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

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2013 Winter

INSIDE THIS ISSUE:

MAVEN LAUNCHES SUCCESSFULLY!!!

See photo of MAVEN launch on page 13

Lunar Atmosphere and Dust Environment Explorer (LADEE) – Something for Everyone …

On Friday, September 6, 2013 LADEE had a spectacular launch on the new Minotaur V launch vehicle, from the recently refurbished Wallops launch pad. The thousands of spectators

(LADEE continued on page 4)

MMS Starts Environmental Testing at GSFC!

The Magnetospheric Multi-scale (MMS) mission is a Solar Terrestrial Probes mission comprised of four identically instrumented spacecraft that will fly through the outer region of the Earth’s magnetosphere. MMS will investigate how the Sun’s and Earth’s magnetic fields connect and disconnect,

(MMS continued on page 8)

NOTICE—THE CRITICAL PATH

Like so many other communications and newsletters, The Critical Path (TCP) will move to an electronic distribution in the future. Each edition will be sent as an attachment in individual e-mails to all our current recipients. We realize that this might take some time to accomplish, so it is important that our readers contact Paula Wood, TCP Production Assistant with their updated e mail addresses. Paula’s e-mail address is: Paula.L.Wood@nasa.gov, or she can be reached by phone at: (301) 286-9125.

There still will be a limited number of hard copies made of the TCP. We will send hard copies of the next issue to those from whom we still have not received e-mail addresses, and/or who may not have means of receiving electronic data. Subsequent changes to e-mail addresses should be sent to Paula as well to receive future copies of the TCP.

Message from the Director Of

I am writing this message from Cocoa Beach, Florida the evening of November 18, 2013, after the successful launch of the Mars Atmosphere and Volatile Evolution (MAVEN) mission. The weather held and the Atlas V 401 launch vehicle and Centaur upper stage performed flawlessly. MAVEN is power positive, healthy and on its way to Mars. Congratulations to MAVEN Principle Investigator, Bruce Jakosky, MAVEN Project Manager, Dave Mitchell, and the entire MAVEN team and thank you to the NASA Launch Services Program and United Launch Alliance teams for a great ride. MAVEN is the third GSFC mission in 2013 to be delivered to space under budget and on or ahead of schedule and for MAVEN it was done in the face of a Government shutdown.

The Lunar Atmosphere and Dust Environment Explorer (LADEE) was successfully launched on September 6, 2013. While LADEE is an Ames Research Center managed mission, the scientific payload elements were the responsibility of Bob Caffrey and his team at GSFC. The LADEE spacecraft is performing well and all scientific payload elements are activated and operational. In addition to the scientific payload, LADEE carried a Lunar Laser Communications Demonstration (LLCD) payload developed by Don Cornwell (464.1) and his team at GSFC in partnership with MIT Lincoln Laboratory. LLCD has performed extremely well, meeting or exceeding all requirements and made history using a pulsed laser beam to transmit data over the 239,000 miles between the moon and Earth at a record-breaking download rate of 622 megabits per second (Mbps). It also has demonstrated an error-free data upload rate of 20 Mbps transmitted from the primary ground station in New Mexico to the spacecraft.

As if MAVEN and LADEE weren't exciting enough accomplishments for one quarter, the GSFC Total Solar Irradiance Calibration Transfer Experiment (TCTE) is a payload on Operationally Responsive Space - 3 (ORS-3) which is scheduled to launch on a Minotaur-1 rocket from Wallops Island on November 19, 2013. Tracking and Data Relay Satellite – L (TDRS-L) is ready to be shipped to Kennedy Space Center and is scheduled to launch on an Atlas V on January 23, 2014. In addition, Global Precipitation Mission is in its shipping container awaiting shipment to Tanegashima, Japan for launch on February 28, 2014.

I think you will agree that what has been accomplished since my last report in August is remarkable and it is truly amazing to me what the Flight Projects Directorate and the entire GSFC team can accomplish even in the face of obstacles and adversity like a Government shutdown. The 16 or so days of the shutdown were wild and showed how strong the GSFC senior management team is and how it works together to keep things moving forward and to accomplish our mission.

The holiday season is fast approaching. I wish you all the very best and encourage you to take time off if you possibly can to spend with friends and family.

Sincerely,

George W. Morrow
Director of Flight Projects
george.w.morrow@nasa.gov

PERSONALITY TINTYPES

Donna Swann

Donna is an Assistant Director of the Flight Projects Directorate. She transitioned to this position in May 2013. Prior to her reassignment to 400, she was matrixed to 400 from the Office of Human Capital Management, where she was the Product Development Lead for the new Flight Projects Development Program (FPDP). Donna looks forward to playing a major role in the following key initiatives: FPDP implementation; career paths within 400; succession planning; diversity and inclusion; employee engagement and increasing directorate communications.

Education:

BS, Human Resources Management, Towson State University
Senior Professional Human Resources Certification, Society of Human Resources Management

Life Before 400

Donna began her Federal career at age 19 as a Clerk Typist during her summers while in college at the David W. Taylor Naval Ship R&D Center in Annapolis, Maryland. After graduating from Towson State, Donna worked as a Human Resources Specialist in private industry. In 1991, she joined the Goddard family as a Personnel Management Specialist and subsequently held an assortment of positions in her 20+ years in the Human

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Steven Horowitz

Steve is the Mission Manager for the Ionospheric Connection Explorer (ICON). ICON was selected last spring as one of the new missions in the Explorer Program.

Born: Bronx, NY

Education:

BS, Electrical Engineering, Rutgers University
MA, Science, Technology and Public Policy, The George Washington University.
Graduate of the GSFC PMDE Program

Life at Goddard

Steve came to GSFC in 1990 after several years working in the private sector. Since starting out in the Flight Data Systems Branch (the old 735), Steve has held a variety of positions. His first positions were as a COTR for flight tape recorder developments on the ISTP (SOHO, Cluster), POES and EOS missions. Further, Steve worked developing other onboard data storage technologies including solid state and optical disc.

In 1992 Steve was selected as Product Development Lead (PDL)/Lead Engineer for the HST Servicing Mission 1 Coprocessor. The Coprocessor restored the failing HST computer's memory and added a (then) spaceflight state-of-the-art Intel 386 processor. Working on HST SM 1 was particularly

(Horowitz Tintype continued on page 38)

(LADEE continued from page 1)

in the Chinco-teague VA area (see photo 1) and the millions of residents up and down the East Coast (see photo 2), were treated to a rare sight … a refurbished and enhanced Peace-keeper rocket carrying a NASA satellite to the Moon! An unlucky frog was also treated to the LADEE launch.

