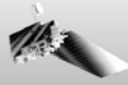
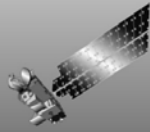
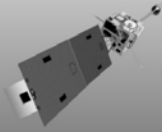


National Aeronautics and Space Administration



The Critical Path

A Flight Projects Directorate Quarterly Publication
A Newsletter Published for Code 400 Employees

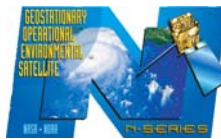
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2006 Summer

INSIDE THIS ISSUE:

GOES N	Page 1
Message From The Director	Page 2
Tintypes	Page 3
Solar-B Mission	Page 4
Comings & Goings	Page 7
2006 NASA Honor Awards	Page 14
THEMIS	Page 16
PM Challenge 2007	Page 17
Quotes	Page 17
One Lucky Family	Page 18
Wedding Bells	Page 19
Social News	Page 19
William Schiavone	Page 21
Cultural Tidbits	Page 21
The Doctor Is In	Page 22
2006 Awards of Excellence	Page 23
Peer Award & Picnic	Page 24
Future Launches	Page 24

GOES N

“MISSION UNBELIEVABLE”




Riding the wave of the Geostationary Operational Environmental Satellite (GOES N) launch on May 24, 2006 and the early in orbit success, the expression “Mission Impossible”, which is what many people were pondering the year prior to launch, would now be better characterized as “Mission Unbelievable”. GOES N was launched nearly one and one half years late, spent more than a year at the launch base, and overcame incredible obstacles to finally demonstrate its performance and the determination of the satellite team. Throughout the entire process the spacecraft team simultaneously supported an environmental test program on the GOES P satellite at the Boeing factory. The success speaks volumes of the determination and value of the combined Government and industry team. Also, the GOES project has been the successful benefactor of the relatively new capabilities of the Delta IV launch vehicle and the near flawless orbit raising and activation sequence. Given the multitude of issues and the significant delays, “Total Mission Success” seemed to be quite the “Mission Impossible”.

The GOES N NASA mission is to develop and checkout the new GOES weather satellites guided by a Firm Fixed Price (FFP) contract with Boeing. The contract is effected by

(GOES N Continued on page 8)

Message from the Director Of

Greetings:



Our list of successful launches grew by two since our last issue of The Critical Path. We launched both the Calipso/CloudSat and GOES-N missions and from initial evaluations, all three missions are performing very well. The two STEREO spacecrafts have been stacked and will shortly be transported to the launch pad for their scheduled August 31 afternoon lift-off. In addition, the Solar-B launch is scheduled for September 23. The next launch in our 2006 schedule, THEMIS, is awaiting a determination of the flight worthiness of its launch vehicle. The five identical spacecraft that constitute the THEMIS mission are in final environmental testing and will shortly be placed in temporary storage; a launch readiness date of mid-December is currently being evaluated. Another first, or at least the first occurrence in recent memory, the ST-5 mission, designed for a 90-day technology demonstration, completed its objectives within the 90-day period and was turned-off. While I am sure that the engineers and scientists who had contributed their talents and energy to this mission had hoped for an extension in operations, the successful accomplishment of mission objectives permitted the decision to not allocate additional scarce resources a practical one.

The “new” Flight Projects Directorate has been up and running since June. I have been asked, many times, if Goddard is no longer in the “Program” business since our title now describes our emphasis on “Projects”. The answer is quite simple – we manage a collection of flight projects through their various stages; pre-formulation, formulation, implementation and operations. Our five Divisions each have a specific focus as do our two standalone projects (JWST and GOES-R). We still are assigned program responsibilities by the Headquarters Mission Directorates. These program functions are performed by the appropriate Division management. Our new organizational structure not only better aligns our work focus with our Headquarters customers; it also facilitates our implementation of the NASA Governance Model. The Mission Directorates have been assigned ultimate responsibility for the successful accomplishment of their purpose, with the GSFC Flight Projects Directorate providing the personnel, technical expertise and an environment with which the projects can succeed. Our name may have changed, but our mission - enabling each project managed at the GSFC to be successful - is constant.

A final thought. In late June Goddard took a small portion of our busy schedule to celebrate what makes the GSFC unique. Stretched over portions of three days, and in many venues, we looked at the individual interests, skills, and talents of our civil servant and contractor communities. The diversity of our workforce was graphically demonstrated through talks, interactive exercises, demonstrations, and energetic discussions. I was reminded, as I always am, that Goddard is different from most organizations inside and outside of government. We have smart and talented folks, as do other organizations. Goddard does its best to build on the individual strengths of our people, taking maximum advantage of their backgrounds and experience bases. We are the best because our people have not all come from the same background. And, as long as we create an environment in which everyone is encouraged to speak freely, we will remain truly unique.

Rick

PERSONALITY TINTYPE

Kevin Miller

Kevin just started as the Geostationary Operational Environmental Satellite (GOES) N-Q Deputy Project Manager/Resources (DPM/R) in June 2006.



Born: Pensacola, Florida

Education: BA History, University of Minnesota, 1981; MA Public Affairs, Humphrey Institute, University of Minnesota, 1989; Senior Executive Fellow (SEF) certification, Kennedy School of Government, Harvard University, 2001; Project Management Development Emprise (PMDE) graduate, 2002; Project Management Professional (PMP) certification, Project Management Institute, 2004

Life at Goddard: Kevin arrived at GSFC in 1989 as a Presidential Management Intern. He served in a series of rotations with the CFO's office (Code 153), the old Engineering Directorate (Code 703), the Science Directorate (Code 603), and at HQ in the old Code S Program Analysis Office. Kevin joined the GOES Project as a resources analyst in early 1991. In the fall of 1992 he joined the International Solar Terrestrial Physics (ISTP) Project (Code 408) as the Project Support Manager (PSM) and also served as the PSM on the Polar Operational Environmental Satellite (POES) Project (Code 480) from 1994-1998. In early 1998 Kevin moved back into the financial resources management arena by accepting the Financial Manager position on the HST Servicing Missions Project (Code 442). Kevin found his new position to be both extremely challenging and rewarding. In this position, Kevin worked with his resources team to develop, execute, and monitor the project budget in support of the on-going HST servicing missions. He ultimately supported the HST Orbital Systems Test (HOST) Mission (STS 95, 10/98), Servicing Mission 3A (STS 103, 12/99) and Servicing Mission 3B (STS 109, 03/02), and enjoyed every minute of

(Miller Tintype Continued on page 20)

Vickie Moran

Vickie Moran is the Observatory Manager for the Glory Mission. This Mission is designed to increase our understanding of aerosols as agents of climate change by flying an Advanced Polarimeter Sensor (APS) and to continue measurements of the sun's direct and indirect effects on climate by flying a Total Irradiance (TIM) sensor.



Born: Washington, D.C.

