the sole purpose of flight testing a specific device type and to validate the modeling for device upset," Adolphsen said. "It is then, a typical example of experimentally verifying a hypothesis."

Adolphsen said another CRUX, incorporating new state-of-the-art microcircuits, is ready for shuttle flight 41-G in October. For this mission, some upsets are expected because the shuttle will be flown at a higher angle than previous flights.

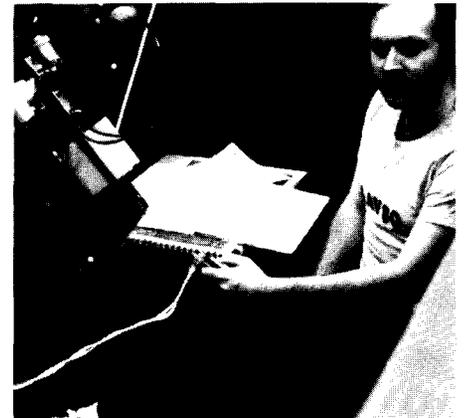
"The next CRUX is more likely to record some upsets," he said. "It's been redesigned to incorporate more sensitive memory devices and will be flown on a shuttle with a higher angle inclination (57°), which will yield a harsher cosmic ray environment." Most shuttle missions have had an inclination to the Equator of 28.5 degrees.

"Also, GAS offers a quick, low-cost means of assessing device sensitivity to upsets in flight, as opposed to free flyers," Adolphsen added. For shuttle applications, data are directly applicable. But, data also can be extrapolated to other (free-flyer) applications in other orbits.

SPARTAN

Spartan 1, originally scheduled for Space Shuttle mission 41-F in late August, now is on the manifest for mission 51-G, slated for May, 1985.

Spartan Project Manager Dave Shrewsbury, says, however, there is a possibility of it being launched in November, 1984. As events warrant, Goddard News will keep you updated on the Spartan launch.

Amateur astronomer uses automated telescope

BACKYARD OBSERVATORY — David Skillman sits at his backyard observatory. The computer driven observatory is one of the few automated telescopes in the country.

From the Control Center in his basement, amateur astronomer David Skillman sends out a string of commands to his backyard observatory — one of the few observatories in the country, amateur or professional, with remote control computer capability. The star gazer built and installed the system himself.

Skillman may be an amateur astronomer, but the Goddard systems engineer is well versed on telescopes, indeed. Three years ago, the work on his automated observatory and the results generated landed him a job at the Steward Observatory in Tucson.

Equally notable is that the 90-inch telescope at Kitt Peak in Tucson, the second largest at the observatory, is running on his software. Skillman also has published several papers in scientific journals, and recently he presented a well received paper at the Baltimore, Md., AAS meeting. Moreover, he currently is working on the Center's Hubble Space Telescope team, a project designed to put the first large aperture telescope in outer space.

Primarily, Skillman's avocation involves variable star studying, "... the simplest kind of serious astronomy which can be done ...," he says. This study entails measuring the brightness of a star over a period of time to see if its brightness changes.

continued on page 7

Goddard adopts a school in new NASA program

There was the family that adopted 600 kids. Seriously.

The family is Goddard. The kids are from the Robert H. Goddard Middle School. And the activity is NASA's new Adopt-A-School Program.

"It shows teachers that industry, business and government are concerned about the schools," said Dr. Nancy H. McClelland, principal of Goddard Middle School. "It's a marvelous opportunity for the community and for Goddard people to see what we're doing in school, and it gives our seventh and eighth graders a chance to see what careers are available."

The program is part of a national effort to foster a lasting relationship between the Nation's schools and NASA and stems from a Presidential proclamation declaring 1983-84 the National Year of Partnership in Education. Several NASA field centers have implemented the program.

President Reagan wrote last October: "America's future is dependent upon the health and vitality of her education system. Although thousands of businesses, industries, individuals, organizations, teachers, administrators and government at all levels have been involved in the education of our youth, there is more work to be done. More people must become active in improving the quality of education in our Nation."

Shortly, Goddard Middle School officials and the Center's education officers will be planning the next academic year's activities for the program. Last year's activities included a career day with the theme, "What will I do with the rest of my life," in which 16 Goddard personnel participated, a lecture-demonstration from Gregory Crosby of Goddard's Educational Programs Office, a Center tour for school staff members, and a short astronomy course via computers at the school.

"We think we've made an excellent start getting the program underway at the Goddard Middle School," said Richard Crone, Educational Programs Officer. "With the excellent support of Dr. McClelland, we will be concentrating, during the next school year, on helping teachers strengthen their math and science program."

