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

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INSIDE THIS ISSUE:

The Distress Alerting Satellite System (DASS)

-Taking the search out of Search and Rescue-

Introduction

NASA, which pioneered the technology used for the satellite-aided search and rescue capability that has saved more than 28,000 lives worldwide since its inception nearly three decades ago, has developed new technology that will more quickly identify the locations of people in distress and reduce the risk to rescuers. This is being accomplished in the Search and Rescue Mission Office at

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Goddard's DESDynI

It's not the ***Biggest*!** It's not the *Baddest*! It's not the most expensive! It's not even the most ***Well Known!*** But, Goddard's newest Deformation, Ecosystem Structure, Dynamics of Ice (DESDynI's) Light Detection and Ranging (LIDAR) mission promises to deliver the most comprehensive set of data when it comes to mapping the Earth's vegetation canopy and its evolution. This mission will set out to answer the tough questions of how the Earth's carbon cycle and ecosystems are changing. We know that

(DESDynI Continued on page 10)

Goddard's Terra and Aqua Help Determine Extent of Oil Spill

(Oil Spill Continued on page 20)

Message from the Director Of

Greetings:

It's mid-August already. Where has 2010 gone? Time flies when you are extremely busy and the Flight Projects Directorate has been. I am extremely excited by the new initiative I kicked off called Creating a New Future for Code 400. The objective of this initiative is to increase FPD organizational performance, inclusiveness, and trust among internal and external employees, customers, and stakeholders. Thanks to the members of the Creating a New Future Design Team that worked to determine where we are today, created a future vision, and now are working with the leadership team on outcomes, activities, and milestones. The implementation phase was kicked off with a senior leadership and design team retreat the first week of June where objectives and membership for a People team, a Processes team, and a Relationships team were developed. The teams are working and making good progress. A second one day off-site meeting is scheduled for August 19. I'm impressed with the energy and enthusiasm behind this initiative!

After a lot of blood, sweat, and tears since February, JPSS is firmly established as a NASA program in FPD. The core staff is engaged and working the path forward to JPSS-1 launch in 2014. There have been fits and starts and differences of opinion among the Agencies involved but real progress is being made.

At the same time, LDCM had a successful mission CDR, JWST and MAVEN had successful mission PDRs, and GOES-R had a successful mission SDR. About the time this issue of The Critical Path is distributed, MMS will be in their mission CDR. With JWST, MMS, GPM, ICESat-II, and Servicing Technology all vying for in-house I&T floor space, GSFC is once again busting at the seams.

On June 27, 2010 at 1733Z, the last command was sent to TDRS-1 and the spacecraft was retired after a long, remarkable 27 year lifetime. As some will remember, TDRS-1 was launched in April 1983 but after a failure of the upper stage, was placed in the wrong orbit. Weeks of around the clock planning, care, and command execution by dedicated staff and a robust spacecraft propulsion system resulted in TDRS-1 reaching it planned orbit. The rest is history. In addition to TDRS-1, ICESat is also currently being decommissioned. ICESat was launched in January 2003 and produced the first precise global ice measurements across seasons. It is estimated that ICESat will re-enter the Earth's atmosphere the last week of August.

Congratulations to all the recent NASA Honor Award winners. A complete listing of the winners can be found in this issue. The Robert Goddard winners (September ceremony) will be announced in the next issue (December). Also, please plan to join me for the annual Flight Projects Directorate Peer Awards Ceremony and Social on Wednesday, September 1, from 3-5 pm.

Glory is our next launch and is scheduled for November 22. Please give Bryan Fafaul and his team all the support possible in the final test program and launch campaign.

Lastly, I would like all of you to join me in wishing Howard Ottenstein, Editor of the Critical Path, a very happy and healthy 100th birthday. May there be many more!

Make the most of the summer that is left.

George

Editor's Note: Contrary to persistent rumor, I recently celebrated 'only' my 80th birthday. However, I've told George that I certainly would not be displeased to celebrate my 100th as well, when it arrives.

PERSONALITY TINTYPE

Ashley Behrle

Ashley Behrle started at Goddard as a summer intern supporting the Hubble Space Telescope Program and is the Human Resource Generalist for the PAAC III Contact which now has 400 employees.

Born: Adana, Turkey (Air Force Brat)

Education: Bachelor of Science degree in Business Management from York College of Pennsylvania; pursuing a Masters of Science degree in Human Resource Management from University of Maryland University College.

Life before Goddard: Ashley lived in 3 different states and 2 countries before settling down in the DC Area. Ashley's father was finally stationed at the Pentagon in 1996. Before starting at Goddard, Ashley helped out at her mother's hair salon by booking appointments and shampooing clients.

Life at Goddard: Ashley started working at Goddard as a summer intern in May of 2006 for the PAAC II Contract. She provided Documentation support to the Hubble Space Telescope Program and gained experience working with engineering documents and familiarizing herself with the NGIN System. During her second summer, she was named the Lead Intern for PAAC's 10 interns, coordinated all summer intern training and organized an end of the year summer intern presentation session. In May of 2008, Ashley accepted a full-time position in the PAAC II Program Office as a Human Resource Assistant. She was responsible for assisting the HR Manager with the hiring, on-boarding and recruiting efforts for the PAAC Contract. With the transition to PAAC III, Ashley became the PAAC III Contract's Human Resource Generalist for over 300 employees. She is responsible for all hiring, training, on-boarding and badging of all personnel for the PAAC Contract.

Life outside Goddard: Ashley likes to spend her time outside of work playing sports. She plays competitive kickball and softball leagues. She also enjoys going to country concerts in the summer along with trips to the beach with her friends and family. Ashley recently moved to Federal Hill in Baltimore and enjoys the city life.

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Goddard Space Flight Center (GSFC). In collaboration with several government agencies, GSFC has developed a next-generation search and rescue system, called the Distress Alerting Satellite System (DASS). NASA, the National Oceanic and Atmospheric Administration (NOAA), the U.S. Air Force, the U.S. Coast Guard and other agencies, are now completing the development and testing of the new system and expect to make it operational in the coming years after a complete constellation of DASS equipped satellites is launched.

When completed, DASS will be able to almost instantaneously detect and locate distress signals generated by 406 MHz beacons installed on aircraft and maritime vessels or carried by individuals, greatly enhancing the international community's ability to rescue people in distress. This improved capability is made possible because the satellite-based instruments used to relay the emergency signals will be installed on the U.S. military's Global Position System (GPS), a constellation of 24 spacecraft operating in mid-Earth orbit (MEO).

Background

The beginnings of SARSAT date back to 1972 when a plane carrying two U.S congressmen (Representatives Boggs and Begich) crashed somewhere in a remote region of Alaska. A massive search and rescue effort was mounted conducted by search aircraft flying over thousands of square miles hoping to sight the missing aircraft. However, no trace of them or their aircraft was found. At the time, search for missing aircraft was conducted by search aircraft flying over thousands of square miles hoping to sight the missing aircraft. As a result of this tragedy, Congress recognized this inefficient search method and passed an amendment to the Occupational Safety and Health Act of 1970 requiring most aircraft flying in the United States to carry Emergency Locator Beacons (ELTs) to provide a local homing capability.

NASA then developed the technology to detect and locate an ELT from ground stations using the beacon signal relayed by satellites to provide more global coverage. This concept evolved into a highly successful international search and rescue system called Cospas-Sarsat.

Innovations

Since this auspicious beginning, NASA has continued to perform SAR research and development as a member of the National Search and Rescue Committee, and supports the National Search and Rescue Plan through an interagency Memorandum of Understanding with the Coast Guard, the Air Force, and NOAA. NOAA is responsible for operation of the U.S. portion of current Cospas-Sarsat system that relies on SAR payloads on NOAA weather satellites in low-Earth and geostationary orbits. As shown in Figure 1, the satellites relay distress signals from emergency beacons to a network of ground stations and ultimately to the U.S. Mission Control Center (USMCC) operated by NOAA. The USMCC distributes the alerts to the appropriate search and rescue authorities; the U.S. Air Force or the Coast Guard. The Air Force coordinates search and rescue for the mainland U.S. SAR region and operates the Air Force Rescue. This concept evolved into a highly successful international search and rescue system called Cospas-Sarsat.

