NASA
National Aeronautics and Space Administration
Goddard Space Flight Center

Goddard News

Greenbelt, Maryland and Wallops Island, Virginia Vol. 36 No. 3 March 1990

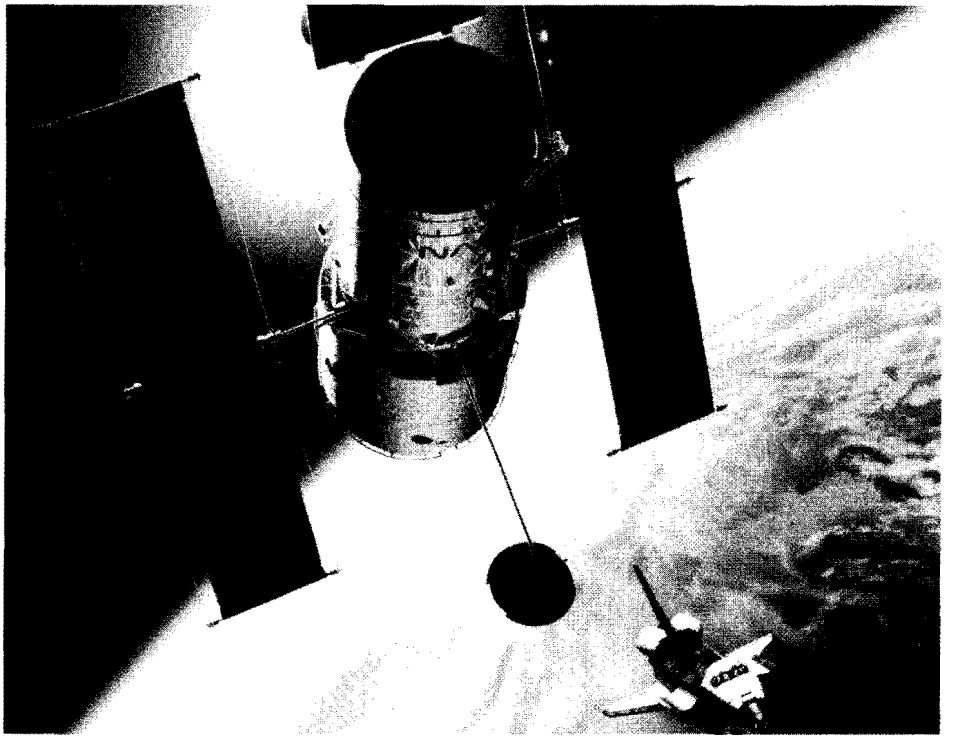
New Target Launch Date Set for HST Mission

NASA Shuttle managers announced this month that the target launch for Shuttle Mission STS-31, scheduled to deploy NASA's Hubble Space Telescope, will now be no earlier than April 12, 1990.

The original target date for STS-31 had been March 26th, but in January, NASA officials concluded that the righthand aft motor segment needed to be replaced and set April 18th as the revised target date. The processing of the segment changeout along with overall mission preparations have been completed well ahead of schedule, thus permitting the six-day advancement in the target launch date.

For five months after launch the 43-foot-long spacecraft will conduct astronomical observations of star fields familiar to most amateur astronomers, as it calibrates the initial measurements taken by its five instruments.

Rising 370 miles above the Earth, the Hubble Space Telescope will be the largest orbiting astronomical observatory ever built. It will "see" planets, stars, and other objects in the universe about 10 times better than now possible with the best optical telescopes on the ground.



I CAN SEE CLEARLY NOW—Rising 370 miles above the Earth, the Hubble Space Telescope will be free of interference from the Earth's atmosphere, increasing our ability to see clearer than ever before.

