



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

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Explorers Launch Update

INTEGRAL - CHIPS - GALEX

INTEGRAL

Integral was successfully launched on 17 October 2002, from Kazakhstan on a Russian Proton rocket. It's intent is to solve some of the biggest mysteries in astronomy. Specifically, Integral, ESA's International Gamma-Ray Astrophysics Laboratory, will gather some of the most energetic radiation that comes from space—gamma rays.



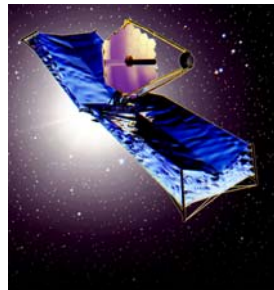
Fortunately, the Earth's atmosphere acts as a shield to protect us from this dangerous cosmic radiation.

(Explorers Continued on page 4)

Where Have All the Media Gone?

JWST Announcement

Eclipsed by Anniversary of 9/11



For the hundreds of people who devoted 7 years of their professional lives creating a follow-on mission to the Hubble Space Telescope, September 10, 2002 was bittersweet.

After months of review, NASA finally announced that TRW had won the coveted prime contract to

(JWST Continued on page 8)

Message from the Director Of

To all of Code 400,

On October 3, the National Space Club presented an award to the Flight Programs and Projects Directorate, during an event held at the Visitor's Center, celebrating Earth Science. The award is for our activities on the EOS program. The citation reads: "For outstanding leadership in delivering instruments, spacecraft and data systems that serve the needs of a world-wide user community." A great number of you have worked on the EOS program over time. It is an honor to receive this acknowledgment, and I thank you for your part in making this program a success.

We are coming up fast on a couple of seasons. First, a season of launches. It actually started October 17 with the successful launch of the Integral mission, part of the Explorers program. Checkout is proceeding well. We'll be launching TDRS-J, SORCE, ICESat and CHIPS (together), and GALEX in the next few months. Many of you are involved with these missions, and working hard to achieve success in launch and checkout. I give you my thanks for your commitment and my admiration for what you have achieved on these demanding projects. I offer my thanks also to your families, who support you in your efforts to achieve NASA's mission, and who tolerate the myriad activities that occur - in and outside of normal working hours - as we approach a launch.

The second season, of course, is that of holidays - Thanksgiving, Hanukkah, Christmas and celebration of the New Year. I hope you all enjoy these with the love and warmth of family and friends, and that you find time to relax and renew yourselves. Please take care to be safe, and please take care of those around you.

Dolly

Best Looking Pet in the Universe Contest

The Critical Path is now sponsoring its third Best Looking Pet in the Universe Contest.



Any Code 400 civil servant or contractor may submit a (returnable) picture of their pet (pet name and your name on back of picture) to the Board of Judges no later than Wednesday, December 24, 2002. Any type of pet is eligible, but no more than one nomination per family. Pictures without additional ornaments preferred. As TCP editorial personnel may also submit a picture, we need three volunteers to serve as judges.

Please send your pet pictures to Nancy White in Code 403 or email electronic pictures (tif, gif, bmp, or jpeg files) to her @ nlwhite@pop400.gsfc.nasa.gov. Those volunteering as judges should call Howard at x6-8583. Prizes will be \$10, \$7 and \$5 for first, second, and third place winners, and will be gift certificates from PetSmart, to be found in a number of locations in Maryland and Virginia.

Of course ... pictures of the three winners will appear in the winter edition of The Critical Path (mid-February 2003).

PERSONALITY TINTYPES

Rick King

Rick King is currently the Deputy Project Manager/ Resources for the HST Development Project. Rick joined the Flight Programs and Projects Directorate back in 1984 and will celebrate a milestone this December with 25 years at Goddard. Rick has been with the HST Program going back to June of 1995. He has supported three of the four HST Servicing Missions including SM2, SM3A and SM3B, and is looking ahead to the SM4 Mission scheduled in 2004.



Born: Baltimore, Maryland

Education: B.A. University of Maryland Baltimore County, 1979

Family: Rick was born and raised in Baltimore and still resides there with his five fish and a snail. Oh yes, Rick also has three children who occupy most of his spare time outside of work. Alyssia (16 years old) just got her driver's license and spent the summer at Goddard as a co-op student. Justin (15 years old) just finished with the U.S. National Soccer championships and is looking forward to dad's help with driving this year too. Slater (see picture – 6 years old) just started first grade and likes to wrestle with dad as much as possible.

Life on HST:

Rick started on HST as the DPM/R for the Operations and Ground System Project. During his tenure HST successfully completed the Second Servicing Mission and set in place the reengineered CCS ground system. The experience was not only rewarding but educational in that it provided an opportunity to work with the design, development and implementation of a state of the art ground system plus the opportunity to work with the Science Institute on data analysis related issues. After 4 years, Rick migrated to the HST Development Project, where he felt back at home

(Tintype Continued on page 17)

Ruth Carter

Ruth is a Project Formulation Manager in Code 490, SEU Program Office.

BORN: South Korea

Education: BS and MS in Nuclear Engineering from the University of Maryland, BS in Radiologic Technology from the University of Maryland

On Family: Ruth and her husband Eric live in Gaithersburg, Maryland with their daughter Julia and their dog, Libby. Eric is a CPA and Julia is a junior at Carnegie Mellon University in Pittsburgh, PA. Libby is a lovable little beagle and helps make the house a home while Julia is away at college.

Life in Code 490: Ruth joined Code 490 after STAAC was dismantled and all of the Project Formulation Managers were transferred to Code 400. Ruth has been managing Structure and Evolution of the Universe (SEU) missions, ACCESS and EXIST; thus her logical new home has been SEU Program Office (Code 490). The ACCESS mission feasibility study included working with the Korea Aerospace Research Institute (KARI). Although it was only a study, ACCESS was the very first space mission that NASA and KARI engineers worked together. The study completed successfully early this year and it was a rewarding experience for both sides. In addition to ACCESS, Ruth initiated the mission study for EXIST. The EXIST mission is in pre-formulation phase and the study to determine mission feasibility has been completed. Since June of this year, Ruth has been tasked to lead the GPM Microwave Imager (GMI) Instrument Acquisition effort. GMI instruments will be flying on the GPM Core Observatory and Constellation Observatory.

