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A FLIGHT PROGRAMS AND PROJECTS DIRECTORATE QUARTERLY PUBLICATION
A Newsletter Published for Code 400 Employees

INSIDE THIS ISSUE:

Touching Hubble's Universe: The Majesty of Space in Braille

Thanks to *Touch the Universe: A NASA Braille Book of Astronomy*, Hubble images are literally in the hands of those who could not previously experience the beauty of the cosmos. This 64-page book of breathtaking celestial images, taken by the Hubble Space Telescope, literally brings the wonders of our universe to the fingertips of the visually impaired.

For each of its 14 photographs, the book incorporates Braille and large-print descriptions, making the images accessible to most readers with visual disabilities. *Touch the Universe* presents color images of planets, nebulae, stars, and galaxies, but each image is also embossed with lines, bumps and

(Braille Continued on page 4)

Studying ExtraSolar Planets with HST

The detection and characterization of planets outside our Solar System ("extrasolar planets") is an observational quest still very much in its infancy, this in spite of the discovery over the last 7-8 years of 100+ planets orbiting an assortment of mostly nearby stars. Extrasolar planets seem to be nearly everywhere, and the number of astronomers participating in the hunt for and study of them is growing at a rapid rate. This new field is strongly driven by the twin desires to a.) learn more about our own planetary system and the process by which it formed, by observing other such systems and correlating their properties with those of their parent stars and surrounding environments; and b.) to determine whether other planets in addition to Earth may be suitable abodes of life. Both endeavors are very much at the

(HST Continued on page 8)

Message from the Director Of

Congratulations to the Goddard Award winners from Code 400, acclaimed in this issue of The Critical Path. Your accomplishments are substantial, and I appreciate your contributions to the success of NASA programs.

Upcoming on September 3 is the Directorate Peer Awards Ceremony and picnic. It's wonderful to be able to honor those who are selected by their peers as deserving of awards. I'm also looking forward to the picnic, to see folks whose paths I don't cross regularly and to enjoy some "down" time from the office routine. I hope to see as many of you as possible at the event.

Another thing that I'd like to encourage you to do is to participate in the informal mentoring program that we are establishing in the Directorate. Repeatedly I've seen the benefits of a good mentoring relationship, for both parties. As a mentee, you can benefit from having a sounding board, or good advice, from a knowledgeable mentor. You can learn how things really work at the Center, and who are the "go-to" people when you need to accomplish something. You can be introduced to people you'd not otherwise meet, and even interview them if you are so inclined. You can go to meetings to observe how decisions are made, meetings controlled, people interact. You can obtain help from someone who gets to know you, and who has only your interest at heart, about your career options and good paths to take. You can learn more about the programs that the Directorate sponsors to create awareness of self and of others.

As a mentor, you can share your knowledge of things technical, organizational, political. You can help someone in their own career path, and develop new contacts and relationships yourself. You can share yourself and your experiences with someone else, identify and leverage talents that are underutilized, and perhaps in the process learn things about yourself that will take you along new paths.
The informal program is flexible, and less rigorous than past programs. It will support a continual learning environment that, in our world of constant change, is critical to the success of our Directorate and our employees.

The program has some essential structure to it, including a guide designed to provide practical information for beginning, continuing or ending a mentoring partnership. Mentors and mentees will select each other, so matches are mutually acceptable and anticipated.

Please contact Terri Yancy to obtain more information and to sign up.

Dolly

Guess who had the most popular newborn boy & girl names in 2002. See Page 21 for the answers.

PERSONALITY TINTYPES

Tony Comberiate

Tony is the Associate Director/Program Manager for Explorers, Code 410. He has been with GSFC for 29 years, the last 16 in the Flight Programs and Projects Directorate.

BORN: Washington, D.C., grew up in Hyattsville, MD.

EDUCATION: BS in Electrical Engineering from the University of Maryland in 1972 and an MS in Electrical Engineering from the University of Maryland in 1975.

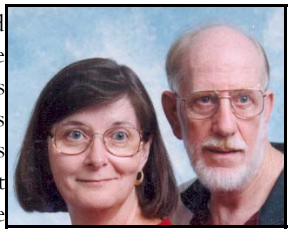
FAMILY: Tony and his wife, Janet, live in Clarksville, MD and have seven children. Anthony, 27, who lives in Bethesda, has a BS and MS in Electrical Engineering and works as a Senior Software Engineer at GSFC with the Hammers Company. Angela, 25, lives in Laurel and is a Biologist for BioReliance in Rockville. She is also pursuing an MBA at Johns Hopkins University. Joseph, 21, is an Electrical Engineer and is completing his PhD under an NSF Fellowship at the University of Illinois. He also works part time for APL. John, 19 is a Sophomore, majoring in Computer Science at the University of Maryland, College Park. Thomas, 16, is a National Space Club Scholar working at GSFC this summer. He will be a junior at Mount St. Joseph High School in Baltimore. This fall, David, 10, will enter 6th grade and Daniel, 7, will enter 2nd grade at St. Louis School in Clarksville. Tony's older brother, Mike, also works at GSFC.

EXPLORERS: Tony began managing the Explorers Program in July 2000. Since then, he, together with a staff of highly experienced project and mission managers, has managed over 30 missions, including 6 launches. The Explorers Program contains Middle Size Explorers (MIDEX), such as Swift, THEMIS, and WISE, Small Explorers (SMEX), such as GALEX and AIM, and Missions of Opportunity, including ASTRO-E2, CINDI, TWINS, and EUSO. CHIPSat, launched earlier this year, was a

(ComberiateTintype Continued on page 15)

Cheryl Jones

Life in Code 403: I am the Program Support Manager (now on the endangered species list) for the Flight Programs and Projects Business Management Office. I've worked in the Directorate office since 1996 in various capacities. My main responsibility is managing the Workforce Budget Planning exercise for Code 400, a truly arduous task because of our complexity! My favorite part of that process is getting to interact with people from all over the Directorate on a daily basis. The phone never stops ringing once "Workforce" starts. I am the Code 400 representative to the Persons with Disability Advisory Committee. I recently completed training to become a Diversity Dialogue Facilitator and have begun facilitating my first Group. I encourage everyone to participate in Diversity Dialogue Program. It's a great way to get to know people from other areas on Center, as well as a wonderful way to challenge your preconceptions about others.



Born: Washington, D.C. (sometime after WW II).

Education: A college drop-in! Attended Frostburg State (now a University), Montgomery College, and the University of Maryland Adult Education Center all without managing to snag a degree yet.

Life before Code 403: In October, I'll have 25 years service at Goddard. I had a ten-year break while following the "Mommy" track, but happily came back in 1982. I spent my first 17 years as a Secretary: first (1966-69) in the old, old, Code 533 in the Space Tracking and Data Acquisition Network (STADAN). After my return, I worked for a few years on the HST Servicing Project, Space Station, the Flight Telerobotic Servicer (FTS) Project, TIMED, and then on to POES. In 1996 I applied for a position as a Project Support Specialist and entered the Professional Intern Program (PIP)...the rest as they say is history.