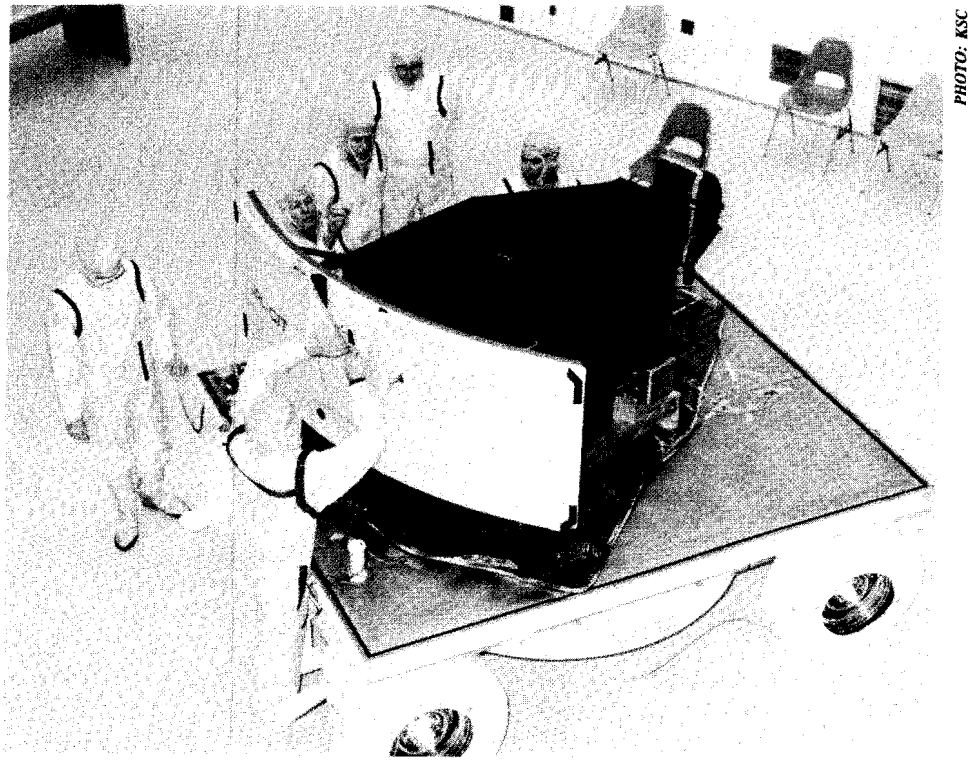


PHOTO: KSC

PUTTING IT ALL TOGETHER—Technicians in the clean room at Kennedy Space Center, FL put the final touches on the Jet Propulsion Laboratory's (JPL's) Wide Field/Planetary Camera before integrating it with the rest of the spacecraft. This camera can operate in either of two modes to view entire galaxies or close in on individual planets.

INSIDE

He Knew NASA When... William G. Stroud

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Talk from the Top

John W. Townsend Jr.

Q: Why does GSFC often fill positions with new-hires, rather than with current NASA employees who wish to transfer. . . ?

A: A manager may fill a vacancy in several ways: reassignment of a current employee; competitive selection and promotion from within the Center or from a larger pool of federal employees; reinstatement; transfer; or a new hire from outside the federal service. Usually, GSFC managers have authority to fill a vacancy using any of the above approaches. Almost 1,000 positions were filled by reassignment in FY89. However, because approximately 280 employees leave GSFC each year, at least that many new hires are made from "outside" even if the manpower ceiling remains static. Last year because of a significant increase in ceiling, almost 400 new hires were brought to the Center.

Rosat Arrives at Kennedy

The Rosat spacecraft, a German scientific satellite to be launched by NASA in early summer, arrived this month at Cape Canaveral, FL, after a flight from the Federal Republic of Germany (FRG) aboard a German 747 cargo plane.

Rosat, which stands for Roentgen Satellite, will be launched using a Delta II rocket in late May or early June. Built by Dornier Systems of the FRG, Rosat will perform the first all-sky survey with an imaging X-ray telescope. The survey will be followed by individual observations of X-ray sources. Rosat is a cooperative project between NASA and the FRG's Federal Ministry for Research and Technology. The United Kingdom is cooperating on Rosat through an agreement with the FRG.

The spacecraft is equipped with two imaging telescopes—a German Large X-Ray Telescope and a smaller extreme ultraviolet telescope known as the Wide Field Camera, contributed by the United Kingdom. A High Resolution Imager (HRI) on the Large X-Ray Telescope, was contributed by the United States. The HRI was built by the Smithsonian Astrophysical Observatory and is managed by Goddard.

After the initial six-month all-sky survey, Rosat will be devoted to detailed observations of X-ray sources with observing time divided among investigators from the United States, the FRG and the United Kingdom.

The 5,000-pound satellite will be deployed into a 53-degree inclined, circular orbit 360 miles from Earth. Rosat will be launched from Complex 17 at Cape Canaveral Air Force Station by the U.S. Air Force and a McDonnell Douglas launch team. Final assembly and pre-launch testing of Rosat's science instruments will be performed in the clean room at NASA's Hangar AE, Cape Canaveral Air Force Station.