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A recent well publicized rescue occurred on June 10, 2010 when 16 year old Abby Sunderland on her 40 foot sailboat “Wild Eyes” encountered heavy seas approximately 2000 miles west of Australia in the Indian Ocean. Her sailboat was dismasted and an emergency situation resulted. Abby activated her two 406 MHz emergency beacons, one a handheld Personal Locator Beacon (PLB) and the other an Emergency Position Indicator Radio Beacon (EPIRB) designed for maritime use. This event is one of thousands of successful rescues that can be credited to the International Cospas-Sarsat system. The Cospas-Sarsat system has 40 participating countries and organizations and has been instrumental in saving over 28,000 lives world-wide, including 6,400 in the U.S.; all as a result of NASA’s innovations.

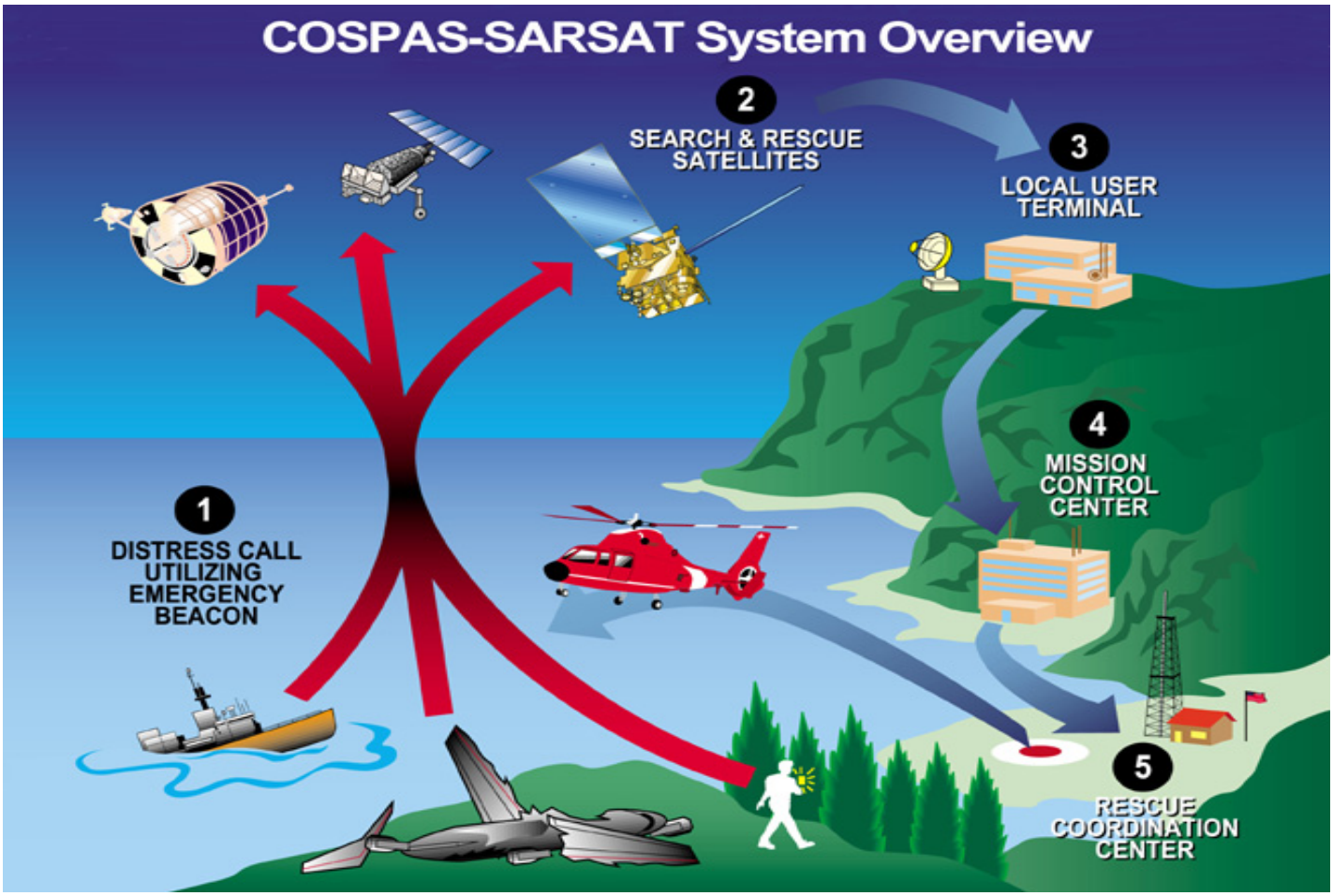

Figure 1 Overall Concept of Search and Rescue system

Room for Improvement

The current Satellite Aided Search and Rescue System (SARSAT) first became operational in the mid-1980s. The current system uses so-called “repeaters” placed on NOAA weather satellites operating in low-Earth (LEO) and geostationary orbit to detect and locate mariners, aviators, and recreational enthusiasts in distress almost anywhere in the world at anytime and in almost any condition. Although it has proven its effectiveness, as evidenced by the number of persons rescued over the system’s lifetime, the current capability does have limitations. The LEO spacecraft orbit

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the Earth 14 times a day and use the Doppler effect to help pinpoint the location of the signal. However, a satellite may not be in position to pick up a distress signal the moment a user activates the beacon. NOAA's geosynchronous weather satellites, on the other hand, orbit above the Earth in a fixed location over the equator. Although they do provide continuous visibility of much of the Earth, they cannot independently locate a beacon unless it contains a navigation receiver that transmits its position. Currently, few of the beacons activated are those that provide GPS location data. Furthermore, the beacon-to-satellite link can be obstructed by mountainous terrain or thick foliage. The next generation system, DASS, will improve accuracy and response time to provide an even more capable life-saving system.

Distress Alerting Satellite System (DASS)

A 1997 Canadian government study of alternative satellite systems determined that the ideal system would use Mid-Earth Orbiting (MEO) satellites. A MEO system would be able to provide superior global detection and location data with fewer ground stations than the Cospas-Sarsat system. The GPS constellation was identified as an ideal MEO platform. Its principle of operation is similar to that of GPS receivers using the difference in time of arrival and frequency of arrival at a DASS ground station to determine the position of the emergency beacon. The GPS system will eliminate or mitigate deficiencies of the current Cospas-Sarsat system as follows. Reception of the emergency signal will be instantaneous and will not be dependent upon having the position of the beacon encoded in the beacon signal to determine its location. Locations could be determined by a single burst since it would not be essential to measure the Doppler shift to determine position. Accuracy will be significantly improved when a full constellation of equipped GPS satellites are in orbit. This will insure that a minimum of four or more satellites will be in view of the transmitting emergency beacon anywhere in the world. An additional benefit would be that the system would be redundant as the failure of a single satellite or SAR instrument would not reduce the capability of a GEO system.

NASA via the GSFC SAR Office began discussions with the Department of Energy's Sandia National Laboratories (SNL) to determine if it would be feasible to add a SAR repeater function to a Department of Energy (DOE) instrument on GPS satellites. Sandia representatives thought it possible and NASA agreed to fund a study to determine if, with minor modification, one could include a search and rescue repeater function to their instrument. The SNL feasibility study concluded that the GPS DOE package, could with minor modifications perform the SAR mission. The study also determined that accurate locations could be calculated after a single beacon transmission and improved with each subsequent transmission. The predicted location error would be about 6 to 7 km from a single burst and within 4 km or better in less than 5 minutes. Based on this information, NASA, with the cooperation of the United States Air Force Space Command and DOE's Sandia National Laboratory proceeded with the development of a new space based Search and Rescue System. The MEO GPS satellite constellation was selected as the most likely candidate to host the future search and rescue repeater function which has been named the Distress Alerting Satellite system (DASS).

A Memorandum of Agreement (MOA) between NASA, NOAA, the U.S. Air Force, the U.S. Coast

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Guard, and the Department of Energy tasked NASA to perform a Proof-of-Concept (POC) Demonstration and Evaluation (D&E) program for DASS. The MOA included the development of a DASS space segment as well as prototype ground station to perform post-launch checkout, testing, and performance predictions and implementation planning of an operational DASS system. It stressed the need for DASS, gave authority to each participating agency to participate in the POC demonstration and defined the roles of each. The United States Air Force Space command approved the addition of modified equipment on GPS satellites. The DASS POC space segment operates as a subcomponent of GPS Block IIR and IIF satellites. Nine GPS Block IIR satellites and all twelve IIF satellites are scheduled to carry experimental DASS payloads. Therefore, the final space segment will consist of twenty-one DASS equipped GPS satellites. Each payload receives 406-MHz SAR signals on an extant GPS UHF antenna and relays the signals at a GPS S-band frequency on a second extant antenna

The concept of the DASS system is straight forward. Three or more separate antennas track different GPS Satellites equipped with search and rescue repeaters that receive the distress signal and retransmit the signal to the ground. Since each satellite is in a different orbit, each received signal has a different Doppler shifted arrival frequency and time of arrival. Knowing the position and orbit of each satellite it is possible to triangulate the position of the distress beacon. This is similar to the process used by the common GPS receivers. Provided the beacon continues to transmit (not always the case) the Doppler curve can also be used. As is often the case, the devil is in the details. The major difficulty in developing the location algorithm was in combining all the information available in such a way as to optimize the location accuracy.