On Family: My husband Warren and I live in

(Jones Tintype Continued on page 15)

FEEDBACK

GSFC Resident Office at KSC

- William F. Readdy, Associate Administrator for Space Flight at NASA Headquarters in Washington, named James W. Kennedy as the new Director of the agency's Kennedy Space Center (KSC) in Florida. Kennedy has served as KSC's Deputy Director since November 2002. He will succeed General Roy Bridges, who was appointed to lead NASA's Langley Research Center, Hampton, Virginia. Woodrow Whitlow Jr., Director of Research and Technology at Glenn Research Center, will become second-in-command at KSC.
- Astronaut Hall of Fame inducted four new members. Astronauts Dan Brandenstein, Robert "Hoot" Gibson, Story Musgrave, and Sally Ride joined 48 others currently in the Hall of Fame. Frank Ceppolina, Project Manager, HST Development Office (442), and Colleen Rapp, SGT-Inc. PAAC II Team Leader, attended the induction at the KSC Visitor Complex.
- A meeting was held at the GSFC Resident Office to hear SGT, Inc. Harold Stinger, President/CEO and Dr. Kam Ghaffarian, Executive VP/Chief Operating Officer tell us about the current and future plans for SGT, Inc. and an opportunity to get acquainted. KSC SGT Orbital Space Plane team, SGT PAAC II team, and H. Robert Spiess, Goddard Resident Office Manager attended.
- Several changes have taken place within the GSFC payload projects. David Wilcox is leaving the Shuttle Small Payloads Project for a branch position in the GSFC Applied Engineering and Technology Directorate, Mechanical Systems Branch. Charles L. Brodell is the Wallops Flight Facility (WFF) Assistant Chief for the Shuttle Small Payloads Project and will have management responsibility for the SEM program. Barbara Justis will be assuming the role of Get Away Special (GAS) Mission Manager.
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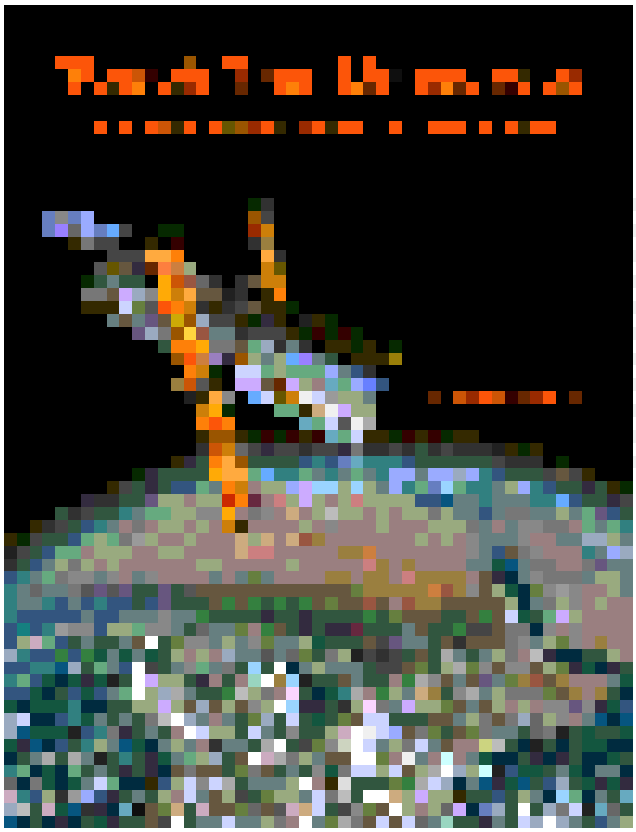
- Columbia Reconstruction Hanger Walk-Through was held for KSC workers and their family members to view collected debris. This Walk-Through was held to educate, inform, give us a new respect for space exploration and of those who serve, and

(FeedBack Continued on page 15)

(Braille Continued from page 1)

other types of texture. These raised patterns represent colors, shapes, and other intricate celestial details, allowing visually impaired to feel what they cannot see.

Bernhard Beck-Winchatz, an astronomer at DePaul University in Chicago, got the idea for the book while browsing through a museum gift shop where he saw a tactile astronomy book called "Touch the Stars," written by Noreen Grice. The book contains



tactile line drawings of objects such as constellations, planets, and galaxies. Grice, operations coordinator for the Charles Hayden Planetarium at the Boston Museum of Science, has been making astronomical pictures accessible to the blind for 18 years.

"I thought that Noreen's book 'Touch the Stars' was a wonderful idea, especially because astronomy is thought of as a visual science," Beck-Winchatz explains. "At the same time, when I saw the book and her sketches, I thought there was so much more we could do. I thought it would be intriguing to create similar tactile pictures based on real Hubble Space Telescope images."

With a $10,000 Hubble Space Telescope grant for educational outreach, Beck-Winchatz and Noreen Grice began work on the book. Grice wrote the text and translated the images; Beck-Winchatz served as science advisor.

What they created is a tactile vehicle to take the reader on a cosmic journey that begins with an image of the Hubble Space Telescope orbiting Earth, and then travels outward into the universe, showing objects such as Jupiter, the Ring Nebula, and the Hubble Deep Star Field North.

"Hubble discoveries have .... rewritten the science textbooks," explains Dr. Ed Weiler, NASA's Associate Administrator for Space Science. "The stunning images from HST have also become a part of American culture. But while these images have wowed the world, until now, there was still one group—the blind—who could not share in this marvel. Now," he said, "Hubble images are literally in the hands of those who could not experience the beauty of the cosmos before."

"I think this book will help the blind community to better understand the variety of objects in space," explains Grice. "This book brings amazing celestial objects, seen with the Hubble Space Telescope, to the fingertips of the visually impaired, where they can better understand the universe and their place within it."

Grice's involvement with the blind community began when visitors from the Perkins School for the Blind arrived for a show at the Charles Hayden Planetarium in Boston.

"I didn't know what to do," recalls Grice. "I hadn't thought that blind people would be interested in astronomy. After the show I asked them how they enjoyed the astronomy program and they said, 'It stunk.' After that I thought: What went wrong? Why did they have such a negative experience? I realized that the planetarium's celestial images were not accessible to people who could not see them and decided to do something about it."

(Braille Continued from page 4)

Working in her kitchen, Grice made prototypes of the Hubble images for "Touch the Universe" by tracing them on plastic sheets, using tools to create raised details. She not only tried to represent the outlines of stars, planets, and galaxies, she also used consistent patterns to denote color and matter. Raised lines, for example, represent blue. Rings are illustrated with dotted lines, and wavy ones signify gas currents.

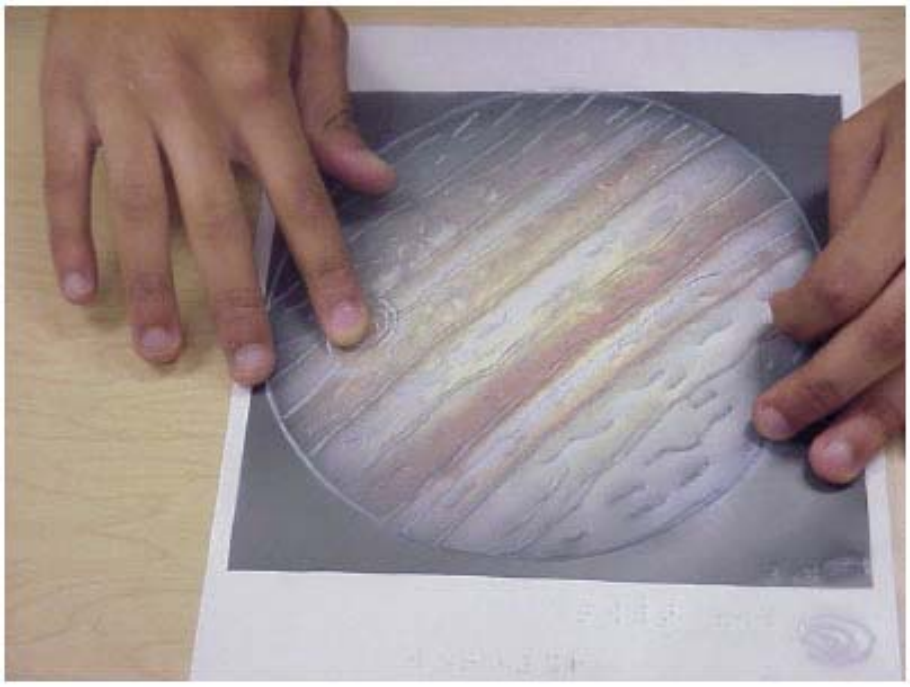
Grice sent the prototypes to students at the Colorado School for the Deaf and Blind in Colorado Springs, who evaluated each image for clarity and provided suggestions for improvement. Grice then traced the final illustrations onto metal plates and placed them in a heat vacuum machine to create multiple copies of molded plastic pages. The pages became the first prototypes of her book.

The biggest challenge was making the complex Hubble images simple enough to understand by touch. Benning Wentworth III, a science teacher at the Colorado school who arranged for the book's evaluation, explains, "The fingers of a blind person must move in order to transmit information to the brain. Where a sighted person takes a look at an image as a whole and then breaks it down into its parts, the blind person must take the parts and make it into a whole."

Beck-Winchatz adds, "There are 10 million visually impaired people in the United States. I am thrilled that these amazing resources for studying the universe are now available to them."