Education: Bachelor of Science degree in Applied Mathematics from University of Maryland College Park (UMCP) with significant course work in Electrical Engineering at UMCP and Johns Hopkins University

On Family: Vickie has been happily married for 16 years to husband Richard, who is an extremely supportive and understanding NASA spouse with a great sense of humor. They have two children, 12 year old Sam, and 8 year old Abbey, who are also NASA enthusiasts. They live in Odenton, Maryland just two miles away from all the grandparents. Vickie's sister, Lorrie Eakin, also works at Goddard. Lorrie is currently the Contracting Officer for the GLAST project.

Life On Glory: Vickie has only been the Observatory Manager since February but she says it's the best job she's had so far at Goddard. It's a nice balance between systems engineering and technical management. Since joining Glory, Vickie has traveled to both instrument vendors (Raytheon Santa Barbara Remote Sensing and University of Colorado Laboratory for Atmospheric and Space Physics (LASP)) and to the Goddard Institute for Space Studies (GISS) in New York City. Did you know Goddard has a facility over the diner featured in the Seinfeld television series? She also travels out to Orbital Sciences Corporation in Dulles, Virginia frequently. Orbital is modifying and will be reintegrating and environmentally testing the bus used for the Vegetation Canopy Lidar (VCL) mission that was canceled in 2001. The last four months have been extremely busy with

(Moran Tintype Continued on page 20)

Solar-B Mission



The Solar-B mission is a follow-on to the Japan/USA/UK Yohkoh (Solar-A) satellite, which operated between 1991 and 2001. Led by the Japanese Aerospace Exploration Agency's (JAXA) Space Science Research Division (formerly the Institute of Space and Astronautical Science (ISAS)), Solar-B consists of a coordinated set of optical, EUV, and X-ray instruments that will investigate the interaction between the Sun's magnetic field and its outer atmosphere. The result will be an improved understanding of how the Sun's magnetic field heats the solar atmosphere and drives solar eruptions. An outcome of this research will be a better understanding of how the Sun releases the magnetic energy that accelerates the high-energy particle storms that propagate from the Sun to the Earth and beyond; in this sense, Solar-B will help us predict the most dangerous aspects of "space weather".

Solar-B is one of the projects under the Heliophysics Project Division here at GSFC, but the Solar-B project management office is at Marshall Space Flight Center (MSFC). Otilia Rodriguez-Alvarez is the Mission Manager (Code 466).

The spacecraft has three instruments: the Solar Optical Telescope (SOT), the X-Ray Telescope (XRT) and the Extreme Ultraviolet Imaging Spectrometer (EIS).

The SOT will be the first large solar optical telescope flown in space. The telescope is a diffraction limited, aplanatic Gregorian with an aperture of 0.5 m. It provides angular resolution of about 0.2 arcsec over the field of view of about 400 x 400 arcsec. The Focal Plane Package is an integral part of Solar-B's solar optical telescope and contains a suite of three instruments. They are a high-resolution imager that records optical images of the sun in different spectral bands corresponding to different heights and temperature in the solar atmosphere; a narrow band imager that is both an imaging vector magnetograph and a Doppler (or velocity field) imager, and a spectropolarimeter to make more accurate, but slower measurements of the Sun's magnetic field.

Together, these instruments will for the first time precisely measure how both small and large changes in the sun's magnetic field propagate outward through the solar atmosphere. They also will show how these changes evolve and give rise to the dynamic events seen in the sun's corona – the sun's "atmosphere," which extends millions of miles into space.

Once Solar-B is operating in space, a key product of the focal plane package will be a series of vector magnetograms pictorial representations of the 3-dimensional structure of the magnetic field that allow variations in the field's strength to be followed. The uninterrupted view from

(Solar-B Continued on page 5)

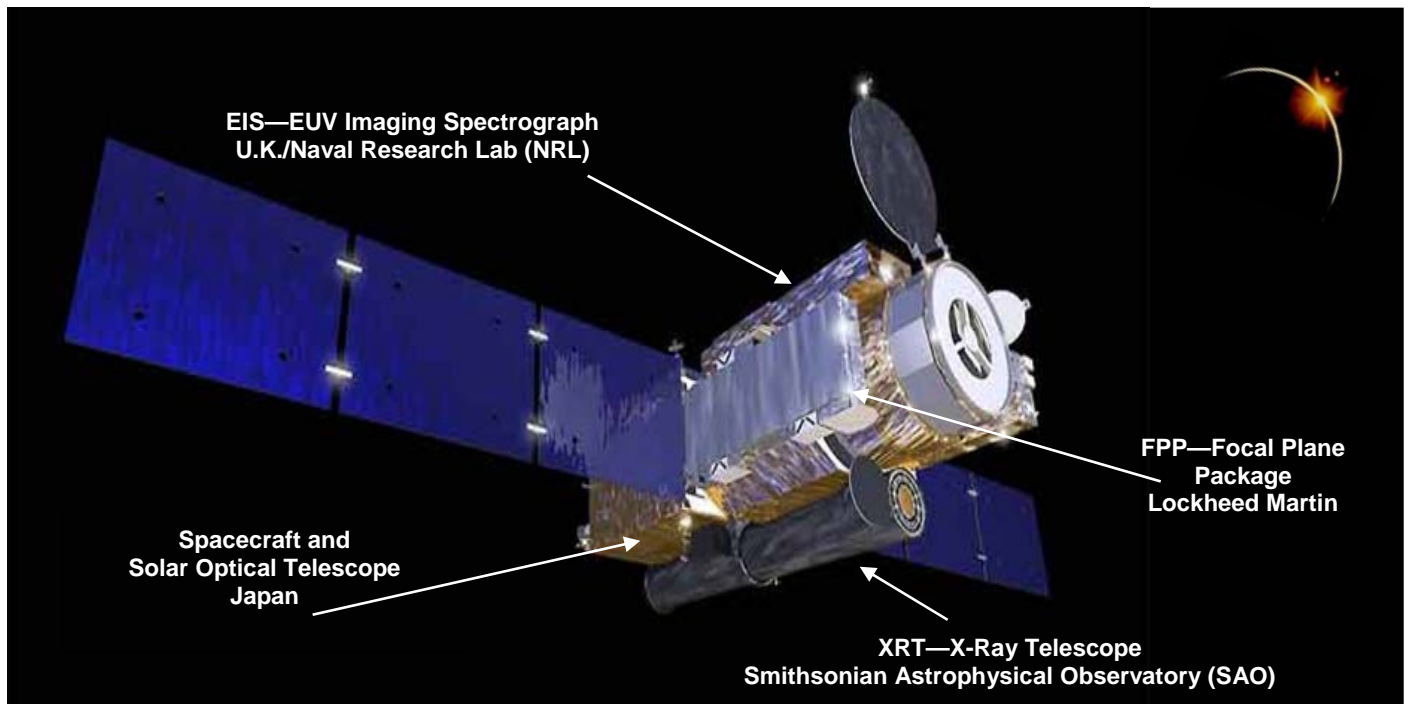
(Solar-B Continued from page 4)

space will allow the variations to be followed continuously with improved sensitivity and spatial resolution than obtainable from the ground. This will enable scientists to follow, for the first time, the build up of stresses in the magnetic field and how and why these stresses are sometimes released explosively to create solar flares and coronal mass ejections.

