National Aeronautics and Space Administration
Goddard Space Flight Center

Goddard News

Greenbelt, Maryland / Wallops Island, Virginia

October 1996 Vol. 43 No. 18

High Energy Payloads Launch from Wallops on Pegasus

by Jim Sahli

With two successful NASA Pegasus launches completed in 1996, Goddard will fly again on a Pegasus rocket to place two space science spacecraft into orbit this October from Wallops.

The spacecraft are an Argentine satellite called SAC-B and an MIT-built payload called HETE. The two missions will study gamma rays and other astrophysical, high energy, and solar events.

SAC-B (Satelite de Aplicaciones Cientificas) is an international cooperative project between NASA and Argentina's National Commission of Space Activities (CONAE). The spacecraft is designed to advance the study of solar physics and astrophysics through the examination of solar flares, gamma ray bursts, diffuse X-ray cosmic background, and energetic neutral atoms.

"The primary goal of SAC-B is to develop and test scientific technology on a new, light, capable spacecraft designed and developed in Argentina. Follow-on spacecraft will form a series of light spacecraft for space applications, scientific investigations, and technology development," said Dr. Mario Acuna, project scientist for SAC-B in Goddard's International Projects Office.

NASA is providing two scientific instruments, launch services on the Pegasus' launch vehicle, and support for initial orbit operations and emergency backup throughout the mission life. CONAE is responsible for the design and construction of the SAC-B spacecraft, the Hard X-ray Spectrometer (HXRS) instrument, the ground station and the scientific data distribution.

Under a separate agreement between Argentina and Italy, the Italian Space Agency (ASI) is providing the solar arrays plus a scientific instrument. Also under an additional separate agreement between Argentina and Brazil, the Brazilian National Space Research Institute (INPE) is providing the facilities required to perform environmental testing of the spacecraft.

SAC-B, a 400-pound (181 kilogram) class spacecraft, launches from the Pegasus XL expendable launch vehicle which mounts to a Lockheed L-011 transport aircraft. Launch operations will take place at the Goddard's Wallops Flight Facility in Virginia.

SAC-B's Mission Operation Control Center located at San Miguel (just outside of Buenos Aires, Argentina) will be

Continued on Page 2

New Technology Could Save 130 More Lives Annually

NASA leads in installing new aircraft technology to assist with search and rescue

by Allen Kenitzer

NASA is among the government agencies leading the way to install new technology which could save 130 more lives annually once placed on all general aviation aircraft, according to a NOAA study.

The National Oceanic and Atmospheric Administration (NOAA), United States Coast Guard and NASA recently completed the installation of newly-available satellite-compatible Emergency Locator Transmitters (ELTs) on six aircraft. The new transmitters are designed to eventually replace 1970s technology ELTs that are currently installed in the U.S. general aviation fleet, which numbers over 200,000 mostly small single-engine aircraft. The aircraft selected to receive the new ELTs include a NASA DC-8 research plane, a NOAA P-3 "hurricane hunter," and Coast Guard command, search, and recovery aircraft. The sixth plane is a twin-engine Aero Commander that is flown by NOAA at low altitudes in remote areas to measure the water content of snow packs.

NASA has gotten a jump start on the aviation industry by voluntarily converting to the new technology ELTs in advance of a Federal Aviation Administration (FAA) ruling for conversion of the entire general aviation fleet.

"We're excited about the installation of this new technology," said Ron Wallace, Goddard's Search and Rescue Mission Manager. "We hope that other general aviation plane owners will follow our lead and update their own beacons."

ELTs were originally designed to be detected and located by overflying aircraft and fixed radio receivers. Soon after ELT installation was mandated, the FAA learned that many distresses were not being detected. Consequently, NASA initiated a research and development program to see if ELT signals could be detected and located from space. Today, space-borne instruments are the primary sensors used for locating missing aircraft.