Life before Code 490: Prior to Code 490, Ruth was in STAAC as a Project Formulation Man-

(Tintype Continued on page 17)



FEEDBACK

GSFC Resident Office at KSC

- TDRS-J arrived at the Shuttle Landing Facility (SLF) on October 17, 2002. The payload and several team members arrived on board an Air Force C-17. Off load was successfully accomplished and the TDRS-J was transported to the Spacecraft Assembly and Encapsulation Facility (SAEF-II) for processing. Launch is scheduled for November 20, 2002, however, booster and spacecraft problems may impact that date (now early December).
- Several payload teams have recently arrived at Kennedy Space Center (KSC) for Ground Operations Working Group (GOWG) or Technical Interchange Meetings (TIM). GOES-N, SORCE, Hubble Space Telescope SM 4, are a few of these teams keeping our office busy in support.
- Frank Cepollina, GSFC Project Manager for Hubble Servicing Missions, praised and recognized KSC talents in meeting GSFC's mission objectives. Several employees received certificates; an STS-109 photomontage, and an exquisite crystal cube with a floating Hubble image embedded by the latest laser technology. Kris Nighswonger and Mary Halverstadt, from the GSFC Resident Office, were recognized for their support and received these awards.
- Delaware North (operator of KSC Visitor Complex for NASA) has announced that it will purchase the Astronaut Hall of Fame. Delaware North will operate the Astronaut Hall of Fame in its present location for the foreseeable future, with a long-term plan to move the attraction to the Visitor Complex property. The Astronaut Hall of Fame houses the world's largest collection of astronaut memorabilia, as well as displays, exhibits and tributes dedicated to the heroes of Mercury, Gemini, and Apollo. Space Camp activity floor and equipment are located in the building, however, the company did not purchase the intellectual property rights to the camp or purchase/lease its dormitory. The activity floor and equipment will be used for current educational programs, including Camp KSC spring and summer day camps; educational field trips; job shadowing programs for students with disabilities; overnight adventure campouts, and Salute to Scouts days.
- Mary Halverstadt received a "Silver Quality Dollar Award for Continual Improvement" and a coin "In Honor Of Your Commitment to Safety, Teamwork and Innovation" for KSC Teamwork relating to work accomplished on the Canaveral Spaceport Technical Training Panel (CSTTP). This CSTTP panel reviews Safety Training required for secured facilities.

(Explorers Continued from page 1)

tion. However, this means that gamma rays from space can only be detected by satellites. Integral



Integral Lifts Off

will be the most sensitive gamma-ray observatory ever launched. It will detect radiation from the most violent events far away and from processes that made the universe habitable.

Integral is a truly international mission with participation of all member states of ESA plus United States, Russia, Czech Republic, and Poland. ESA appointed Alenia Aerospazio, Italy, as industrial prime contractor, responsible for the design, integration and testing of the satellite. On board, four instruments from teams led by scientists in Italy, France, Germany, Denmark, and Spain will gather and analyze the gamma rays from space. A Russian Proton rocket successfully placed the spacecraft into orbit. NASA and ESA ground stations will stay in contact with Integral. The mission operations centre responsible for satellite control is located at ESOC in Germany. The Integral Science Operations Centre (ISOC) at Noordwijk, the Netherlands, is providing the observation plan, and Switzerland hosts the centre for the scientific data, the Integral Science Data Centre (ISDC).

Goddard provided the Pulse Shaped Discriminator (PSD) for SPI Spectrometer through a contract with the University of California at San Diego (UCSD). Scientists at Goddard developed software for the

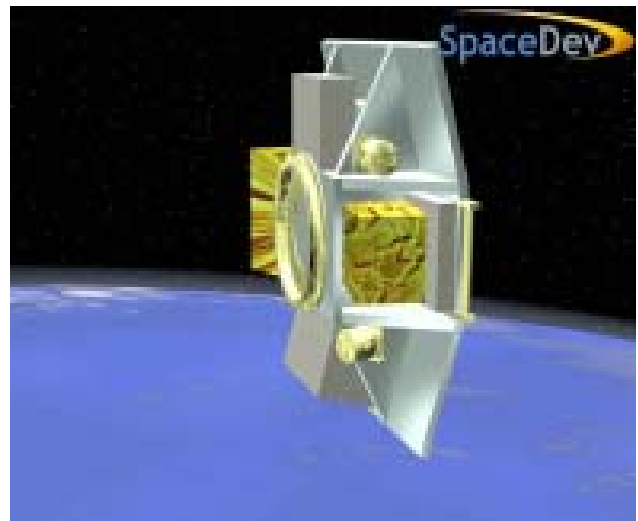
calibration of the satellite's spectrometer instrument and the analysis of its data. Goddard will administer the guest observers program for this ESA-led mission and will oversee research grants to scientists to analyze and interpret Integral data. Goddard will also provide the Integral data center for U.S. scientists.

Integral is the last of the missions managed by the disestablished Internationals Project and has recently been managed by the Explorers Program Office at GSFC.

CHIPS

The Cosmic Hot Interstellar Plasma Spectrometer (CHIPS) satellite, the first of NASA's University-class Explorers (UNEXs), will examine the interstellar medium, the "empty" space that fills the space between stars.

Dr. Mark Hurwitz, CHIPS principal investigator



CHIPS—Artist Rendition

from the University of California, Berkeley, said, "When you look up in the night sky you get the impression that the area between the stars and planet is empty. However this space is filled with gas and dust. CHIPS will give us invaluable information on the origin, physical processes and properties of the interstellar medium."

Just as raindrops split sunlight into the colors of the rainbow, the CHIPS instrument will collect and

(Explorers Continued on page 5)

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separate the diffuse extreme ultraviolet glow from the interstellar medium. By measuring the distribution and intensity of the glow, scientists will be able to test several competing theories about the formation of the clouds of hot interstellar gas that surround our solar system.

CHIPS will fly as a secondary payload, with ICESat aboard a Delta II rocket, and is scheduled for launch mid-December, 2002. The CHIPS satellite, which weighs 131 pounds and is about the size of a large suitcase, will orbit about 350 miles above the Earth. It is expected to operate for one year.

The CHIPS mission is sponsored by the Explorers Program. UNEX missions are managed by Wallops for the Explorers Program. David Pierce (850) is the GSFC Mission Manager for CHIPS.