A prototype MEO ground station (Figure 2) was funded by NASA and installed at GSFC. The DASS POC ground system consists of four antennas, four receivers, and the workstations and servers necessary to process the received data, command and control the operation of the ground station, and display and analyze the results. The antennas are located on the corners of the roof on Building 28 and connected to signal processing equipment located in Building 25 via fiber optical cable.

Proof of Concept Testing

The overall objectives of the POC tests were to demonstrate the effectiveness of the DASS concept and to define its technical and operational characteristics. The primary technical objective was to demonstrate the system's ability to detect and locate 406 MHz emergency beacons under various controlled conditions. This is the most important measure of the system ability to perform as expected.

The objectives of the DASS POC demonstration were to:

Confirm the feasibility of the MEOSAR concept as defined in the Cospas-Sarsat 406 MHz MEOSAR Implementation Plan;
Determine if new or enhanced MEOSAR requirements can be established; and Define prelimi-

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nary performance levels that will be used to establish the scope and content of the Cospas-Sarsat MEOSAR demonstration and evaluation phase.
It is important to note that the required performance of the POC system assumes a full constellation of DASS equipped GPS satellites. However, POC testing was performed with only eight DASS equipped satellites in orbit. This was taken into account as much as possible when analyzing data recorded with a system that rarely had sufficient DASS equipped GPS satellites visible in optimal orbits.

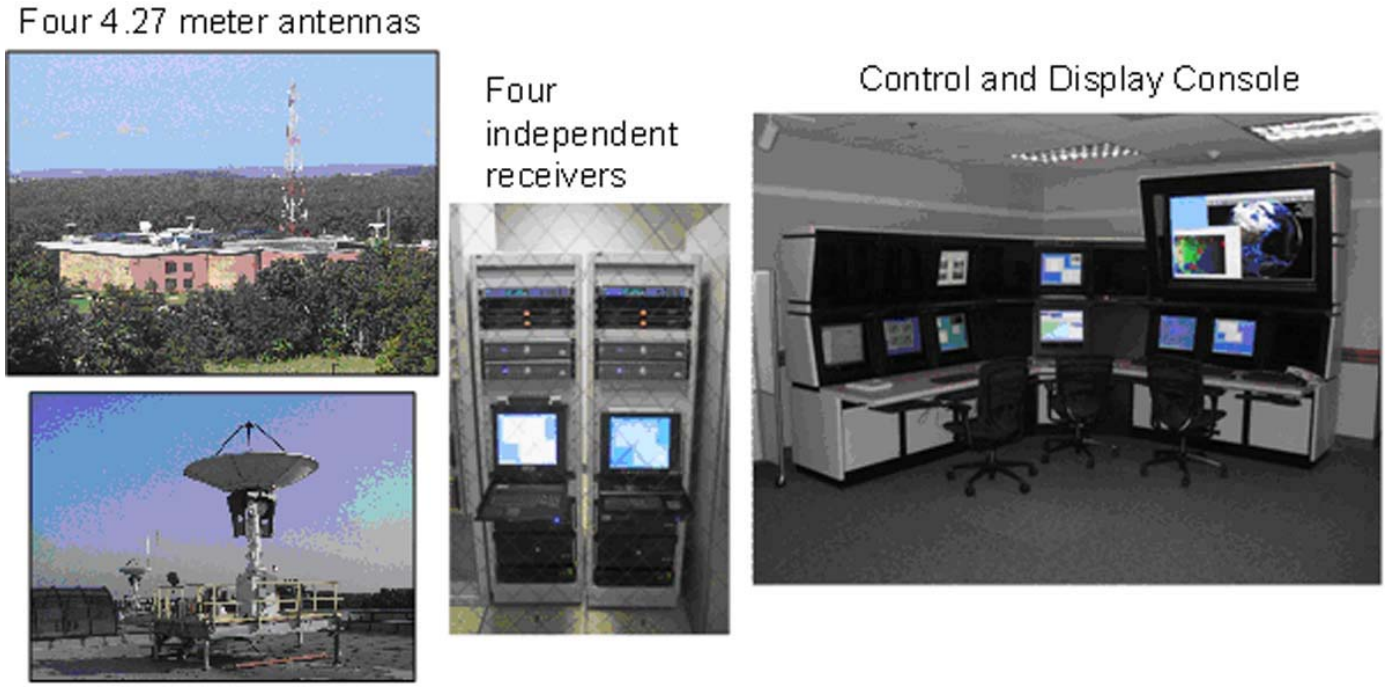

Figure 2 MEOSAR Proof-of-Concept Station at GSFC

The GSFC beacon simulator is a custom designed unit capable of simulating multiple Cospas-Sarsat 406 MHz beacons over an extended period of time. To represent expected operational realism in the tests, beacons were transmitted at the limits of the five major beacon parameters specified by Cospas-Sarsat as well as the nominal values. Two characteristics that affect system performance are beacon antenna pattern and ground mask. The effect of beacon antenna pattern is fully included in the study but ground mask was taken into account by limiting satellite visibility to an elevation cut-off of fifteen degrees.

Test results were obtained in the presence of interfering signals. In fact, significant effort was spent identifying interfering signals and evaluating their impact on system performance. For example, test results indicate that Wind Profiler Radars do not significantly impact system performance since the number of satellites simultaneously impacted is limited by the geographic separation of GPS satellite orbits.

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In spite of the limitations imposed by the lack of DASS equipped GPS Satellites, the DASS POC has demonstrated reliable detection and accurate location of beacons within five minutes of activation. Accurate locations are produced after a single burst of a newly activated beacon. The DASS POC system has demonstrated performance that is better than the existing Cospas-Sarsat systems while using only eight of the planned twenty-one DASS equipped Global Positioning System (GPS) satellites. Projections indicate that significant improvement will occur when a full constellation of satellites becomes available. The POC up to the initial development and demonstration of concept (initial testing) phase is considered to be successfully completed.

Future Development

Tests are being developed to investigate system characteristics in more detail and to further improve system performance as part of a Demonstration and Evaluation phase. Areas of further investigation will include:

Networking for data sharing between ground stations;
Beacon modifications that would improve system performance;
Increase probability of location;
Improve resistance to interference;
Verify coverage area, and
Accuracy as a function of time and beacon position.

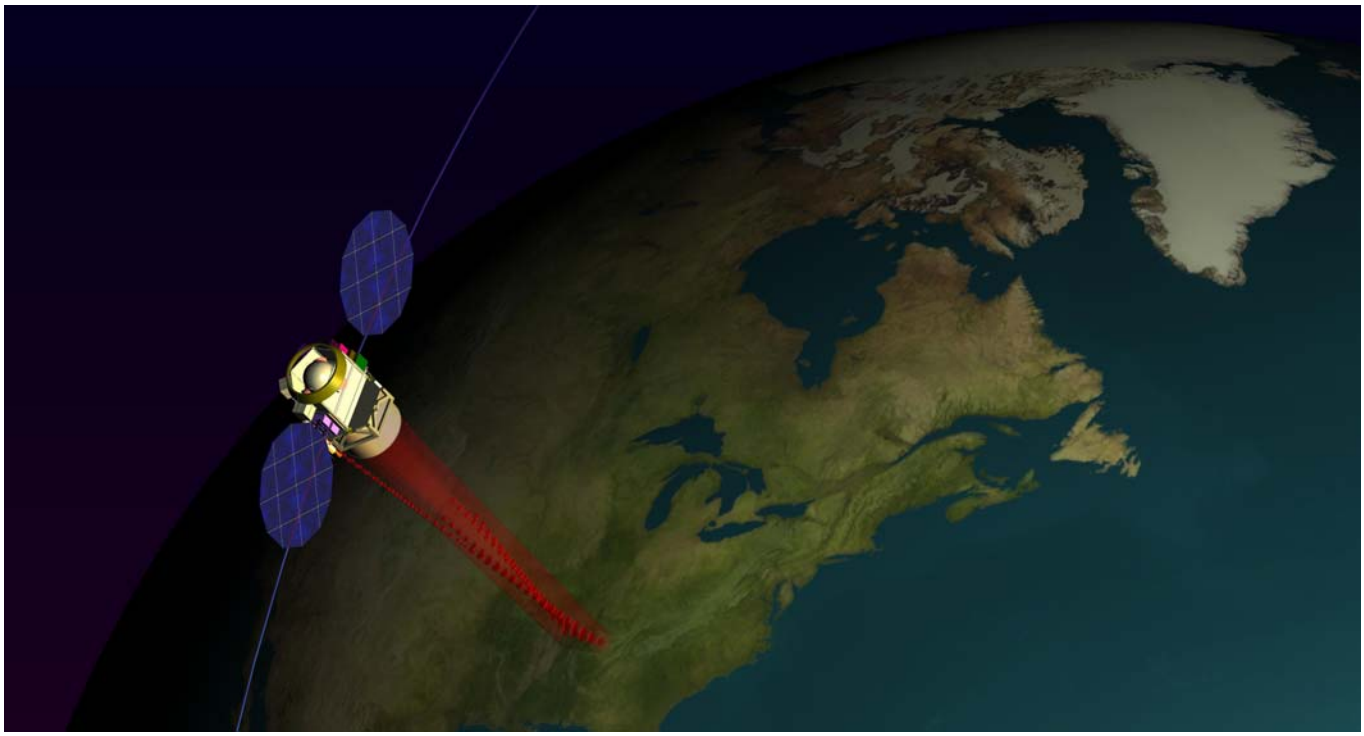
In addition, efforts are ongoing to integrate a satellite beacon repeater instrument, to be provided by the Canadian government, onto the GPS block III B and C satellites to provide the DASS space segment for operational use.