Photo 1 – The LADEE Launch as seen from Wallops Island

The flying frog was captured by a sound-triggered camera, silhouetted against the smoke and flames of the LADEE launch vehicle (see photo 3). Wallops reported that the fate of the frog was 'uncertain.'

Photo 2 – The LADEE Launch as seen from NYC

There is nothing uncertain, however, about the initial success of the LADEE mission! The Ames-managed spacecraft and the Goddard-managed payloads have completed a 30-day cruise to the Moon and a successful 30-day commissioning phase. The spacecraft has lowered to its ~50 km science orbit, and the instruments (as of November 21, 2013), are poised to start an exciting science phase, with hopes of solving some of the mysteries reported by the Apollo 17 astronauts. The astronauts observed a glow at the sunrise terminator. LADEE will attempt to confirm whether dust caused this mysterious glow at the lunar horizon.

The three science instruments on LADEE will help solve this mystery. The Goddard-developed Neutral Mass Spectrometer (NMS) is similar to the spectrometer flying on the Mars Atmosphere and Volatile Evolution Mission (MAVEN), launched on November 18, 2013. NMS will measure variations in the different gases making up the lunar atmosphere. It will detect these over multiple orbits.

The Laboratory for Atmospheric and Space Physics (LASP) of Colorado University-developed Lunar Dust Experiment (LDEX) will collect and analyze lunar dust particles in the Moon's thin atmosphere. The instrument recorded its first dust hits within minutes after its cover was deployed on October 16, 2013. In subsequent orbits, LDEX observed dozens of dust particles, indicating an impact rate on

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(LADEE continued from page 4)

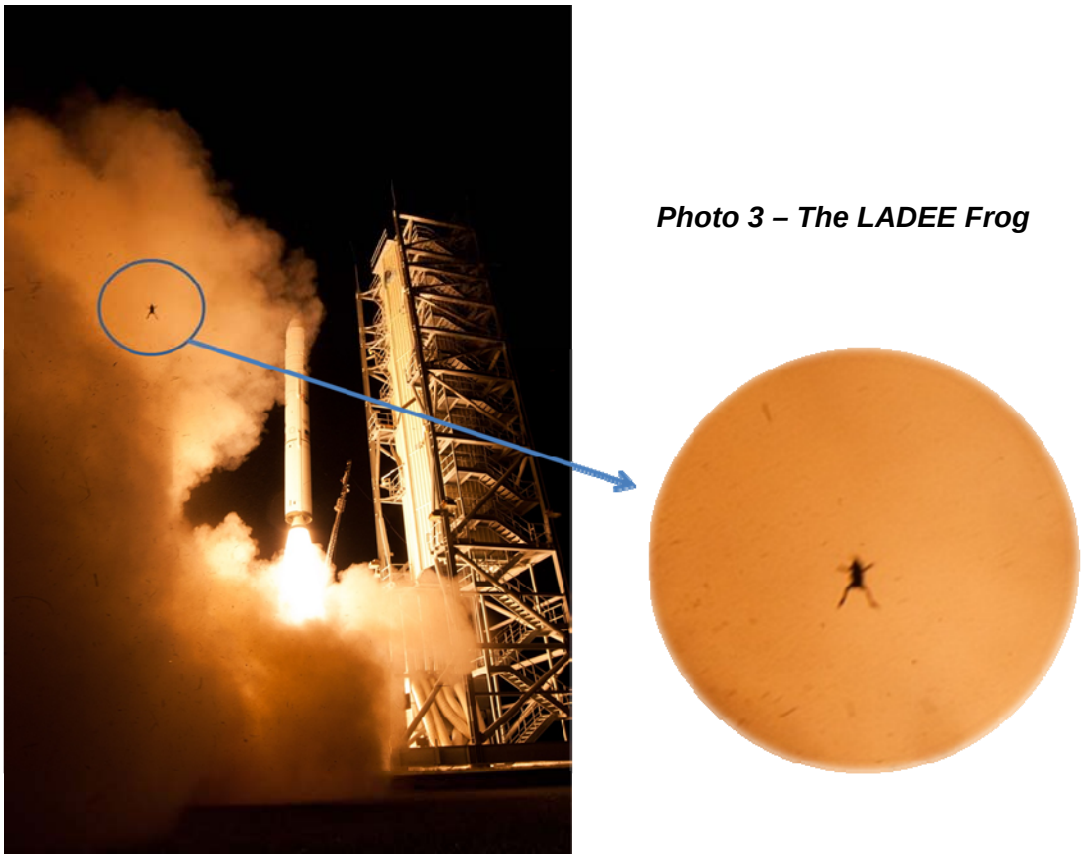

Photo 3 – The LADEE Frog

the order of 1 hit/ minute. Preliminary analysis suggests the particle sizes are much less than 1 micrometer in radius.

The Ames-managed and Draper-developed Ultra-violet and Visible Light Spectrometer (UVS) instrument will probe the composition of the lunar atmosphere. The instrument made its first measurements shortly after the telescope door opened on October 16th. The instrument has been performing as expected and has conducted a series of pointing and instrument performance calibrations, including looking at the limb of the Moon and performing solar crossings by aiming the solar viewer at the Sun and panning back and forth.

In addition to the three science instruments, LADEE includes a Goddard-managed, Massachusetts Institute of Technology (MIT) Lincoln Laboratory (LL)-developed payload, the Lunar Laser Communication Demonstration (LLCD). LLCD made history using a pulsed laser beam to transmit data over the 239,000 miles between the Moon and Earth at a record-breaking download rate of 622 Megabits per second (Mbps). LLCD is NASA's first system for two-way communication using a laser instead of radio waves. It has also demonstrated an error-free data upload rate of 20 Mbps trans-mitted from the primary ground station in New Mexico to the spacecraft currently orbiting the Moon.

The Ames-developed Mission Operations Center (MOC) and the Goddard-developed Science Operations Center (SOC) successfully supported the cruise and commissioning phases and are now ready to support the 100-day science phase (as of November 21st).

The LADEE concept started as a collaboration between NASA Headquarters, Ames, Goddard, MIT/ LL, Wallops, and the Air Force, to give each partner the key component they wanted to see developed (i.e., something for everyone). Ames got its first in-house mission development; Goddard got its first lunar lasercom mission; MIT/LL got its first lunar lasercom payload; Wallops got its first launch to the Moon and the Air Force got its first Minotaur V (Peacekeeper-based) launch vehicle. The joint Ames-Goddard LADEE team took the initial concept into Goddard's Mission Design Lab and created a detailed implementation approach.