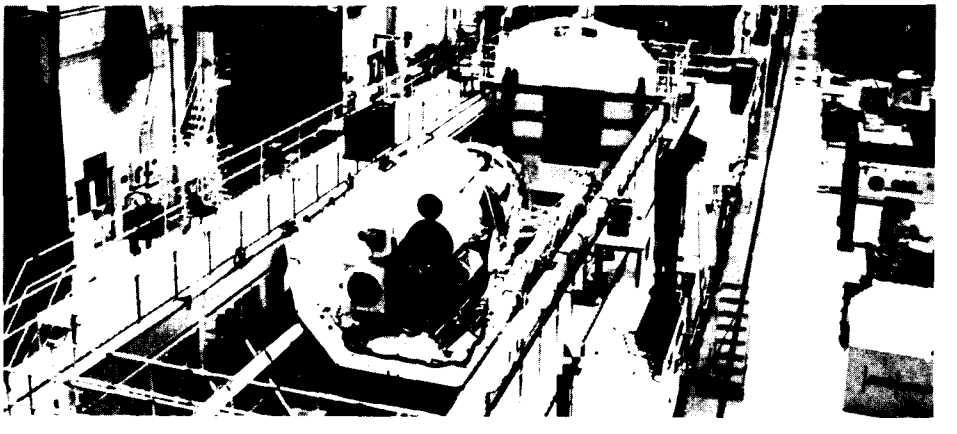
Within NASA, the Rosat program is managed by the Astrophysics Division of the Office of Space Science and Applications. Goddard is responsible for detailed implementation of the Rosat program.

ASTRO-1 Power-on Testing Completed

At Kennedy Space Center, payload managers are making plans to move the ASTRO-1 payload to Columbia's payload bay in preparation for the STS-35 mission. Launch is now scheduled for no earlier than May 9, after which the ASTRO-1 payload will complete more than 80 hours of observations from its altitude aboard the shuttle of 190 nautical miles (360 kilometers). All ASTRO-1 and Broad Band X-ray Telescope (BBXRT) power-on testing has been completed. Functional verification tests between the BBXRT and the Payload Operations Control Center (POCC) have been satisfactorily completed. The Hopkins Ultraviolet Telescope (HUT) camera has been reconditioned. The HUT camera will not need reconditioning until mid-March. The Goddard-built Ultraviolet Imaging Telescope (UIT), also is at the Cape.

New soft baffle covers have been installed on the telescopes. These new covers will be easier to remove and reinstall than the original hard covers. Daily checks are being performed on the Wisconsin Ultraviolet Photopolarimeter Experiment (WUPPE).

The actual date of transfer to the Orbiter Processing Facility will be determined by the Columbia's processing schedule. Installation into Columbia's payload bay is expected to take about one shift.



***TELESCOPE TEST BED*—This photograph shows the instruments which make up the Astro-1 mission after they were integrated in the testing facility at Kennedy Space Center, FL. The payload's complement of four telescopes will complete more than 80 hours of observations from its shuttle-borne altitude of 190 nautical miles (360 kilometers).**

Referred to jointly as ASTRO-1, the payload consists of an Instrument Pointing System (IPS), a Spacelab Pallet System (SPS), associated support structures, a cruciform structure with four science experiments (telescopes), and a Star Tracker (ST). The three telescopes are the Wisconsin Ultraviolet Photopolarimeter Experiment (WUPPE), which will measure the polarization of ultraviolet light emitted by celestial sources; the Hopkins Ultraviolet Telescope (HUT), which is designed to study very short wavelength ultraviolet light; Goddard's Ultraviolet Imaging Telescope (UIT), which takes photographs through a variety of ultravio-

Continued on page 8

Launch Update: EUVE Telescopes Arrive at GSFC

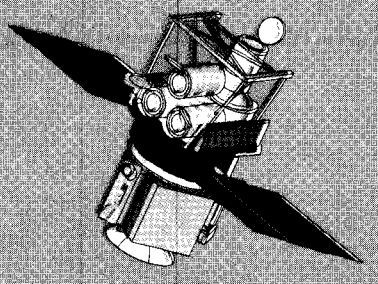
The astronomical telescopes for the Extreme Ultraviolet Explorer (EUVE) have been delivered to Goddard for integration into the Goddard-designed payload module and for subsequent environmental testing.

The scientific payload consists of four specially designed telescopes that will make astronomical observations in the previously unexplored portion of the spectrum called the extreme ultraviolet (EUV), which is between the X-ray and ultraviolet regions of the spectrum.