To help ensure clear, focused images and highly accurate readings, an image motion stabilization system is a key part of the instrument suite. A joint JAXA/NASA development, the system will compensate for residual motions in the spacecraft that would otherwise appear as jitter in the images recorded by the Japanese-developed Solar Optical Telescope. Using this suite of instruments, scientists will also study the time variations, through movies, of the photosphere and chromosphere – the sun's visible, gaseous surface layers.

The SOT Optical Telescope Assembly (OTA) was JAXA's responsibility and the FPP was designed and developed by Lockheed Martin, of Palo Alto California as part of NASA's contribution to the mission.

The XRT is a grazing-incidence modified Wolter I X-ray telescope, of 35 cm inner diameter and 2.7 m focal length. The 2048 by 2048 back illuminated CCD has 13.5 μ m pixels, corresponding to an angular size of 1.0 arcsec or 700 km on the surface of the Sun and also provides a full Sun field of view. This will be the highest resolution, orbiting X-ray telescope ever flown for solar coronal studies. Improvements in detector technology incorporated into the design allow it to



(Solar-B Continued on page 6)

(Solar-B Continued from page 5)

observe both the high and low temperature coronal plasma. A small optical telescope provides visible light images for coalignment with the Solar-B optical and EUV instruments.

The XRT is a full-Sun instrument and is co-aligned with the Optical Telescope (OT). It therefore will at all times observe the target area of the OT, while maintaining the ability to detect large-scale coronal phenomena. A regular synoptic program of Sun-centered observations will be formulated to provide a long-term database for evolutionary studies and for mission planning. For active regions, the expected exposure times in the XRT are ~1s or shorter. Based on the Solar-B spacecraft performance data presently available, and XRT's short exposure times, we anticipate that the short-term jitter will be small compared to our pixel size so that no internal motion compensation is needed. It is essential that the XRT be capable of coalignment with the OT. A blue neutral-density filter near the focal plane will produce a moderate resolution, high-contrast image formed by the grazing-incidence telescope.

The XRT is a NASA contribution and was built by the Smithsonian Astrophysical Observatory (SAO) with the CCD camera provided by JAXA. The Extreme-ultraviolet Imaging Spectrometer (EIS) will perform spectroscopic observations of the dynamic solar upper atmosphere in two extreme-ultraviolet wavelength ranges, 170–210 Å and 250–290 Å. These bands include strong emission lines that are formed at $10^{4.7}$ – $10^{7.3}$ K. A high-cadence spectroscopic observation with EIS is suitable for the studies of the coronal heating process and will reveal rapid plasma motions in and around solar flares of all sizes. These observations are of critical importance for describing the key physical processes of coronal heating and transient solar dynamic events that will also be simultaneously observed with SOT and XRT.

A consortium led by the UK's Mullard Space Science Laboratory (MSSL) built the EIS. The US Naval Research Laboratory (NRL) built the instrument's optics and their mechanisms, including the entrance filter, multilayer-coated mirror and grating, and the spectrograph slit.

Solar-B is scheduled for launch by the M-V-7 rocket of JAXA from the Uchinoura Space Center located on the southern coast of Japan on September 23, 2006.

Otilia I. Rodriguez-Alvarez, Code 466
Solar-B Mission Manager

Comings & Goings

Comings:

Mark Flanagan joined 458/LCNS Project Office, Flight Segment Manager

Betsy Park joined 401/Advanced Concepts and Formulation Office, Formula Manager

Bob Savage joined 402/NPOESS IPO Office, Technology Systems Manager

Eugene Guerrero-Martin joined 401/Advanced Concepts and Formulation Office, Instrument\Systems Manager

Donna Burfoot joined 492/GLAST Project Office, Resource Analyst

Michael Prior joined 441/HST Operations Project Office, Mission Operations Manager

Daniel Devito joined 429/NPP Project Office, Deputy Project Manager/Technical

Vince Elliott joined 442/HST Development Project, Financial Manager

Goings:

Barry Sherman retired from 462/Living With A Star Program Office, Instrument Manager

Marguerite Tallant retired from 408/ESTO Project Office, Secretary

Pam Guzzone from 408/ESTO Project Office to 111/Change Integration and Sustainment Manager

Joan Walton retired from 450/Space Communications Program Office, Program Secretary

Donald Lewis retired from 420/Earth Observing Systems Program Office, Mission Manager

Gilbert Flaming retired from 420.2/GPM Project Office, Instrument Manager

Carmen St. Paul resigned from 495/ST-5 Project Office, Deputy Project Manager/Resources—

Note: Carmen would welcome calls and email messages from friends and colleagues; (301) 805-1753; CarmenST5@yahoo.com

STEREO To Launch Aug 31

See lead story about STEREO in
spring 2006 issue of The Critical
Path.

(GOES N Continued from page 1)

NASA at the Goddard Space Flight Center and the satellites are handed over to NOAA after a six month post launch verification. The satellite includes a suite of Earth and space sensing instruments, where the primary sensors are the Imager and Sounder (built by ITT to take visible and infrared images of the Earth), and the Solar X-Ray Imager (SXI) (built by Lockheed Martin (LM) to take images of the Sun). The primary instruments are managed through independent NASA Cost Plus contracts with ITT and LM. After instrument development and test are complete, the instruments are provided as Government Furnished Equipment (GFE), to Boeing for their integration and test with the spacecraft. The contract with Boeing was let in 1998 and is billed as a FFP delivery in orbit commercial launch with NASA taking ownership six months after launch and final checkout. The in orbit satellite checkout period is independently performed by NASA and NOAA. The contract philosophy was designed to put the burden of risk on the spacecraft contractor (Boeing). However, this effectively reduced NASA's ability to easily redirect Boeing and in the wake of the Shuttle Columbia accident and the dropped Polar Operational Environmental Satellite (POES), the NASA management philosophy was changing to increase oversight and push to significantly reduce risk. This philosophy is frequently in contrast with the delivery in orbit procurement concept and the GOES project is frequently challenged to stay within the confines of the Fixed Price contract and to continue to maintain an acceptable level of risk.

The myriad of technical and contractual challenges could have been forecast late in 1999 when the Satellite Critical Design Review (CDR) rendered 500 plus action items. Along the way the integration and test team were met with challenges as the integration of the GFE instruments found new areas of complexity which resulted in developmental delays. This, combined with differing (NASA and Boeing) expectations of the contract scope forced delays and realignment between the two organizations. Ultimately, the contract launch date of October 2002 was moved to December 2004 to accommodate the changes. Fortunately, the continued success of the previous GOES series satellites allowed for the flexibility in the NOAA need date. In hindsight, the earlier launch date was a little ambitious. Added to this, the pressure to repeat the previous missions (GOES I-M) success weighed heavy on the NASA project.