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(LADEE continued from page 5)

Goddard's software groups contributed their core flight software (cFE/cFS) and the software backbone of their I&T and Mission Ops system (ITOS). During formulation, the joint teams talked regularly to keep the mission moving forward. The Goddard team also supported design reviews, peer reviews, dry-runs, and mission milestone reviews.

In addition to the day-to-day support of the LADEE development, Goddard was responsible for many of key elements on the LADEE mission. Goddard/Wallops was responsible for managing the launch vehicle development and the launch campaign. Goddard/Greenbelt was responsible for managing the science instruments; managing the lasercom demonstration payload; managing the Science Ops Center (SOC) and providing a team of engineers to support Ames in every aspect of its spacecraft and mission development. The table on the next page captures some of the key contributions Goddard made to the LADEE Mission and photo 4 includes some of the key Goddard Team members. Goddard contributed to the success of LADEE in many ways. The table does not capture every effort or person.

Photo 4 – The (partial) LADEE Goddard Team

LADEE is a historic mission and it's thrilling that Goddard, both Wallops and Greenbelt, have such a large role in it. The breakthroughs in this mission, from helping to resolve a past Apollo mystery, to demonstrating future communications capabilities, to demonstrating the viability of peacekeeper components and the Minotaur V launch vehicle, are very exciting for NASA.

Bob Caffrey / Code 460
LADEE Mission Manager

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WBS	Role	Summary	Team Members
2.0	SE Support	Code 500 provided the Deputy Mission SE, Mission Design Lab, Planetary Protection, Orbital Debris & Flight Dynamics support	Mast, Oberright, Rodriguez-Juarbe, Hull, Sampler, Nicoletti, and more
3.0	Mission Assurance	Code 300 provided Mission S&MA support including the Deputy CSO, QA, Safety, Contamination, Parts, Material, and Review Support	Melito, Casey, Dedalis, Gallo, Hull, Leitner, Powers, Rutledge, Uhl, Straka, Woronowicz, Errigo, Aziz,and more
5.1	P/L Mgmt/ Resources	Code 460 provided Payload management and Resource Analysis support	Caffrey, Marechek, Montanez
5.2	P/L Systems Engineering	Code 460 provided Payload SE support	R. Wingard, Hall, Earl, and more
5.3	Payload SM&A	Code 300 provided Payload S&MA support including the Deputy CSO, QA, Safety, Contamination, Parts, Material, and Review Support	Archer-Davies, Cockrell, Moore, and more
5.4	NMS Instrument	Code 690 and Code 500 provided instrument development support.	Mahaffy, King, Kellogg, Tan, Jaeger, Barciniak, Weidner, Lyness, Nolan, Harpold, E. Wingard, Hengemihle, Carrigan, Bendt, Noreiga, Noreiga, Westberg, McClaeb, Johnson, Wilkinson, Saguelnitzky, Loughlin, White, and more
5.5	UV-Visible Spectrometer	Code 300 provided instrument S&MA support (including QA, Safety, Contamination, Parts, Material, and Review support) and Code 500 provided Thermal, FPGA, and FSW support.	Cockrell, Moore, Rutledge, Uhl, Smith, Fraeman, Godfrey, and more
5.6	LDEX Instrument	Code 300 provided instrument S&MA support (including QA, Safety, Contamination, Parts, Material, and Review support) and Code 500 provided Thermal, FPGA, and thermal blanket support.	Cockrell, Moore, Rutledge, Uhl, Smith, Fraeman, Young, and more
5.7	Laser Com Payload	Code 450 provided management and SE; Code 300 provided payload S&MA support, and Code 500 provided Thermal, Mechanical, and Electrical support.	Cornwell, Menas, Feehan, Shaw, Knapp, Lafon, Volosin, Gordon, Pendus, Peabody, Yang, Zeller, S. Smith, Barclay, and more
5.8	Science Ops Center (SOC)	Code 580 developed a multi-mission SOC for both I&T support and flight ops	D. Smith, Sager, Swenson, Hanna, Kreisler, Navas, Heiges, Ido, and more
5.10	Payload I&T Support	Code 568 provided Payload I&T support	Hoffman
6.1	Structures/Mech Support	Code 543 provided structures/mechanical support	Cooper, Stevens, Simmons, and more
6.2	Propulsion Support	Code 597 provided propulsion support	Willis, Glubke
6.3	Thermal Support	Code 545 provided thermal support	Nguyen, Quinones, and more
6.4	Power & Electrical Systems Support	Code 563/565 provided power/electrical systems support	Beaman, Eckert, V. Johnson, and more
6.5	C&DH Support	Code 561 provided C&DH/Avionics support	Godfrey, Johnson, T. Smith, and more
6.6	Telecom Support	Code 567 provided transponder development support	Acosta, Sank, Charlson, Shama, and more
6.7	GN&C & FDF Support	Code 591 & 595 provided GNC and FDF support	Mason, Richon, Lamb, and more
6.8	Flight SW Support	Code 582 provided flight S/W support	Marquart, Bartholomew, Strege, Medina, and more
7.0	Mission Ops Support	Code 580 provided mission support (including ITOS)	D. Smith, Marius, and more
8.0	Launch Vehicle Support	Code 800 implemented all launch vehicle activities	Underwood, Voss, Wilcox, Fitzpatrick, Thompson, Neely, Whealton, and more
9.0	GDS Support	Code 580 provided Ground Data System support	D. Smith, Milner, and more
10.0	Systems I&T Support	Code 568 provided System I&T support	Wright, Kilroy, Hoffman

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explosively transferring energy from one to the other in a process that is important on the Sun, other planets, and everywhere in the universe, known as magnetic reconnection. Reconnection limits the performance of fusion reactors and is the final governor of geospace weather that affects modern technological systems such as telecommunications networks, GPS navigation, and electrical power grids. Solving magnetic reconnection will unlock understanding of a fundamental and universal energetic plasma process that drives our space weather and affects and limits our use of technologies on Earth.

At GSFC about 125 NASA Civil Servants and another 150 onsite contractors built the spacecraft and are assembling and testing the four observatories. The Mission Operations Center is being built at GSFC and the Science Operations Center is located at the University of Colorado. The science instruments have been built by a team of institutions that include the Southwest Research Institute (SwRI) in San Antonio, the University of New Hampshire, John Hopkins Applied Physics Lab, the University of Colorado, UCLA, the Austrian Institute for Space Science, Meisei Corporation in Japan, and NASA GSFC. SwRI provides science leadership for the mission and integrated all instruments onto an instrument suite for delivery to GSFC. GSFC provides one of the key instruments for MMS known as the Fast Plasma Investigation.