A little understood aspect of Search and Rescue is that not only is the time to find the person in distress critical to his or her survival but there is significant danger to the people doing the searching. Extensive searches over extensive areas of ocean or mountainous terrain are also very expensive and use limited resources. The motto of the Search and Rescue Office is: "*saving more lives, reducing risks to search personnel and save resources".*

James Mentall/Code 480
George Theodorakos/Code 560
Roy Dreibelbis/CSC

(DESDynI Continued from page 1)

forests account for about 85% of the above ground carbon. We also know that through photosynthesis forests scrub CO_2 from the atmosphere and when they are disturbed by fires or logging can release CO_2 back into the atmosphere. What we don't know is where all this carbon is and how fast it's changing. Even after studying three decades of two-dimensional satellite images we still cannot balance the Earth's carbon budget. DESDynI's Lidar mission adds the third dimension and will measure forest height and other structure parameters. This will enable, for the first time, accurate information about carbon in the Earth's terrestrial ecosystems. DESDynI will allow scientists to finally quantify the net flux of carbon from the land surface, which is a critical measurement for understanding the effects of carbon on the Earth's climate.



Artist's Sketch

Overview:

DESDynI is one of NASA's Tier 1 decadal climate missions planned for launch in the 2016-2017 time frame. The DESDynI mission is composed of two satellites in a joint Goddard and JPL venture. The overall mission is to monitor solid Earth land movement, the Earth's vegetation canopy and the dynamics of the Earth's ice sheets. The two spacecraft constellation has two prime instruments; the JPL spacecraft with a Synthetic Aperture Radar (SAR) and the Goddard spacecraft with a Laser Lidar (Light Detection And Ranging). Together, the two spacecraft will provide data for the three science disciplines; Solid Earth, Ecosystems, and Ice. The JPL SAR focuses on monitoring of solid Earth movements for determining the likelihood of earthquakes, volcanic eruptions, and landslides. It also monitors the dynamic response of the ice sheets to climate

(DESDynI Continued on page 11)

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change and maps the global vegetation disturbance. The Goddard Lidar focuses on the precision three dimensional mapping of the Earth's biomass and the dynamic change of the ice sheets. Together the two spacecraft comprise the DESDynI mission in meeting the science community needs.

DESDynI Science:

DESDynI plans to provide the first ever globally consistent and spatially resolved estimates of the above ground biomass, carbon stocks, and measurements of the vegetation vertical structure. The data will be used to understand changes and trends in terrestrial ecosystems and their planetary role as carbon sources and sinks resulting from disturbance and recovery. According to Project Scientist Ken Ranson (614.4), the new information will for the first time allow scientists to balance the Earth's carbon budget. The vegetation height and its vertical profile also help characterize species habitat and assess the ecosystem health. Forested ecosystems provide a means of scrubbing carbon from the atmosphere and will be of significant value to the US Geologic Survey and the National Oceanic and Atmospheric Administration.

The DESDYnI Lidar will also make major contributions to our understanding of the response of the ice sheets to climate change and the impact on sea level. Despite the scientific and societal importance and their sensitivity to climate change, they remain one of the most under sampled components of the Earth system. Recently, the flow rates of outlet glaciers around many parts of Greenland and Antarctica have increased significantly. The increased melt rates cause the glaciers and ice sheet margins to thin as much as meters to tens of meters per year. The phenomena raises the question of ice sheet stability and the potential of these ice sheets to contribute to the relatively rapid rises in sea level. DESDynI will help address these questions by providing comprehensive observations of ice sheet surface dynamics. This is directly related to ice sheet stability, ice sheet elevation, ice sheet surface area, mountain glacier elevation changes, and measuring sea-ice freeboard heights. These measurements are all complementary to the science mission of ICESat II.

To ensure that DESDynI meets its science requirements, Goddard has been collecting airborne simulator data sets over the last decade. The Land, Vegetation, and Ice Sensor (LVIS) has been collecting DESDynI-like data sets over a variety of targets such as forests in U.S. and Costa Rica, and ice sheets and sea ice in the Arctic and Antarctic. These data are not only scientifically useful, but they provide the DESDynI Scientists a taste of what DESDynI will provide and confidence that these data can meet their requirements. In addition, JPL has been flying the UAVSAR instrument in a similar role for the DESDynI SAR.

The DESDynI SAR will provide annual maps of forest disturbance and measure surface velocities of the rapidly changing outlet glaciers, enabling improvements in ice sheet modeling. Both ecosystem and ice science will benefit from the fusion of the highly accurate Lidar sampling and the mapping capability of the DESDynI SAR.

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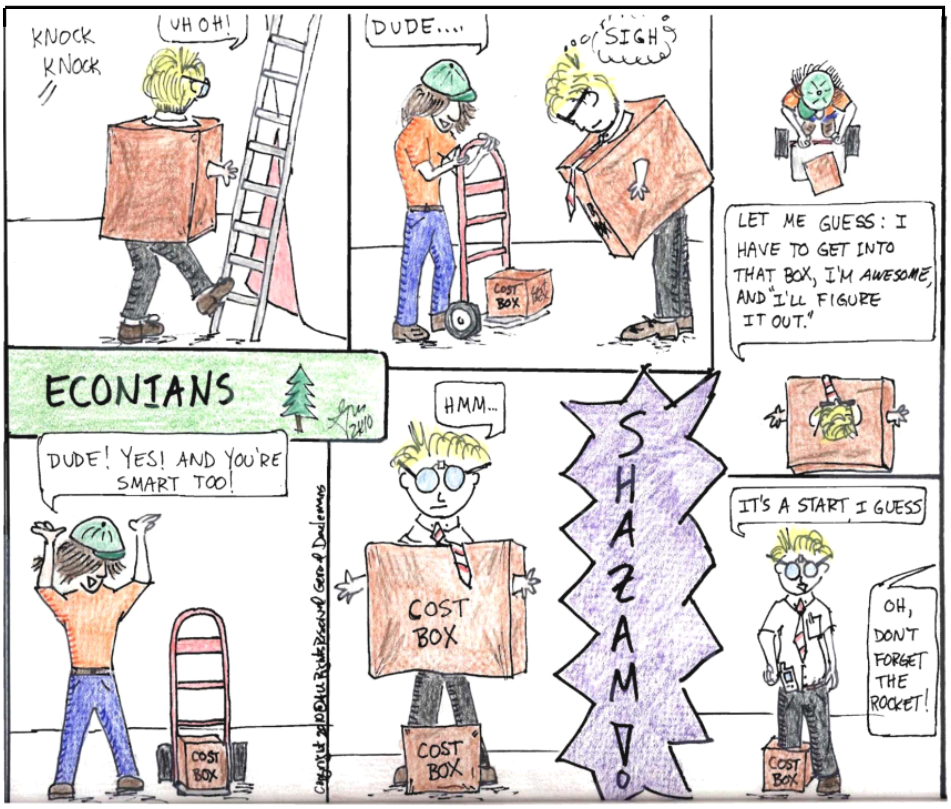
DESDynI Mission and Observatory:

The Mission is currently in pre-phase A with a Mission Concept Review (MCR) planned for January 2011. The MCR was originally planned for the Spring of 2010, when NASA Headquarters instituted a cost cap on the mission. The entire mission was given approximately $1.5 billion, with $506 Million delegated to the Goddard team for the development of the Lidar Observatory. A tough task for the Goddard team, given the cost cap includes the spacecraft, instrument and the launch vehicle. The Goddard team has been working hard to define the mission while still staying within the cost constraint. Even though it is a tough task, the team still manages to keep its sense of humor as Gerry Daelemans (Formulation Manager) displays in his cartoon account of the dilemma.