More information on the CHIPS is available at: <http://chips.ssl.berkelet.edu>

GALEX

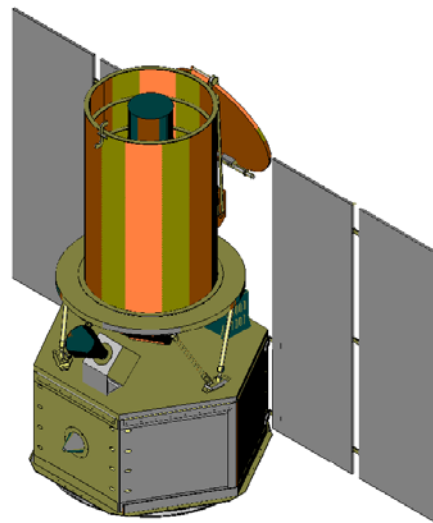
Goddard's most recent Small Explorer (SMEX), GALEX - Galaxy Evolution Explorer - is an Ultra-Violet (UV) imaging and spectroscopic survey mission. The mission is designed to map the UV properties of local galaxies and probe the causes of star formation and its evolution over the red-shift range $0 < z < 2$. The All-sky UV imaging portion of the mission will observe over 10 million galaxies, and the spectroscopic survey will include 10,000 galaxies.

GALEX will launch from Kennedy Space Center in February 2003 aboard a Pegasus XL launch vehicle. The GALEX instrument was designed, built, and tested at the Jet Propulsion Laboratory (JPL) in collaboration with CalTech, University of California at Berkeley, and the French Laboratoire d'Astronomie Spatiale (LAS). The GALEX spacecraft was developed at Orbital Sciences Corporation (OSC). OSC also performed mission integration and test, and will provide 29 months of mission operations from their Dulles, Virginia offices.

According to the Principal Investigator, Dr. Chris Martin, "GALEX will produce an unprecedented statistically powerful database of UV images and

spectra of nearby and distant galaxies. Using UV properties, supplemented by other wavelengths, GALEX will derive global parameters for each galaxy (star formation rate, extinction, initial mass function (IMF), starburst parameters) vs. red-shift, and characterize their relationship to galaxy properties (luminosity, type, metallicity, gas supply)."

GALEX is a high-priority Origins and SEU mission, tracing the origins of the majority of stars, metals,



GALEX—Artist Drawing

and many galaxies and galaxy disks, providing a framework for understanding HST and JWST rest UV from high z galaxies, and understanding the drivers of galaxy and Quasi Stellar Object evolution. It is expected that many UV objects HST must study in preparation for JWST will be discovered by GALEX.

The GALEX mission is sponsored by the Explorers Program. Frank Snow (410) is the GSFC Mission Manager for GALEX.

Explorers Program Staff



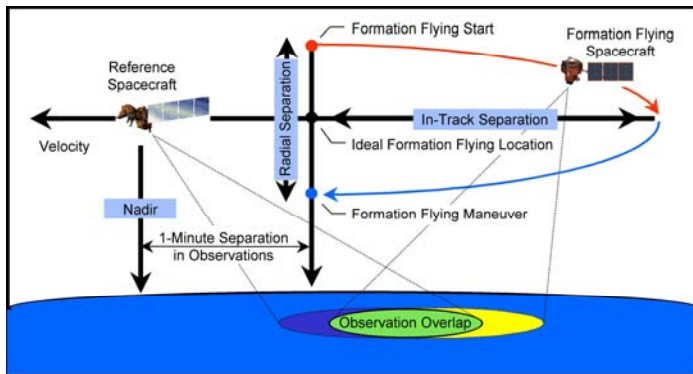
Technology Corner



Technology Successes Flying on Goddard Missions AutoCon: Enabling NASA's Formation Flying

One of the most exciting concepts permeating NASA today is the utilization of multiple satellite missions and formation flying spacecraft to obtain science data that cannot be gathered by a single satellite. Formations provide new opportunities for both Earth and space science, including stereo viewing, temporal and spatial resolution, interferometry, and multiple angle viewing to gather previously unavailable data. To enable formation flying, members of Goddard's Information Systems Division and Guidance, Navigation, and Control Division, together with engineers from a.i. solutions, Inc., developed the Autonomous Maneuver Control (AutoCon) software, an autonomous maneuver planning and control tool that executes on the ground (AutoCon-G) and on-board the spacecraft (AutoCon-F).

AutoCon-G was developed to provide support for the Earth Observing-1 (EO-1) mission, the Earth Observation System (EOS) Terra satellite, the Microwave Anisotropy Probe (MAP), and the US Navy's UHF Follow-On (UFO-1). A follow-on flight version of the software, AutoCon-F, has also been developed and is currently being flown on the EO-1 spacecraft. AutoCon-F allows the on-board planning and execution of maneuver commands to reduce latency for formations, and provides the flight operations team with the ability to change



spacecraft behavior without flight software changes.

Formation-keeping control of the EO-1 satellite was successfully handed over to the AutoCon-F software on May 17, 2002, demonstrating for the first time the autonomous formation-flying technology that will enable a host of future multi-spacecraft missions. EO-1 was able to stay within one second of its specified position using on-board algorithms to plan and execute maneuvers, allowing the EO-1 hyperspectral imager to analyze the same image as the Landsat instruments without atmospheric distortion. Although initially planned as a technology experiment, AutoCon-F has performed so reliably that it now functions as the operational software for regularly planned formation control maneuvers. The Global Precipitation Measurement (GPM) mission is also planning to use the AutoCon-F software.

AutoCon-F was recently selected as a runner-up in the 2002 NASA Software of the Year competition.

Scott Green, Associate Branch Head, Code 583



Technology Corner



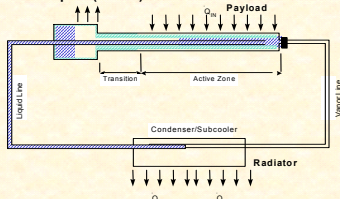
Capillary Pump Loops and Loop Heat Pipes

Two-phase technology, such as Capillary Pumped Loops (CPLs) and Loop Heat Pipes (LHPs), is clearly the major thermal control innovation of the last decade and as such defines the state-of-the-art. This technology has now gained acceptance and is used in an increasing variety of NASA, DoD, and commercial applications. Goddard initiated research into two-phase technology in the early 1980's and has maintained national/international leadership ever since.