Continued on Page 8

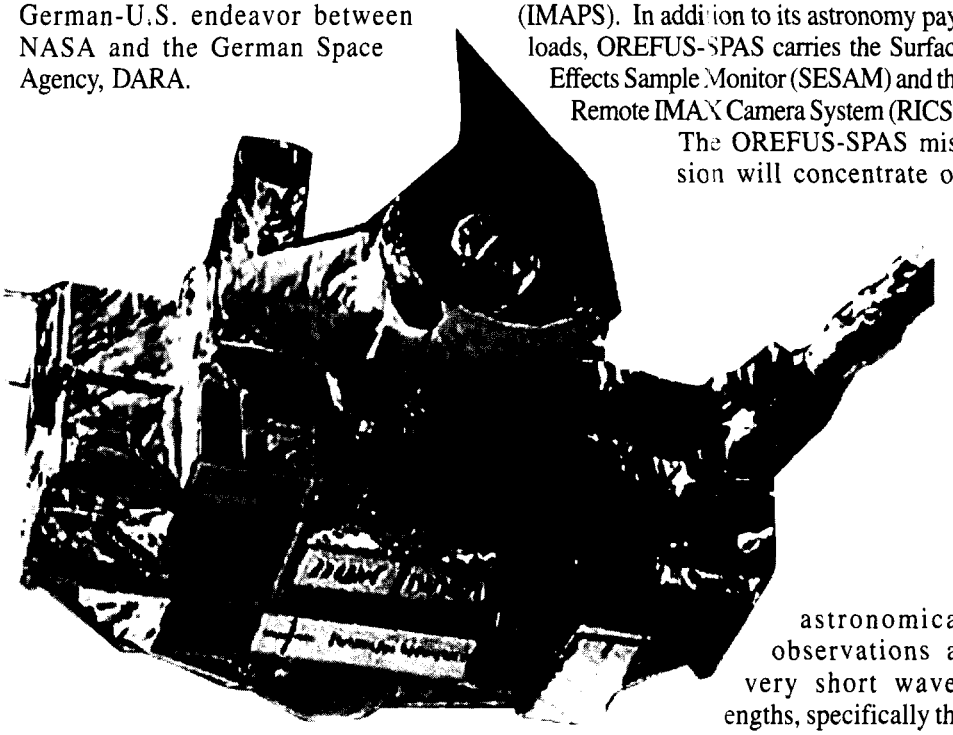
Hot and Cold Running Observations

ORFEUS-SPAS-2 Explores New Territory in the UV

by Jim Sahli

Goddard scientists will be among the U.S.-German science team working together on the Orbiting and Retrievable Far and Extreme Ultraviolet Spectrometer - Shuttle Pallet Satellite-2 (OREFUS-SPAS-2) mission. Scientists will travel to Kennedy, where the science mission operations will be conducted during the 16-day Shuttle flight. The OREFUS-SPAS astrophysics mission will investigate very hot and very cold matter in the universe.

This fall's flight is the third in a series of missions using the German built ASTRO-SPAS science satellite. The ASTRO-SPAS program is a joint German-U.S. endeavor between NASA and the German Space Agency, DARA.



"ORFEUS-SPAS-2 will attempt a large number of observing programs. We hope to gain new insights about the evolution of stars, the structure of galaxies, and the nature of the interstellar medium," said U.S. mission scientist for ORFEUS-SPAS-2, Dr. Ron Polidan of Goddard's Space Science Directorate. "While we are in space for 16 days aboard Atlantis, we will be exploring new territory. Many of the objects we are looking at have never been observed before in the ultraviolet," said Polidan.

ASTRO-SPAS is a spacecraft designed for launch, deployment and retrieval by the Space Shuttle. Once deployed from the Shuttle by its Remote Manipulation System (RMS), ASTRO-SPAS will operate quasi-autonomously for 14 days in the Shuttle vicinity. After its free flight phase, the satellite is retrieved by the RMS and returned to Earth.

The one-meter diameter OREFUS Telescope with its Far Ultraviolet (FUV) Spectrograph and Extreme Ultraviolet (EUV) Spectrograph is the main payload for ORFEUS. A secondary, but highly complementary payload is the Interstellar Medium Absorption Profile Spectrograph (IMAPS). In addition to its astronomy payloads, OREFUS-SPAS carries the Surface Effects Sample Monitor (SESAM) and the Remote IMAX Camera System (RICS).

The OREFUS-SPAS mission will concentrate on astronomical observations at very short wavelengths, specifically the two spectral ranges Far Ultraviolet (FUV, 90-125 nanometers) and Extreme Ultraviolet (EUV, 40-90 nanometers). This part of the electromagnetic spectrum is obscured by the Earth's atmosphere, making it unsuitable for ground-based observations. The region is extremely interesting to astronomers since it possesses one of the highest concentrations of spectral lines, including the lines for various states (at various temperatures) of hydrogen and oxygen — key elements for life.■

High Energy Continued from Page 1

the focal point for mission operations. An Argentine flight operations team will be responsible for the spacecraft and instruments, as well as tracking, data acquisition and science data management. The Wallops and the Bermuda Island tracking station will provide complete powered flight ascent coverage. The Wallops Tracking Station will provide launch support command and engineering telemetry support augmented by the Deep Space Network which will provide one contact per orbit for up to 30 days after launch.

SAC-B will carry three astronomical instruments. The scientific payload is comprised of the Argentine-built HXRS instrument which was developed by the Institute of Astronomy and Space Physics. HXRS will study changes in the spectra of gamma-ray bursts and solar X-ray flares.

Goddard will provide two detectors to measure soft X-ray emitted by solar flares and gamma ray bursts. The instrument is called the Goddard X-ray Experiment (GXRE). A diffuse X-ray background detector, the Cosmic Unresolved X-ray Background Instrument using CCDs technology (CUBIC), is being provided by Penn State University. It will map the X-ray sky to study the background radiation emanating from the galaxy and the universe. Also flying will be an Italian instrument called ISENA to measure energetic neutral atoms.