The integration and testing at GSFC are expected to take 18 months. The payload module will be mated to NASA's Explorer platform spacecraft bus prior to being put into Earth orbit by a Delta II expendable launch vehicle from Cape Canaveral Air Force Station, FL, in August 1991.

During its expected two-year mission, the EUVE will carry out an all-sky survey in the 100 to 1,000 angstrom wavelength region and will subsequently include a program in which guest scientists will be able to conduct spectroscopic observations of the brightest EUV celestial sources.

The EUVE science payload has been designed, built, and tested by the Space Astrophysics Group of the Space Sciences Laboratory, University of California, Berkeley. Professor Stuart Bowyer is the principal investigator. Dr. Roger F. Malina is the principal investigator for the construction of the telescopes. The project manager is Steven J. Battel. Donald Margolies is the EUVE mission manager at Goddard.



NASA Pipeline

AMES RESEARCH CENTER, Moffett Field, CA—Pioneer 11 recently crossed the orbit of Neptune to become the fourth spacecraft to leave the solar system. Pioneer 11 will join Pioneer 10 and Voyagers 1 and 2 in searching for the heliopause, the point at which the Sun's electromagnetic influence gives way to the galaxy's influence. As it crossed Neptune's orbit, Pioneer 11 was 2.8 billion miles from the Earth. Launched in 1973, Pioneer 11 provided scientists with their closest view of Jupiter, passing within 26,600 miles of the cloud tops in December 1974. The close approach and the spacecraft's speed of 107,373 mph, by far the fastest speed ever reached by a man-made object, hurled Pioneer 1.5-billion miles across the solar system toward Saturn.

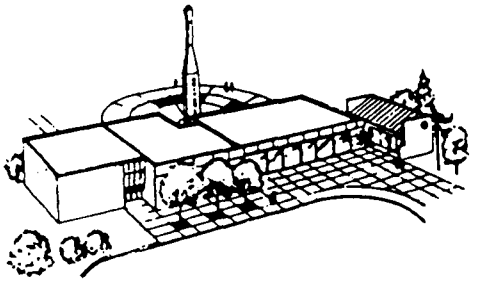
DRYDEN FLIGHT RESEARCH FACILITY, Edwards, CA—Three of the supersonic SR-71 "Blackbird" aircraft being retired from the U.S. Air Force are slated for loan to the Ames-Dryden Flight Research Facility. The aircraft will remain in flyable storage at the NASA facility until the Air Force determines it no longer has a need to preserve them. NASA would like to use the aircraft to fly scientific experiments requiring high-speed research testbeds. The SR-71s are capable of flying at greater than three times the speed of sound. The approximately 101-foot long titanium structure is powered by two J58 engines. The airplanes are coated with a special black paint that helps dissipate heat caused by high speeds. The manufacturer is Lockheed Corp.

NASA HEADQUARTERS, Washington, DC—NASA and the University Corporation for Atmospheric Research (UCAR), Boulder, Colo., have signed an agreement under which NASA will support UCAR's exploration of the feasibility of using Shuttle external tanks (ETs) as research, storage or manufacturing facilities in low-Earth orbit. Under the agreement, UCAR has the main responsibility to address the issues associated with their planned orbital use of external tanks. NASA's support of UCAR's efforts is on a direct cost, reimbursable basis. The ET is a structure (154 feet long, 28.6 feet in diameter) which is used to carry the 500,000 gallons of liquid hydrogen and oxygen used with the Space Shuttle main engines during launch and initial orbit insertion. This activity is part of NASA's effort to seek and encourage, to the maximum extent possible, the fullest commercial use of space.

April Visitor Center Events

The Earth Observing System: The centerpiece of NASA's Mission to Planet Earth.

All events are free. For more information call 286-8981.



Launch Site Goddard — Sunday, April 1 and 15, 1:00 p.m. — Bring a rocket and participate or just watch the fun!

Saturday Videos — Saturday, April 7, 1:00 p.m. — Learn how satellites watch over our Earth in "Sentinels In Space" a video about managing our natural resources through the use of satellites.

Know and Tell — Sunday, April 22, 1:00 p.m. — Join Dr. Gerald Soffen for a look at Goddard's most exciting project for the 1990s, the Earth Observing System — a project to study the Earth as we would another planet.