The instrument is planned to be an in-house build, leveraging off the proven technology and Goddard's engineering expertise in the laser field. The instrument team, led by Cynthia Simmons (556), is confident in the laser design and is currently in the development phase of a qualification engineering unit.

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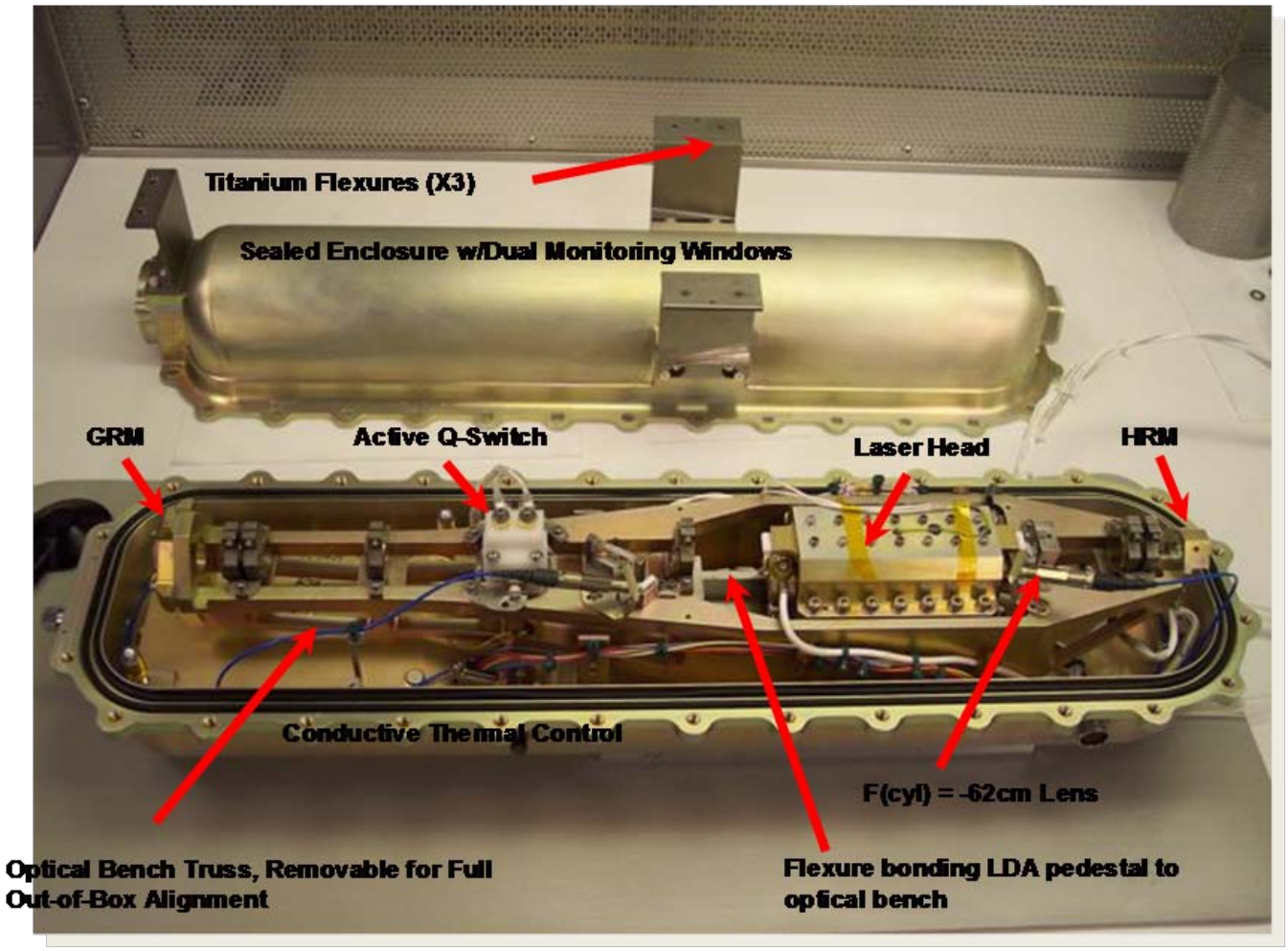

Figure 1: High Output Maximum Efficiency Resonator (HOMER) laser.

The heart of the DESDynI multi-beam, full-waveform laser altimeter LIDAR instrument is a Laser known as HOMER (High Output Maximum Efficiency Resonator) displayed in figure 1. It is named after the Fox Network cartoon superstar, Homer Simpson. Unlike Homer the cartoon, HOMER the laser is no animation. The Laser was developed at Goddard, in collaboration between Codes 500 and 600.

The HOMER design is a unique "positive branch unstable resonator" employing a graded reflectivity mirror with a Gaussian reflectivity profile which produces high-quality beams and long lifetime. The high pulse energy capability of the HOMER oscillator-only design is typical of larger and more complex Master Oscillator/Power Amplifier designs, except HOMER comprises approximately 1/3 the optical surfaces resulting in higher efficiency, less complexity, and reduced cost.

HOMER and the DESDynI Lidar instrument designs represent the culmination of more than 10 years of research and development from Goddard's own crack engineers Barry Coyle (Code 554) and Bryan Blair (Code 694). The compact laser and instrument designs incorporate lessons

(DESDynI Continued on page 22)

Agency Honor Awards

The Agency Honor Awards Ceremony was held on June 16, 2010. Noted below are awards to Code 400.

GROUP ACHIEVEMENT AWARD

EOSDIS Metrics System Team

For developing, implementing and managing the ESDIS Metrics System which provides excellent metrics information to the ESDIS Project management enabling better decision making.

GOES-O Project Team

For outstanding contributions to the successful launch and activation of the GOES-O mission.

Gravity and Extreme Magnetism Small Explorer Team

For extraordinary teamwork in the pursuit of a new mission that will revolutionalize our view of the universe.

HST SM4 Servicing Implementation Team

For achieving the renewal and science upgrade of the Hubble Space Telescope, bringing great credit to the team, to NASA and to the Nation.

Hubble Space Telescope SI C&DH-R Test Team

For outstanding contributions, exceptional performance and dedication, culminating with the installation during Servicing Mission 4.

JWST Integrated Ground Support System (IGSS) Team

For dedication and outstanding contribution to the successful development and deployment of the JWST-IGSS.

LRO Business Management Team

For support and dedication to the successful development, launch and operations of the Lunar Reconnaissance Orbiter Mission.

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LRO Flight Dynamics Team

For exemplary flight dynamics support of the Lunar Reconnaissance Orbiter Mission.

LRO Public Outreach Team

For excellence in communicating the LRO message to the media and to the public through innovative methods.

MMS Flight Dynamics Team

For phenomenal dedication and engineering excellence in undertaking a "Herculean effort" to ensure the most complex flight dynamics mission at Goddard successfully passed PDR.

NOAA N Prime Team

For exceptional dedication, perseverance, and team effort in support of the launch of the last NOAA POES spacecraft, N Prime.

Teams Nominated & Recognized By Other Centers:
Imagery Team for STS-125 HST Servicing Mission 4
James Webb Space Telescope Team

EXCEPTIONAL PUBLIC SERVICE MEDAL

Richard Saylor/HTSI/Code 451

For exceptional service in leading LRO Mission Operations and in supporting LRO Mission Design, Integration & Test, and Launch.

Kenneth Sembach/STSI/Code 441

For exceptional contributions to HST's SM4 priorities, implementation strategy, mission execution and leadership in achieving STScI mission readiness.

Randy Jay Stevens/Lockheed Martin/Code 441

For outstanding ingenuity and vital contributions to the Hubble Space Telescope Science Instrument Operations Program for almost 30 years.

(Honor Awards Continued on page 16)

(Honor Awards Continued from page 15)

EXCEPTIONAL ACHIEVEMENT MEDAL

Arlin Bartels/Code 451

For exceptional achievement in making the Lunar Reconnaissance Orbiter mission a success.