The SAC-B spacecraft will be launched with its companion payload, the High Energy Transient Experiment (HETE). HETE is a Massachusetts Institute of Technology mission coordinated with the Goddard International Projects Office.

HETE will carry three instruments: a gamma-ray burst detector; an X-ray camera; and ultraviolet cameras. Investigators will use these instruments to detect a gamma-ray burst and observe its associated X-ray emissions, obtaining a general location in the sky before finally using the UV cameras to pinpoint fainter UV emissions to determine burst location with a high degree of precision. Information will be continuously transmitted in real time to enable numerous ground observatories to participate in rapid co-investigations of observed targets.■

Hubble Sees Early Building Blocks of Today's Galaxies

by Tammy Jones

On Sept. 4, NASA Hubble Scientists announced the discovery of galaxies "under construction." New Hubble Space Telescope images reveal what may be galaxies under construction in the early universe, out of a long sought ancient population of "galactic building blocks."

Hubble's detailed images, taken with the Wide Field Planetary Camera-2, reveal a grouping of 18 gigantic star clusters that appear to be the same distance from Earth, and close enough to each other that they will eventually merge into a few galaxy-sized objects. They are so far away, 11 billion light-years, that they existed during the epoch when it is commonly believed galaxies started to form.

These results add weight to a leading theory that galaxies grew by starting out as clumps of stars, which, through a complex series of encounters, consolidated into larger assemblages that we see as fully-formed galaxies today.

The finding is another step back into the dim past, where astronomers ultimately hope to uncover the earliest seeds of galaxy formation which arose shortly after the birth of the universe, or the Big Bang.

Astronomers at Arizona State University, Tempe, Ariz., (ASU) and the University of Alabama at Tuscaloosa found 18 of these cosmic building blocks packed into an area about two-million light-years across. "It's the first time anyone has seen that many star-forming objects in such a small space.There are not nearly as many such luminous objects in the two-million light-years separating Earth's galaxy, the Milky Way,from the Andromeda Nebula, the nearest major galaxy," says Rogier Windhorst of ASU.

The astronomers published their findings in an article, authored by ASU graduate student Sam Pascarelle, in the Sept. 5 issue of the journal Nature.

The building blocks seen by Hubble consist of only about a billion young stars each, and Hubble shows star formation is underway through the presence of many blue stars and glowing gases. The objects typically measure only 2,000 light-years across. "That's not very big. Our own galaxy is 100,000 light-years across," Odewahn says. The objects are much smaller than even the central bulge of the Milky Way, which measures about 8,000 light-years in diameter.

"We think that by repeated merging, they will grow big enough to become the bulges of nearby galaxies," says Keel, citing other Hubble studies that have shown that the galaxy merger or collision rate was higher in the past. "In fact, at least four of the objects in this field show double structure in their centers only a few thousand light-years apart, as if we've caught them in the act of falling together."

Hubble shows a new level of detail for determining the true nature of these "pre-galactic blobs." Hubble resolved clumps as small as 2,000 light-years across (1/10th of an arc second). These were seen in a two-day (67-orbit) exposure by Hubble of a small region of sky in the northern part of the Hercules constellation near the border with Draco.

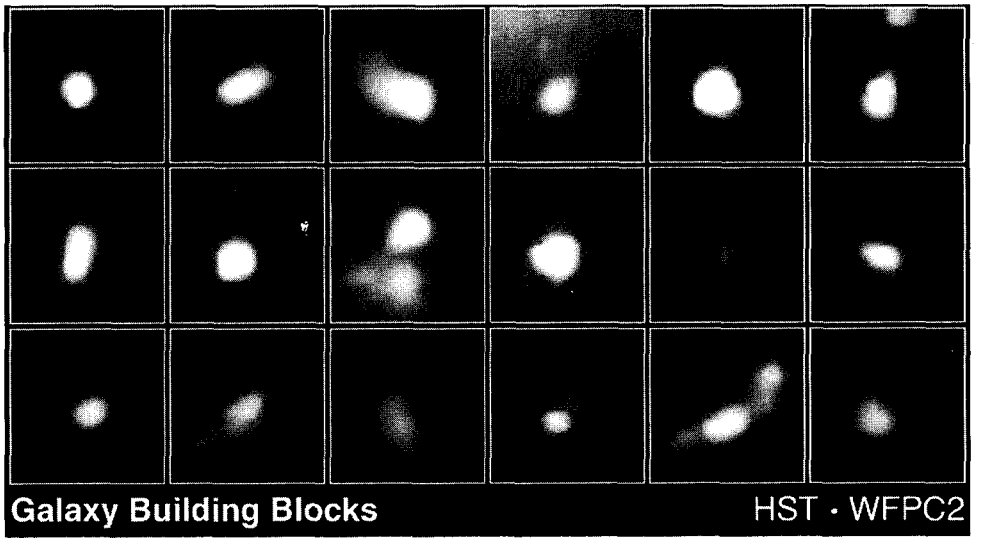
"We've never seen so many of these objects in a single exposure and so small," says Pascarelle. "We are convinced that these objects are not peculiar, but part of the general formation process of galaxies in the early universe."