Two-phase thermal control technology offers some unique benefits. It can transport high levels of waste heat, maintain tight temperature control over large areas and indefinite periods of time regardless of changes in heat load or sink temperature, and can do so with

Thermal Control State-of-the-Art

Two-Phase Technology, which involves acquiring waste heat via the evaporation of a fluid and heat rejection via condensation of the vapor, is the major thermal control innovation of the last decade. Devices include Capillary Pumped Loops (CPLs) and Loop Heat Pipes (LHPs)



Over last two decades Goddard has taken the national lead in developing and implementing this technology.

negligible control power. Fluid movement is accomplished by capillary forces alone: no mechanical pumps are required. Operational temperatures can also be changed on-orbit for even greater versatility. This design flexibility has led to applications on some of NASA's premiere spacecraft. For example, the Terra spacecraft, which was launched in December of 1999, has three CPLs that have been in successful operation since launch. In July of 2001 cryo-coolers on Terra's ASTER instrument, which is thermally conditioned by a CPL, began to experience excessive temperatures. The temperature control point of its CPL was adjusted on-orbit to accommodate this temperature growth, thus extending the instrument's life.

Another major CPL application is the Hubble Space Telescope. On SM-3B this past March, astronauts installed a CPL to remove hundreds of watts of waste heat from the new NICMOS cryocooler placed inside the aft shroud. The aft shroud was never designed to passively remove this much heat, and thus use of a two-phase device was necessary to enable the application. Additionally, LHPs will be used in major instruments on several upcoming Goddard missions, including the ICESat GLAS, Swift BAT, and Aura TES instruments

Theodore Swanson, Assistant Chief for Technology, Code 540

Two-Phase is Now Operational

- Offers flexible design, unmatched performance
 - comparable to other S/C subsystems in complexity/cost/risk



TERRA: Three key instruments cooled by CPLs. Allowed on-orbit temperature change to save SWIR instrument.

Current applications include: **TERRA, HST/SM3, ICESAT/GLAS, Swift, GOES N-Q, DoD missions, comsats**



HST: currently one operational CPL, two more planned for next servicing mission



ICESAT/GLAS: two LHPs cooling laser and electronics. Readjustment of loop temperature facilitated laser beam realignment post TV testing.



GOES N-Q: two LHPs per S/C. To be launched FY03

(JWST Continued from page 1)

build the Next Generation Space Telescope (NGST), renamed the James Webb Space Telescope (JWST). And in doing so, the Agency ended months-long speculation over who would oversee NASA's next high-profile mission involving hundreds of millions of dollars.

But, as with most everything in life, timing is everything.

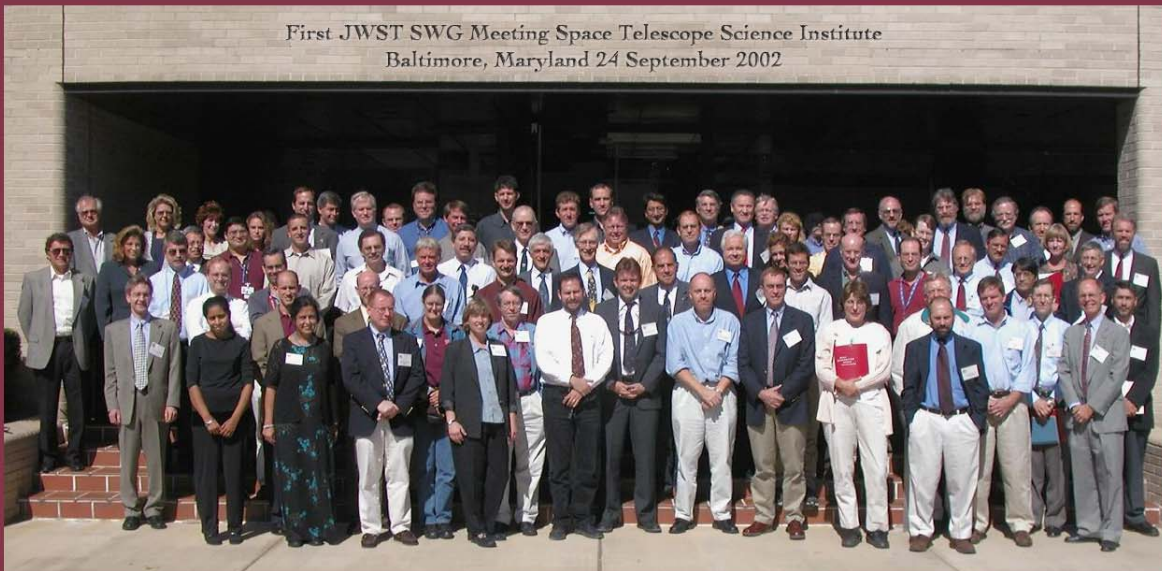
The long-anticipated announcement suffered the misfortune of falling right in the midst of the first anniversary of the 9/11 tragedy.

"We didn't even make the CNN crawler," recalls JWST Project Manager Bernie Seery (443), referring to the headlines that scroll across the bottom of the screen during a CNN broadcast. He, along with Goddard Space Flight Center scientist John Mather (685), has been working on a Hubble follow-on mission since October 1995 – a scant 2 years after space-walking astronauts corrected Hubble's blurred

vision by installing the COSTAR instrument.

It wasn't much of a hurrah for the nine voting members of the Source Evaluation Board, either. Led by Board Chairman John Decker (540/443) and Goddard Contracting Officer Mary Stevens (210.S/443), the team spent nearly a year sequestered in a small room in the basement of Building 25 evaluating two, multi-volume proposals submitted by TRW and Lockheed-Martin. Although they had finished their reviews on schedule before the end of July, it took an additional six weeks before the announcement could be made as Sean O'Keefe, the new NASA Administrator, decided to break with tradition and rename the observatory. The decision triggered a slew of actions, including obtaining legal approval from the Webb family to use the name.

Meanwhile, employees of TRW, Lockheed-Martin, Goddard and the rest of the aerospace world waited, even delaying their summer vacations for an announcement that would not come until Septem-



(JWST Continued from page 8)

ber. Finally, it didn't help matters either that at the very time of the JWST announcement, 72-year old Buzz Aldrin allegedly punched a 37-year old man in the face after he asked Aldrin to swear on a Bible that he had been to the moon. Somehow, media coverage of that non-event took precedence over the JWST announcement.

Ushering in a New Era

However, even though the mass media didn't pick up the story at the time, increasing coverage has occurred ever since. The announcement nonetheless signaled a new start for a telescope that promises to usher in a new era in astronomical discovery.

JWST will pick up where Hubble leaves off. Equipped with a suite of revolutionary, infrared-sensing instruments, this "first light machine" will allow scientists to see farther into space and observe what the universe looked like when it was merely a fraction of its current age and size, when the first stars and galaxies were just beginning to form. No one has ever observed this cosmic "dark zone" before. It also promises to set the standard for building and operating spacecraft in the 21st century.