With four observatories to build and test at GSFC, MMS has some unique challenges. The spacecraft are far from small, with each observatory carrying 25 instruments. The MMS manufacturing effort was large, diverse and distributed among over 40 organizations. A staggering total of 638 flight components and boxes were built and delivered to GSFC and SwRI for integration into four observatories. In order to accommodate this amount of hardware, the MMS Project was required to build its own 4,300 square-foot clean room. By testing so many common parts, MMS uncovered and corrected part issues that would not have been uncovered if the mission comprised only one spacecraft. The Project utilized enhanced configuration control processes to ensure traceability for each observatory. In order to build spacecraft in a staggered fashion, MMS personnel were required to multi-task with board manufacturing, component testing and observatory integration and testing all going on at the same time.

MMS started environmental testing in earnest this past summer. Acoustics, vibration, shock and EMI testing have been completed on some observatories. Thermal vacuum testing of the first observatory started this November at the Naval Research Lab. With four observatories to test, the environmental campaign will be long and demanding for the MMS team. Although the observatory thermal vacuum tests are done serially, many other observatory activities must be done in parallel during these tests in order to meet the schedule for the launch date.

All four MMS spacecraft will be stacked for launch on an Atlas-V 421 rocket from Cape Canaveral in late 2014. After launch and commissioning, MMS spacecraft will fly in a tetrahedron formation, as close as 10 km apart. In order to maintain the formation, the spacecraft are required to make precision thruster maneuvers every few weeks, all while spinning at 3 rpm. MMS employs two mission phases to optimize encounters with both dayside and night-side magnetic reconnection regions. Because reconnection events are not stationary and move quickly through space, MMS will acquire science data with high time resolution of 30 msec. MMS will collect data continuously in regions of interest but only downlink data likely to be captured during a reconnection event. All MMS spacecraft will eventually be positioned 25 Earth Radii away from Earth, almost half way to the Moon.

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Although much work lies ahead to complete testing of four observatories in the next year, the MMS team is well positioned to succeed in building and launching a NASA Category 1 mission. The experience gained in working on MMS is invaluable. When the mission is completed, a number of people will be able to say they built not one but four large spacecraft that will make new discoveries in science and increase our knowledge of the universe. Who knows what it will lead to? Not bad for a day's work.

Two MMS observatories being prepared for shock testing at GSFC

Brent Robertson / Code 461
MMS Deputy Project Manager

Business Change Initiative (BCI) and the Joint Confidence Level (JCL) Handbook

In 2011, the Flight Projects Directorate established the Business Change Initiative (BCI) to comprehensively evaluate management, communication, and information sharing mechanisms across Goddard's flight programs and projects to promote the application of Program Planning, and Control (PP&C) best practices. To support this objective, the BCI's Cost Estimating Action Team crafted a Joint Confidence Level (JCL) Handbook for projects required to perform an advocate JCL leading to Key Decision Point (KDP)-C.

A handful of projects have generated their advocate JCL position and the Cost Estimating Action Team's Param Nair briefly sat down with Matt Ritsko (Code 460), the JCL project lead for Gravity and Extreme Magnetism Small Explorer (GEMS), and Vince Elliott (Code 433), the JCL project lead for Origins Spectral Interpretation Resource Identification Security – Regolith Explorer (OSIRIS-REx) to capture their thoughts on various aspects of the JCL process and advice for teams who will be involved with a JCL in the future. The GEMS program was one of the first at Goddard to conduct a JCL following a more standard approach and OSIRIS-REx just recently completed its JCL.

Article Takeaways

- Have an in-depth understanding of your program or project's risks, schedule, and costs
- Engage technical and subject matter experts early and often
- Make realistic inputs and educate stakeholders like the Standing Review Board
- Produce a model that is highly informative
- Take advantage of helpful resources such as the GSFC JCL Handbook

Param Nair: Understanding that cost, schedule, discrete risks, and generic uncertainty are the four major inputs to a JCL model, what are some critical success factors for advocate JCL model development?

Matt Ritsko: The right mix of technical and resource personnel was important while developing the product. GEMS did fine, but we could have benefited from more technical participation from subject matter experts. Success of the model depends on providing realistic inputs and being transparent. Preplanning and having an early handle on risks and a stable schedule and budget plan are key inputs to the JCL model.

Vince Elliott: Humility is a critical component of success because it can lead to more advanced cooperation. Experienced personnel are open-minded to unexpected developments. Furthermore, at least one subject matter expert from each component area is necessary.

Param Nair: What is the appropriate, ideal duration of the JCL process?

Matt Ritsko: We took 3 to 4 months to complete our JCL, but in retrospect, 6 to 8 months would have been better. We started with monthly meetings which progressed to bi-weekly tag ups. Nearing the deadline, refinements were made daily.

(BCI continued on page 11)

(BCI continued from page 10)

Vince Elliott: We benefited from the other projects that had done a JCL before us and improved the process. Accordingly, we knew we had to devote time to it. Projects need to own the JCL and it takes time to wrap your arms around a new process, especially a detailed assessment like the JCL.

Param Nair: Did the model produce valuable insight?

Matt Ritsko: Being the first JCL on Center using the current process, I was initially skeptical and was concerned about the final product. Additionally, being on a tight review schedule between Preliminary Design Review and KDP-C, I was concerned the JCL would be a distraction. Early on, I viewed the JCL as a "check the box" activity for the project; however, having the support from the Flight Projects' Resource Analysis Office and directorate technical experts via the BCI made a difference. The JCL turned out to be useful and collaborative. As I learned about the JCL, I liked it and found it to be an insightful product. If, by osmosis, the model predicts what I am currently feeling in terms of project performance, then my confidence in the model is stronger. Multiple iterations of the model and adjustments to risks and sensitivities allowed me to feel an ownership and trust in the model's output.

Vince Elliott: I had some prior JCL experience from work performed by The Aerospace Corporation in the proposal world but this was very different. I was not expecting this depth and was caught flat-footed to some extent. But the team took ownership midway after connecting the dots (especially on the evolving programmatic maturity over time). Once we knew the ins and outs, we didn't look back. The task-level insight from the JCL model was much more useful than aggregate numbers from other sources.

Param Nair: Could you talk a little about your interactions with the Standing Review Board (SRB)?