Donna Bird/Code 460

For exceptional achievement in restructuring the program support team activities during consolidation of the three Heliophysics Programs into one division.

Thomas Gitlin/Code 452

For excellence in the development and operational acceptance of the Space Network Expansion – West to meet the needs of NASA and the Nation.

Thomas Griffin/Code 440

For exceptional contributions to the Hubble Space Telescope during Servicing Mission 4.

Barbara Scott/Code 441

For exemplary achievements resulting in timely delivery of critical Flight Software for Hubble's final servicing mission.

William Sluder/Code 461

For exceptional achievement in managing the Lunar Reconnaissance Orbiter Mission's resources and support staff.

H. Robert Spiess/Code 460

For outstanding dedication and flawless leadership of the GEMS Step 1 and Step 2 Proposals, leading to the GEMS SMEX Award.

Exceptional Engineering Achievement Medal

Edward Cheung/J&T/Code 442

For superior engineering accomplishments in support of numerous pivotal instruments serviced or repaired during the Hubble Space Telescope Servicing Mission 4.

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(Honor Awards Continued from page 16)

Exceptional Service Medal

Roger Flaherty/(Retired)/Code 452

For outstanding service, dedication and operational management of the Space Network, including the on-orbit Tracking and Data Relay Satellite System (TDRSS).

J. Keith Kalinowski/Code 441

For championing the minimizing of risk to HST health and safety, and maintaining its high observation efficiency following its final servicing mission.

Herbert Mittelman/460

For many years of dedicated service in making NASA's longest running program, Explorers, a continued success.

Michael Weiss/Code 455

For numerous initiatives, creativity, thoroughness and professionalism which were critical to the success of HST Servicing Missions 3B and 4.

OUTSTANDING LEADERSHIP MEDAL

Daniel DeVito/Code 429

For outstanding leadership, exemplary performance and steadfast determination to develop the NPP Mission and NPOESS Program.

Gregory Frazier/460

For outstanding leadership leading to the successful launch and operations of the IBEX Mission, and the BAT and SAM Instruments.

Michael Kienlen/Code 442

For outstanding leadership in the development of the Hubble Space Telescope Servicing Mission 4.

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(Honor Awards Continued from page 17)

George Komar/Code 407

In recognition of innovative leadership and sustained contributions to Earth Science Technology, which have transformed the NASA Earth Science Program.

Robert McIntyre

For excellent stewardship in leading the development and completion of the NOAA N Prime Satellite.

William Ochs/Code 427

For outstanding leadership of the Landsat Data Continuity Mission team through formulation.

Hsiao-Yuan Smith/Code 450

For outstanding leadership in the completion of development, test and integration of the HST complex instruments for Servicing Mission 4.

Craig Tooley/Code 455

For outstanding leadership, dedication and flawless management of the LRO Project leading up to and including launch and early orbit check-out.

DISTINGUISHED PUBLIC SERVICE MEDAL

Michael Bay/Code 464

For significant contributions to Scientific Exploration, Systems Engineering, spaceflight mission success and engineering expertise transfer to NASA and spaceflight communities.

Edward Cheng/Code 442

For exceptional ingenuity, dedication and initiative in devising a solution to repair the Advanced Camera for Surveys on the Hubble Space Telescope Servicing Mission 4.

Seventeenth Annual Federal Inter-Agency Holocaust Memorial Remembrance Program

This Holocaust Memorial Remembrance Program was held on June 9, 2010 at the historic Lincoln theatre in Washington D.C. It was sponsored by 27 different Federal departments and agencies including NASA. Goddard sent a bus with the largest contingent of employees to the ceremony since its inception in 1994.

Sensitively hosted by Carolyn Lyders weeknight anchor for ABC7, the program honored the 11 million individuals murdered during the Holocaust. Office of Personnel Management Director, John Berry urged Federal support of the program and requested that Federal employees be allowed time off to attend the ceremony.

There were three speakers, including Helmuth von Moltke, a son of German political resisters. He was a child when his parents joined a group of German intellectuals and political leaders who participated in discussions that dealt with plans for a German government after Hitler and support for his assassination. Both of his parents, who were skilled lawyers, abhorred the conduct of the Nazi government. They legally fought to protect the legal standing and property of those oppressed. Helmuth's father was hanged in 1945 after a Nazi court sentenced him to death.

Robert Wagemann, a Jehovah's Witness who was born physically disabled in 1937, was the second speaker. Except for his mother's intuitive action he would have been killed by the Nazis who did so to all mentally and physically disabled German citizens. Nazi judges approved the killing of all those with Alzheimer's, tuberculosis, epilepsy, depression, bipolar disorder, paranoia, the blind, lame, deaf, feeble minded and deformed. His mother overheard the doctor saying he would apply a lethal injection to Robert after lunch. When he left, she took Robert, left the office and hid until the end of WW II.

Auschwitz survivor Eva Kor was the last speaker. She and her twin sister Miriam underwent horrible medical experiments by the infamous "Angel of Death," Dr. Josef Mengele while at Auschwitz. Both eleven years old at the time, Miriam later perished from the physical damage of being injected by various potential lethal strains of bacteria. Born in Romania, their entire family was lost at Auschwitz. Living in Indiana today, Eva founded a children of Auschwitz museum there to help "eliminate hatred and prejudice from our world."

The annual Holocaust program is authorized through Public Law 96-388,which Congress passed in 1980 as part of honoring the "Days of Remembrance." Through the act, the United States Holocaust Memorial Council was instructed to provide for appropriate ways for the Nation to commemorate the Days of Remembrance, as an annual, national, civil commemoration of the Holocaust and to encourage and sponsor appropriate observances throughout the country. This annual observance is held so that anyone not knowing about the Holocaust will learn, and that people who have learned will never forget.

Howard Ottenstein, Editor

(Oil Spill Continued from page 1)

Goddard's Terra and Aqua Help Determine Extent of Oil Spill

April 20, 2010 is a date many of us will not soon forget. On that day, a great oil spill, lasting more than 3 months, spewed forth into the Gulf of Mexico. Due to its critically important contributions, NASA received a letter of thanks from the Department of the Interior for its efforts in responding to this disastrous oil spill. The oil spill was a result of an explosion and fire on April 20th and the resulting collapse of the Deep Horizon Oil rig. Administrator Bolden has echoed his appreciation to all who have been supporting this effort.

Since the tragedy on April 20, the US remote sensing assets have been tasked to help track oil from the spill – how the oil has affected wetland areas, the depth and extent of oil, the effect of the currents in the Gulf and on other natural processes. Daily meetings between agency officials gathered all data and information to support the emergency response coordinators.

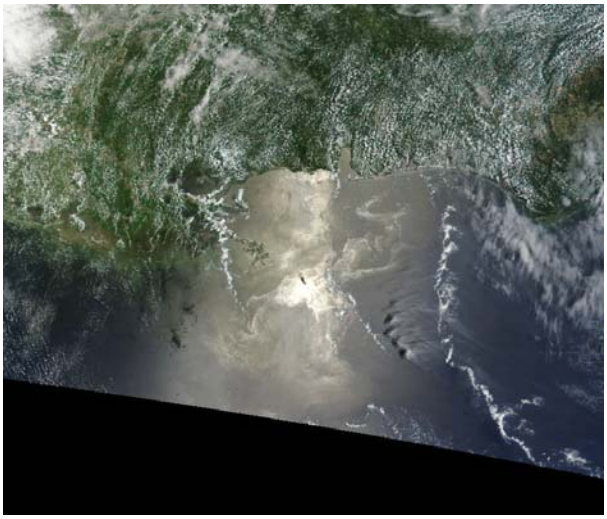
Several NASA remote sensing satellites and airborne missions are being used to evaluate conditions of the Gulf of Mexico region. This article focuses on two of the Earth Observing Satellites (EOS) missions used to detect the extent of the slick, the Moderate Resolution Imaging Spectroradiometer (MODIS) sensors on the Terra and Aqua satellites and the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) on Terra. Both Terra and Aqua pass over the Gulf area 3 times a day.

Earth Sciences Data and Information System (ESDIS) and Earth Science Mission Operations (ESMO) have been among the many NASA team members supporting NASA's efforts. ESMO is responsible for flight operations for Terra and Aqua, receiving the data and initial processing. ESMO sends this raw data to the ESDIS Science Investigator-led Processing Systems (SIPS) for processing into science data products. ESDIS data centers archive the science data products and provide data and services to users.