Astronomers see stars form, because star formation is an ongoing process. However, astronomers have never directly seen galaxies form, because their formation may have happened a long time ago, or because galaxy formation is not as spectacular as once believed, and is therefore much harder to observe.

The idea that galaxies grew from small pieces coming together, rather than through the collapse of a gigantic gas cloud, has been predicted from previous theoretical work and ground-based observations. The Hubble observations offer some of the best direct visual evidence to date, says Pascarelle.

"Though many of the objects are isolated in the image, they are close enough together in space that most of them should eventually merge," according to Windhorst. He sketches a scenario where two or more objects will pass through each other, drawing out hydrogen gas to form more stars later. (Although the term "collision" is used, their individual stars don't collide.) They may then evolve to form the numerous faint blue galaxies, a distant population of galaxies seen by Hubble and other telescopes. Later, surrounding hydrogen gas then settles into a disk to form a spiral galaxy.

If this construction plan is correct, our Milky Way galaxy contains all the pieces of the assembly process. The older, redder stars in the Milky Way's central bulge came from the merged clusters, or "sub-galactic units," seen by Pascarelle and collaborators. The spiral arm that our Sun inhabits was made later after hydrogen settled into a disk. Some of the 140 globular star clusters which orbit the Milky Way may be "left over" smaller building blocks which formed before the larger units seen by Pascarelle and collaborators, but were never pulled directly into larger assemblages.



GIF and JPEG images, captions and press release text are available via World Wide Web at:

http://www.stsci.edu/pubinfo/PR/96/29.html
and via links in:
http://www.stsci.edu/pubinfo/Latest.html or
http://www.stsci.edu/pubinfo/Pictures.html.■

The Sunset of SSBUV, Goddard's 'Frequent Flyer'

by Denise Konopka

The sun is a major driver in what happens naturally with ozone. The sun's output, particularly its output in the ultraviolet (UV) region of the spectrum has great influence on the chemistry and dynamics of the Earth's atmosphere. Knowledge of temporal and spectral solar irradiance changes, particularly in the middle and near UV, are needed to study and understand the thermal structure, dynamics, and energy budget of the Earth's middle atmosphere. Scientists also use measures of ozone to study the combination of natural influences (like the sun) and imposed influences (like human behavior). To do so requires accurate measurements over long time intervals.

The Shuttle Solar Backscatter Ultraviolet (SSBUV) instrument, developed at Goddard was designed to measure ozone concentrations by comparing solar ultraviolet radiation with radiation scattered back from the Earth's atmosphere. The SSBUV is one instrument that helps scientists to understand natural short- and long-term changes that impact how the sun changes.

In late 1989, the Space Shuttle Atlantis carried the first flight of the SSBUV instrument. Since then, SSBUV has made eight flights. The most recent (and final one) was as part of the Atmospheric Laboratory for Application and Science-3 (ATLAS-3). After eight successful flights, the SSBUV has collected data that will also help scientists maintain the long-term accuracy of the daily ozone measurements.

Tracking solar UV changes requires a high degree of accuracy to thoroughly understand the role of solar variations on atmospheric change. To increase the accuracy, reliable instruments that are carefully and regularly calibrated are needed. SSBUV underwent rigorous calibration before and after flight. In fact, the SSBUV program pursued a vigorous laboratory calibration effort with standards traceable to the National Institutes for Standards Technology. This also enabled scientists to compare observations of several ozone measuring instruments such as those aboard the Upper Atmosphere Research Satellite (UARS) and others.

SSBUV's impact on NASA's ability to detect ozone trends was realized during the fourth SSBUV flight, when the instrument was carried as part of the ATLAS package.

Student Experiments Hitch a Lift

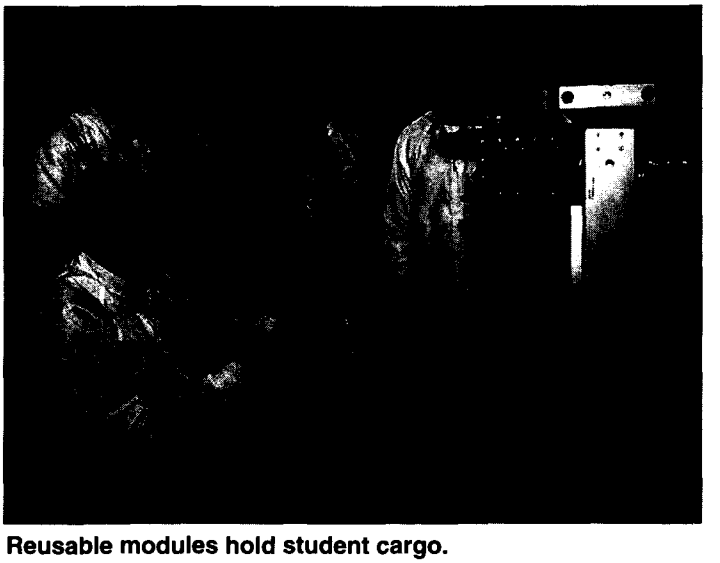
From Silly Putty to Dahlia Bulbs and a Fluid Thermal Convection Apparatus: Students from Kindergarten through College Fly their Science Projects in Space