The key ingredient in creating this unique book was the partnership between a teacher, a scientist, and a planetarium educator. "What is unique about this book is that it is taking actual photographs and bringing them to life for blind students," Wentworth says. The finished product delighted his students.

This book also adds a new dimension for sighted readers already familiar with these Hubble images. The sighted can join the tactile adventure simply by closing their eyes and touching a page. Odds are the Eagle Nebula—and each of the other thirteen images—will never seem the same again.



Until *Touch the Universe*, a visually impaired person could touch and smell a flower, or a tree or an animal...but he or she could only imagine the beauty of the cosmos. Until now.

Touch the Universe costs $35, and can be ordered by calling 1-888-624-8373 or by going on line at: < http://www.nap.edu/catalog/10307.html >.

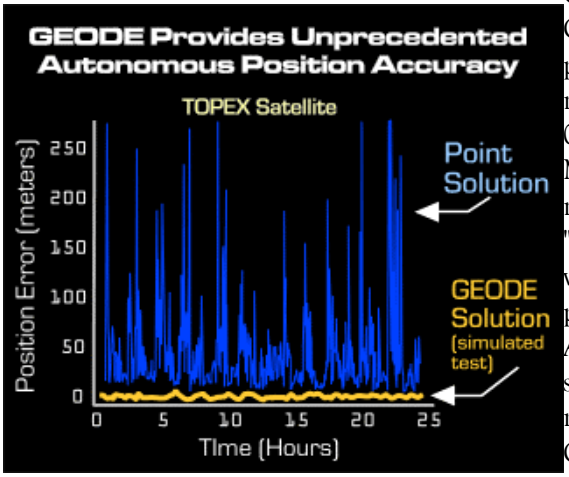
Ann Jenkins and the STScI OPO Staff/SGT 442

Technology Corner

GPS-Enhanced Orbit Navigation System (GEODE)

Overview

The GPS-Enhanced Orbit Navigation System, GEODE, is a NASA-developed software package that improves the accuracy of GPS-generated three-dimensional position and velocity fixes.



GEODE means true orbit determination -- not just positioning with GPS. Tested on NASA satellites, GEODE-filtered GPS data produced position accuracies to better than 20 meter -- a five-fold increase over most commercial receivers -- and velocity measurements to better than 0.03 meter per second (both results are 1 sigma).

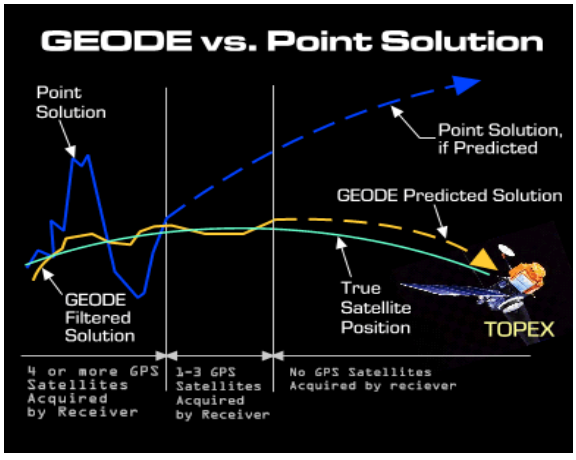
Many spacecraft have orbit and/or attitude constraints that limit how much of the GPS constellation they can see, making a traditional "point solution" GPS system inaccurate or unusable during periods when less than four GPS satellites are in view. Understanding this problem, the GEODE development team, led by the Flight Dynamics Analysis Branch at NASA's Goddard Space Flight Center, built their software with enough robustness to continue to generate quality navigational products with fewer than four GPS satellites in view. GEODE is so robust that it can function with NO GPS satellites in view. --

GEODE version 4.XX features:

- 10 meters 3-D position and 0.01 meter per second 3-D velocity (one sigma) for Low Earth Orbiters
- Reliable position and rate information with fewer than four GPS SVs in view
- Seamless performance through GPS SV handoff
- Developed in C, executes in Sun/Unix, Intel/Windows and Dec Alpha/Linux environments, requires 200 Kbytes, 0.3 MIPS
- GEODE flies on-board, on-station ALL of the time, either in the GPS receiver itself or in virtually any other spacecraft processor
-

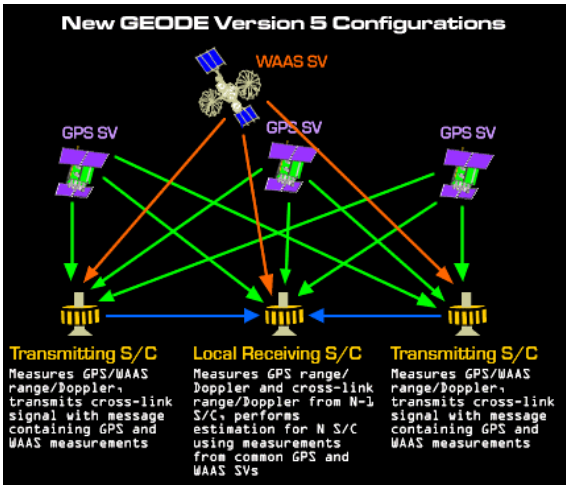
New GEODE version 5.XX features:

- Simultaneous estimation of 1 to 255 satellites
- Additional measurement types:
  - Wide Area Augmentation System (WAAS) space vehicles
  - Intersatellite cross-link
  - Singly differenced GPS
- Reduced memory requirements:
  - 50 Kbytes for single satellite estimation
  - 130 Kbytes for four satellite estimation
- Load module can be built for specific application (e.g. number of satellites estimated, measurement type processed)



How GEODE Works

Standard GPS service computes the real-time 3d spacecraft position and receiver time bias by solving four simultaneous equations with four unknowns, constructed using pseudo-range measurements from a minimum of four GPS space vehicles. These are referred to as "point" or "geometric" solutions. The major source of error in these standard services is the Department of Defense's Selective Availability (SA) option that, when enabled, corrupts or degrades the quality of the GPS signals for national security reasons. GPS vendors typically quote a 2-d RMS accuracy of 50 meters for their products to account for SA-active scenarios.



Because the geometric solutions are derived from measurements at a single point in time, they produce relatively poor velocity solutions compared to typical filtered orbit determination solutions. Geometric solutions can also undergo significant discontinuities when orbital motion introduces new GPS satellites into the calculated solution.

While real-time positioning is adequate for some onboard applications, the resultant position discontinuities are not acceptable for high-precision instrument applications such as view period prediction and maneuver planning – computations that require a continuous prediction of the spacecraft state. Real-time positioning also requires simultaneous measurements from four GPS satellites, a mission-limiting factor that must be considered.

How does GEODE overcome SA corruption and provide high quality solutions when fewer than 4 GPS space vehicles are visible?

GEODE employs an extended Kalman filter (EKF) augmented with physically representative models for gravity, atmospheric drag, solar radiation pressure, clock bias and drift to provide accurate state estimation and a realistic state error covariance. GEODE incorporates the information from all past measurements – carefully balanced with GEODE's information on the physical models governing these measurements – to produce an optimal estimate of the user spacecraft's orbit. GEODE's high-fidelity state dynamics model reduces sensitivity to measurement errors and provides high-accuracy velocity estimates, permitting accurate state prediction during signal outages or degraded coverage.

The impact of SA corruption on the pseudo-range measurement is typically about 25 meters (one sigma) with a correlation time of approximately five minutes. GEODE has an option in which the EKF algorithm samples measurements from a specific SV, nominally at a 5-minute rate, to reduce the correlation between the SA-induced measurement errors. SA clock dithering is treated as white noise without the additional filter states or colored noise models. The option is also provided to process measurements from all GPS SVs in view at a specified rate.

GEODE was designed for autonomous operation within the very limited resources of an onboard computer. Autonomous initialization and enhanced fault detection capabilities are implemented using instantaneous geometric GPS solutions. GEODE's object-based design and open architecture make it highly reusable.

GEODE's performance has exceeded the expectations of the developers. When raw pseudo-range measurements were processed from GPS receivers flying on the EUVE and TOPEX/POSEIDON missions, GEODE navigation algorithms provided a total position accuracy of better than 10 meters (one sigma) and velocity accuracy of better than 0.01 meters per second (one sigma) with SA at typical levels.