With its new \$824.8 million prime contract in hand, TRW will, over the next year, finalize its designs, choose the mirror and telescope technologies and begin laying the groundwork for assembling the largest single-aperture telescope ever flown. Meanwhile, the Goddard Space Flight Center and the instrument development teams are responsible for choosing the detector technology.

Without question, a number of significant technological challenges remain before the telescope flies aboard an Atlas 5 booster in 2010.

Groundbreaking Technologies

As the telescope must operate at no warmer than 35 Kelvin, the telescope will orbit the L2 point 940,000 miles away. In addition, it will live in the shadow of a giant tennis-court-sized sunshade, which will deploy en route to L2.



More technologically challenging is the development of a 7-meter-class ultra-lightweight mirror. Unlike Hubble's 2.4-meter monolithic glass mirror, JWST's primary mirror will be segmented. Made of either glass or metallic beryllium, it will do what no other mirror has done — it will unfold like a dining room table once NGST reaches its L2 destination.

To foster the development of these technologies, NASA, the Air Force and the National Reconnaissance Office created the \$30 million Advanced Mirror System Demonstrator (AMSD) program and awarded contracts to three companies to build three 1.4-meter versions and to test them in the large vacuum chamber at Marshall Space Flight Center (MSFC). TRW, with NASA's concurrence, will decide in 2003 which technology ultimately will fly.

Although this approach allows the telescope to fit

(JWST Continued on page 16)



Code 400 Peer Awards & Picnic

The Flight Programs and Projects Directorate (FPPD) held its annual Peer Awards ceremony and picnic this year in the Rec Center on September 18. Just about every seat was taken for a most enjoyable lunch, singing of the Code 400 Fight Song, and presenting peer awards to a large number of winners. The latter were selected from a huge number of submittals (183 or thereabouts in number) by a panel of judges comprised of last year's winners.

FPPD Director Of Dolly Perkins presented the awards along with various contractor supervisors. Category winners and citations appear below:

Boundless Energy

You never hesitated to assist others when needed and you welcome new challenges. For your boundless energy in support of the ICE-Sat Project, as well as your dedication to the Center and safety of Center personnel. –this award goes to: Catherine D. Fleshman/425

In recognition of your boundless energy and unwavering commitment to the success of EOS-DIS Science System.–this award goes to: Glenn T. Iona/530, supporting Code 423

In recognition and appreciation of your dedication, integrity, and unwavering team spirit in successfully meeting the many challenges associated with business management of the Ground Network Project and its science customers.–this award goes to: Christine M. Hinkle/453

Mission Impossible

In appreciation for the extraordinary effort and dedication that it took to deliver the X-ray telescope and the UV optical telescope to GSFC. The in-house SWIFT instrument may have BATman but you are the Swift's superman, congratulations. –this award goes to: Renan A. Borelli/410

For ensuring consistent progress and significant achievements in all aspects of EOS science networks.. – this award goes to: Jeffrey A. Smith of Code 586, supporting Code 423

Steady Helm

For your constant focus and leadership amidst the constant turmoil known as HST. – this award goes to: Sherri R. Hall/442

You are a major contributor to the success of the TDRS project. While supporting the TDRS project through sometimes-turbulent seas, you are a tremendous asset to the project with your unparalleled continuous support.– this award goes to: Barbara B. Sweeney/454

Rookie of the Year

Your tenacity and eagerness to learn quickly made you a highly valued member of our Hubble Space Telescope Servicing Team.. – this award goes to: Jodie A. Jones/QSS Group, supporting Code 442

You are awarded the Rookie of the Year award for your outstanding transition into the Goddard community, including thriving in the complex EOS-DIS environment while inventing new approaches to better serve the EOS-DIS community.– this award goes to: Beth E. Weinstein/586, supporting Code 423

Through your dedication to your work, demonstrated agility in taking on new tasks, and your continuous diligence in developing yourself through training and on-the-job activities, you exemplify the Rookie of the Year award.– this award goes to: Diane E. Trakas/Boeing, supporting Code 490



Code 400 Peer Awards & Picnic

Unsung Hero

This is in recognition of your outstanding, steady and critical support to the success of the EDOS and DAAC elements of the ES-DIS Project.– this award goes to: Sheri E. Platt/423

Owing to you many accomplishments and prodigious output, you exemplify the “world class” reputation of the NASA team, earning the admiration and respect of scientists, engineers, and managers representing multiple agencies, as well as setting the example for your peers. You are clearly placing NASA’s “fingerprints” on the future NPOESS for science, weather, and national security. – this award goes to: Michael H. Lee/581, supporting Code 402

Mentor Award - Under your Wing

An amazing, wonderful, talented, extremely intelligent person who shares herself with others in such a positive way that Code 400 and the Center continues to benefit by the people she takes under her wings and become inspiring leaders themselves.....Mentor Under Your Wing Award goes to: Dorothy Tiffany/490

Honoring Diversity

In recognition of your outstanding dedication and accomplishment in creating a workplace that gains strength through diversity–this award goes to: Susan M. Sparacino/441

Wild Card

For your dedication and support to the ICESat Project, your willingness to accept new responsibilities, and your commitment to teamwork and integrity in all that you do. You are a true Wild Card.– this award goes to: Darlene Fennell/425

Because of your outstanding efforts in outreach to the EOS-DIS user community you are awarded the Wild Card Peer Award.–this award goes to: Jennifer L. Farnham/586, supporting Code 423

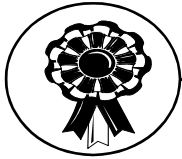


1st Row – Jodie Jones, Beth Weinstein, Sherri Platt, Diane Trakas, Cathy Fleshman, Renan Borelli , Jennifer Farnham

2nd Row – Glenn Iona, Dorothy Tiffany, Michael Lee, Dolly Perkins

3rd Row – Christine Hinkle, Jeff Smith, Barbara Scott, Darlene Fennell

Not Pictured: Sherri Hall, Susan Sparacino, Barbara Sweeney



More Awards

Ten Code 400 Goddard employees were recently honored with NASA's Space Flight Awareness (SFA) awards, the highest tribute paid by NASA's SFA Program, to government and industry workers.

They joined approximately 250 other honorees from NASA centers and contractor companies as they toured Kennedy Space Center, and attended a reception in their honor. Unfortunately they were not able to view the STS-112 launch that had to slip to a later date.