Matt Ritsko: There is a shift in expectations with the implementation of the projects and use of the JCL. Previously, elements of a project may have had an engineer discussing only technical aspects and a business lead only providing cost spreadsheets. This segmented approach, while never ideal, may have functioned well enough in some cases to clear hurdles. The sensitivity to cost and schedule in today's environment and greater oversight from external stakeholders, such as Congress, Office of Management and Budget, Office of Inspector General, and NASA Headquarters heightens the burden of proof. Project team members have to be more aware of the whole picture and not stove piped based on disciplines. Everyone needs to take and demonstrate ownership and commitment to achieving a mission's goals (technical, cost, and schedule). The JCL is an analysis tool that can help demonstrate to reviewers that the team has a detailed understanding of their baseline. This is always important, but will receive more scrutiny in a severely constrained environment. In the case of GEMS, we did not receive any specific feedback from the SRB on the JCL, probably because it was so new.

Vince Elliott: The SRB was utterly convinced that we both knew the model inside out, and that the model was an accurate portrayal of the program. In fact, they commended us on the use of innovative aspects of our JCL model. Many SRB members are chosen for their experience in prior comparable missions. For example, our SRB Chair was also the Chair of the Juno Mission. We

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(BCI continued from page 11)

translated model-speak into SRB language which helped with items such as distinguishing discrete risks from generic uncertainty. Also, we spoke to historical missions for the latter (generic uncertainty) because most SRB members are technical experts well versed in comparable historical missions – like comparing cost and schedule performance of past sample return missions.

Param Nair: What challenges did the JCL present?

Matt Ritsko: The process was more lengthy than expected and time constraints prevented us from pursuing options in the model (e.g., running impact analyses if reductions to the mission's scope were implemented). Ideally, more time to educate non-business staff to the benefits and details of a JCL model would have been useful.

Vince Elliott: This is one of many estimates leading to KDP-C and collectively, it is time consuming. Also, projects are fluid while the JCL snapshot is static.

Param Nair: What advice would you offer to future Goddard teams regarding JCLs?

Matt Ritsko: Future teams should take advantage of the support provided by the BCI and utilize the Goddard JCL Handbook. Utilizing the resources that are available early in the process will help build a better product. Also, make sure you take ownership of your JCL, make realistic inputs, and educate your stakeholders. This will build confidence in the model's outputs.

Vince Elliott: Regardless of how intrusive any assessment may be, buckle down and accept it. It is important to reviewers and external stakeholders. Ensure a good representation of leads, start early, and take ownership and control. Take advantage of institutional support via the BCI.

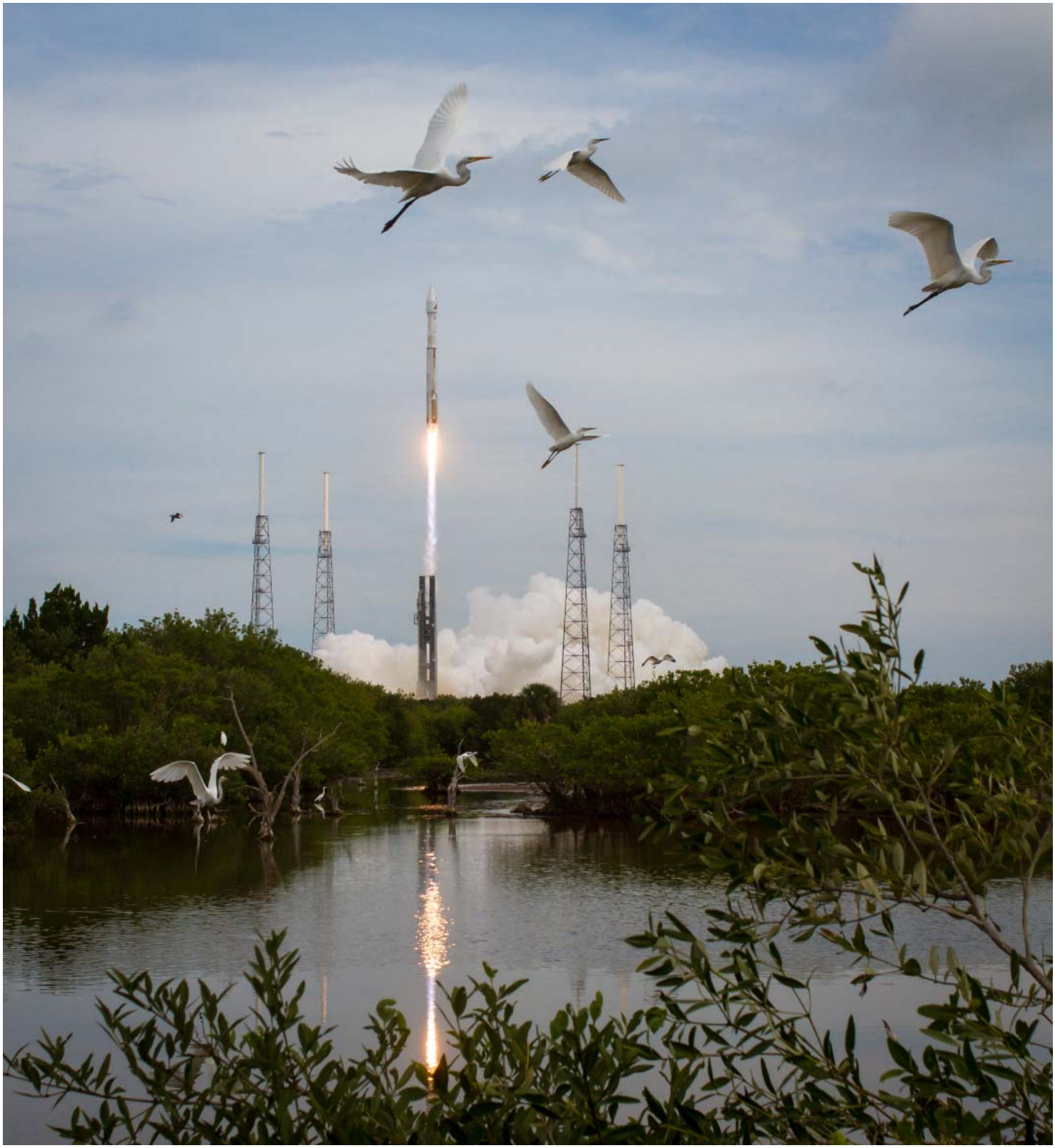
Param Nair / Code 401
Operations Research Analyst

Flight Projects Development Program Update

The Flight Projects Development Program (FPDP) has encountered a few twists and turns in the road (including the government shutdown!), resulting in a delayed FPDP job announcement date. We are working with Office of Human Capital Management (OHCM) to finalize the job announcement and anticipate an early December posting in USAJobs. The job announcement will describe eligibility requirements, as well as specifics about the application process. Once the job announcement is posted, FPD will host a Lunch and Learn where interested and potential applicants can obtain additional information concerning the FPDP application process and related topics, to optimize their application submittal. Once the applications are vetted through the OHCM referral process, the FPDP Governance Board will interview and select participants in the months of January and February, 2014. Additional information about FPDP can be found at: http://fpd.gsfc.nasa.gov/images/FPDP%20September%2010%20Lunch%20and%20Learn.pdf