For technical questions, contact:
Russell.Carpenter@gsfc.nasa.gov

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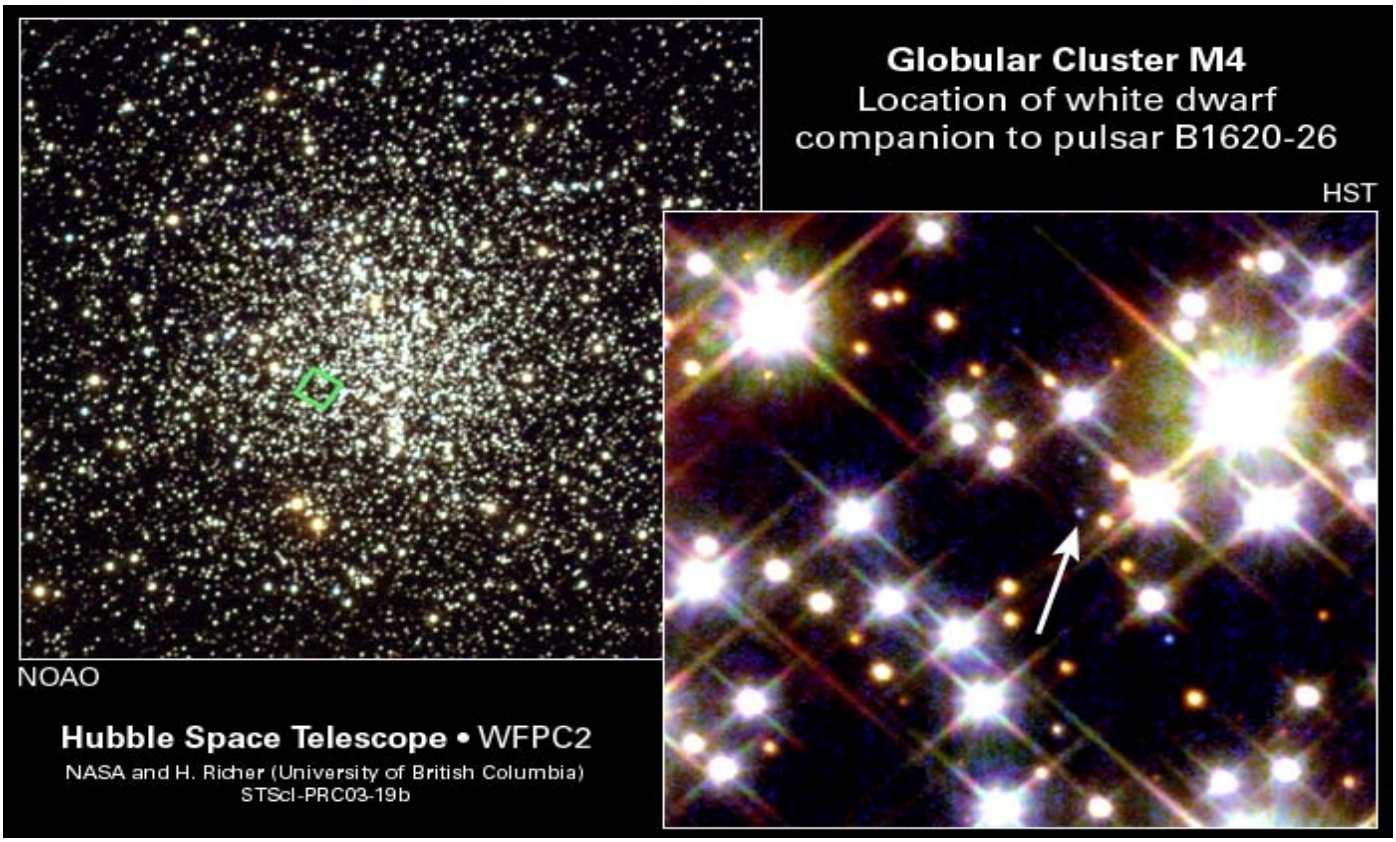

heart of the search for our origins. A review of all the activity going on in this rich new discipline is obviously beyond the scope of this brief article, and the reader is referred to the excellent website http://www.obspm.fr/encycl/encycl.html, which serves as a frequently updated "encyclopedia" of new discoveries, research papers, and search techniques and strategies in extrasolar planet research.

The Hubble Space Telescope (HST) has played a central role in several recent and important chapters of this work. In 2000, Ron Gilliland (Space Telescope Science Institute) and colleagues pointed HST in the direction of the globular star cluster 47 Tucanae, hoping to record instances of diminished starlight as close-in planets passed in front of their central stars and blocked a small fraction of their light in time series of images taken with the Wide-Field Planetary Camera 2 (WFPC2). Because HST records tens of thousands of stars per WFPC2 exposure of "47 Tuc", it was expected that if planets existed in any reasonable number in this cluster—which is 13,500 light-years distant and nearly as old as the Universe itself—a small fraction of them would be detected by the eclipse technique used by Gilliland et al. Somewhat surprisingly, no detections were made. This meant either that planets don't form in old star clusters which lack the heavier-than-hydrogen and –helium elements which are necessary to construct planets by accretion of rocky and/or icy "planetesimals" in the debris disks surrounding newly formed stars; that they do form planets but not close enough to their parent stars to have a high probability of eclipsing them; or that planets do form but they cannot be retained by their central stars very long because the gravitational forces of nearby passing stars in the dense cluster strips them away. The 47 Tucanae results, while disappointing in a sense, do tell us

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important things about planet formation.

In 2001-2003, HST was used by Timothy Brown, David Charbonneau, and A. Vidal-Madjar and their teams to probe the size and atmospheric make-up of an approximately 0.7 Jupiter-mass planet already known to be orbiting a nearby star, 150 light-years away, in a nearly edge-on eclipsing system. The idea was to use the Space Telescope Imaging Spectrograph (STIS) on HST to measure the amount of starlight blocked by the "solid" planet and its atmosphere as a function of the color (or wavelength) of the light during an eclipse. The planet's radius as measured by Brown et al. using this technique was 1.347 times Jupiter's radius, a far more accurate value than had been obtained before and critical to the understanding and modeling of the planet's structure given that its mass, and now its mean density, were well-determined. Charbonneau et al. recognized that the atoms and molecules in the planet's atmosphere would produce extra absorption at wavelengths characteristic of the specific gases present, and careful measurement could reveal the identity of the constituents. This is not as easy as it sounds, however, since the atmospheric absorption was expected to be very small, removing hundredths of one percent of the star's light above and beyond the 1.5% blocked by the planet's "solid" body. Detailed analysis of the STIS data resulted in a detection of sodium at a level about one third of that expected, and one possible explanation in addition to under-abundant sodium is that a high cloud deck exists in the atmosphere. Using the same technique, Vidal-Madjar et al. detected an enormous hydrogen atmosphere which is continuously "boiling off" in response to intense heating from the nearby central star. While these studies do not provide a complete list of the planet's atmospheric constituents, the HST/STIS observations nonetheless represent an historic first detection of an extrasolar planetary atmosphere, as well as the first (partial) determination of its chemical composition. Expect more work of this kind from HST in the future.

Most recently (2003 July), Steinn Sigurdsson, Harvey Richer and colleagues have reported precise HST measurements connected with the most distant known extrasolar planet, which lies outside the core of the globular cluster known as M4 (for "Messier 4") some 5,600 light-years away. The HST data have provided the most reliable and detailed information about the nature of this planet, the strange 3-body system of which it is currently a part, and its likely age and origin. The results are not only spectacular in and of themselves, but are extremely important for what they say about where, when, and under what conditions planets can form. Briefly put, what this newest study is telling us is that planets may be significantly more numerous than even the detection of 100+ nearby extrasolar planets would suggest.