The honorees were recognized by astronaut Alan Poindexter at a special awards ceremony in Florida on September 29.

The next SFA event will be the STS-114 launch tentatively scheduled for March 2003.

For additional information about the Goddard SFA Program, please contact Esther C. Johnson, SFA Coordinator at 6-0023

Those receiving awards are noted below:

Kathy Bielski- Honeywell Technology Solutions Inc./452.C

For your outstanding support that significantly impacted the front line engineers, testers, operators, technicians and managers, enabling them to provide the high level of support that is required for the success of the Human Spaceflight program.

Thomas Franklin- The Hammers Company/452.C

For your continuous dedication to safety, process improvement, and cost savings in support of NASA's space program.

Clay Fulcher- Boeing/442

For your many excellent and timely technical efforts that have helped make Hubble Space Telescope Servicing Mission Extra Vehicular activities so successful.

James Gavura- Boeing/White Sands/452

For your leadership and excellence in the management of the Tracking and Data Relay Satellite System.

Nicholas Jedrich- Jackson & Tull/442.0

For your outstanding commitment, and dedication to the development, successful installation, and operation of the Near Infrared Camera and Multi-Object Spectrometer Cooling System.

Deborah Knapp- 581 /440.8

For your outstanding technical and Leadership contributions to the Hubble Space Telescope Servicing Missions 3A and 3B.

(More Awards Continued on page 13)

(More Awards from page 12)

Laura Schroder- Honeywell Technology Solutions Inc./441

For your exceptional effort in the development of the Servicing Mission Integrated Timeline and outstanding planning support during the Hubble Space Telescope Servicing Mission 3B.

Scott Swain- Lockheed Martin Technical Oper./441

For your extraordinary technical efforts and leadership in support of the Hubble Space Telescope Electrical Power Systems team during the Servicing Mission 3B.

Linda Winchell- Honeywell Technology Solutions Inc./452.C

For your consistent emphasis on customer satisfaction, security, and excellent administrative support through many NASA Human Space Flight Missions.

Darrell Zimbelman- 553/415

For your outstanding commitment and dedication to development, successful installation, and on-orbit checkout of the Near Infrared Camera and Multi-Object Spectrometer Cooling System.

Quotes of the Quarter



“Had I been present at the Creation, I would have given some useful hints for the better ordering of the universe.”

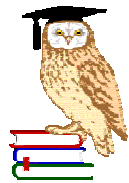
— Alfonso The Wise, King of Castile —

“Markets can remain irrational longer than you can remain solvent.”

— John Maynard Keynes —

“Observe how system into system runs, what other planets circle other suns.”

— Alexander Pope —



“... Here and there a touch of good grammar for picturesqueness.”

— Mark Twain —

TDRS-J Ready for Launch

On October 17, 2002, an Air Force C-17 aircraft transported the TDRS-J spacecraft from the satellite manufacturing facility in El Segundo, California, to Kennedy Space Center's (KSC) Shuttle Landing Facility (SLF). The Boeing Satellite Systems shipping container with TDRS-J inside was offloaded from the aircraft at the SLF, and a mobile crane hoisted it onto a flatbed trailer for transport to the Spacecraft Assembly and Encapsulation Facility 2 (SAEF-2). There, it was placed in the SAEF-2 airlock for cleaning and subsequent transfer into the high bay clean room. After removal of the container lid, the container strongback assembly was rotated into the vertical position. Then workers at KSC mated electrical connectors to the spacecraft and initiated launch site electrical testing.

The following day, the spacecraft was lifted off the strongback and lowered onto the flight launch vehicle (LV) payload adapter (PLA) for LV interface checks. After this interface was verified, workers hoisted the spacecraft off the PLA and moved it to the BSS fueling stand to continue electrical and propulsion system testing until October 25. During the week of November 4, approximately 3,686 pounds of monomethylhydrazine and nitrogen tetroxide propellant was loaded into the spacecraft, and the helium tanks filled and pressurized.

After flight mechanical closeouts are accomplished, TDRS-J will conduct LV integrated operations and be mated to the PLA on the following day. The spacecraft/PLA stack then undergoes payload fairing encapsulation and preparations for transport later in November. The encapsulated spacecraft will then be transported to Space Launch Complex (SLC) 36A, and mated to the Atlas Centaur. The launch vehicle/spacecraft Combined Electrical Readiness Test will be performed the following day. Launch rehearsals, final testing and closeout activities, and pre-launch reviews will be accomplished during the remaining days before launch.

The KSC Center Director's Launch Vehicle Launch Readiness Review was successfully completed on October 15, 2002. The Atlas IIA Booster and Centaur upper stage have been erected on SLC 36A and the Lockheed Martin Ground Operations Readiness Review was completed on October 18. The GSFC Mission Readiness Review for the TDRS-J mission was held on October 30.

The TDRS-J launch is now scheduled for early December. TDRS-J is the third in the series of TDRS H, I, J communications satellites, and the latest addition to the fleet of eight on-orbit TDRS satellites. In addition to providing tracking services for expendable launch vehicles, the TDRS provide high data rate communication links for the Space Shuttle, the recently refurbished Hubble Space Telescope, the International Space Station, and numerous other Earth-orbiting spacecraft. This launch will mark the last flight of the Atlas IIA launch vehicle.