NASA celebrates 20th anniversary of Nimbus-1

By Ralph Shapiro

August 28, 1984 marks the 20th anniversary of the launch of the Nimbus-1 satellite, the first of seven satellites in NASA's Earth Resources Research and Applications Program.

The Nimbus satellites have served as research platforms for 48 experiments used to survey the atmosphere of the Earth, map land ocean characteristics; and to observe weather and climate patterns. The Nimbus program has contributed to the scientific advances of meteorology, climatology, oceanography, geology, geography and hydrology.

With the first satellite, Nimbus initiated the technique of transmitting to the ground high quality cloud pictures taken locally.

With the third and fourth satellites, it demonstrated so successfully the ability to remotely measure the temperature of the atmospheric layers — a method which proved to be so cost effective and with a worldwide capability — that the Weather Service of NOAA now uses this method almost exclusively as a source of temperature data used in weather forecasting.

In the environmental area, a 10-year data base of worldwide atmospheric ozone distribution has been collected — with a quality that has become the standard for the worldwide ground-based systems. In the communications field, it developed the technique of locating the source of a low level signal transmission that is used in the current international search and rescue program.

Among the unusual phenomena discovered by the Nimbus satellites was the existence of stratospheric warmings in the Siberian Arctic which cause cold weather over the North American Continent and the discovery of previously undetected newly-active volcanoes.

Nimbus was the satellite structure for the first three Landsat Earth resources satellites. Nimbus-7, the last in the program, continues to operate. It provides coastal water chlorophyll and sediment information used by oceanographers and commercial fisheries, data used by the Navy for polar ice mapping, and global ozone distribution data which, added to the existing base, is used for long-term ozone trend analysis.

Model Rocket Contest



MODEL ROCKET CONTEST — National Association of Rocketry judges view visitors preparing rockets for launch at the Visitor Center's fourth annual rocket contest. Cosponsored by the National Space Institute and the Washington chapter of the American Institute of Aeronautics and Astronautics, this year's competition drew close to 90 contestants vying for donated trophies and rocket kits in two rocket events. The contest was held July 15, and featured over 200 rocket firings. More than 700 spectators attended the day-long activity.

Irish group visits Goddard as part of summer program

What better way to show Irish children subjected to religious segregation that people of different faiths can live together harmoniously, than to bring them to America to see for themselves.

Such was the case last month when 14 children from Belfast, Northern Ireland visited Goddard as part of activities in the Belfast Children's Summer Program. Purpose of the six-week program was to give the nine to 11-year-olds a chance to live with American families, and learn more about each other in a tension-free environment, according to John Emond (code 288), program committee member who arranged the tour.

Emond is a Presidential Management Intern in the procurement office of the newly formed Mission Operations and Data Systems Directorate.



BELFAST KIDS VISIT — Two children of the Belfast Summer Program touch Africa on the globe at the Visitor Center during their visit to Goddard as part of activities while in the U.S.

"This summer was possibly the first time that these kids (Protestant and Catholic) were allowed to mingle in a nonthreatening atmosphere," Emond said.

Ireland has been a troubled land for centuries, according to Emond, however,



J.L. Emond, Belfast Summer Program Coordinator.

the most recent resurgence of fighting in Northern Ireland began with Catholic and Protestant clashes in 1969.

"For some Belfast children, their entire lives have been spent in religious segregation," Emond said. "This program offered a unique opportunity for them to know each other better and also to see how different religions coexist."

Before visiting Goddard, the Belfast group and their host families saw a plane-
continued on page 7

GSFC Amateur Radio Club performs well in prep test



EMERGENCY PREP TEST — Top left, Joe Lundholm (l), and Hugh O'Donnell contact hams; top right, retiree Hugh Turnbull; bottom left, Andy Zwirko communicates through one of the amateur radio satellites; bottom right, club Vice President Frank Bauer (m) helps new ham Bert Johnson while retiree Willis Holmes looks on; inset, Turnbull (l) and Jim Gass.

Goddard's Amateur Radio Club (GARC) performed its best ever in the annual Field Day Emergency Preparedness Test June 23-24 at Goddard's Visitor Center.

"It's the best we've ever done," said Frank Bauer, club vice president. "We made about 1,200 contacts and earned 4600 points. Most contacts were in the U.S., but some were foreign."

GARC members used makeshift antennas and emergency generator power to operate the three ham and one satellite stations. Mock emergency field days occur annually and stations can be found in various places across the nation and around the world.