The planet in M4 is part of a gravitationally bound system containing three objects: a radio-emitting pulsar ("PSR B1620-26") spinning 90 times per second, a "white dwarf" star one third as massive as the Sun, and the planet. The discovery of the pulsar was made in 1987 using a radio telescope, and even the earliest follow-up observations showed that the pulse timing pattern required the gravitational presence of a 0.3-0.4 solar mass companion in orbit around the pulsar, probably a white dwarf. As the pulse timing data from radio telescopes began to span a substantial time range, it became evident that something else was present in the system, a "second companion" which was either a stellar-mass object far from the pulsar/white dwarf binary or a substellar/planetary object closer in. The data strongly favored the latter scenario, but the range of uncertainty was larger than desired.

Since the 1990s, a number of HST observing programs have been directed at M4, mostly in studies of binary star production, white dwarf evolution, and cluster age determination. What

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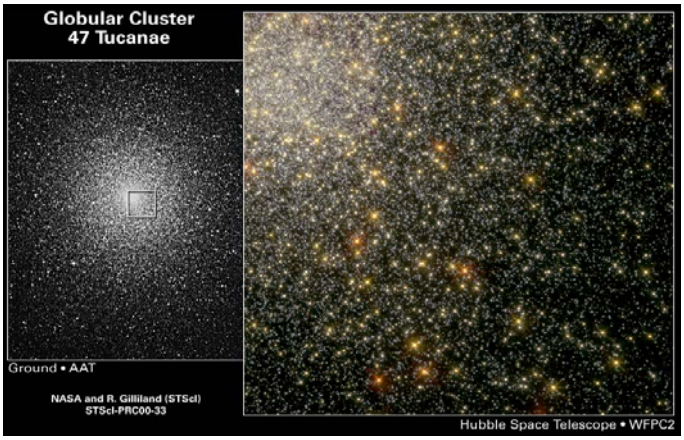
Sigurdsson et al. realized was that their recent "deep" WFPC2 observations of the cluster might for the first time show the purported white dwarf component of B1620-26, and thereby reveal more details about this complicated system (neither the pulsar nor the "planet" were expected to be visible in HST images). Examination of the relevant images did turn up an object at the right position whose brightness and color matched what was expected for low-mass white dwarf stars. Theoretical modeling of the object produced a mass of 0.34 solar masses and a "young" age of 480-million years. The high precision value for the mass allowed the orientation of the pulsar/white dwarf orbital plane to be calculated, which in turn allowed both the planet's orbit plane and mass to be determined. The end result was that the "second companion" was found to



have a mass of 2.5 (+/- 1) Jupiters, which indeed makes it a planet and not, for example, a brown dwarf "star". The planet is in an orbit whose average distance from the pulsar/white dwarf is 23 astronomical units, and it orbits them both.

What is most interesting about this planet is where it lies: in an ancient place where heavy elements are rare and encounters with other stars are common; in short, where the planet-making cookbook, as well as 47 Tuc, say "no." What is going on? The most likely scenario is that the planet was born (somehow, even without heavy elements) outside the core of M4, at a location where encounters with other stars are much less frequent than in the core. Detailed computer simulations suggest that somewhere in its descent to the center of M4 the star/planet system passed very close to a neutron star/white dwarf binary, and in the ensuing "collision" the white dwarf was ejected and the star/planet and neutron star became a new 3-body system. This "reshuffling" produced a recoil effect which propelled the neutron star/star/planet system out of the M4 core, and in the ensuing billion years the star became a red giant which shed much of its mass onto the neutron star, spinning it up into a pulsar and becoming, in the process, a young white dwarf. In spite of the high density of stars in the cluster, the planet has survived because it has spent most of its time outside of the core. The planet's age? As far as we know, essentially the age of the cluster itself: approximately 13 billion years.

The 47 Tuc and M4 results are perhaps telling us that planet formation in the oldest stellar systems known—globular clusters—was not uncommon, but that for whatever reason such planets were not formed, or did not migrate, close enough to their parent stars to produce eclipsing systems which could be seen with HST. Clearly there's much more we have to learn about planet formation and where and when it occurs, but we can look at these recent amazing HST results and see that surprises can always be just around the corner. Stay tuned.

Malcolm B. Niedner
HST Deputy Senior Project Scientist

Around the Agency

FUSE

Goddard, JHU, and contractor engineers have installed new software to keep the Far Ultraviolet Spectroscopic Explorer (FUSE) operating even if all of its gyroscopes fail. The "brain transplant" on three computers aboard FUSE will keep it running for a few more years. FUSE would normally need three of its six gyroscopes working to point the telescope, with one now failed and the remaining five beginning to age.

SOHO

Although a high-gain antenna used to aim high-rate scientific data transmissions toward Earth remains jammed aboard the Solar and Heliospheric Observatory (SOHO), Goddard engineers have found that high-rate data can still be picked up via SOHO's weaker low-gain antenna through big receiving antennas in Spain. However, blackout periods of from 9 to 16 days every 3 months will continue unless the high-gain antenna can be repaired. Meanwhile, SOHO recently captured images of a pair of comets belonging to the Kreutz family, as they passed through the sun's corona.

Get Ready to Duck

JPL has announced that asteroid 1950 DA might hit the Atlantic coast of the U.S. creating waves as high as 122 meters on March 16, 2880. Better think twice about buying that neat little condo in Ocean City.

RHESSI

Astronomers have discovered solar flares as much as 11 million degrees Celsius hotter than previously believed through the use of Goddard's Reuven Ramaty High Energy Solar Spectroscopic Imager spacecraft.

NASA Scholarship Fund Awarded to Goddard Dependents

Berendena, daughter of **Dennis VanderTuig**, (Code 450) and wife Mary was one of two Goddard employees' dependents to win a NASA college scholarship this year. Dena will be entering Calvin College, Grand Rapids, MI in the fall to major in biology. She received A's throughout high school, except for four semester B's. She was enrolled in numerous honors and advanced placement math and science classes. Dena has a SAT score of 1580 and will attend her parents' alma mater (Calvin College). She has numerous academic honors, including National Merit Finalist, first place in a NASA Student Involvement Program Journalism Competition, selected for County and State Choruses, Piano Guild Auditions National Winner, awards for acting in high school Shakespeare Festivals, and National Honor Society. She was also librarian for Madrigal Singers, founding member of an acapella singing group, Treasurer and Vice President of the Shakespeare Club, assistant director of "Winter's Tale", and Captain of the Sailing Club.

Berendena VanderTuig holds scholarship plaque with Center Director Al Diaz

Abstracted from The Goddard News

Awards

Goddard Annual Awards
Code 400 Recipients
July 23, 2003

Exceptional Achievement

David W. Affens/567/480
"In recognition of your vision of a Global Positioning Satellite (GPS) Based Distress Alerting Satellite System and your efforts to bring it from an idea to a funded program."

Andre Dress/NOAA/415
"In recognition of your expertise and leadership on the Geostationary Operational Environmental Satellite (GOES) N-Q Program. Your efforts significantly contribute to assuring a healthy constellation of the GOES Spacecraft for NASA, NOAA and the nation."

Mark Erickson/Ball/443
"In recognition of your superior performance contributing directly to the success of the Hubble Space Telescope (HST) Advanced Camera for Surveys Instrument."

Karen Michael/586/423
"In recognition of your heroic leadership in simultaneously integrating the AQUA, Ice, Clouds, and Land Elevation Satellite (ICESat) and AURA science data systems."

Vickie E. Moran/581/428
"In recognition of your exceptional technical achievement in developing and executing the Earth Radiation Budget Satellite calibration and orbit lowering maneuvers."

Benjamin B. Reed/543/442 (Swales)
"In recognition of your superior performance contributing directly to the success of the Hubble Space Telescope (HST) Advanced Camera for Surveys Instrument."

Timothy Schoeneweis/442 (J&T)
"In recognition of your outstanding and sustained contributions to the successful development of scientific instruments for the Hubble Space Telescope."

Joseph Sullivan/442 (Ball)

"In recognition of your outstanding and sustained contributions to the successful development of scientific instruments for the Hubble Space Telescope."

Mark Turczyn/533/442
"In recognition of your diligence, ingenuity, attention to detail and constant mindfulness of protecting Hubble's health, while helping to make the telescope more productive and efficient than ever before."

Exceptional Achievement (Group)

Advanced Camera for Surveys Flight Team/442
"In recognition of your outstanding contribution to the successful development, integration, test, and deployment of the Advanced Camera for Surveys Scientific Instrument for the Hubble Space Telescope."