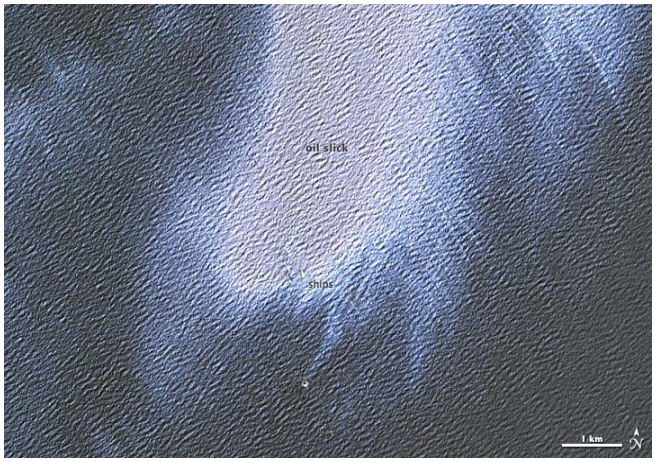
NASA Earth Observatory image from NASA/MODIS Rapid Response Team. The smoke plume from the burning oil rig can be seen in the center of this April 21st Aqua MODIS image.

(Oil Spill Continued on page 21)

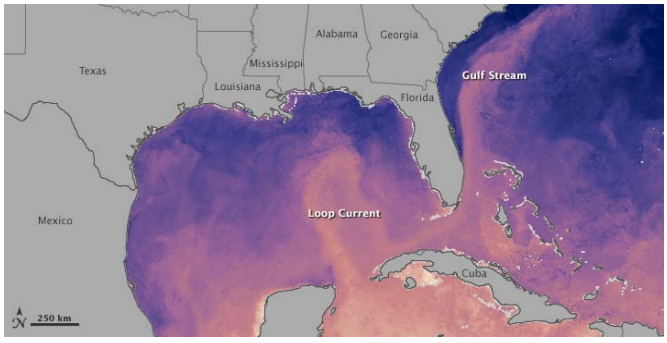
(Oil Spill Continued from page 20)



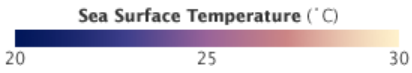
This Terra resultant image was produced by the MODIS Direct Broadcast system. Using the International Polar Orbiter Processing Package (IPOPP) end to end processing system (satellite reception to data products), this image illustrates the effects of the Gulf oil spill as of June 9, 2010. There is some distortion in the presentation due to sun glint.



Ships and the oil slick can be seen in this May 1st ASTER false-color image made from both visible and infrared light. NASA Earth Observatory image created by Jesse Allen, using data provided courtesy of NASA/GSFC/METI/ERSDAC/ JAROS, and U.S./Japan ASTER Science Team



As the oil spread, concern for the oil entering the loop current increased. Once in the loop current, the oil could then be carried by the Gulf Stream. This Terra MODIS image of sea surface temperature shows the connection of the loop current and the Gulf Stream. This data was acquired over a few days (May 1-8). NASA Earth Observatory image created by Jesse Allen, using data obtained from the Goddard Level 1 and Atmospheric Archive and Distribution System (LAADS)*



(Oil Spill Continued on page 24)

(DESDynI Continued from page 13)

learned from previously-flown Goddard laser instruments (MOLA, SLA-01/02, ICESAT-I/GLAS, CALIPSO, MLA, and LRO/LOLA). Years of experience and testing culminate into HOMER's simplicity, compactness, and high efficiency. This fact bodes well for the DESDynI Lidar mission as the instrument development is way ahead of the game. Two HOMER laser assemblies (HOMER-1 and HOMER-2) have been built and tested, which together with the breadboard testing represent an accumulation of over 10 billion shots to date. The HOMER-2 began continuous life testing in March of 2010, and currently has over 3 billion shots.

Summary:
In short, Goddard's DESDynI Lidar Mission boasts to make a significant impact in the realm of climate science. It will provide the long sought after data required by the science community and provide the first ever global map of the Earth's forest biomass. Its lasers will complement the ICESat II data by giving increased understanding of the dynamic response of the ice sheets to climate change and the impact on sea level. The team has a tough job ahead in meeting the cost challenge presented by HQ, but the team is focused, confident, experienced and ready to make history with the DESDynI Lidar mission.

Andre' Dress, Code 420
DESDynI Lidar Project Manager

THE 2010 CODE 400 PEER AWARDS CEREMONY
WEDNESDAY, SPETEMBER 1, 2010
GSFC Rec Center
3:00—5:00 PM
Cost $5 per person

Payments may be made in Bldg. 8 between now and August 25th to the following :

Debbie Hamby—Room 240
Karen Rogers—Room 240
Jeaneene Scarano—Room 222

Bringing Christmas Cheer in April, One Bolt at a Time

NASA is known for creating memorable moments.

PAAC III Xmas In April Volunteers

Few things can compare to the awe and wonder of seeing a Shuttle launch into space. Or of gazing at a far-off galaxy and realizing how small our own Earth is in comparison.

But for one Brentwood, Maryland resident, his most memorable NASA moment came from being able to step into a safe, warm home, thanks to the hard work and dedication of 15 PAAC team volunteers from NASA's Goddard Space Flight Center. These participants in the Prince George's County "Christmas in April" program went the extra mile to transform the Williams' house into a secure residence – a home that will serve Mr. Williams and his family for years to come.

Following Christmas in April's mission – to "repair the homes of senior citizens who are either low-income and/or physically challenged so they may live in warmth, safety, and independence" – PAAC team members, family and friends joined on Saturday April 24, 2010 for this worthy project. Using materials provided by the Program, the team successfully reframed and replaced the soffit on the porch and repaired a broken external basement door. Under the leadership of House Captain Michelle Sohl, Resource Analyst, they also tore up the kitchen floor in preparation for new tiling and removed trash and other debris from the yard.

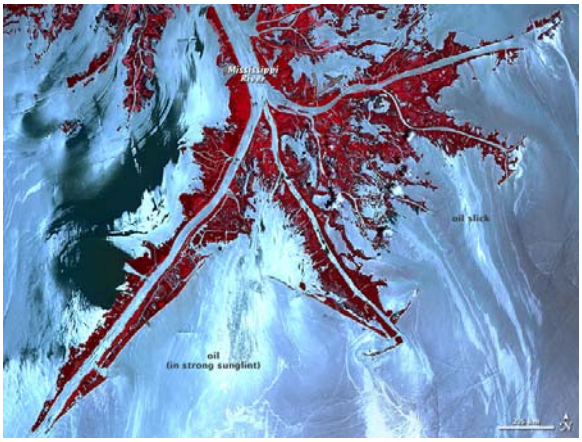
Although a knee injury prevented licensed handyman Matthew Ponton, husband of PAAC III Integrated Project Team Leader Colleen Ponton, from participating on April 24, he volunteered additional materials and labor to complete the floor project in May. As he was preparing the kitchen area, a new – and alarming – problem came to light. "We noticed a distinct slope in the floor that affected the rear door operation," Ponton said. "At first glance we thought it was caused by basic settling over the years. But after further review, we discovered that the floor joists by the rear door were close to near collapse."

With a little help from a jack and some shoring up, the floor was installed level, the door was operational, and a potential disaster was diverted. "It sure is amazing what $300.00 and a lot of sweat equity can do for a room. The area is now safe to navigate," reported Ponton.

The dedicated PAAC team truly achieved the mission of Prince George's County Christmas in April, leaving Mr. Williams' house warm and safe. Each member deeply appreciated the opportunity to give back to the community in such a meaningful way. In the meantime, Mr. Williams – who, though sight-impaired, offered to help several times during the project – was extremely grateful for the improvements and their service. Yet another memorable NASA moment was created.

Adrienne Alessandro
Code 440

(Oil Spill Continued from page 21)



The ecology of the Delta and livelihood of the Gulf residents has been of major concern as the oil spread. This May 24th Terra ASTER is a false-color image of the Delta and nearby ocean water. Vegetation appears darker.
NASA Earth Observatory image created by Jesse Allen, using data provided courtesy of NASA/GSFC/METI/ERSDAC/JAROS, and U.S./ Japan ASTER Science Team

Although data from Earth Observing satellites has been used mainly to detect the extent of the oil spill, the work has just begun in determining the environmental damage to the Gulf and the states that border it. There will be an ongoing need for the archived data available from NASA EOS satellites to determine the changes in the Gulf and its environs. One of the outcomes of the intensive data coordination effort are new ways to make data products of applications use. To meet the needs of the emergency, blends of radar, hyperspectral, etc. were created. This blending will present new ways to look at NASA data in the future.