*By Mike Goeser/TDRS-J Launch Manager
and Marco Toral/Code 454*



Things You Should Know About

- It's Open Season time now (until December 31) to make changes in your Thrift Savings Plan (TSP) if you wish to do so. One thing you should certainly consider is the ability to increase your deduction for the upcoming year from 12% to 13% (FERS) or 7% to 8% (CSRS). Nor do you have to wait until 2003 to start. If you complete form TSP-1 pronto, the change can be implemented as early as the first pay period in December.
- It's Open Season too (until December 9) for any Health Plan change that you may be contemplating. You should review your plan and compare it to other available possibilities. Average rate increase for the upcoming year will be 11%, but some plans will rise substantially more. A much smaller number actually decrease. Of course, premium rates are not the only thing to change. Increases are possible in a series of categories that can all cost you money. Some are: prescriptions; co-payments; catastrophic caps; deductibles...well you get the (not so pretty) picture. Take a look.
- Don't forget also, that the Open Season for long term care concludes on December 31. No word yet on when it may open again. Remember that if you or your spouse do not join now, when you retire you will be completing a much longer and detailed application as a retiree. Adding another birthday to the mix will increase the cost as well. If you sign up before the end of 2002, your premiums are based on your age as of July 1, 2002. Younger employees with a good health history should look at plans offered by companies in the private sector as well. There, discounts are offered for husband/wife joiners, belonging to a particular organization, the ability to choose simple (rather than compound) interest accruals each year, and more. And then, too, you might not see long term care as a need for you, given your particular circumstances.
- By the time you read this, it's too late to vote. That is, unless you work at Stennis Space Center and live in Louisiana. There will be a runoff between the incumbent Democrat senator and Republican challenger in December. Republicans will still retain the Senate majority, but their lead will reduce to a single senator should they fail to unseat the Democrat. TV viewers in Louisiana will be seeing more political ads than they would like between now and then.
- Thursday, November 28 is Thanksgiving Day. We should all count our blessings and then some for living in the Good Old USA. Although observed on the fourth Thursday of November each year by Act of Congress (1941), the first national proclamation of Thanksgiving was issued by President Abraham Lincoln in 1863. Some sources believe that it was instituted by the Pilgrims to give thanks to the Lord for their survival in the 1620s.
- Beginning in 2003 the Federal Government Life Insurance (FGLI) program will reduce its basic insurance rate from 15 1/2 cents per \$1,000 of coverage to 15 cents. Coverage in other areas of insurance may go up or down according to age. Check with your Personnel Management Specialist. NASA's own insurance program (NEBA) just distributed a refund of premium (checks for 12 pay periods) to its 600 GSFC members. This marked the fifth consecutive year that NEBA's Board of Directors has voted for a return of premium.

(JWST Continued from page 9)

inside a rocket fairing, it complicates the task of making sure the mirror holds its proper shape. Therefore, the JWST team must create a method for measuring errors in the telescope's optical system and then correcting the problem while the spacecraft is on orbit. Using highly sophisticated computer algorithms, ground controllers will be able to determine the level of distortion in camera imagery of bright guide stars and activate mechanical actuators to move the mirror segments until the mirror shape is optimized.

Detectors

Another challenge involves the development of the instrument detectors. Because JWST's prime targets are intrinsically faint, with as few as a single photon arriving every second, the detectors must be more sensitive than any detector ever flown. In addition, JWST must be able to image large areas of the sky to detect the first star-forming regions, which means that the detector assemblies must be large mosaic arrangements of 4 million pixel arrays for a total of 64 million pixels—another first for NASA.

Micro-Electro-Mechanical Systems

Multi-object spectroscopy using JWST's ESA-supplied Near-Infrared Spectrometer represents yet another first for NASA. To efficiently characterize the nature of the early universe, JWST will have to take spectral data of many different targets simultaneously.

To accomplish this in space, the telescope also will fly NASA's first Micro-Electro-Mechanical Systems (MEMS) device, a programmable aperture mask made up of four million microscopic shutters assembled onto a silicon grid. Ground controllers will send commands directing specific shutters in the array to open or close through magnetic actuation, forming "slits," depending on which astronomical targets astronomers study. The technology will allow astronomers to simultaneously gather spectral

data on at least 100 objects per observation. Goddard's Harvey Moseley (685) is leading the MEMS development team.

Cost-Breaking Paradigm

NASA could not have considered a mission of this magnitude just a few years ago. The mission is budgeted at \$2 billion, which includes development and operations costs over its nominal 10-year life. Undoubtedly, JWST would have cost more than \$6 billion had NASA not attempted to break the classic telescope cost curve through a combination of innovative systems engineering and the infusion of breakthrough technologies.

International partnering is another way that NASA also hopes to keep down costs. The European Space Agency (ESA) is contributing about \$200 million (U.S.) for a 15 percent observing share and the Canadian Space Agency (CSA) is paying more than \$50 million for its roughly 5 percent share.

In addition to its partnerships with Europe and Canada, NASA has relied on the expertise of the Department of Defense, particularly with the mirror-technology development program. It also tapped the expertise of its field centers, including Goddard, Ames Research Center, the Jet Propulsion Laboratory, and MSFC, as well as several of the Department of Energy's national laboratories. The Space Telescope Science Institute in Baltimore, the same organization that now operates Hubble, will operate JWST's Science & Operations Center.

As of today, the team has proven all major technologies, including the viability of lightweight active optics. Now, with the selection of a prime contractor, the JWST program officially moves to the next phase of its development, a step closer to launching a new era of astronomical discovery.

Bernie Seery, Project Manager,/Code 443

(TinTypes Rick King Continued from page 3)

working hardware related issues and budgets. While on the development side of the program Rick has supported Servicing Mission 3A, 3B, and SM4, orchestrating the finances for the infamous Frank Cepollina. Rick feels that HST has provided one of the most exciting and dynamic environments that one could ever hope to work in. "It's not just a paper project. There is space flight hardware around all the time. You not only get to touch it and feel it (assuming that you're clean of course) but you connect with it. You get to understand not only the hardware, but the science that it produces. Then, you get to watch as the servicing mission brings that science to life, knowing that it will be in your kids school text books in a couple of years."

Life before HST:

"Just a blur....." (Oh that was before COSTAR!!)

Before HST Rick was the DPM/R for the ISTP Program and the GGS Program. Prior to that he headed up the International Space Station Resources and Control Office. Rick came to Goddard in 1977 as a co-op student from the University of Maryland Baltimore County and says that he can still remember the nerves and butterflies of his first day like it was yesterday.

Hobbies:

When not engaged in some sort of family activity with his kids you'll find Rick in the gym working out. Rick has been competing in local bodybuilding contests for almost two decades. He holds various titles including 1991 Masters Mr. Maryland, 1997 Masters Mr. Annapolis, and this summer he placed fifth in the "40 years and over" Junior National Championships held in Philadelphia. Rick is looking to better his fifth place showing in 2006 when he competes in the 50 and over division. Recently bitten by a physics bug, Rick spends quiet times at home reading books on Einstein, astronomy, and cosmology.

(TinTypes Ruth Carter Continued from page 3)

ager. Before taking this position Ruth was a systems engineer in STAAC and the old Engineering Directorate (Code 700). Earlier, she was assigned to TRMM, FUSE, and EO-1. TRMM gave Ruth an opportunity to learn Japanese, which she put to good use while she supported the mission testing at Tanegashima, Japan. Ruth was also a Project Safety Manager for the HST First Servicing Mission. This assignment required working closely with the European Space Agency and Johnson Space Center.