Baseline (contract inception), the GOES N mission was slated to be launched on a Delta III launch vehicle which was believed to have cataloged many successful flights prior to the GOES N launch. However, in 2002 the Delta III fleet had only recorded three launches of which only one of the missions was considered marginally successful and its mission was a dummy payload. Complicating matters, the ICO communications satellites program which was planned for launch on the Delta III vehicle, was in financial trouble and stood down on all their launches. This change left GOES N as the only remaining mission to be flown on the Delta III vehicle. In late December of 2002, a contract modification was effected to launch GOES N and all subsequent missions on the new Delta IV launch vehicle. Ultimately, the Delta IV fleet successfully launched four missions prior to the GOES N launch in May 2006. This is not to suggest the Delta IV did not have its own challenges as the new launch date of December 2004 slipped into May of 2006 and Boeing Delta experienced a delay of almost 1½ years without a launch of a Delta IV vehicle.

(GOES N Continued on page 9)

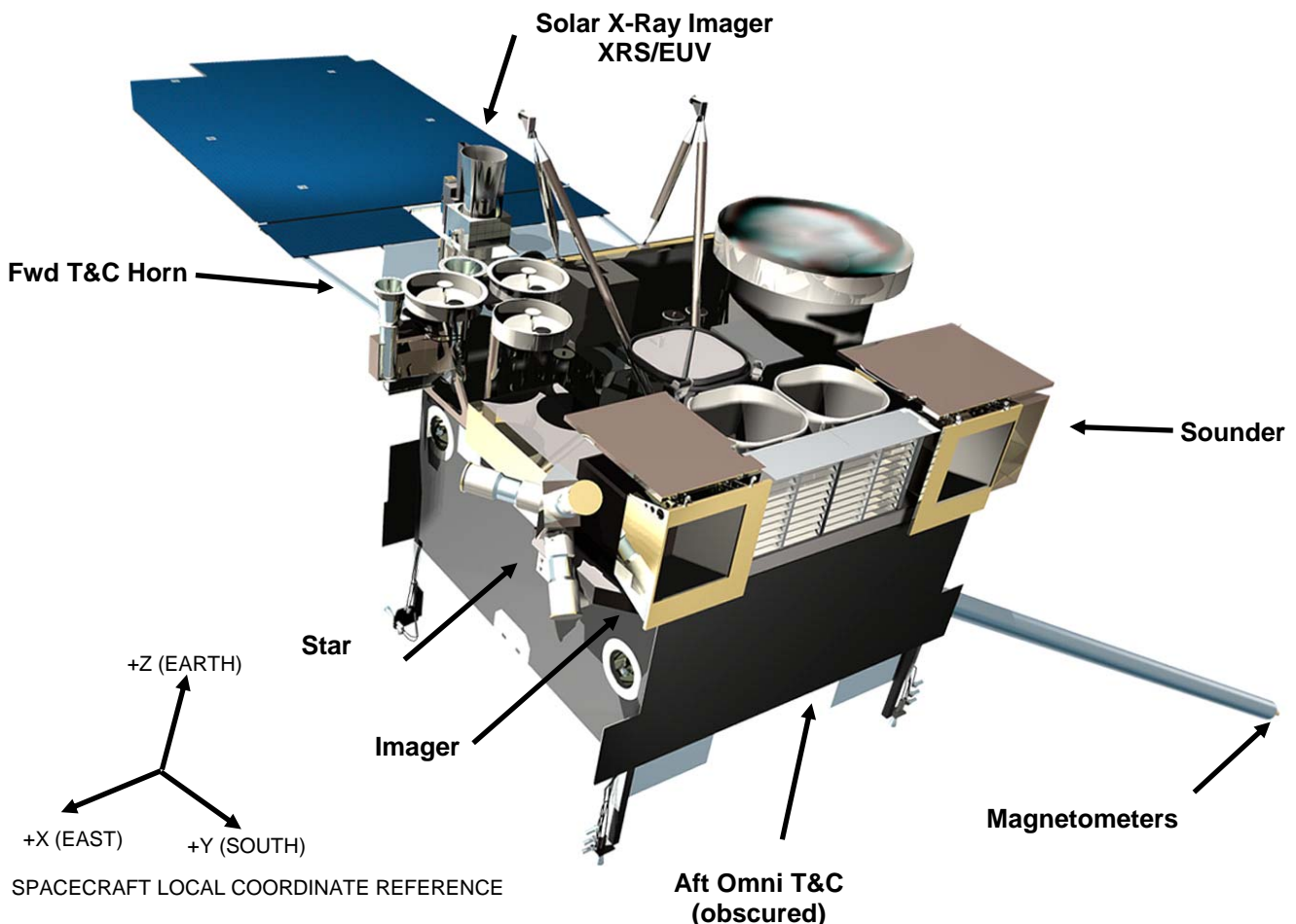
(GOES N Continued from page 8)

Throughout the process, NASA Launch Service Program (LSP), located at Kennedy Space Flight Center, had been supporting the GOES project with launch vehicle engineering oversight. At the February 2004 Mission Unique Design Review, LSP determined that because of the numerous issues and the depth of concern, a full Independent Verification and Validation (IV&V), for the vehicle, was warranted. LSP estimated the full IV&V effort would be complete in September 2006, which at the time would require a near two year slip in the GOES N launch date. The two year slip in launch was not possible as a Boeing contract modification would have been necessary and the cost implications were more than the project could absorb.

Without the opportunity to perform the full IV&V, LSP was uncomfortable with continuing to support the mission and disengaged its support. The project was left with the responsibility

(GOES N Continued on page 10)

GOES N SPACECRAFT



(GOES N Continued from page 9)

of the Launch Vehicle oversight and hired the Aerospace Corporation in an advisory role. This maneuver proved to be very advantageous as the Aerospace Corporation had significant insight through the ongoing Air Force Delta IV missions. As the December 2004 launch date approached it became obvious that Boeing Delta IV Heavy Demonstration Launch (an Air Force Mission) would impact the GOES N launch date. The Heavy Demonstration launch had significant delays due to heavy doses of hurricanes that hit the Florida area in the Summer/Fall of 2004 (Charlie, Frances, Ivan, Jeanne). Ultimately, the Air Force mission successfully launched in late December 2004 and cleared the way for GOES N. The GOES N new launch date, complicated by the launch pad repairs and the timing of the satellite eclipse season was set for the early Spring of 2005.

In January 2005, Boeing found a new issue with the Delta IV launch vehicle helium tank pressure vessels. A number of the Composite Over-wrapped Pressure Vessels (COPV) were found

(GOES N Continued on page 11)

GOES N LAUNCH



(GOES N Continued from page 10)

to have defects and warranted replacement. This was complicated by the fact that the launch vehicle was already erected on the launch pad. To minimize the impact to the launch date, Boeing developed a special lift and support fixture and separated the launch vehicle first and second stages (on the pad) in order to replace and pressure test the COPVs. This operation was the first of its type and drew significant attention. This COPV replacement and regression testing resulted in a new launch date of June 23, 2005. The June 2005 date became the first realistic launch date and was seemingly on target as the project completed all the required program reviews and gained approval from GSFC and NASA HQ management.