Star Watch — Saturday evening, April 14, 7:00 - 9:00 p.m. — Enjoy a spring night viewing the moon and stars. Bring your binoculars, or use one of the Visitor Center's telescopes.

Looking Ahead...
Mixed Fleet Manifest—January 1990

Space Shuttle

Flight	Date/ Orbiter	Primary Payload
31	4/18/90 *Discovery*	HST
35	5/9/90 *Columbia*	ASTRO-01
38	7/9/90 *Atlantis*	DOD
40	8/29/90 *Columbia*	SLS-01
41	10/5/90 *Discovery*	ULYSSES
37	11/1/90 *Atlantis*	GRO SSBUV-02
42	12/12/90 *Columbia*	IML-1 (DOD)
43	1/31/91 *Discovery*	TDRS-E
44	3/4/91 *Atlantis*	DOD
45	4/4/91 *Columbia*	ATLAS-01 (DOD)
46	5/16/91 *Discovery*	TSS-01 (DOD) EURECA-1L
47	6/17/91 *Atlantis*	SL-J (DOD)
48	8/22/91 *Discovery*	UARS
49	9/30/91 *Atlantis*	STARLAB (DOD)
50	12/5/91 *Discovery*	LAGEOS II
51	1/23/92 *Atlantis*	AFP-675 (DOD)
52	2/13/92 *Endeavour*	GEOSTAR-01 EURECA-1R
53	3/5/92 *Columbia*	USML-1
54	4/23/92 *Atlantis*	ACTS
55	5/28/92 *Endeavour*	SL-D2
56	6/18/92 *Columbia*	ATLAS-02 SSBUV-03
57	7/16/92 *Discovery*	SRL-01
58	8/6/92 *Atlantis*	Flight Opportunity
59	9/3/92 *Endeavour*	SPACEHAB-01
60	9/30/92 *Columbia*	SLS-02
61	10/29/92 *Discovery*	INMARSAT-01
62	12/10/92 *Endeavour*	TDRS-F
63	1/28/93 *Columbia*	ILM-02
64	2/25/93 *Discovery*	SPACEHAB-02
65	3/18/93 *Atlantis*	USMP-02
66	4/15/93 *Endeavour*	ATLAS-03 SSBUV-04
67	5/6/93 *Columbia*	EURECA-2L
68	6/10/93 *Discovery*	HST Revisit
69	7/1/93 *Atlantis*	Flight Opportunity
70	7/22/93 *Endeavour*	SPACEHAB-03
71	9/2/93 *Columbia*	Flight Opportunity
72	10/1/93 *Discovery*	Flight Opportunity
73	10/22/93 *Atlantis*	SPACEHAB-04
74	11/12/93 *Endeavour*	EURECA-2R
75	12/9/93 *Columbia*	SRL-02
76	2/3/94 *Discovery*	ISF-01
77	2/24/94 *Atlantis*	XTE/EUVE RETR
78	3/17/94 *Endeavour*	ATLAS-04 SSBUV-05
79	4/7/94 *Columbia*	USML-02
80	5/12/94 *Discovery*	SPACEHAB-05

Flight	Date/ Orbiter	Primary Payload
81	6/2/94 *Atlantis*	SFU-RETR
82	8/4/94 *Columbia*	SL-D3
83	8/25/94 *Discovery*	AAFE
84	10/6/94 *Atlantis*	SPACEHAB-06 SSBUV-06
85	10/27/94 *Endeavour*	ISF-02
86	12/8/94 *Discovery*	Flight Opportunity
87	1/19/95 *Atlantis*	OMV
88	2/15/95 *Columbia*	SLS-03
89	3/9/95 *Endeavour*	SSF/MB-01 (FEL)
90	4/27/95 *Atlantis*	TDRS-G
91	6/1/95 *Columbia*	IML-03
92	6/22/95 *Endeavor*	SSF/MB-02
93	8/10/95 *Discovery*	SSF/MB-03
94	9/7/95 *Columbia*	ATLAS-05 SSBUV-07
95	9/28/95 *Endeavour*	TDRS-H
96	11/16/95 *Discovery*	SSF/MB-04
97	12/7/95 *Atlantis*	SRL-03
98	1/11/96 *Columbia*	SPACEHAB-07
99	2/8/96 *Endeavour*	SSF/MB-05
100	2/29/96 *Discovery*	HST REV-02
101	3/28/96 *Atlantis*	SSF/MB-06
102	5/9/96 *Columbia*	USML-03
103	5/30/96 *Endeavor*	ISF-03
104	6/20/96 *Discovery*	SSF/MB-07 (MTC)
105	7/18/96 *Atlantis*	EURECA-3R
106	8/15/96 *Columbia*	ATLAS-06
107	9/19/96 *Endeavor*	SSF/OF-01