Cecilia Allen Czarnecki / Code 400
FPDP Program Manager

**MAVEN is doing well on its journey to Mars,
now over 200,000 miles away from Earth, never to return.
Safe travels MAVEN!**



A New Game in Town for Instrument and Technology Development at GSFC

INTRODUCTION

Introducing, the newest Division in the Flight Projects Directorate, the **Instrument Projects Division (IPD)**. Code 490 was formed to align the management responsibility for in-house instruments with the outstanding management skills and experience of the Flight Projects Directorate (FPD). The move resulted from a re-organization of the FPD and the Applied Engineering and Technology Directorate (AETD) where the management responsibility for in-house science instruments moved to FPD, and the instrument systems engineering was united with the mission systems engineering within the Mission Engineering and Systems Analysis Division, Code 590, of AETD. The reorganization is a move to provide focus in the work of designing, building, and delivering in-house instrument and technology efforts, thereby making GSFC even stronger and more competitive in providing world class scientific instruments. All in-house instrument and technology projects with a Life Cycle Cost (LCC) of $20M or more will become a management function under the IPD. The IPD currently provides the primary management and infrastructure functions for nine in-house instrument projects and one technology development with the capacity to expand.

WHO WE ARE

The Instrument Projects Division is led by a decidedly experienced management team whose combined experience at GSFC nearly exceeds 100 years in in-house and out-of-house projects. The Associate Director of the Instrument Projects Division is Ken Schwer. Ken is a highly experienced Project Manager with nearly 30 years of experience both at GSFC and industry. His most recent accomplishment was the successful launch and in-orbit commissioning of the Landsat Data Continuity Mission (LDCM). He also served as the Project Manager for the enormously successful Suomi National Polar-orbiting Partnership (SNPP) and the Project Manager for the Solar Dynamics Observatory (SDO), and as the Mission Manager for the Quick Scatterometer (QuickScat). Serving as a Deputy Division Chief, Rob Lilly has over 30 years of project experience most recently serving as the Deputy Project Manager, part of the dynamic duo management team for LDCM and SNPP. Rob also spent seven outstanding years as the Deputy Project Manager on SDO. Serving alongside Ken and Rob as a Deputy Division Chief is Laura Milam-Hannin with over 30 years of experience at GSFC. She most recently served as the Deputy Division Chief for the Mechanical Systems Division (MSD) in AETD. Other positions in AETD include Associate Branch Head and Branch Head in the Electrical Systems Branch and Branch Head in the Integration and Test Branch in the Electrical Systems Division in AETD. A graduate of the Code 400 Project Management Development Emprise (PMDE) program, she also served as an Instrument Manager for two Earth Science instruments in the Earth Observing System Program. No successful organization is complete without a skilled Business Manager. Rob White comes to the IPD from AETD where he served as the Associate Chief of the 501 Business Office for R&D. After joining GSFC, Rob served as a Resources Analyst and a Business Manager for the Code 200 Institutional Directorate. He also served as the Financial Manager on the Astro-H and Soil Moisture Active Passive (SMAP) instrument projects.

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Ken Schwer Rob White Laura Milam-Hannin Rob Lilly

OUR CHARTER

The IPD will provide the management and oversight for the programmatic development of all GSFC in-house instrument and technology efforts greater than $20M LCC and will negotiate on projects of lower LCCs. Under the IPD umbrella, each project will be provided with an Instrument Project Manager and most will have a Deputy Instrument Project Manager. IPD also provides a Resource Analyst and some projects will have a Business Manager or a Deputy Project Manager for Resources. A major responsibility of the Division is to provide dedicated infrastructure to each project. The IPD provides the personnel management including all performance reviews, awards, travel and training approval to all Civil Servants assigned to the Division, and provides Branch type oversight for Project procurements. IPD provides business management for the IPD Division Office and supervisory oversight to the Project Civil Servant resources staff. A Deputy Business Manager, Matt Mazur (acting) will help provide the oversight necessary for the large resource staff. The resources staff will provide the oversight, planning, analysis, tracking and reporting to manage the division office and project finances, and future planning and analysis associated with new business proposals. They will provide the expertise and oversight of Basis of Estimates (BOEs) including the budget for Civil Servant and contractor manpower; manufacturing and testing; materials and testing procurements; budget analysis, review and phasing; budget submittals for reporting and planning and Earned Value Management (EVM). Per NASA 7120.5, EVM is required for all projects over $20M and is therefore an important part of the IPD function and support. The focus of EVM is on the project Work Breakdown Structure (WBS), the level and methods of reporting, and proper level of staffing. The IPD will provide support for the structuring and tailoring of the process for projects to make EVM a value added tool.

Matt Mazur—DBM (acting)

(IPD continued on page 16)

(IPD continued from page 15)

IPD partners closely with Code 401, the Advanced Concepts and Formulation Office in providing technical, programmatic, and resource management review of new proposals throughout the life cycle of the proposal from the initial concept through submittal. As the organization responsible for the implementation of a new Instrument Project, the IPD has a vested interest in the development of every aspect of the proposal for technical, cost, and schedule. The IPD will provide initial resource planning help to capture managers and proposal managers as well as reviewers for Peer, Technical and Management Review, Blue, and Red Team reviews. They provide candidates for new proposal Instrument Project Managers. The IPD has a voice in Code 400's vote on a new proposal.

As part of the infrastructure, the Division Office will carry a Chief Instrument Development Engineer and a Chief Safety and Mission Assurance Officer, both yet to be named. The Chief Instrument Development Engineer will provide technical leadership and support for each project. Specific duties include requirements generation/verification; anomaly and incident review and resolution and support of internal design reviews. This Chief also serves as a consultant and provides coordination for GSFC Gold Rules, GEVS, Lessons Learned, and NASA Standards. The Chief Safety and Mission Assurance Officer provides performance assurance leadership and support for all projects specifically for reliability, quality assurance, software assurance, EEE parts control, materials and process control, environmental verification, system safety, radiation, contamination control and design reviews. Another valuable contribution to each instrument effort is Procurement support. The Division Office has a Procurement Liaison Officer, Nylse Ortiz Collazo who will serve as a single point of contact between the Division and Code 200. At the time of writing, the Code 490 procurements are supported by six procurement offices. Besides providing subject matter expertise, the procurement liaison will help facilitate communications and complete actions between procurement management and the Division office, and help anticipate future procurement needs.