Within days of the launch, it was reported by Boeing that they had experienced a qualification failure with similar launch vehicle Flight Termination System (FTS) Batteries. The FTS batteries are used for the vehicle self destruct system and are a Range Safety requirement. The failed units were not the batteries used for the GOES N launch vehicle but were built of the same design. Given the battery failure and the risk, Range Safety became concerned with the GOES battery functionality. Ultimately, re-qualification of the GOES vehicle FTS batteries was warranted. The battery re-qualification further delayed the launch until the Range could be assured the self destruct system would operate as expected. However, there was a significant consequence of the testing and the failures. While the GOES vehicle batteries were determined to be flight worthy, they were the last available pair and were only good through August 16, 2005. The failed battery lots remained unacceptable for launch. This meant that with GOES holding the last remaining flight worthy FTS batteries, the entire Delta fleet was in a stand down until the root cause of the failure was found and re-qualification was demonstrated.

Following the successful launch of the Shuttle Discovery's return to flight, the GOES N launch was once again on track with a July 29, 2005 launch date. After the significant delay, the team was anxious and prepared to execute the launch. But the launch was once again delayed as a spacecraft communication issue with the GOES P satellite, back at the Boeing factory raised significant concern, as it related to GOES N. With the launch date one day away and a mission critical component in question, the decision was made to again stand down until it could be resolved. In the subsequent weeks, testing and analysis cleared the GOES N satellite and set the new launch date for August 15, 2005. With only a two day launch window, as the FTS batteries were only good through August 16, 2005, the project could not afford any more glitches. After an aborted attempt on August 15, 2005 due to a COPV limit violation, the final attempt was made on August 16th. On August 16th the launch proceeded as planned and ultimately came within 4 minutes and 20 seconds of liftoff before launch control detected a violation with the Launch Vehicle Batteries (not the FTS batteries) and the second launch abort was called. At this point, the allowable life of the FTS batteries expired and there were no more batteries to support any Delta Mission. The project had come to the realization that GOES N may be sitting on the launch pad for a significant period, although no one realized the wait would be nearly

(GOES N Continued on page 12)

(GOES N Continued from page 11)

one year.

As the FTS battery investigation, retesting, and analysis proceeded, more failures were experienced and it became obvious a quick resolution would not be forthcoming. As such, Boeing Delta started looking at alternatives for the fleet and a quick means for proceeding with the multiple planned launches, as they now began to stack up. While the FTS battery issue was being worked, the situation became more impossible as Boeing's employees, who were members of the International Association of Machinists and Aerospace Workers Lodge 725 went on strike, starting November 2, 2005. Without the machinists, it was not possible to launch the GOES N satellite. The strike lasted until February 2, 2006 at which time, the decision was made to remove the satellite from the launch vehicle, return the satellite to the processing facility, and perform a retest to ensure it was still functioning properly. The testing was successfully completed and ultimately the satellite was returned to the launch pad and re-erected on the launch vehicle. Meanwhile, the near year long FTS battery issues were still unresolved and plans were redirected to launch with batteries from a different vendor. The proposed new batteries were those used in the Lockheed Martin Atlas Launch Vehicles. This change presented a unique problem in maintaining the same interface as that of the Atlas Vehicle, to ensure proper operation. Boeing Delta carefully tailored the Delta IV rocket to be compatible and successfully integrated the new batteries.

With the new plan in hand, "Mission Impossible" was now becoming "Mission Possible". The new launch date was set for May 24, 2006, but for GOES N, it would not be easy. NASA Goddard and NASA HQ required additional reviews to demonstrate to management the spacecraft was still ready for launch. Doing so was a struggle, as it seemed the closer the project got to launch, more issues would arise either internal to Boeing or within NASA. The combined teams worked diligently to clear the issues as they arose. Weeks before launch the satellite battery performance became the next significant stumbling block. Through the review process, NASA Goddard management requested the NASA Engineering and Safety Center (NESC) assess the recent performance and viability of the satellite batteries. The project and the Goddard Battery Branch presented the relevant data to the NESC team for an independent assessment. What was at stake was the possibility of, once again, de-stacking the satellite and once again delaying the launch. This would present new technical risks and contractual issues for the GOES project office. Ultimately, the NESC recommendation was to launch the satellite with the existing batteries. The GOES launch date of May 24, 2006 was no longer "Mission Impossible".

The Government and contractor teams successfully worked all the remaining issues as well as the continued execution of the GOES P satellite thermal vacuum testing (which was completed on July 17, 2006). The final launch vehicle issue was closed at 11:00pm, the night before the L-1 day Launch Readiness Review. In addition, days before the launch, the operations team executed a two day End to End test between the operations control center in Suit-

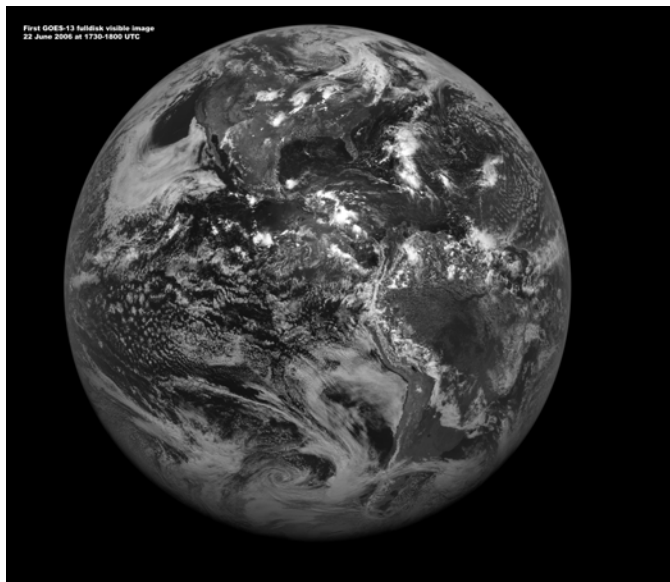
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(GOES N Continued from page 12)

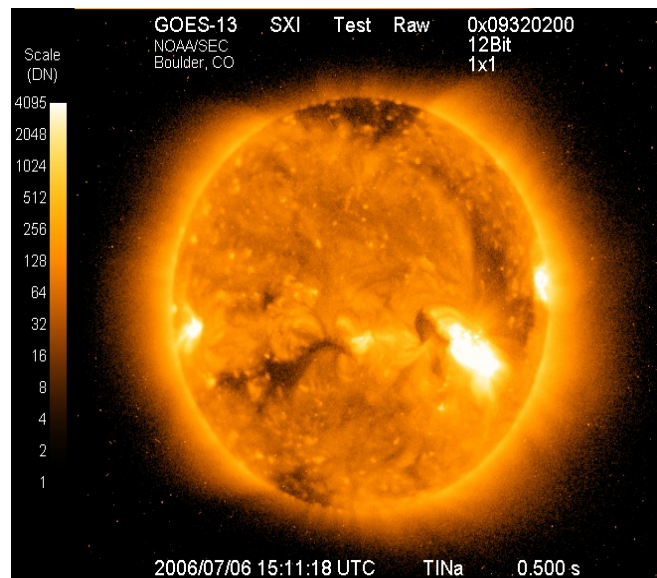
land, Maryland and the GOES P satellite at the Boeing Facility. The test was executed without incident and the team prepared the control center and the team for the GOES N launch.