by Tammy Jones

A new educational initiative at Goddard takes students' science lessons from the chalkboard to the launch pad this fall. The Space Experiment Module (SEM), conceived and managed by the Shuttle Small Payloads Project, targets kindergarten through university level students. Students develop their own experiments and use SEM hardware to carry the payloads into space.

"SEM stimulates and encourages hands-on/minds-on student participation in the creation, development, and potential flight of zero-gravity and micro-gravity experiments on the Space Shuttle," said Dr. Ruthan Lewis, SEM mission manager.

Student experiments will make their maiden voyage flight on board STS-80 with the ORFEUS-SPAS-2 mission this fall. The student payloads will be flown inside ten reusable containment modules for experiments within a 5-foot Get Away Special canister. The system includes an internal support structure, battery, power distribution system, devices for data sampling and storage, and a harness — all provided by GSFC. Experiments may be "active" (requiring power) and/or "passive" (non-powered). Prior to flight, customized data sampling schemes are programmed for each experiment. Data reduction and processing are completed post-flight.



Reusable modules hold student cargo.

When data from three different instruments on board ATLAS-1 were compared with one another, the agreement between the three data sets was excellent.

These instruments had been calibrated against three independent absolute standards. Because calibrations of the three instruments were based on independent standards, the information about solar spectral irradiance is now known with much better accuracy. This is a much improved confidence over historical measurements, and means that the data furnishes a good baseline for future solar measurements.

SSBUV observed the sun from the Space Shuttle a total of eight times from 1989 through 1996, making it one of the most frequently flown payloads in the Shuttle's Cargo Bay. The measurements obtained during SSBUV constitute the longest solar UV data base made with an instrument calibrated preflight, inflight, and postflight. Launches of other BUV instruments in the future will provide a unique opportunity to intercompare the new generation of ozone measurements with those that have been in orbit for some time.

Interested readers make check out the SSBUV web site located at:

http://ssbuv.gsfc.nasa.gov/■

Experiments flying on SEM's first flight include CAN-DO's Gravity & Acceleration Readings, Bacteria-Agar Research, Crystal Research and Magnetic Attraction; Surface Tension from Glenbrook North High School; Fluid Thermal Convection from Purdue University; Fluid Mixing from NORSTAR Student Research Center; and Bacteria Inoculation from Poquoson Middle School. Seeds, soil, tubers, Dahlia bulbs, chalk, crayon, calcite, Silly Putty, bubble solution, popcorn, mosquito eggs, and other organic compounds will also fly aboard SEM as passive experiments sponsored by Hampton Elementary School, CAN-DO, Glenbrook North High School, and Purdue University.

Additional information on SEM may be accessed via the Shuttle Small Payloads Project World Wide Web Homepage at:

http://sspp.gsfc.nasa.gov ■

Is this Ancient Life?

4 lb. Rock Raises Host of Questions for Viking Project Scientist

by Dr. Gerald Soffen

This August, a NASA research team of scientists announced that they had found evidence strongly suggesting primitive life may have existed on Mars more than 3.6 billion years ago. The team found the first organic molecules thought to be of Martian origin inside of an ancient Martian rock that fell to Earth as a meteorite.

Ironically, this news was announced on the heels of the twentieth anniversary of the Viking Mars Landing. Former Viking Project Scientist, Dr. Gerald Soffen, remembers the thrill of early Mars exploration and reflects on the significance of this major planetary discovery unearthed in our own back yard.

1976. Viking Instrument Manager Al Diaz briefs Soffen.

Wow - FANTASTIC. Mars Rock with possible microfossils inside! I have to pinch myself to make sure I'm not dreaming. All my adult life I have been thinking about the origins of life (on the Earth). I joined NASA to be able to search for life on Mars. And now, right under our nose, in some dusty storage case, comes an almost miracle.

A rock from Mars formed when Mars was becoming a planet 4 1/2 billion years ago, got knocked off by a great big boulder that hit the planet 10 to 20 million years ago, and now landed on Earth at the South Pole at the dawn of civilization.

I have spent most of my life (as the Project Scientist for the Viking) searching for life on Mars and came up empty handed. Roberta Score in 1984, on a National Science Foundation expedition to the Antarctic, finds a 4 pound rock in the blue ice and may have changed scientific history.