Nylse Ortiz-Collazo—Procurement

Also as part of the infrastructure, IPD will provide discipline experts for top level support of each project. The discipline experts are in the areas of Configuration Management and Management Information System, Scheduling/Planning, Earned Value Management (EVM) and Risk Management. These subject matter experts (SMEs) are by definition senior highly skilled and experienced personnel. They will provide expertise and best practices in their discipline fields based on their in-house experience; training and consulting to the Project specific SMEs with help on the rules and regulations of the GSFC Quality Management System, surge support during peak times or for special circumstances at no charge to the project. They will also help establish each project early on by tailoring processes based on the size, risk category and complexity of the project. The Division has an Information Technology representative that provides IT security and support for the Division office as well as overall SME support to each project as needed. Lastly and arguably most importantly, the IPD provides Administrative and Logistics support for the Division and its personnel. IPD has experienced and highly effective administrative and project support personnel. They will provide the Division office and projects support for office moves, meeting scheduling and conference rooms, phone moves and computer set-ups, IdMAX requests, eMOD requests, property management, domestic and foreign badge requests, document preparations for reviews and presentations, and support for travel.

(IPD continued on page 17)

(IPD continued from page 16)

Bob Hesenperger—EVM Bill Paradis—Scheduler Jerry Klein—Risk Management
Toni Hagerty—CM/MIS

Karla Kahler—PSM Sara Dureja—Admin Chris Tinker—IT John Bruce—IT

OUR VISION, MISSION, and STRATEGY

Vision:

- To be the leaders in world-class scientific instrument projects that enable amazing new Discoveries

Mission:

- Provide unparalleled leadership in scientific instrument development by meeting our commitments on technical, cost, and schedule while maintaining a competitive edge in an ever increasing budget challenged environment for the greater benefit of the scientific community

Strategy:

- To get better at all three legs of the development stool (cost, schedule, technical) which will lead to happy customers, more in-house developments, employ/attract good people, and push science.
  - To achieve this, we will continually monitor our progress & document our challenges and successes to learn from our experiences
  - We will be flexible (one size doesn't fit all) and will assist teams to manage in a streamlined manner

(IPD continued on page 18)

(IPD continued from page 17)

OUR PROJECTS, THEIR MANAGERS AND RESPONSIBILITIES

There are ten projects in IPD. The Division Office and the Instrument Project personnel are responsible for the full success (technical, schedule and cost) of the Project in delivering hardware to meet the requirements of the mission project. The IPM is responsible for managing the Instrument Project and for programmatically reporting to the Mission Project. Due to the critical nature of in-house projects, the IPM has a direct reporting path to Center management. The mother organization of Code 490 provides a path or process for handling or negotiating differences of opinion on programmatic and technical details regardless of where the Mission management resides.

When you read about our projects, you will probably wonder why they are numbered the way they are. Great Question! Each project receives a 49X number or 490.X number based on whether the Instrument Project is a stand-alone full instrument or technology package delivering to a larger project or subsystems or components delivering to a large system or a very small instrument package.

Code 490.1 ExoMars MOMA-MS—The Mars Organic Molecule Analyzer (MOMA) will answer questions pertaining to the study of the possible origin, evolution, and distribution of life on Mars. The primary goal is the detection of organic molecules. The MOMA Mass Spectrometer will be provided to the mother MOMA instrument developed by the Max Planck Institute for Solar System Research, Germany. It is part of the overall payload to fly on the ESA ExoMars Rover.

Robby Estep—IPM

Joan Rodriguez—RA / Michelle Sohl—Senior RA

Code 490.2 Soft X-ray Spectrometer Astro-H—Astro-H is a Japanese X-ray astronomy mission, and will be primarily developed at the Institute of Space and Astronautical Science of Japan Aerospace Exploration Agency (ISAS/JAXA) in collaboration with U.S. (NASA/GSFC) and Japanese institutions. The mission will trace the growth history of the largest structures in the universe, reveal the behavior of matter in extreme gravitational fields, determine the spin of black holes and study neutron stars, trace shock acceleration structures in clusters of galaxies, and investigate the detailed physics of galactic jets. SXS performs high-resolution x-ray spectroscopy using an x-ray calorimeter spectrometer and x-ray mirror.

Jim Pontius—IPM

Pat Miller—RA

(IPD continued on page 19)

(IPD continued from page 18)

Code 490.3 JWST Near Infra-Red Spectrograph (NIRSpec)—The NIRSpec employs a micro-electromechanical system "microshutter array" for aperture control, and it has two HgCdTe detector arrays. The Detector and Microshutter subsystems will be provided to ESA for the NIRSpec instrument. NIRSpec will perform spectroscopic surveys of faint galaxies at high redshift; obtain sensitive spectra of transiting exoplanets and image line emission from protoplantary disks and protostars.

Tom Johnson—IPM

Code 490.4 Neutral Gas and Ion Mass Spectrometer(NGIMS) (MAVEN)— The NGIMS instrument is a high sensitivity quadrupole mass spectrometer. It will measure the composition and isotopes of thermal ions and neutrals in the Martian upper atmosphere. MAVEN will provide a comprehensive look at the present state of Mars' upper atmosphere and ionosphere and the process by which it evolves. This instrument was successfully delivered to MAVEN. It developed an issue during launch activities. It was removed, repaired, and returned to the Spacecraft at KSC during the recent government shutdown. This instrument is the one exception to the Code 490 numbering system, due to the under $20M price tag and the fact that it had delivered before the re-organization took place.

Todd King—IPM

Code 490.5 Soil Moisture Active Passive (SMAP) Radiometer—The SMAP radiometer will be the first radiometer in space to utilize digital detection techniques for polarimetry and RFI mitigation. SMAP will provide global measurements of soil moisture and its freeze/thaw state and to develop improved flood prediction and drought monitoring capabilities. This instrument successfully delivered on-time to JPL on May 3rd.

Michelle Sohl—Senior RA

Robby Estep—IPM

Code 491 Advanced Topographic Laser Altimeter System (Atlas) (IceSat II)—The instrument is a multi-beam micropulse laser altimeter. Atlas will examine how ice sheets will impact global sea level and ocean circulation in a changing climate. It will also measure sea-ice thickness to understand ice/ocean/ atmosphere exchanges of energy, mass and moisture. The Atlas instrument has two Project Managers, Cathy Richardson who concentrates on the external interfaces and Cynthia Simmons who focuses on the internal interfaces.