On May 24, 2006 at 6:11pm EDT, at the opening of the 60 minute launch window, the Delta IV launch vehicle lifted off and with precision placed the GOES N satellite in its proper orbit. In the following weeks the operations team executed a near flawless transfer orbit sequence and placed the satellite in its final orbital checkout location. The satellite was handed over to NASA on June 13th for the start of the post launch verification and validation testing. The first formal visible Imager picture of the Earth was taken on June 22, 2006 and the first formal Solar X-Ray image of the Sun was taken on July 6, 2006. To date, there have been no issues identified that will prevent GOES N from meeting all of its mission requirements. Given the year long wait and the number of pre-launch issues, the performance of the Delta IV launch vehicle and the GOES N satellite are a credit to the determination and technical excellence of the people working the project. The team overcame many technical issues and worked simultaneous spacecraft projects. GOES N has truly become "Mission Unbelievable".

GOES N First Public Images



Imager



SXI

Andre' Dress, Code 424
GOES N-P Deputy Project Manager

2006 NASA Honor Awards June 21, 2006

EXCEPTIONAL ACHIEVEMENT

Russell Werneth/Code 442

For your NASA-wide contributions to the safety and success of the Return to Flight Mission by supporting the planning and design of in-flight tile repair capabilities.

EXCEPTIONAL EQUAL OPPORTUNITY

Nathaniel Wright/Code 441

In recognition of your outstanding leadership provided to the Goddard Flight Projects Diversity Committee.

EXCEPTIONAL SERVICE

James Bangerter/Code 451

For exceptional dedication and leadership ensuring the readiness and exceptional performance of the Space Communications Networks in support of the STS-114 Return-to-Flight Mission.

James Barcus, Jr/Code 442

For the personal sacrifices, overwhelming commitment, and professional expertise given to the logistics of the Hubble Space Telescope and its Team Members over the past 15 years.

Andre Dress/Code 415

In recognition of your sustained contribution and extra effort to improve the value of the GOES Program for the American taxpayer.

James Greaves/Code 400

In recognition of the consistent, extremely high level of service you have provided to the Goddard Flight Projects Directorate since 1999.

James Jeletic/Code 441

In recognition of your extraordinary service as the Hubble Space Telescope Science Operations Manager and your outstanding contributions toward NASA public outreach.

Dr. James Kalshoven/Code 408

In recognition of your exceptional service in technology development and community outreach in support of the NASA mission.

Gregory Smith/Code 406

For exceptional service in the management of flight projects, for your leadership of the Rapid Spacecraft Development Office, and for your significant contributions to the mentoring and development of future NASA project managers.

(Awards Continued on page 15)

(Awards Continued from page 14)

Keiji Tasak/Code 452

For exceptional dedication and leadership in achieving outstanding performance by the Space Network in support of U.S. and international missions.

OUTSTANDING LEADERSHIP

Joseph Dezio/Code 410

In recognition of your outstanding leadership resulting in the successful development and launch of the Swift mission.

David Mitchell/Code 415

In recognition of your dedication and leadership of the GOES N project for the last seven years.

George Morrow/Code 400

In recognition of the consistently strong leadership you provide to the Goddard Flight Projects Directorate.

Richard Ryan/Code 461

For your outstanding leadership on the STP Program and your commitment to the NASA/Goddard business community.

DISTINGUISHED PUBLIC SERVICE

Larry Dunham/Code 440

In recognition of more than 15 years of extraordinary and dedicated service to the Hubble Space Telescope Program, and for numerous key contributions to the HST's success.

W. Bruce Schneck/Code 452

In recognition of over 30 years of exceptional and dedicated service to NASA's mission and for exceptional leadership of GSFC's Shuttle Return-to-Flight activities.

PUBLIC SERVICE

William Huey/Code 440

In recognition of your steadfast dedication and outstanding contributions to the HST Program for supporting the HST Robotic Servicing and De-Orbit Mission (HRSDM).

Walter Majerowicz/Code 490

In recognition of your hard work and dedication in delivering high quality training opportunities to the NASA workforce.

Bruce Vreeland/Code 440

(Awards Continued on page 22)

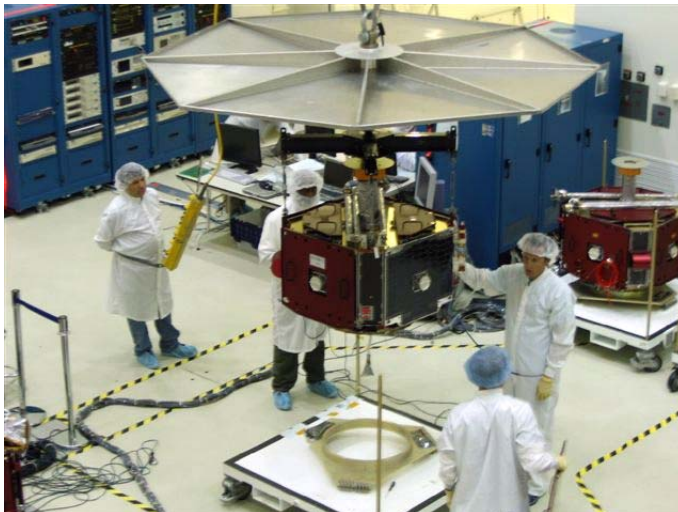
THEMIS Readies for EOY Launch

The THEMIS is the sixth Medium-class (MIDEX) mission from NASA's Explorers Program Office. THEMIS, an acronym for Time History of Events and Macroscale Interactions during Substorms, is a constellation of five-satellites. The primary mission objective is to discover what causes the global reconfigurations of the Earth's magnetosphere, which are evidenced in aurora activity known as the Northern Lights. In addition to the five small satellites, known as Probes, the THEMIS mission includes launch services, an upgraded ground control center, 20 ground based observatories, and a science operations center.

Each THEMIS Probe carries an identical suite of electric, magnetic, and particle detectors. During the winter months, the Probes will align with the Earth's magnetic tail every four days, allowing the detector instruments to track the Earth's magnetosphere in space, and the aurora disturbances from a network of ground



Probe Carrier Assembly Ready for Vibration Test



Probes Were Moved One by One to the Probe Carrier

NASA HQ in Washington D.C. Frank Snow is the THEMIS Mission Manager. Dr. Vassilis Angelopoulos of the University of California, Berkeley, California, (UCB) is the Principal Investigator for THEMIS. UCB performs all mission management functions, mission and ground operations, as well as providing all Instruments. Swales Aerospace provides the five Probe Busses, as well as the Probe Carrier (PC), and supports Probe integration and mission integration at UCB. KSC provides launch services through their primary contractor, The Boeing Company.