Data Resources
Land Processes Distributed Active Archive Data Center (LPDAAC)* has made ASTER and MODIS images available through the Event/Disaster Response area of USGS's Hazards Data Distribution System (HDDS): http://hdds.usgs.gov/hdds/

The Atmospheric Science Data Center (ASDC)* updated the Multi-angle Imaging SpectroRadiometer (MISR) imagery web pages to spotlight information on the use of MISR for the Gulf oil slick: http://eosweb.larc.nasa.gov/

The MODIS Rapid Response system has set up a web page to host twice-daily near-real-time images of the oil in the Gulf: http://rapidfire.sci.gsfc.nasa.gov/subsets/?project=gulfofmexico

Earth Observatory has set up a special section for Gulf Oil Spill images in its Natural Hazards area and a web page to answer frequently asked questions about the images:
http://earthobservatory.nasa.gov/NaturalHazards/
http://earthobservatory.nasa.gov/Features/OilSlick/?src=features-recent

* ESDIS data centers

Cultural Tidbit

Did you Know…… what ***Law & Order*** and organizational cultures have in common…*They both have perps and victims.* In organizational jargon, they are coined 'microperps' and 'microvictims'. Microperps are, typically, those in positions of influence while microvictims are subordinates or employees.

Why 'micro'?
In part due to the subtle or "small scale" offenses that are just as "automatic as breathing" and as "invisible as air". "A glance at the watch, a roll of the eye, a quick doodle: the almost imperceptible gestures researchers call "microinequities" have a huge impact on the way your day, job is going".
According to Stephen Young, former senior VP of global diversity at JPMorgan Chase, microperps, often times unknowingly, exploit their position. Whether it's a junior employee who is constantly being told "that won't work" or "we've been doing it this way for years", the residual effect is disengagement of the employee.

So how does a leader avoid this pitfall?
Young challenges leaders to recognize that they possess the power to change the tone, the *organization's culture*. He stresses that by paying attention to everyone's input, maintaining eye contact and not interrupting, being cognizant of their facial expressions, asking someone who would not ordinarily voice their opinion to provide feedback are but a few of the ways to level the "microinequity" playing field.

(Drafted by Nicole Turner from The *Little Chill* by Lise Funderburg)

Things You Should Know About

Former Director of Flight Projects and the Wallops Flight Facility, John Campbell (retired) received a Presidential Distinguished Rank Award.

GSFC scientist (Project Scientist for Aqua) Claire Parkinson was elected to the American Philosophical Society.

GSFC scientist Neil Gehrels (Principal Investigator for CGRO and Swift) was elected into the National Academy of Sciences.

Wallops Flight Facility (NACA/1945) celebrated its 65th anniversary.

The Hubble Space Telescope celebrated its 20th anniversary.

Swift (2004) findings confirm that black holes 'light up' when galaxies collide.

GSFC was one of 100 civilian and military agencies participating in Public Service Recognition Week on the National Mall.

Goddard celebrates its DAY on the Goddard Mall.

GSFC/Headquarters at the Visitor Center toast 26 years of successful service of TDRS-1, (now decommissioned), the first TDRS mission

Social News

Congratulations

Congratulations to Elizabeth Choi (403) and Dan her husband who welcomed their beautiful baby girl Isabella McKenna Choi born Aug.4th, 7 pounds 4 oz. Mum, dad and grandpa Dan Whorton (400) are all doing great!

Sharon Garrison (401) is very proud of her daughters. Her daughter, Hannah, recently performed for Michelle Obama and the First Lady of Russia in a dance performance at her school, Duke Ellington School of the Arts. In addition, Sharon's older daughter, Shahla, won the Emerging Artist competition of the Washington Printmaker's Gallery, located in downtown Silver Spring. As such, she was eligible to apply for membership and recently heard she was accepted. As a member, her work is now on display in the gallery and available for viewing online at http://washingtonprintmakers.com/artists/shahla-abdi.

Congratulations to Lisa Renee' Hoffmann (formerly Feudale) who ***happily*** took Vincent (Vinny) Michael Hoffmann's Hand in Marriage on Saturday, July 17th, 2010. They were joined by their Family and Friends. Lisa, Vinny, and their three children, Baby (Terrier), Pixie (Terrier), and Doobie (Min-Pin), reside in Owings, MD.

Bill Anselm (427) LDCM Observatory Manager's daughter, Monica, married Matt Garcia on August 15. Monica is a Montessori teacher at Chesapeake Montessori, and Matt is director of the Y camp at Camp Letts, Annapolis.

Jill McGuire (442) and her husband, Guy, welcomed twins on July 2. Lucas David, weighing 6-lbs 13 oz, and 19" long, arrived at 5:10 a.m. Logan Michael arrived at 5:36 a.m., weighing 6-lbs 1-oz, and was also 19" long. Big brother Wyatt is proud of his new brothers.

Mark Hubbard (442) is the proud grandfather again (for the 5th time). William Tigner Hubbard, 7 lbs 13 oz, was born on June 14, 2010, to Mark's son, Billy, and his wife, Becca, in Providence, RI.

Congratulations to Edward Cheung (J&T/442), who was recently Knighted. Established on September 29, 1815, the Royal Order of the Netherlands Lion is the oldest civil order in the Netherlands. Knighthoods are awarded every year by the Queen on her official birthday, April 30. This honor is awarded to people with special merit for society of a very exceptional nature, and never before has it been bestowed upon a person from the Caribbean. Queen Beatrix conferred Knighthood on Sir Edward Cheung for conspicuous service on the Hubble Space Telescope and for work in education and outreach to the island nation of Aruba.

Beverly Townsend (ASRC/448) is very proud to announce that her youngest son, Michael, has enlisted in the U.S. Navy. He will leave for boot camp on or around Sept. 15, after which he will spend several weeks at "A" school before being assigned a duty station. He hopes to continue his criminal justice degree while serving as a Master at Arms.

Best wishes to Ray Pages (450.2) and his wife Astrid, who are expecting their third child in December of this year.

Congratulations to Katy Boone (403) and her husband Brian, are expecting their first child in October of this year.

Comings & Goings

Comings:

Michael Seablom to 407/Earth Science & Technology Office
Joseph Famiglietti to 407/Earth Science & Technology Office
Chris Carson to 454/Tracking & Data Relay Satellite Project @ White Sands
Margaret Pavlik to 470/Joint Polar Satellite System (JPSS) Program (Pending re-org.)
Lourdes Wisniewski to 460/Explorers & Heliophysics Projects Division
Susan Wright to 440/Astrophysics Projects Division
Garry Gaukler to 474/JPSS Ground Project (Pending re-org.)
Ben Reed to 442/Space Servicing Capabilities Project (Pending Re-org.)
Valerie Mackritis to 460/Explorers & Heliophysics Projects Division
Dan Blackwood to 400/Flight Projects Directorate
Deanna Adamczyk to 450/Exploration & Space Communications Projects Division
Diane Hronek to 423/Earth Science Data and Information Systems Project Office

Goings:

Stan Schneider retires from 420.1/NPOESS IPO Support Office
Elaine Shell retires from 452/Space Network Project
Linnette Morales to Code 150/Office of the Chief Financial Officer
Sherri Corbo detailed to 153/Program Analysis Office
Mary DiJoseph transfers to Langley Research Center
Joanna Gavaghan retires from 454/Tracking & Data Relay Satellite Project
Tom Anderson retires from 464/Solar Dynamics Observatory Project Office

Quotes To Think About

"Half of the American people have never read a newspaper. Half never voted for President. One hopes it is the same half."
-Gore Vidal-

"Creativity can solve almost any problem. The creative act, the defeat of habit by originality, overcomes everything."
-George Lois-

"Computer Science is no more about computers than astronomy is about telescopes."
-E. W. Dijkstra-

"The key to being a good manager is keeping the people who hate me away from those who are still undecided."
-Casey Stengel-

www.nasa.gov

FUTURE LAUNCHES CALENDAR YEARS 2010/2011	
Glory (VCL bus)	NOV 2010
Aquarius	APR 2011
NPP—RSDO S/C	OCT 2011
MSL/SAM	NOV 2011

ATTENTION INTERNET BROWSERS:

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

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Howard K. Ottenstein,
Editor

Nancy L. White,
Production Assistant/Photographer

Paula L. Wood,
Editorial Assistant

If you have a story idea, news item, or letter for The Critical Path, please let us know about it. Send your note to Howard Ottenstein via Email: Howard.K.Ottenstein@nasa.gov, Mail: Code 403, or Phone: 6-8583. Don't forget to include your name and telephone number. Deadline for the next issue is Nov 22, 2010.