NICMOS Cooling System Development Team/442
"In recognition of your outstanding contribution to the successful development of the Near Infrared Camera and Multi-Object Spectrometer (NICMOS) Cooling System and the return of infrared science on the Hubble Space Telescope."

TDRS H Acceptance Negotiation Team/454
"In recognition of your outstanding teamwork in negotiating the acceptance of the very capable TDRS H spacecraft resulting in $35 Million in savings to NASA."

TDRS I Orbit Raising Recovery Team/454
"In recognition of your dedication, professionalism, and outstanding efforts in the recovery of the second of the TDRS HIJ Spacecraft. "

TDRS Project Team/454
"In recognition of your dedication, professionalism, and outstanding efforts in the development, launch and on-orbit testing of the second and third replenishment TDRS-I and J Spacecraft."

Outstanding Leadership

Robert J. Menrad/423 (now 301)
"In recognition of your leadership of the Earth Science Data and Information System (ESDIS) Project in guiding the Earth Observing System (EOS) Data and Information System to become the largest multi-mission science data archive ever implemented by the United States of America."

CELEBRATE GODDARD DAY

On a very, very, very, very, very hot day in June, numerous people once again lined up at the Code 400 booth to collect exciting items provided by the Code 400 programs and projects. Not only did the folks who staffed the booth hand out "goodies" to all those overheated patrons, but they engaged them in activities designed to demonstrate various aspects of diversity, the goal of Celebrate Goddard Day. One particular activity, the "Jelly Bean" game was quite a hit with both young and old! (If you weren't there, you might want to know what that was).

The Code 400 Diversity Council worked long and hard to make this a successful event for the directorate and would like to thank the managers who took time to participate in manning the booth along with the incredible staff of people who worked outside off and on all day. The Council would also like to express appreciation to all the support staff who collected and delivered all the items to be given away.

One particular group deserving of many thanks and recognition is the karaoke group headed by Bonnie Matters (for the second year). This group (see picture below) presented a very creative and impressive demonstration of how we can produce "beautiful music" when we think outside the box and use the various offerings that diversity affords us.

Julia Knight
Project Support Specialist, Code 403

Code 400 Karaoke Group Making Music

Kathy Neiman (Conductor)

Nate Wright (Narrator)

Left to Right
1. Bonnie Matters, 2. Jane Liu, 3. Grettchen Burton, 4. Susan Sparacino, 5. Laura Marechek, 6. Marge Rich, 7. Lizette Figueroa-Valeyre, 8. Mellani Crespo-Ramos, 9. Barbara Scott, 10. Gene Grunby

(Comberiate TinTypes from page 3)

University Explorer (UNEX), also managed by the Explorer Program. Explorers are Code S competitive Principal Investigator (PI) mode missions, proposed in response to Announcements of Opportunity, and offer frequent flight opportunities for superior science at a relatively low cost. They allow PI's to do what they do best-their science, the way they propose it-and is typically the highlight of their career.

BEFORE EXPLORERS: After working for the U.S. Army in both a civilian and military capacity, Tony came to GSFC in 1974 and worked for the Networks Directorate as a Compatibility Test Engineer, who assured that spacecraft were compatible with the tracking network. Working with his brother Mike, he put together the first satellite communication system in Antarctica in 1984. He left the Compatibility Test Section Head job in 1987 to be a Systems Manager for the TDRS Project. After a number of management jobs on TDRS, he became the DPM in 1993, the acting Project Manager in 1995 and the Project Manager in 1997. During Tony's years with TDRS, the project launched TDRS 3, 4, 5, 6, 7, and TDRS H. He managed TDRS H,I,J from its early formulation days, through its definition, design and development. It was the agency's first firm fixed price contract for a major spacecraft system. As a result of the project's success, Tony was invited to give numerous lectures on performance based contracting to NASA, OMB, DOD, and industry.

OTHER INTERESTS: Over the years, Tony has had many interests-some for enjoyment and others out of necessity. He has juggled for large and small audiences, taught karate, played softball, coached baseball, helped build houses, fixed cars, served as a credit union, church, and school volunteer, and worked crossword puzzles. His main leisure activity, though, is chief ball player, whether it be baseball, football, basketball, volley ball, or foosball, at the Comberiate household.

(Jones TinTypes from page 3)

Lanham, but are in the process of moving to Clarksville this fall. He is retired from Goddard and Bendix and spends his time providing after-school care for our Granddaughter Megan (11). Megan has a form of high-functioning Autism called Asperger's Syndrome. She is main-streamed in the Howard County school system and will enter middle-school in the fall. She is doing very well in large part due to the one-on-one attention she has received from her Grandfather since she was a baby. Those two have a truly remarkable relationship. I have a daughter Jen (30-something) and a son Dave who is 27. Jen is very creative. She wrote a full-length book based on the characters from the X-Files (yet to be published, but really really good!). She is doing web design for a number of clients on the side and working in retail, all while being a single parent. Dave is an IT Security expert sub-contracting to Verizon at this time and in the process of starting a company with a number of friends. They are both doing well. Can you tell I'm a proud Mother?

Life outside of Work: Right now all of my energy outside of work is involved in an adaptation of lifestyle (down-sizing) and preparation for the next phase of our lives. I was diagnosed with Facioscapulohumeral Muscular Dystrophy in 1999. Stairs are becoming, difficult to manage so we're moving into an elevator condo to make life simpler to navigate. We are paring down our belongings, and though its time consuming, it feels very freeing in many ways. It's been fun watching the construction as "our" building has gone up. I get reports from all over the Center on its progress from the people who live up that way.

My hobbies are reading, cooking, and entertaining. I truly love my life and my job. I have had the benefit of some wonderful mentors over my career: Harry McCain who supported my efforts to transition out of the secretarial field; Diane Williams who gave me a chance and hired me as a PSS, and Kevin Miller who has guided my progress. It just doesn't get any better than this!

(FeedBack Continued from page 3)

help bring some closure to this tragedy. Reconstruction team members were at the hangar during tour hours to answer questions and explain the debris and the processes used to help identify and place crucial pieces on the grid.

-
- Mary Halverstadt

THE CRITICAL PATH SOCIAL NEWS

Births

Best wishes to Lourdes (480) and John Wisniewski on the birth of their first child, Jonah, on April 21, 2003.

Jim Jeletic (441) and wife Kelly (585/429) welcomed a baby girl on June 14, at 5:22 pm. Jenna Marie weighed in at 7 lbs, 12 oz., and is 20 1/4 inches long.

Wedding/ Engagements

Congratulations to Beverly Seman (443) and Howard (Kip) Thomas, who were married on May 25, 2003, in Jamaica. The happy couple reside in Severn, Md.

Congratulations to Brett Weeks (461) who is engaged to marry Donna Strawbridge on October 11th at Dewey Beach.

Graduation

Scott Hall, son of Sheila Hall (415), graduated from Marine Corps Boot Camp, Parris Island in January 2003, as required for all USMC reservists. In March, Scott also graduated from Advanced Infantry Training, where he was meritoriously promoted to PFC. On July 30, he will start attending the Northern Virginia Criminal Justice Training Academy to become a police officer with the Metropolitan Washington Airports Authority.

Howard Griffin, nephew of Vanessa Griffin (423), graduated from Montgomery Blair High School on June 2.

"Cultural Tidbits"

Did you know … that India has 16 official languages, including English, as well as more than 1400 dialects? Limited internal transportation has resulted in the isolation of people and has facilitated the growth of diverse cultural regions and this variety of languages. Most of these languages originated from the ancient Indian language called Sanskrit.

Do you have a cultural tidbit to share? Send it to the Code 400 Diversity Council c/o Andrea Razzaghi @ andrea.i.razzaghi@nasa.gov and we'll publish it in a future issue.