The tests are designed to help hams refine operating skills necessary to handle messages efficiently during emergencies when normal means of communication are unavailable.

Hundreds of visitors saw the event, learned about GARC's live transmission of space shuttle audio to listeners across the globe and sent free messages to friends in other parts of the U.S.

Additionally, they saw the videotape "Amateur Radio's Newest Frontier." The tape depicts Astronaut Owen Garriott's ham radio activities onboard the Space Shuttle Columbia during STS-9.

Goddard/Teacher Engineering Orientation Program

*Area teachers visit Goddard
as part of two-week EEO
engineering program*



EEO PROGRAM — Teachers from area schools participating in the Goddard Teacher Orienting Program are shown here. At far left is program coordinator Waddell Longus.

Goddard's Equal Employment Opportunity (EEO) office has started a new teacher program, geared to interest more minority students in engineering careers.

Twenty teachers from area junior and senior high schools spent the first part of the two-week program in an engineering workshop at Howard University's School of Engineering, where they discussed

career fields, computer use, curriculum enrichment ideas and engineering systems with faculty and staff.

At Goddard, the teachers observed engineers at their craft — designing, building and making things work. Among the topics teachers were briefed on during their three-day tour were: the Tracking and Data Relay Satellite System, the

Laser Tracking Network, the Get Away Special program, the Hubble Space Telescope, Landsat, International Ultraviolet Explorer and Voyager spacecraft.

They also received an in-depth tour of the Engineering Services Division, which provides the Center with a comprehensive capability to support all aspects of spacecraft/instrument production and usage.

The theory behind the program is that if math and science teachers can learn more about the "real world" of engineering, they can better motivate their students to pursue such careers.

"That's the goal of the program," said Waddell Longus (Code 120) program coordinator. "We're trying to help expand the number of qualified students in the Washington, D.C. area for entry into engineering colleges, universities and technical schools."

The two-week Goddard/Teacher Engineering Orientation Program is a combined effort of Goddard, Howard University's School of Engineering, the District of Columbia Metropolitan Consortium for Minorities in Engineering.

Participants included teachers from: McKinley, Central, Cardozo, Woodson, Spingarn, Coolidge, Banneker and Ballou high schools and from Shaw, Stuart, Roper, Langley, Hart and Jefferson junior highs.

New hires and retirees

Danick, Michael A. Code 226/247	Student Trainee (Procurement)	Khan, Noor J. Code 300	Clerk-Typist	Murphy, Robert M. Code 522.1	Computer Scientist AST, Computer Science
Davis, Anderson	Student Trainee (Engineering)	Kratz, Catherine C. Code 226/151	Student Trainee (Accounting)	Prestel, Gregory P. Code 226/150	Student Trainee (Accounting)
Eakin, Vickie J. Code 226/711	Student Trainee (Engineering)	Lim, Hsia-Yuan Code 226/581	Student Trainee (Engineering)	Stewart, Victoria L. Code 200	Clerk-Typist
Estin, Lynn R. Code 200	Clerk-Typist	Maufer, Thomas A. Code 226/522.2	Student Trainee (Mathematical Science)	Tominovich, Sharon J.	Clerk-Typist
Frakes, Joseph P.	Aerospace Engineer AST, Flight Systems				

Retirements

Dembrow, David W. Code 740	6/1/84	Kenny, Philip H. Code 292.1	8/3/84	Owen, Robert L. Code 800.4	6/30/84	Smith, Raymond I. Code 733.1	6/4/84
Doeler, Richard A. Code 730	6/2/84	Longanecker, Marjorie Code 804	5/26/84	Rychlik, Jan Code 727	8/3/84	Wardrip, Schuyler C. Code 854	6/22/84
Doyle, Harry J. Code 303	8/3/84	Miller, Glenn E. Code 303	6/11/84	Shapiro, Paul Code 823	8/3/84	Weichmann, Laverne R. Code 034.3	7/31/84
Kellam, Fred G. Code 1031	8/31/84	Moss, Ruth D. Code 253	6/1/84	Shehab, Alfred H. Code 130	8/31/84	Williams, Alexander Code 252	8/2/84

NASA continues plasma physics experiments from Wallops

continued from page 2

the "daughter" was separated at 95 kilometers (59 miles) as the rocket ascended. This section contained instrumentation to measure electric fields and conductivity.

The "mother" was ejected at 98 kilometers (61 miles), near apogee.