Now, what's in this rock? For years nobody looked, and then in 1992 some folks at the Johnson Space Center discovered that the composition of the trapped gases match the signature of Mars (as measured by Viking). That discovery turned an Antarctic sample into a Martian Rock. As the team spent the next two years examining the rock, they began to turn over clue after clue, including a special Electron Microscopic picture (inset) that includes things that look like very small microfossils. Is this ancient life?

Who knows? To a biologist, it sure looks interesting. A lot of other data — organic stuff, the shapes of crystalline iron oxide granules, the appearance of segmentation — all point towards some kind of primitive ancient micro-organisms. It's too much to hope for. This could be the Holy Grail of questions about other life in the cosmos.

But what if it's only a fluke? A touch of nature to tease the cursed scientist. Ah, that's the way science and nature work!

But what if it's real. Will we ever know? Who has conceived the defining experiment? Oh, what a great time to be alive and in the middle of one of the most intriguing questions of our age. Thanks NASA for a great life.

MARS Meteorite Images Available Via the Internet:

The Internet World Wide Web URLs are:
http://rsd.gsfc.nasa.gov/marslife
http://www.jsc.nasa.gov/pao/flash
http://cu-ames.arc.nasa.gov/marslife

Back-To-School

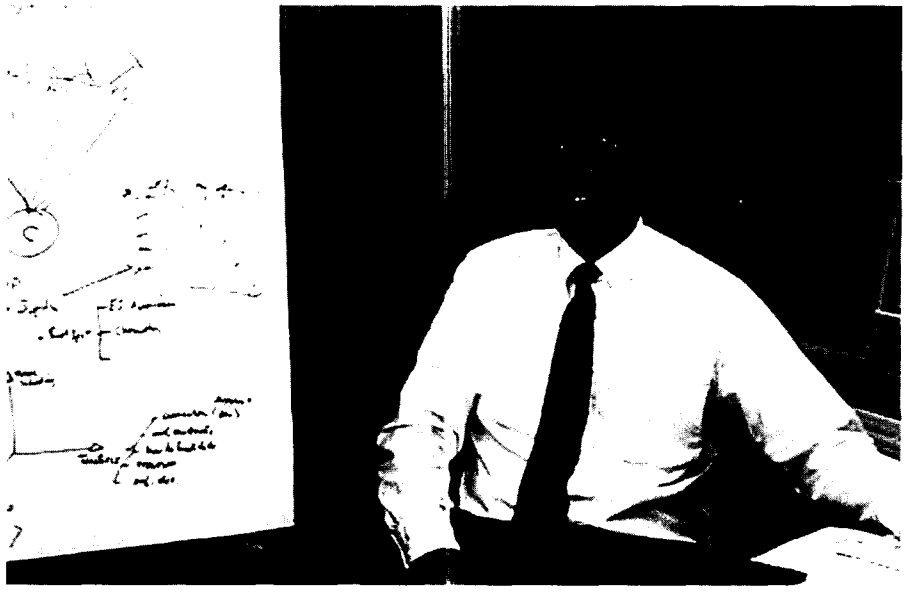
For a Lesson on Goddard's Education Office

by Dr. Bob Gabrys

Dr. Gabrys joined Goddard in April, after more than nine years with the Maryland Department of Education. In his first few months here, Bob has been a "quick study." Today, he and his staff are moving out on plans for reshaping the Center's education programs.

Since joining Goddard, I have been heartened to learn of the deep commitment to education on the part of the entire Goddard community and its talented workforce. I have seen a sincere interest in trying to improve education. The folks I have come in contact with have evidenced an interest not only in what they might do to support education within their normal jobs, but they have also given generously of themselves, volunteering personal time and resources. Everybody wants to help.

I am committed to reshaping the Education Office at Goddard to better serve the education community and to encourage the participation and support of the Goddard workforce in achieving the Center's and the Nation's goals for education. Our goal is to create an Education Office able to better serve the Goddard community in its effort to implement significant education programs for kindergarten through community college customers.



All of Goddard's education services are being relocated this fall to the first floor of building 28, bringing together all of the education services in a single location. Building 28 will house the Kindergarten through Community College staff and the Aerospace Specialists under my direction, as well as the graduate education programs under the direction of Dr. Gerry Soffen. This consolidation will enable better coordinated services.

The Education Office staff includes two teachers-on-loan—Kevin Boone of Southern High School in Baltimore City, and Elaine Lewis of Buck Lodge Middle School in Prince George's County; the five aerospace education specialists (Vern Smith, Al Byers, Dennis Christopher, Joan Sanders, Ron Ernst; and their administrative assistant Bonnie Rowell); Larry Brown (re-employed annuitant under the Partners in Education initiative); and Bowden Ward (phased retirement annuitant). Completing the staff are Lynda Matys of the Teacher Resource Laboratory, located at the Visitors Center; and summer employees Joy Claud for SHARP and Steve Korpon for the Space Scholars program.