Andrea Razzaghi/Code 424

Things You Should Know About

Dan Goldin Picked to Lead Boston University

Boston University trustees unanimously offered the University presidency to former NASA Administrator Daniel S. Goldin on July 8, 2003. Goldin accepted the position on August 14, the University announced. The job will be Goldin's first in academia, and it comes with great expectations. An unconventional candidate for the presidency, lacking a graduate degree or any prior connection to BU, Goldin told trustees that he would lead the 30,000 student private university for a decade, thru its first billion-dollar Campaign and toward the goals of greater academic and student prestige. Historically, BU has had one of the highest-paying Presidencies in the nation. BU's last president earned $591,000. Trustees chose Goldin from among a group of about 10 finalists.

NEBA

The NASA Employees Benefit Association (NEBA's) Board of Directors agreed to conduct another refund of premium during a videoconference that was held on May 30, 2003. The refund will be issued to members of record for at least 1 year, as of May 31, 2003, and will be based on their basic and dependent coverage. The refund will be equivalent to 20 pay periods of payments, the most ever voted by the Board. The checks will be delivered to the chapters by the insurance carrier on or about October 1, 2003 in envelopes marked "NEBA Refund Check Enclosed." The checks will be valid for 6 months. Plan holders in receipt of checks are urged to cash or deposit them immediately.

Upcoming Events—The 2003 Peer Awards

Just a heads up to let you know that this year's Code 400 Peer Awards ceremony is scheduled for September 3, 2003, at the Goddard Rec Center. The FPPD Peer Awards are morale boosters that say my co-workers (civil servants and contractors alike) value me and my work. It is a process that recognizes that we are all peers, a Code 400 value added process for identifying nominees for Agency and Center Awards. The FPPD Peer Awards program promotes and recognizes innovation, teamwork, respect, diligence and efforts to improve. It recognizes all who contribute to the success of the Directorate (both Code 400 and matrixed personnel) and provides illumination of the breadth and depth of the Directorate's Mission and its People. It gives us the opportunity to say—Thank You!

Additional information for the Peer Awards is available on the Code 400 website.

Peer Awards September 3, 2003 at Goddard Rec Center
11:30 – 12:30 Picnic Lunch ($5.00)*
12:30 – 1:30 Awards Ceremony

** Please pay your Code 400 project representative as soon as possible.*

What is ATO – The Aerospace Technology Office?

Since the mid-90's, many NASA Headquarters' (HQ) program functions have been transferred to the Centers. Additionally, new HQ program functions have been established at the Centers directly. Four of these functions are located in the Aerospace Technology Office (ATO), Code 408: Small Business Innovation Research (SBIR); Small Business Technology Transfer (STTR); the NASA Institute for Advanced Concepts (NIAC), and the NASA Technology Inventory (NTI). Paul Mexcur is the ATO Chief. ATO was transferred into Code 400 from the old Code 700 in July of 2002.

In 1995, the two oldest of those program offices, SBIR and STTR, were transferred to Goddard, which won the hosting rights over bids from Marshall and Langley. SBIR began at HQ twenty years ago under a Congressional mandate. Likewise, STTR issued its first NASA solicitation ten years ago. The other two ATO program functions began as NASA-specific functions in the late nineties hosted at Goddard. Serendipitously, these four programs are interrelated: They either fund external organizations for new concepts or technologies for near and far-term infusion within NASA, or track what NASA is currently doing in technology development.

Besides his role as ATO Chief, Paul is also the Program Manager for both the SBIR and STTR programs. Bob Nelson and Jan Kalshoven are the deputy managers respectively. Jan is also the R&D Technology Manager. Sharon Garrison is the NIAC coordinator, and Mary Reph manages the NTI. Other ATO staff includes Mike Talley, resources, Pam Guzzone (currently on detail to Code 110) and Marguerite Tallant, secretary. Janet Jew began as a one-year detailee on July 7th as commercialization specialist. Matrixed to ATO on a part-time basis are Barry Jacobs, database management, and Pat Fogleman, program support.

While the Program Management Office (PMO) for both SBIR and STTR is located in Code 408, every NASA Center and JPL has its own local SBIR and STTR program office that reports to the PMO. Congress requires that NASA, and any other government Agency that has over a $100M in external R&D expenditures, must run an SBIR program. If that amount exceeds $1B, the Agency must also run an STTR program. Nine other government organizations, such as DOD and NIH, have SBIR programs, and four of these have STTR programs.

Both the SBIR and STTR programs concurrently issue a new solicitation every summer. The solicitation is literally filled with hundreds of topics and subtopics describing the highest priority new technology thrusts and needs of the Agency. These are determined each year by the Centers with guidance from the HQ Enterprises. Small U.S. businesses (< 500 employees) submit proposals in hopes of solving a problem presented by one of these solicitations. The major difference between SBIR and STTR is that STTR requires a cooperative agreement between the small business and a university or other non-profit research institute. This agreement has to do with the transfer of intellectual property or technology development from the research institute to the firm.

For SBIR and STTR, a combined total of more than two thousand proposals are received every year, each requiring two in-house reviewers. Almost 500 new contracts are signed each year, disbursing over $110M for SBIR and $13M for STTR. About half the Agency's new contracts with for-profit firms are issued by these

(ATO Continued on page 19)

(ATO Continued from page 18)

two programs.

NIAC seeks revolutionary advanced concepts for aerospace systems and architectures, not near-term R&D like SBIR and STTR, which aim to enable our nation's future space exploration in the 10-40 year time frame. Working with an annual $4M budget, NIAC receives over a hundred proposals each year and is not limited to just small businesses. At least twenty grants are issued each year for creative new concepts.

NIAC is a unique NASA activity designed not to be unduly influenced by the current needs at the Agency. NIAC is operated as a virtual institute run by Robert Cassanova out of Atlanta for University Space Research Association, Inc. under a recently renewed contract to NASA.

There are administrative similarities among these three ATO programs. NIAC has a two-phase proposal process just like SBIR and STTR, on which it is modeled: Six months for a phase I (one year for STTR) in which the ideas are fleshed out, and then a chance at a two-year phase II for further refinements.

SBIR and STTR have a least two NASA civil service reviewers for each proposal. A separate commercial review by an outside panel set up by each Center is added in the SBIR and STTR phase II's review and evaluation process. NIAC has a proposal review process that requires at least three experts in the relevant field and rarely includes a NASA reviewer, although a concurrence briefing is provided for NASA HQ.

ATO's fourth function, NTI, provides a comprehensive accounting and description of NASA's overall technology investment. Growing and becoming more thorough and user friendly each year since 1996, it provides program and project managers, as well as technologists and engineers, across the Agency a single source of information about what technologies NASA is developing, why we are developing them (the benefit), when we're planning to accomplish the tasks, and how much we are investing. These data are useful for management assessments and decisions, as well as for making design decisions and trade-offs and determining partnering possibilities. They are also useful for responding to external requests such as Office of Science and Technology Policy (OSTP), government-wide surveys, Congressional inquiries or inter-agency programs or surveys. NTI minimizes the collection of data on an ad-hoc basis. All NASA Centers and NASA Headquarters participate in the annual data collection and update process.

Grouping of these four programs under ATO has provided for a natural synergy and a continuum in seeking to conceive, develop and track advanced concepts and technology to enhance American goals in space. More information can be found about each program at their web sites:

SBIR & STTR (Small Business Innovation Research and Small Business Technology Transfer):
http://sbir.nasa.gov

NIAC (NASA Institute for Advanced Concepts):
http://www.niac.usra.edu/

NTI (NASA Technology Inventory):
http://inventory.gsfc.nasa.gov/

Jan Kalshoven
Deputy Program Manager, Code 408

Getting to Know ESTO

You may have heard the acronym before. You may even know that ESTO is located at Goddard Space Flight Center within Code 400. But, chances are, you may not have a clear idea of what ESTO does.

ESTO, the Earth Science Technology Office (Code 407), was created in 1998 to lead strategic technology development and planning for the Earth Science Enterprise. Although ESTO is physically located at GSFC, it is a level 2 office and performs an Earth Science Enterprise headquarters function. George Komar is Program Manager.

The first Earth Science Biennial Review in 1997 recommended that missions be implemented with shorter development times using the best suitable technologies. The recommendation produced a dramatic shift in process: science objectives, not mission objectives, drive technology development; technology, in turn, expands mission horizons; and missions evolve from the convergence of science objectives and technology. ESTO was established to develop and nurture the technologies required by this new process.