The "daughter" section continued to free fall and landed in the Atlantic Ocean. The "mother" descended on a 14 meter (46-foot) cross-shaped parachute and was recovered in midair by the Wallops Skyvan aircraft. The scientific experiment package on the mother will

be refurbished and reflown on future research flights.

In the series launched July 24, three other scientific probes were conducted. A small Super Arcas rocket containing instruments to ascertain whether significant electrical field activity was occurring in the middle atmosphere, was launched prior to conducting the "mother/daughter" experiments.

A small Super Loki Sphere also was launched to obtain meteorological data 48 minutes after the "mother/daughter" probes. Another Super Arcas was lofted to collect additional electric field and conductivity data which will be correlated with the other experiments.

Both payloads on the small Super Arcas rockets descended on parachutes which were snatched in midair and returned to Wallops.

Amateur astronomer David Skillman

continued from page 3

By 1985, however, Skillman may have a chance to gaze at something other than stars. Astronomers here say, at that time, a Goddard satellite, the International Cometary Explorer, will be making its rendezvous with Comet Giacobini-Zinner, and amateur astronomers can catch a glimpse of the comet.

"I have an affection for comets," he said, "because it was Comet Kohoutek that awakened my interest in astronomy, even though it was much fainter than predicted."

Why do comets generate so much interest?

"Bright comets appear so infrequently," he said, "that when one is viewable, astronomers scurry to study it. Comets represent the purest forms remaining from the early solar system. Other bodies in our solar system may have undergone such a complete metamorphosis that studying them wouldn't yield the same type of information as would studying comets. Cometary studies provide us with better insight to the origin of our solar system." Comet Encke appears most frequently at 3.3 year intervals, according to a Goddard scientist.

But Skillman also is interested in other

things that have been around for a long time — trees and music. More specifically, he grows bonsai, or rather he cultivates them so they won't grow. Bonsai is the Japanese-originated hobby of drawing trees by various methods. A bonsai sat recuperating on the well sunlit windowsill in his office when Goddard News interviewed him.

He also likes music. He writes songs and plays a folk guitar. "I got interested in music back in the sixties when folk music was popular," he said. "Between my hobbies and work, I stay busy. When I'm not picking my guitar, I might be pruning a bonsai or star gazing."

Irish kids visit

continued from page 5

tarium show at the nearby Owen Science Center. Once here, they toured the Visitor Center, the satellite integration and testing area and various communications centers. Each child received a Shuttle photo and their teacher received a Landsat image of Ireland.

While in the U.S., the children also had a reception at the Irish Embassy, went on several picnics, had an ecumenical service and toured Congress.

"The Belfast group and their host families had a lot of fun during their visit here," Emond said. The Irish visitors departed for Ireland August 1.

Dale Harris named TDRSS project manager

continued from page 2

1961. He worked on nuclear power supplies for remote applications at Martin Marietta Co., Middle River, Md., from 1961 until joining Goddard in 1963.

Harris received his B.S. in Chemical Engineering in 1958 from the University of Missouri at Rolla. In 1959, he received his M.S. in Nuclear Engineering from the same school. In 1971, he received his Ph.D in Nuclear Engineering from the University of Maryland.

Harris is a member of the American Institute of Aeronautics and Astronautics (AIAA), the Society of Sigma Xi, Phi Kappa Phi and Tau Beta Pi.

Born in Hannibal, Mo. Sept. 19, 1936, Harris resides in Brookville, Md.

NEW GIFT SHOP OPENS AT WALLOPS VISITOR CENTER



NEW WALLOPS GIFT SHOP — Leslie Meredith, (l) Goddard associate director, sells the first item from Wallops' new gift shop to Wallops' Director of Suborbital Projects and Operations Warren Keller. The shop opened last month at the Wallops Island, Va., Visitor Center.

T-shirts, baseball caps, sun visors, tote bags, jewelry, shuttle kits, aircraft kits, cloth patches, and many other items are available at the shop. The VC is open Thursday through Monday 10 am to 4 pm.

Goddard takes active role in space station development

continued from page 1

will permit scientists to conduct work in an Earth-laboratory environment, conducting experiments primarily in life sciences and microgravity.

But outside the Station, equally ideal facilities will be available for observing the Earth, sun and stars. The Station's exterior will provide a base primarily for studying solar physics and astrophysics, enabling scientists to readily assemble, service and change instruments as needed.

At the same time, orbiting platforms associated with the Space Station will operate instruments too sensitive to be attached close to the Station's environ-

ment and will deploy instruments that will make extended, long-term observations. The platforms will utilize support hardware common to the Space Station, economizing construction and providing the capability for easy servicing.