Hobbies: Ruth enjoys listening to classical music. She is an avid piano student and particularly enjoys Chopin. Ruth also likes cooking (and eating).

The Critical Path- 10th Anniversary!

This (fall) issue of The Critical Path (TCP) marks the 40th consecutive quarterly issue, or the completion of ten years of service to Code 400 personnel. Since its inception a decade ago, TCP's circulation has expanded to readers in all directorates, individuals at NASA Headquarters and every NASA field center, and to approximately 300 retirees throughout the United States and overseas. We hope that you enjoy the TCP and we look forward to another ten years of successful publication.

Howard K. Ottenstein - Editor
Nancy White - Production Assistant
Paula Wood - Editorial Assistant

"Cultural Tidbits"

Did you know...

...that the word familia connotes much more to a Latin American than the U.S. sense of the word family. Understanding that not all words translate exactly from one language to another is important when communicating with people with a different native tongue.

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

Andrea Razzaghi, Code 424

What is a Car Pool?

Is it a place where you wash cars? “Ridiculous”, I was told, it’s a lottery on the purchase of a new HUMMER. “Are you crazy”, mumbled a third party ... well, I won’t event get into that person’s definition. Finally, I looked it up in the dictionary.

Carpool [CP] As a dodo, (nearly extinct in the workplace) ... A shared vehicle used by adults, usually working in a common facility to ease congestion on highways, lessen environmental pollution, and save on cost of gasoline while extending life of vehicles of CP participants. At GSFC, has gone the way of the Monroe Mechanical Calculator.

But wait a minute, I hear a faint cry from a far corner of the Center. Apparently one carpool still exists. Can it really be so? Should GSFC consider placing it (the vehicles, not the riders) in a museum (e.g. Visitor Center) or perhaps nourishing it, and reviving the concept of carpooling on our hallowed grounds. Obviously the average GSFC employee is independently wealthy and cares not a whit about the advantages noted in the definition listed above, but nevertheless it might be useful to stimulate the notion of carpooling once again.

Where is this lone carpool and what is its origin? Apparently, it consists of two youngsters from Reisterstown, and one from Pikesville, Maryland: Semion Kizhner (565), 22 years at GSFC, Jay Friedlander (Raytheon/630), 10 years at GSFC, and Howard Ottenstein (403), 38 years on the Center. Howard, with a grizzled beard and twinkle in his newly acquired lens/eye, noted that the “original” Pikesville carpool was really two carpools at the outset, both starting ‘around’ 1963. A merger of the two occurred about 1966. Don Friedman from one (still here as a part time contractor) and Howard Ottenstein from the other (active civil servant) bear testimony to this ancient history (six years before the landing on the Moon/almost to the day 100 years after the battle of Gettysburg).

The writer of this article had to endure many a story from Howard (some say he remembers the

Odysseus-like saga of a ride home in the snow and ice in the winter of 1968/9 better than he does what he did earlier this morning at work). Howard also liked to talk about the time there were six in the carpool for about a year. The best thing about that situation was that almost all decided to lose weight and really worked at it. The better solution, however, was when the carpool reduced to five people. Another story he likes to tell is how Len Arnowitz (Chief of the old Sounding Rocket Division for several years) convinced summer intern (engineering) Ira Fine to follow his instincts and study to become a doctor. Today, Ira is a national leader in the study of arthritis with an active medical practice in Baltimore.

Flexibility and comradeship have always been hallmarks of the Pikesville CP. You have to leave a little early in the morning, stay a little late, hey, no problem. Since its inception, flextime in reverse was always a part of the CP. Members essentially have been working 9-hour plus days (without a day off every two weeks in return) for nearly four decades. True, part of this dedication had to do with beating the traffic in the morning, but the results were basically a bonus for Goddard. An extra hour or more of service daily to the Center (especially when a member’s request for a 20 minute late start going home turned into one or two hours). When one member decided to start grocery shopping on the return trip, however, the CP had to say, “no way”.

“Wait a moment? Did I hear a shout of objection? What, still another one? And another? You mean to say there are three other carpools still extant at Goddard?” If this is so, and you have been part of a bona fide CP for at least 2 or 3 years; please call the editor (x6-8583) and let him know. Perhaps we can start a (revival) trend at Goddard once again for reinstating CPs. Let’s hear from you.

The Editor

Presidential Meritorious Awards - 2002

NASA personnel received 11% of all Presidential Meritorious Awards just announced for Senior Executives throughout the government. Goddard received six of these awards including Code 400's own Phil Sabelhaus. Two former Code 400 awardees were Diane Williams and Rick Obenschain. Other Goddard recipients were: Alison McNally; Jerry Simpson, and Jim Hansen. Congratulations to all.

Top Ten

A management group, The Innovation Group Consulting Inc., that sends occasional news notes to members of the American Society for Public Administration recently presented their "Top Ten Characteristics of Innovative Organizations." I thought I would share them with you.

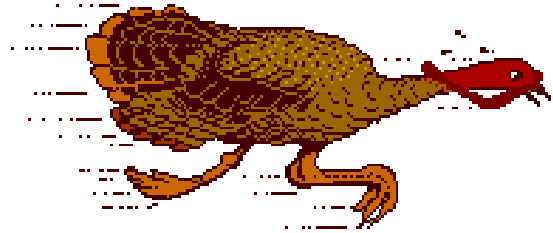
1. They encourage all employees, partners, and suppliers to take an active role in innovation.
2. They welcome new ideas and new approaches.
3. They look to the future to anticipate the customer's future needs.
4. They redefine the rules of the game and challenge complacent competitors.
5. They empower their customers with information and more control over the purchasing process.
6. They embrace new technology to strengthen their competitive advantage.
7. They employ internal processes that support innovation.
8. They allocate resources to find, develop, and implement new ideas.
9. They reward innovative efforts.
10. They move quickly.

The Editor

Obituaries

In memory of Linda S. Kelley (Code 214.3). Your significant contributions over the years to the Flight Programs and Projects Directorate will always be remembered.

Goddard also remembers former Center Deputy Director John Quann, who passed away last month. Mr. Quann served as Deputy Center Director under Directors Noel Hinnners and Jack Townsend in the mid-late 1980's.



Happy Thanksgiving!

FUTURE LAUNCHES CALENDAR YEAR 2002	
TDRS-J	DEC
CHIPS	DEC
ICESAT	DEC

ATTENTION INTERNET BROWSERS:



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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: hottenst@pop400.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 January 21, 2003.