Programmatically, the office will be organized around the 5 education components outlined in the NASA strategic plan for education, consistent with the recommendations of the National Research Council.

Goddard's Education Council, composed of representatives of the various directorates, will develop quality criteria for programs and involvement related to each of these components, and ensure that GSFC education programs are consistent with the GSFC strategic plan that is being developed.

Goddard Education Council

130	Bob Gabrys (Chair)	180	Mary Kicza
100	Jospeh Rothenberg	204	Guy Miller
100	Kathy Nado	310	Ann Garrison
110	Wayne Boswell	411	Howard Ottenstein
120	Dillard Menchan	500	Richard Tagler
130	Janet Ruff	681	Richard Fahey
150	Sherry Platt	700	Nancy Patton
160	Gerald Soffen	800	Arnold Torres
170	Nahid Khazenie	910	Richard Hartle

Undergirding the entire structure are plans for evaluating programs focusing not only on descriptive information about the programs/ involvement, but also qualitative criteria. Goddard and its Education Council will work with the Agency to pilot and refine the Education Computer Aided Tracking System (EDCATS) as a NASA evaluation tool.

In order to accomplish the goals of the Education Office, liason support structures will be established with the directorates to assure linkages with the Goddard enterprises and strategic plan.

Additionally, ties with the schools in the context of the IPA program and the teacher intern program will continue, and will be strengthened in terms of the individuals from schools making direct connections between their work at GSFC and their home school and district. Those individuals who have worked at GSFC over the past 5 years would be contacted in order to re-establish linkages for the translation of GSFC science, mathematics, technology, and engineering findings into the local classrooms, and to seek advice on how to effectively accomplish GSFC's education mission.

$25.8 Million Awarded to Advance Supercomputing

Computing Advances to Overcome High Performance Bottleneck, Make Operations Ten Times Faster

by Allen Kenitzer

NASA has awarded a series of cooperative agreements valued at $25.8 million, supporting collaboration among NASA, nine investigator teams and Cray Research, Eagan, Minn., to achieve supercomputer applications ten times faster than available today.

The advances being pursued, which will provide a new understanding of the fundamental problems in the Earth and space sciences, include modeling changes in global climate and the Earth's interior, simulating the evolution and dynamics of stars, probing microgravity environments, and processing remote sensing imagery and signals.

For broader benefit, the new computer programs and documentation will be made available to the research community on the World Wide Web's National High Performance Computing and Communications (HPCC) Software Exchange at:

http://nhse.cs.utk.edu/home.html

The three-year agreements are funded through the Earth and Space Sciences (ESS) Project of NASA's HPCC program.

Science advances will be enabled by a 384-processor CRAY T3E supercomputer being placed at Goddard as part of a $13.2 million agreement with Cray Research.

"With 49 billion bytes of memory and 230 billion floating point operations per second at peak performance, this system will be NASA's leading testbed for scalable parallel computing, in which a program's speed increases proportionally with the number of processors," said James Fischer, ESS Project Manager. Cray Research subsequently will assemble a CRAY T3E as large as 1,024 processors to allow 100 billion floating point operations per second sustained on investigator applications.

"This effort will further the Earth and space sciences by helping to overcome one of high-performance computing's greatest bottlenecks — the lack of usable software for parallel machines," said Lee Holcomb, Director, Aviation Systems Technology Division at NASA Headquarters, Washington, D.C. "Such computational studies strongly mesh with NASA's observational and theoretical programs and contribute to our wider mission of scientific research and space exploration."

Additional ESS Project information and details on the specific investigations may be obtained on the World Wide Web at the URL:

http://sdcd.gsfc.nasa.gov/ESS/ ■

Ten Fellows Chosen From Goddard

by Mark Goldman

Ten outstanding individuals have been selected from Goddard to participate in the 1996-1997 Council for Excellence in Government (CEG) fellows program. This year's class of ten Goddard fellows will be the largest group to represent the Center since the agency began nominating participants for the government-wide program in 1991. The CEG fellows program is an intensive, year-long leadership development opportunity to build the capacity of mid-level federal managers to lead organizations that get results. As part of their fellowship year, this year's participants will develop strategies for meeting the complex challenges facing their organizations.

Throughout the year, Goddard's fellows will meet with Council Principals, Government Executives, and other public and private sector leaders who have successfully led results-driven organizations in government and business. Fellows will also visit benchmark companies and government organizations around the country to see first hand how they are managing for results in their organizations. Among the potential site visits are: Transamerica Corporation, Eastman Kodak Company, Federal Express, Export-Import Bank of the U.S., and our own Goddard Space Flight Center.