Expendables

Date	Launch Vehicle	Payload
90 04	Scout	MACSAT (NAVY)
90 05	Atlas 50E	NOAA-D
90 05	Delta	ROSAT
90 06	Atlas I	CRRES
90 06	Scout	SALT (NAVY)
91 01	Scout	PROFILE (NAVY)
91 05	Atlas 34E	NOAA-I
91 06	Atlas I	GOES-I
91 08	Delta	EUVE
92 02	Atlas I	GOES-J
92 06	Scout	SAMPEX
92 07	Delta II	GEOTAIL
92 09	Atlas 11E	NOAA-J
92 09	Titan III	MARS OBSERVER
92 12	Delta II	WIND
93 06	Delta II	POLAR
93 06	Scout	TOMS
93 06	TBD	SWAS
93 10	TBD	MSAT
93 12	Scout	FAST
93 12	Titan II	NOAA-K
94 06	Delta II	RADARSAT
94 09	TBD	SMEX-04
94 12	Delta II	LIFESAT-01
95 03	TBD	SOHO
95 04	Titan II	NOAA-L
95 06	TBD	SMEX-05
95 06	Delta II	LIFESAT-02
95 07	Atlas I	GOES-K
95 08	Titan IV /Centaur	CRAF
95 12	TBD	SMEX-06
95 12	Delta II	LIFESAT-03
96 04	Titan IV /Centaur	CASSINI
96 06	TBD	SMEX-07
96 06	Delta II	LIFESAT-04
96 07	Titan II	NOAA-M

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INSIDE

In Bill Stroud's office a sign exhorting one simply to "Think" captures the sense of his lifelong commitment to the advancement of knowledge through the exploration of space.

Perhaps it is his international experiences on detail to the North Atlantic Treaty Organization (NATO), or his more-than-forty years experience in the space business which give him his visionary yet realistic outlook. Either way, William G. Stroud, Special Assistant to the Director of Flight Projects, is a space pioneer with his eye to the future.

"Though the frontiers of knowledge are unlimited in areas such as astrophysics, genetics, and molecular biology, space is the only frontier left for human exploration," said Stroud, explaining his enthusiasm for the space program.

The naturally adventurous Stroud grew up in suburban Philadelphia, where he said "there were no exciting things like volcanos. If you want to study volcanos, you go where the volcanos are." So, at the age of 18, Stroud went off to Penn State, to study not volcanos, but physics.

Auspicious Beginnings

Stroud, who also holds advanced degrees in physics from the University of Chicago and Princeton, has been with Goddard since its beginnings. He came to Goddard in 1959 following his stint as Head of the Astro-Instrumentation Branch of the Army Signal Corps, later to take charge of the TIROS program when it transferred from the Department of Defense to NASA in 1959.

"In the '50's, the only places doing rocket research were the Army Signal Corps, the Naval Research Laboratory, and the Air Force Cambridge Research Center," said Stroud. "I joined the Army Signal Corps to work on sounding rocket atmospheric research and ended up at Goddard."

A photo on his wall shows Stroud with then-Senator Lyndon Johnson and the TIROS spacecraft—testimony both to Stroud's pride in the contributions of the TIROS project and the instrumental efforts of Johnson in the early days of the space program when he was Chairman of the Joint House-Senate Committee on Space,

PHOTO: D. McCALLUM

STROUD

just before becoming Kennedy's Vice-President.

It is perhaps this evidence of diplomacy that made Stroud the candidate chosen to serve on detail to NATO in Brussels, Belgium for six years, where he ran a special program of the NATO Science Committee designed to promote research and development (R & D) as a tool for economic stability in Greece, Portugal, and Turkey.

"It was a super job," said Stroud. "My family enjoyed living in Europe, and I enjoyed the European lifestyle and the challenge of working with these countries."

In trying to develop an R & D infrastructure, Stroud worked for cooperation among universities, government laboratories, and industry, an arrangement Americans may take for granted, but one that Stroud said is not normal in those countries.

As the first director of the program, Stroud assisted the countries to set up programs in applied research projects in such areas as wastewater treatment, microtoxins in food, and digital communication systems.