Dennis S. Lee, Code 410
Systems Engineer

PM Challenge 2007

It seems like almost yesterday that nearly 1,000 NASA project management practitioners from around the nation met in Galveston for NASA's Third Annual Project Management Conference. Yet here it is time to start thinking about PM Challenge 2007. Certainly if you wish to actively participate as a speaker you must submit your speaker proposal no later than September 15, 2006. Visit <https://pmchallenge.gsfc.nasa.gov> for more information.

The 4th Annual PM Conference will be in Galveston TX once again, but several weeks earlier than in 2006: February 6-7 2007. As in 2006, Moody Gardens Hotel & Convention Center in Galveston will again host the conference. Theme of the Conference will be "Knowledge Sharing," and registration commences on November 1, 2006.

PM Challenge is sponsored by the NASA Academy of Program/Project & Engineering Leadership (APPEL). Conference Co-Chairs are Dorothy Tiffany (Code 401) (x6-5917) and Walt Majerowicz (Code 401) (x6-5622).

Quotes To Think About



“A teacher affects eternity; he can never tell where his influence stops .”
- **Henry Brooks Adams** -

“Circumstances are beyond the control of man; but his conduct is in his own power.”
- **Benjamin Disraeli** -

“Today is the pupil of yesterday.”
- **Publilius Syrus** -

“An investment in knowledge pays the best interest. ”
- **Benjamin Franklin** -

“The old are tenacious. ”
- **William Hazlitt** -



One Lucky Family Dines with NASA/GSFC Astronaut Paul Richards (STS-102)

The Kent School in Chestertown, MD had a unique entry in this year's live auction. Up for bid was a "Lunch and Tour NASA/Goddard with Astronaut Paul Richards (STS-102)". The Leverage Family of Chestertown, MD made the successful bid. On August 9th, Jean and Ned Leverage and their two children, Taylor, 11 and Logan, 10 visited GSFC for their tour and lunch. The tour started in the B3 HST Operations area with an informative history of HST, showcasing the HST model and Operations area. Plenty of awesome HST pictures, posters and memorabilia for the family.



On to B21 for lunch with Astronaut Paul Richards, Code 418, Observatory Manager for GOES-R. Paul was gracious to share his time with the family. The children (and the parents) asked very good questions

of Paul. Mr. Richards is a natural with children; he was very approachable and brought home the notion that education and goal setting are paramount to a successful future. He discussed at length when it was that he knew he wanted to be an Astronaut (in Kindergarten) and went on to describe the events that helped him achieve his dream. It wasn't always a clear cut path, but Paul was wonderful in demonstrating his own success. He made it clear that even the best laid plans don't necessarily take a direct route in achieving success. He shared that persistence and keeping sight of the end goal, will lead you to success. It was an awesome lunch and one that Logan and Taylor will remember for the rest of their lives. Jean and Ned Leverage were equally impressed!!

After lunch, the Leverage family was given a personal tour led by Mark Hubbard, Code 442. Mark, with the assistance of Rob Raper/Code 540 first visited the B7 Blanket Lab. The final leg of the tour was the B7/10/15/29 complex. The Leverage family was in complete awe of the size of the clean rooms, the chambers, and (in their words) the size of the doors on the various testing labs. Logan indicated that if there are any opportunities to ride the centrifuge, she's game (apparently she's not afraid of any G-force rides). Sounds like an astronaut in the making.....

The funds raised for this entry at the auction directly supported the Kent School. The Kent School is an Independent Day School in Chestertown, MD (Maryland's Eastern Shore). Sharon Purser, Code 428, Financial Manager/ESMO coordinated the event for the school auction and the lunch and tour. Sharon's children, Randi, 9 and Troy, 6, attend Kent School, along with Taylor and Logan Leverage.

Many thanks to those who volunteered their time and went out of their way to make sure the Leverage family had much to remember about its visit to NASA/GSFC. Special thanks to GSFC's Paul Richards for volunteering his time - on what turned out to be a very cool August day.

Sharon Purser, Financial Manager, Code 428

Wedding Bells Ring in Code 403 Best Wishes to Linny Dyson and Katy Boone



THE CRITICAL PATH SOCIAL NEWS

Congratulations:

Best wishes to Linny Hirshman (403), who married Gary Dyson on Sunday, July 30, aboard Royal Caribbean's Grandeur of the Seas, in Baltimore, MD. Afterwards, they cruised to Bermuda for their honeymoon.

More wedding bells from the Flight Projects Office. Katy Mortimer (403) wed Brian Boone on August 5, at the Annapolis Yacht Club in Annapolis, Maryland. Congratulations!

Barbara Haskell's (424) son Daniel, recently graduated from the Explosive Ordnance Disposal Naval School at Eglin Air Force Base. He will be stationed at Ft. Lewis, Washington.

Miss Kelsey Rae Matters, daughter of Bonnie Jean Matters (444), graduated from Bowie High School, Class of 2006. She will be attending Elizabethtown College, Elizabethtown, Pennsylvania in the fall majoring in International Business.

Best wishes to Bob Caffrey and his wife, Kirsten, on the birth of their daughter. Kiera Marie Caffrey was born Friday, July 21, at 11:53pm.

Congratulations to Larry Gibb (463) and Meredith Bene (660.1), who will be married on August 22 at Disney World in Orlando, Florida.

(Miller Tintype Continued from page 3)

it. Kevin is proud to have worked on HST and is looking forward to following Servicing Mission 4 and HST for years to come.

In 2001 Kevin accepted the position of DPM/R on the Laser Interferometer Space Antenna (LISA) Project (Code 493), then shortly after agreed to take on responsibility for the Earth Observing-1 mission, and finally added the Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation (CALIPSO) Project to his portfolio in 2004. This gave Kevin a variegated experience over this period with a project in Pre-Phase A/Phase A (LISA), one in Phase D (CALIPSO) and one in Phase E (EO-1). He worked with a wide variety of folk including personnel from ESA/ESTEC, JPL, LaRC, USGS and numerous universities, and he found the experience to be very rewarding. Due to major budget and staffing cutbacks for LISA this year Kevin left LISA in February to support an Exploration Systems Mission Directorate study team for small lunar spacecraft missions (both lander and orbiter). He was then asked to join the GOES N-Q Team in June and is happy to be a part of GOES once again.

Family: Kevin and his wife, Carla, live in Columbia, Maryland, where they are kept busy with the multitude of activities (school, sports, theater, music and scouting) involving their three children: Keara (10), Nealon (8) and Eva (8).

Life Outside Work: Kevin enjoys camping, hiking, history, photography and travel. The more that he can combine all these activities into an outing the happier he is – of special interest to him is visiting and hiking around civil war battlefields. He and his family also enjoy going to plays, Orioles games and visiting museums. Kevin and his family also enjoy traveling to Florida, Minnesota and Pennsylvania to visit with family and friends.