In addition to site visits, Fellows will attend workshops where they explore in-depth the qualities that define effective leaders and effective leadership in organizations. They will look critically at their own leadership challenges and develop "how to" strategies for making leadership choices, taking action, and, ensuring results."■

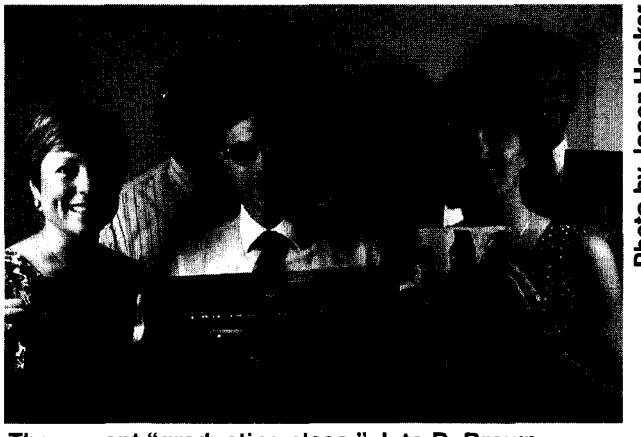


Photo by Jason Hacker

The current "graduating class." L to R: Brown, Robinson, Paprocki, Pine, Buck, Fitzgerald

The 1996-1997 Goddard Fellows		"Graduating" 1995-1996 Goddard Fellows		Goddard CEG Alumni Since 1991	
200	David Moulton	130	Cindy Buck	150	Nancy Abell
	Bradley Poston	153	Dona Vance	110	Wayne Boswell
	Deborah Sharpe	200	Karen Flynn-Newlon	200	Kelly Carter
	Pradeep Sinha		Phillip Holloway		Krista Paquin
300	Ron Chinnapongse		Thomas Paprocki		Mark Walther
	Louis Thomas	300	Gregory Robinson		
540	Steven A. Smith		Esmond Marvray		
700	Mary DiJoseph	400	Richard Fitzgerald		
	Martin Frederick	700	Kris Brown		
900	Mary Cleave				

dateline : Wallops Flight Facility

HOMER

NASA Launches Student Atmospheric Experiment

by Betty Flowers

An experiment to study the atmosphere, designed and built by students from several Colorado universities, was successfully launched late this summer from the NASA Goddard Space Flight Center's Wallops Flight Facility, Wallops Island, Va.

The High Altitude Ozone Measuring and Educational Rocket (HOMER) was launched under the NASA Student Launch Program. The program provides undergraduate students practical, hands-on experience in the development of scientific suborbital payloads.

Ellen Riddle, co-project manager from the University of Colorado at Boulder said "the program provides good insight into working on projects. It gives the student enormous experience in payload development and working as a team." In the classroom, individual effort is the focus, while on the project, teamwork is the focus, according to Riddle.

Riddle, a graduate student, said 50 students from four Colorado universities have worked on the project since March 1995 under the Colorado Space Grant Consortium. The schools included the University of Colorado at Boulder, Colorado State University, the University of Colorado at Colorado Springs and the University of Colorado at Denver.

HOMER was the third atmospheric experiment flown by Colorado students since 1992. Each of the payloads has advanced in complexity. Riddle said, "we learned a lot about preparing missions from the last mission in 1994. Those lessons-learned were incorporated into this mission. This payload is more sophisticated with more advanced science instruments and data support systems," she said.

Wallops provided technical guidance, rocket motors and hardware, recovery system and launch support for the mission. The Colorado Space Grant Consortium provided the telemetry system and science instruments.

The 1992 Colorado mission was a pilot project of the Student Launch Program. In addition to the 1994 launch and the one today, two scientific balloons were flown in 1995 and another sounding rocket mission is scheduled for 1997.

The Student Launch Program is sponsored by the Office of Space Science, the Office of Human Resources and Education, and Office of Equal Opportunity at NASA Headquarters, Washington, D.C.■

Subscription Information:
GSFC & WFF Mailing List
Offsite/Commercial Subscriptions
Retiree Subscriptions

Contact:
Gweny Durrah
Darlene Ahalt
Bob Wilson (301/422-8334)

Goddard NASA

The GODDARD NEWS is published monthly by the Office of Public Affairs, Goddard Space Flight Center, Greenbelt, MD 20771

Deadline to submit material is the first of each month. For additional information contact C. A. Buck (301) 286-7646.

The GODDARD NEWS Staff is:
Executive Editor: Jim Sahli
Acting Managing Editor: C.A. Buck
Senior Photographer: Mark DeBord
Contributing Editors: Tammy Jones, W. Allen Kenitzer, Denise Konopka, Bob Gabrys, Betty Flowers, Mark Goldman.

Continued from Page 1

The NASA Goddard-developed program has been extremely successful, playing a vital role in saving lives. This earlier program evolved into today's Search and Rescue Satellite-Aided Tracking (SARSAT) System. This system provides for location of both old-technology ELT and the new technologies available.

NOAA now operates the space and ground segments for the United States. Internationally, the system is known as COSPAS-SARSAT. Some 28 nations now participate in the program and provide both ground and space segment equipment. The satellite system has contributed to saving more than 6,000 people in aviation and maritime incidents since its introduction in 1982.■