Living in Brussels put the Strouds only about an hour's drive (or flight) from London, Paris, Amsterdam, or Frankfort. His favorate place to visit, though, was..."wherever we were at the time!," he said with a laugh.

A 40-year veteran of government service, Stroud proudly displays his 45-year pin (they were out of 40-year pins!) on the lapel of an academic-looking tweed jacket he is never without.

"I've been part of the space program since long before there was a NASA," he said, smiling at the memory.

It is this special expertise that makes Stroud such a valuble asset to Goddard in his role as an advisor for planning to the Director of Flight Projects. Stroud has lent his expertise in the space business to several Source Evaluation Boards (SEB's), including one for Global Geospace Science for which the SEB Team received a Group Achievement Award. Currently, he chairs the Goddard Committee on the Excellence Award and has recently produced a brochure on Goddard's Program Plan for the '90's.

Back to the Future

What's ahead for this Goddard pioneer who seems to have done it all? "I've been thinking about visiting some of the [few] places in the world I haven't been," he said. Now that his children—four boys and two girls—are all grown and gone, Stroud and his wife Helen will have the opportunity to travel to China, Indonesia, and Malaysia. Last year, the couple traveled by train out West to Arizona and Utah, returning round-a-bout by way of Washington State, where his oldest daughter, Rani, lives.

Helen, a native Washingtonian, who also works at Goddard, is a secretary in Code 700. "And a darn good one, too!" said Stroud with pride.

Also coming up for Stroud is the next phase of work to be done on the Earth Observing System, a project he said he's enthusiastic about.

"The space program has always been a challenge in mankind's search for knowledge and adventure," said Stroud. "As a participant from the days of high-altitude balloons and sounding rockets, through the excitement of the 1960's and its waning as public attitudes have changed, I still am excited by the prospects for the future of space exploration, whether by robots or by men and women. The challenge is still there—especially for the young people who respond to the invitation."

CLOSE UP

THOMAS E. HUBER, formerly Deputy Director for Code 700, has been named Director of the Engineering Directorate. As Deputy Director, Huber has supervised more than 700 people in the matrix-management environment of Code 700 since March 1988. He supported the Center's 20 space flight projects with the appropriate engineering disciplines and sub-professional skills to carry them from the preliminary design through design, fabrication, test, launch, and space operations.

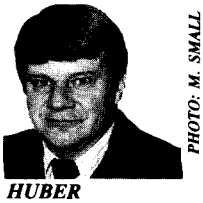

PHOTO: M. SMALL

HUBER

. . . **THOMAS C. UNDERWOOD, JR.,** has been appointed Project Manager for the Space Network Project Office, newly-formed within the Mission Operations and Data Systems Directorate, designated Code 504. The office was established to manage the Advanced Tracking and Data Relay Satellite System (ATDRSS) activities. In his new position, Underwood will provide the overall leadership for the Space Network Development and Operational Integration activities. Since 1985, he has been the Assistant Division Chief for the Tracking and Data Relay Satellite System (TDRSS) in the Networks Division responsible for managing the planning, engineering, and operations of the Space Network, and, in particular, the TDRSS portion. Prior to this, he held various branch and section head positions within the Networks organization, all related to the development, integration, test, and operation of the ground and/or space networks. . . The new Associate Director for Operations for the Space and Earth Sciences Directorate (Code 600) is **DENNIS K. McCARTHY,** appointed to replace William Bandeen, who retired on December 2, 1989. McCarthy has been Deputy Project Manager for the Cosmic Background Explorer (COBE) Project since February, 1983. Previously, he was Head of the Advanced Applications Section of the Mechanical Engineering Branch of the Engineering Directorate.

PHOTO: M. SMALL

UNDERWOOD

PHOTO: M. SMALL

McCARTHY

PHOTO: M. SMALL

***BOX THAT CAN!*—Larry Bohlen (Code 731), Secretary of Goddard's newly-formed Conservation Club, demonstrates how aluminum cans are already being recycled in Buildings 8, 5, 2 and 22. Since its formation February 1, the Conservation Club has arranged with the Explorer Post to pick up and redeem aluminum cans from these four buildings. The Post retrieves about forty pounds of aluminum weekly. Other buildings are scheduled to be added as building representative volunteers are found. If you are interested in volunteering as a building representative, please contact Larry Bohlen on x6-2254.**

GIVE

On February 7, the Bloodmobile was held in Building 8, and 190 prospective donors volunteered to donate blood. The following is a list of Goddard employees who were cited by the American Red Cross with gallon pins at the Bloodmobile.