(Moran Continued from page 3)

every element of the mission (both instruments and the spacecraft) undergoing peer reviews and Critical Design Reviews (CDRs) leading up to Mission CDR July 18-20, 2006. The spacecraft bus is currently in Integration and Test (I&T) and will begin spacecraft level environmental testing in the Fall 2006. Glory is scheduled to launch from the Western Test Range (WTR) in December 2008. Vickie has primarily worked on in-house missions or elements of missions that were in-house activities. She is enjoying working with Orbital Sciences Corporation to gain industry perspective and is happy that Orbital is within driving distance so that frequent interaction at the contractor facility is possible.

Life Before Glory: Vickie joined GSFC fresh out of high school in 1984 working in the Federal Junior Fellowship Program and then continued on through college in the Co-Operative Education Program. After graduating from college in 1989, she went to work full-time supporting the Applied Engineering and Technology Directorate Power Systems Branch (Code 563), where she stayed until December, 2000 working in power system component design/testing (electronics, batteries, and solar arrays). Working with engineers like Dr. John Day and Ernie Rodriguez, as a student and college fresh-out, was the opportunity of a lifetime and the absolute best technical learning experience. Vickie supported power systems for numerous missions and was the lead power systems engineer for the Tropical Rainfall Measurement Mission (TRMM). In December 2000, Vickie became a Mission Director in Code 581 Systems Integration and Engineering Branch supporting mission operations for the Earth Radiation Budget Satellite (ERBS) and TRMM. In 2002, Vickie was accepted in the Project Management Development Enterprise (PMDE) program and became the Acting Deputy Project Manager for the Earth Science Mission Operations (ESMO) Project from 2003-2004. Each new job has been exciting and rewarding.

Hobbies: Vickie's main hobby is balancing work life with two kids' homework and activity schedules and household chores; but she does try to run 6 miles 6 days a week when time permits. Vickie is also becoming more interested in health and researching alternative treatments for cancer as she recently lost her father to lung cancer and her best friend is currently battling breast cancer. Be aware that 42% of all Americans will get cancer sometime in their life!

Willaim (Bill) Schiavone Tree Dedication



Bill's family: L to R, son, Paul (holding granddaughter, Maggie) wife, Debbie, sister-in-law, Nancy and daughter-in-law, Jen

On Wednesday, June 28, 2006, family, friends and former co-workers gathered for a tree dedication ceremony in memory of William (Bill) Schiavone in front of Building 16. Bill was the Earth Science Division (formerly, EOS Program Office) Deputy Program Manager for Resources. George Morrow, Deputy Director, Flight Projects and Dave Scheve, Associate Director, Earth Science Division dedicated a Crape Myrtle Tree and a plaque in his memory. Bill passed away on April 16, 2005, from complications of a stroke. He was 57 years old.

Nita Aanderud Jilek, Code 420

“Cultural Tidbits”

Did you know ... that in 1829, Cherokee women were given the right to dispose of and sell their property. This was 120 years before American women were given the same right, but initially only with their husband's permission. American women could not sell or transfer their property without their husband's permission until 1954.

This cultural tidbit was provided by Mindy Deyarmin(440). 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.

(Awards Continued from page 15)

In recognition of over 12 years of extraordinary and dedicated service to the Hubble Space Telescope Program, and for numerous key contributions to HST's flight software excellence.

GROUP ACHIEVEMENT

GSFC Space Communications, Program, Human Spaceflight Team/Code 451

For exceptional operational performance during all phases of the Space Shuttle Return-to-Flight, resulting in a successful mission and outstanding customer support.

High Resolution Dynamic Limb Sounder Project Anomaly Review Board Team/Code 420

For your extraordinary efforts in investigating, uncovering, and resolving the EOS-Aura HIRDLS on-orbit anomaly, such that HIRDLS is now producing valuable science data records for NASA's Earth Science Program.

HST Two-Gyro Science Mode Implementation Team/Code 441

For the on-budget, on-schedule development of the superbly performing HST Two-Gyro Science Mode, and for the successful, August 2005 operational transition to its use.

TRMM Controlled Re-Entry Planning Team/428

In recognition of your exceptional technical achievement in enabling extended operation of the Tropical Rainfall Measurement Mission (TRMM) through development of new operational approaches for controlled reentry.

CLOSE TO HOME JOHN McPHERSON



"Dave? This diploma is from Uncle Willie's 21-day College of Neurology, this is an award for second place in a bowling tournament, and this is for third prize in a pig-calling contest!"

After all these years my second career has been disclosed (office hours every other Leap Year from 6 to 7 PM).

Dr. Howard Ott(enstein), editor/neurologist

2006 Awards of Excellence

CUSTOMER SERVICE EXCELLENCE

Expendable Launch Vehicle (ELV) Team/Code 451

To the Expendable Launch Vehicle (ELV) Team who brings professionalism and outstanding service to every launch vehicle customer.

DIVERSITY ENHANCEMENT

Julia Knight/Code 403

In recognition of your personal commitment to the Diversity Dialogue Project (DDP) and other Diversity activities at GSFC.

OUTSTANDING TEAMWORK

TRMM Automation Team/Code 428

For successful completion of re-engineering the TRMM front-end components and Telemetry and Command systems and integrating GMSEC automation that has allowed 'lights out' flight operations for midnight shift and substantial operations cost savings.

QUALITY AND PROCESS IMPROVEMENT

SMEX Transition Team/Code 444

In recognition of your dedication to the integration and demonstration of the GMSEC architecture into the SMEX MOC for on-orbit spacecraft operations.

SAFETY AWARD OF HONOR

SGAS/SNE Facilities Construction Team/Code 450

The team of HTSI Corp., the Department of Navy, and Tumon Corp. has performed exceptionally in regards to personal and equipment safety for the SGAS/SNE Facilities Construction activities.

EXCELLENCE IN OUTREACH

STEREO Open House Team/Code 463

In recognition of exceptional effort and outstanding success in planning and conducting the STEREO Days outreach event.

STP/LWS Education & Public Outreach Team/Code 460

For successfully managing a wide network of star partner teachers workshops and partnerships that impact directly and indirectly thousands of students all over the nation and Puerto Rico. For embodying the Education and Public Outreach Spirit of NASA, integrating efficiently the education and outreach activities throughout all the programs and activities.

Sun Earth Connection Education Forum & Sun Earth Day Team/Code 460

For outstanding performance developing and presenting "Eclipse 2006: In A Different Light" - showing the wonders of an eclipse to tens of millions of people, world-wide.

NASA: Explore. Discover. Understand.
www.nasa.gov

Code 400 Peer Award Winners & Picnic

Don't forget to attend the Code 400 Peer Award presentations and picnic on Wednesday, September 6 at the Rec Center starting at 11:30 AM. Tickets are \$5.00 and can be purchased from Nancy Rinker (400), Debbie Hamby (400) and Jeaneene Scarano (403). See you there!

FUTURE LAUNCHES CALENDAR YEAR 2006

STP/STEREO	AUG
STP/Solar-B	SEP
THEMIS	DEC
MetOp-2	TBD

ATTENTION INTERNET BROWSERS:



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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: hottenst@pop400.gsfc.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 November 20, 2006.