Platforms which co-orbit with the Space Station will be serviceable from the Station directly and will be used primarily for sun and space observations. Platforms orbiting in a polar orbit, which is ideal for scanning the Earth's entire surface repeatedly, will be serviced by the Space Shuttle.

"Goddard is developing the facility requirements, tools, techniques and procedures for operating and servicing payloads attached to or co-orbiting with the Station," says Ron Browning, Deputy Director for Space Station, Flight Projects Directorate.

Each of NASA's nine centers nation-

wide is involved in the Space Station program. Lead-center for the work overall is Johnson Space Center in Houston, TX. Marshall Space Flight Center in Huntsville, AL., has responsibility for developing the Station's habitable and pressurized modules. Lewis Research Center in Cleveland, OH., is developing the Station's power system.

The Space Station will cost approximately \$8 billion. Of this approximately \$2 billion will be used for definition studies, reserves and miscellaneous support. This leaves \$5 to \$6 billion for all other activities, including the hardware effort. Of this \$5 to \$6 billion, Johnson Space Center and Marshall Space Flight Center will each manage approximately 40 percent, while Goddard will be responsible for 10 to 15 percent, and the Lewis Research Center for 7 to 10 percent.

August shuttle mission defined

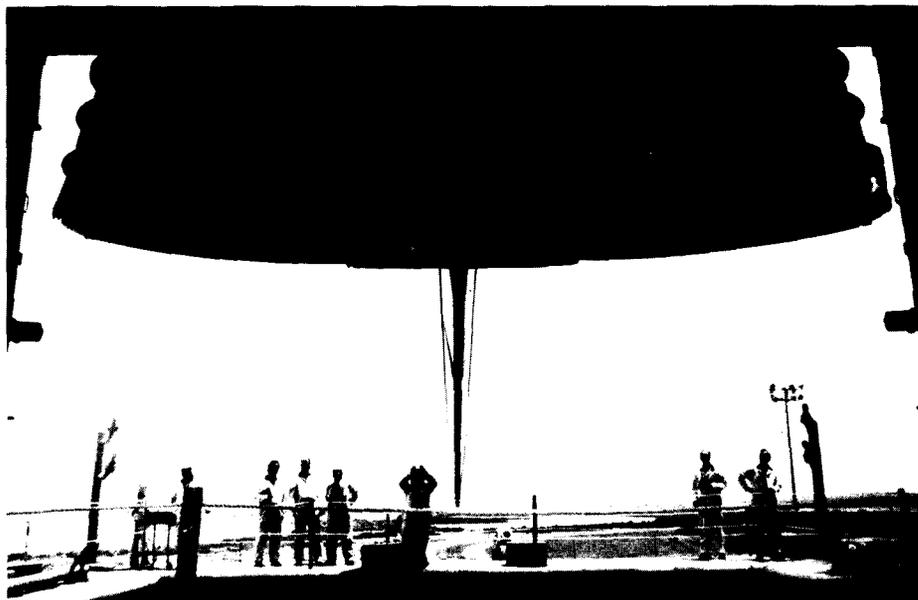
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"The ability to integrate payloads demonstrates a flexibility to recover from unexpected delays that is essential to an operational transportation system. We are determined to honor launch commitments to our commercial customers."

The combined mission cargo will consist of three communication satellites—the Hughes Leasat, Satellite Business Systems, the AT&T Telstar 3-C, and the OAST-1 (NASA's Office of Aeronautics and Space Technology) collapsible solar array. Also on board will be the McDonnell Douglas electrophoresis system.

The second Hughes Leasat Satellite, originally manifested on flight 41-F, will be flown on mission 51-A in November 1984. Two NASA payloads, the Large Format Camera and Spartan, will be rescheduled on later missions.

The crew for mission 41-D is the six member team of Commander Henry Hartsfield, pilot Michael Coats, three mission specialists: Judith Resnik, Steven Hawley and Richard Mullane, and payload specialist Charles Walker, a McDonnell Douglas engineer. The crew of 41-F will be scheduled for a later flight.



ENGINE INSPECTION — An inspection team stands below the orbiter main engines. They entered Pad 39A late in the afternoon following the launch abort of Discovery during the morning of June 26th. A fuel valve on main engine no. 3 (left engine in this photograph) failed to open forcing the Space Shuttle onboard computer to terminate the ignition sequence at T-4 seconds.

NASA
National Aeronautics and
Space Administration
Goddard Space Flight Center

Greenbelt, Maryland and Wallops Island, Virginia

Goddard News

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