Name	Code	Gallons	Name	Code	Gallons
Wayne Boncyk	675	1	Rick Shafer	685	1
Jeff Bowser	735	1	Wendy Shoan	552.1	5
Alan Centa	514	1	Steve Stochaj	661	1
Tom Dixon	743.2	2	David Toll	624	1
Ron Lear	254.6	1	Barbara Vargo	703.1	3
Sherry Schmitz	752.1	4			

Our next Bloodmobile is scheduled for April 11 in the Building 8 Auditorium. Watch Dateline Goddard for more details.

Mixed Fleet Manifest

Continued from page 5

Glossary

AAFE	Aeroassist Flight Experiment
ACTS	Advanced Communications Technology Satellite
AMPTE	Active Magnetosphere Particle Tracer Experiment
ASTRO	Astronomy
ATDRS	Advanced Tracking and Data Relay Satellite
ATLAS	Atmospheric Laboratory for Applications and Science
AXAF	Advanced X-Ray Astronomy Facility
BBXRT	Broad Band X-ray Telescope
CASSINI	Saturn Orbiter/Titan Probe
CRAF	Comet Rendezvous Asteroid Fly-by
CRISTA	Cryogenic Infrared Radiance Instrument for Shuttle
CRRES	Combined Release and Radiation Effects Satellite
DOD	Department of Defense
EOS	Earth Observing System
ERBS	Earth Radiation Budget
EURECA	European Retrievable Carrier
EUVE	Extreme Ultraviolet Explorer
FAST	Fast Auroral Snapshot Explorer
FEL	First Element Launch
FLTSATCOM	Fleet Communication Satellite (U.S. Navy)
FTS-DTF	Flight Telerobotic Service Demonstration Test Flight
FUSE	Far Ultraviolet Spectroscopy Explorer
GEOSTAR	Interactive Radiodetermination Satellite
GEOTAIL	Satellite to Explore the Geotail of the Earth
GOES	Geostationary Operational Environmental Satellite
HCMM	Heat Capacity Mapping Mission
HST	Hubble Space Telescope
IML	International Microgravity Laboratory
INMARSAT	International Maritime Satellite
ISF	Industrial Space Facility
LAGEOS	Laser Geodynamics Satellite
MACSAT	Multi-Access Communications Satellite
MSAT	Mobile Satellite
NOAA	National Oceanic and Atmospheric Administration
OMV	Orbital Maneuvering Vehicle
POLAR	Polar Auroral Plasma Physics
POP	Polar Orbiting Platform
RADARSAT	Radar Satellite
ROSAT	Roentgen Satellite
SALT	Special Altimeter
SAMPEX	Solar, Anomalous, and Magnetospheric Particle Explorer
SFU-RETR	Space Flyer Unit-Retrieval
SHEAL	Shuttle High Energy Astrophysics Laboratory
SIRTF	Space Infrared Telescope Facility
SMEX	Small Explorer
SOHO	Solar Heliospheric Observatory
SPACEHAB	Commercially-owned pressurized module for conducting experiments in a man-tended environment
SPAS-ORFEUS	Orbiting and Retrievable Far and Extreme Ultraviolet Spectrometer
SSBUV	Shuttle Solar Backscatter Ultraviolet Spectrometer
SSF	Space Station Freedom
SWAS	Submillimeter Wave Astronomy Satellite
TDRS	Tracking and Data Relay Satellite
TOMS	Total Ozone Mapping Spectrometer
UARS	Upper Atmosphere Research Satellite
ULYSSES	Formerly ISPM (International Solar Polar Mission)
WIND	Satellite to measure solar wind input to magnetosphere
XTE	X-ray Timing Explorer

NASA National Aeronautics and Space Administration Goddard Space Flight Center

Goddard News

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let filters; and the Broad-Band X-Ray Telescope, which will investigate X-ray emissions from quasars and other sources too faint for detailed analysis by earlier X-ray telescopes. Associated data recorders complete the basic payload hardware.

The 13-foot-long Broad-Band X-Ray Telescope, built at Goddard, was developed based on a new concept in X-ray mirror design that made possible inexpensive lightweight mirrors constructed from commercial aluminum foil. The telescope's silicon detectors function as spectrometers, analyzing images received from the two lightweight aluminum mirrors. This information will help glean information about some of the most interesting sources of electromagnetic radiation.