Through flexible, science-driven technology strategies and a competitive selection process for highly specific technologies, ESTO has developed a broad portfolio of emerging technologies. Currently, ESTO is supporting the development of 174 technologies at over 50 institutions (universities, corporations, and NASA centers) nationwide. Many ESTO technologies have graduated for use in Earth Science missions, as well as Code S and Code M missions, and in commercial applications to benefit society at large.

There are two primary areas of technology development at ESTO: Observation Technologies and Information Technologies. In each of these areas ESTO plans investments, develops new technologies, and identifies infusion paths for successful deployments in future measurements. The Instrument Incubator Program (IIP) and Advanced Component Technologies (ACT) program lead the development of new and innovative technologies that lead to smaller, more powerful, less costly observation tools.

The Advanced Information Systems Technology Program (AIST) and the Computational Technologies Program (CT) work toward a variety of goals within information technologies. From sensor web networking and on-board processing to terabyte acquisition and modeling interoperability, these two programs make observations useful and help to turn data into knowledge.

Technology requirements are derived by ESTO in response to science measurement goals. ESTO recently developed a knowledge management database, the Earth Science Integrated Planning System (ESTIPS), to catalog technology needs as well as communicate the underlying science questions. The database is available at http://esto.nasa.gov/estips

By identifying technology needs from science requirements, regularly assessing the maturity of technologies within the portfolio, and leveraging investments through creative partnerships, ESTO's efforts will continue to enable future science applications far into the 21st century. To learn more about ESTO and its programs go to: http://esto.nasa.gov

Philip Larkin
Communications and Outreach Manager, Code 407

Coming Soon to GSFC: e-Payroll

The IFM project office will be implementing e-Payroll, a comprehensive multi-component personnel and payroll system that includes payroll, time recording, personnel management, and labor costing. Under the President's Management Agenda, the OPM sponsored e-Payroll initiative accelerated the timeline for replacement of NASA's payroll functions under IFMP. NASA has agreed to implement e-Payroll as part of the larger e-Government initiative to streamline and modernize Human Capital systems in order to effectively support Agency missions. The GSFC e-Payroll project will include three stages over the next two years.

The first component will be WebTADS, a new time recording system that will replace OMNI. WebTADS is scheduled to go live at the end of November, 2003, and will affect all civil servants at GSFC. The IFM team will be assisting each directorate in making the transition from OMNI to WebTADS beginning this September, and will continue this assistance right up until go-live in late November. The implementation of WebTADS is a necessary component to allow NASA to move to the new e-Payroll system.

The e-Payroll module that has been selected for NASA is the Department of Interior Federal Personnel and Payroll System (FPPS). The scheduled implementation date is September 2004. The Department of Interior's National Business Center maintains the system for over 26 federal agencies. FPPS will replace the NASA Personnel and Payroll System (NPPS), which provides core personnel management functionality and payroll processing.

After the successful implementation of e-Payroll, the Agency will modify WebTADS to include labor costing functionality. The system release is scheduled to be completed by the summer of 2005.

Look for more details about the November 2003 implementation of WebTADS during the next few weeks.

Jim Mazur,IBM/405
IBM/405

Most Popular Baby Names in 2002

Rank	*Male Name*	*Number Males*	*Female Name*	*Number Females*
1	Jacob	30122	Emily	24262
2	Michael	28119	Madison	21546
3	Joshua	25859	Hannah	18559
4	Matthew	24821	Emma	16324
5	Ethan	21949	Alexis	15411
6	Joseph	21766	Ashley	15217
7	Andrew	21696	Abigail	15155
8	Christopher	21676	Sarah	14564
9	Daniel	21186	Samantha	14540
10	Nicholas	21148	Olivia	14481
Note: Rank 1 is the most popular, rank 2 is the next most popular, and so forth				

- S

50 Years and Still Going Strong

It isn't every day you discover that one of your fellow employees is about to receive a 50-year service award. Lo and behold, Code 403'ers found out a few weeks ago that one of their own fit that description to a "T". Vince Gigliotti, a veteran of 40 years with NASA and 50 years government service overall, was congratulated by the 403 staff in a special ceremony on August 4. Vince received a 50-year pin, a letter from NASA Administrator Sean O'Keefe detailing Vince's many years of service on a number of flight projects (especially Delta), a large, framed picture containing a 50-year service certificate and a letter of congratulations from the President of the United States.

Congratulations once again Vince from all your colleagues in Code 403 and throughout the Center!

National Aeronautics and
Space Administration
Office of the Administrator
Washington, DC 20546-0001

May 23, 2003

Mr. Vincent J. Gigliotti
Flight Programs and Projects Directorate
Goddard Space Flight Center
National Aeronautics and
Space Administration
Greenbelt, MD 20771-0001

Dear Mr. Gigliotti:

It is with sincere pleasure that I congratulate you for your 50 years of service to the Federal Government, including 40 years with NASA. This is indeed a noteworthy anniversary, and I am sure it is one in which you take great pride.

You have had many accomplishments during your career, but of particular significance have been your resource support duties to numerous flight projects that played an important role in their successful completion. Your contributions as a Senior Project Support Specialist and PERT Specialist on ECHO, OSO, ATLAS, Nimbus, OAO, ATS, and FPPRO were noteworthy. In particular, I wish to commend you for your decade-long contribution to the Delta project, both as Configuration Manager and Coordinator with Kennedy Space Center. During your tenure on this project there were 30 successful Delta launches.

In recognition of your long and devoted service to the Federal Government, and especially to NASA, a certificate and a 50-year career service emblem have been prepared for you. Please accept my warmest congratulations and personal appreciation for your dedication and service.

Cordially,

Sean O'Keefe
Administrator

Vince Gigliotti

SEEDS OF INNOVATION® INSIGHT

The Hurried Life

We all know people (perhaps even ourselves) who are drowning in a sea of busyness, rushing from task to task, never really being "present in the moment". Our cell phones are ringing, our email is piling up, and we're late for our next appointment. Everything seems to be on fast forward, running on 24/7 time.

"Hurried sickness" can be characterized by the following four symptoms:

1) Deterioration of the personality–our interests become narrow. We have a preoccupation with getting things done. Life is measured in quantity of output, not quality.

2) Racing mind–we lose the ability to focus, which creates more stress and interferes with our creativity.

3) Inability to recollect pleasant memories–we focus too much on the future or spend too much time stewing about the past.

4) Inability to experience inner contentment–our chronic rushing has a negative impact on our creativity and overall life experience.

While we can't ignore the fact that our world has become more and more dependent on mechanical and Internet time, we can (and need to) take some time to reflect, to incubate, and to experience life. Are you planting the Seeds of Innovation® by acknowledging your hurried life and taking time to focus on what's really important?

Abstracted from Seeds of Innovation® Insight ~ THE INNOVATION GROUP

Quotes of the Quarter

"Always remember this: if you don't attend the funerals of your friends they will certainly not attend yours."
— H. L. Mencken —

"This isn't right. This isn't even wrong."
— Wolfgang Pauli (Nobel Prize winner) —

"Television—a medium. So called, because it is neither rare nor well-done."
— Ernie Kovacs —

"Another good thing about being poor is that when you are seventy, your children will not have you declared insane in order to gain control of your estate."
— Woody Allen —

(I can attest to the accuracy of the Woody Allen statement—The Editor)

FUTURE LAUNCHES CALENDAR YEAR 2004	
CINDI	JAN
AURA	JAN
SWIFT	APR
TWINS A	MAY
NOAA N	JUN
GOES N	DEC
ST—5	DEC

ATTENTION INTERNET BROWSERS:

We're on the WEB
http://fpd.gsfc.nasa.gov/news.html
Or via the New "Code 400" Homepage
http://fpd.gsfc.nasa.gov

The Critical Path

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— In February, May, August, and November —

Howard K. Ottenstein,
Editor

Nancy L. White,
Production Assistant

Paula L. Wood,
Editorial Assistant

If you have a story idea, news item, or letter for The Critical Path, please let us know about it. Send your note to Howard Ottenstein via Email: Howard.K.Ottenstein@nasa.gov, Mail: Code 403, or Phone: 6-8583. Don't forget to include your name and telephone number. Deadline for the next issue is October 31, 2003.