Cynthia Simmons—IPM / Cathy Richardson—IPM

(IPD continued on page 20)

(IPD continued from page 19)





Aprille Ericsson-DIPM ***Scott Reynolds—EVM***
Jahi Wartts—DPMR ***Paul Ondrus—RA*** ***Robert Montgomery—Senior RA***

Code 492 Fast Plasma Instrument (FPI) (MMS)—The mission will consist of a complement of spacecraft carrying identical instrument suites, which will seek to explore and understand the fundamental plasma physics processes of reconnection, particle acceleration, and turbulence on the micro-and mesoscale in the Earth's magnetosphere. FPI is the fastest full sky plasma analyzer ever developed. It's capable of instantaneous all-sky plasma sampling. Its purpose it to discover the detailed physics of the reconnection process including the factors that control it, its spatial distribution, and its temporal behavior.

Art Jacques (401)—IPM

Code 493 Laser Communications Relay Demonstration (LCRD) Payload—LCRD is a technology demonstration experiment to demonstrate geosynchronous relay to ground laser communications. LCRD will use lasers to encode and transmit data. Laser communications will allow communications rates 10 to 100 times faster than RF-based communication.

Glenn Jackson—IPM


l to r: Mike Hill-DIPM
Joe Hickman—RA
Sally Barcus—Senior RA

Code 494 *O*SIRIS Rex *V*isible and near – *IR* Spectrometer (OVIRS) (OSIRIS-Rex) --The overall mission is to provide a sample to be returned from an asteroid. The OVIRS instrument helps select a landing site on the asteroid and determines the asteroid composition through infrared spectroscopy. Specifically OVIRS provides mineral and thermal emission spectral maps and local spectra information from 0.4 to 4.3 µm.

Jason Hair—IPM

(IPD continued on page 21)

(IPD continued from page 20)

Code 495 NICER—An attached payload to the ISS, NICER will study the gravitational, electro-magnetic, and nuclear-physics environments embodied by neutron stars. It will explore the exotic states of matter within neutron stars, where density and pressure are higher than in atomic nuclei, confronting theory with unique observational constraints.

Sridhar Manthripragada—IPM

Tony Cazeau—DIPM

Dwight Norwood—FM

Jackie Peterson--RA

MAJOR BENEFITS OF THE IPD TO DATE

Here are a few of the benefits to instrument projects most of which were accomplished months before the IPD became an official organization.

- Streamlined instrument reporting by getting stakeholders to agree to modify the “champion” review process and make the FP MSR inclusive of code 300/500/600
- Coordinated and chaired the Independent Atlas Programmatic review at the request of Code 400
- Worked with Code 200 to provide a procurement lead to help Instrument Projects. Also, set up monthly meetings with Code 200 procurement management
- Provided Proposal and new business consulting to Earth Venture and Mars 2020 proposals
- Developed SharePoint – Active site for housing financial tools and templates for the 490 resources community
- Co-located and arranged office space, submitted furniture move requests, and provided logistics support to multiple instrument projects
- Set up tasks to provide infrastructure support in areas of EVM, CM, scheduling/planning, and risk management

The Instrument Projects Division is up and running and ready for business. We want to be the gold standard that everyone else strives to achieve. HQ, other agencies, and academic institutions will say that no one does it better than the GSFC Instrument Projects Division.

Laura Milam-Hannin / Code 490
Deputy Division Manager-Implementation
Instrument Projects Division (IPD)

Comings & Goings
July1 thru September 30, 2013

Comings:

Katie Bisci (external hire) to 440/Astrophysics Projects Division, Resources Analyst

Christine Bruner (external hire) to 444/SSMO, Resources Analyst

Gregory Dell (from 581) to 428/ESMO, Deputy Project Manager

Mark Severance (external hire) to 450.1/NIMO, Human Space Flight Network Director

Anthony Foster (from 581) to 450.3/SAR Deputy Project Manager

Claribel Ferrolino (from 150) to 474/JPSS Ground, Sr. Resources Analyst

Jonetta Johnson (external hire) to 420/ESPD, Division Secretary

Eric Ianson (external hire) to 420/ESPD, Deputy Associate Director

Stephanie Gray (from 501) to 401/ACFO, Deputy Program Business Manager

John Decker to 400/Flight Projects Directorate, Consultant

Kimberly A. Ruth (from 201) to 472/JPSS Flight, Project Support Specialist

Goings:

Tim VanSant (from 401) detail to HQs/SMD/Chief Technologist

Karen Fisher (from 400) to NASA Headquarters

John Decker retires from 400/FPD Associate Director

Deb Miller retires from 443/JWST, Project Support Manager

Deborah Cusick retires from 408/SSCO, Project Secretary

Lisa Hoffman, Code 400
Administrative Officer

New Business News
- An Update on FPD "New Business" Activities -

Looking at the recent past…

Earth Venture Class - Instruments (EV-I) – By the time this edition of The Critical Path is published, the latest competitive cycle for EV-I will be completed and GSFC will have submitted proposals for three exciting concepts to study our home planet. Of these, two proposals have had direct Flight Projects Directorate (FPD) involvement: Polarimeter to Evaluate Aerosol and Cloud Effects (PEACE) and Global Ecosystem Dynamics Investigation - Lite (GEDI-Lite). PEACE performs Decadal Survey recommended science by observing aerosols and will accomplish strategic science by fulfilling the aerosol and cloud observation objectives of Glory, a mission which failed at launch. The PEACE Principal Investigator is GSFC's own Dr. Brian Cairns (GISS-611) and the Instrument Capture Project Manager (ICPM) is Jaya Bajpayee (ACFO-401).

Equally exciting, GEDI-Lite will provide the first high resolution measurement of the three dimensional structure of the Earth's tropical and temperate forests and, as a result, GEDI-Lite's measurements will enable us to understand and predict the effects of changing climate and land use on the Earth's carbon cycle and biodiversity. The GEDI-Lite Principal Investigator is Dr. Ralph Dubayah, University of Maryland, and the ICPM is Ken Anderson (ACFO-401). Both of these missions are timely, relevant and represent exciting work for GSFC and our partners. Selections are expected on or about June 2014. Stay tuned!

Looking at the present…

Mars 2020 Instrument Competition – NASA Headquarters' Science Mission Directorate's Planetary Sciences Division has released an Announcement of Opportunity to propose instruments for a future mission to the "Red Planet." Instrument capture teams have been formed, are actively engaged in concept development and preparing for the proposal review process. These in-house instrument concepts are as varied in their concepts as they are compelling for the science investigations they will undertake. Proposals are due by January 15, 2014. Selections are anticipated on or about July 2014. I look forward to sharing more about these exciting instrument concepts in a future edition of The Critical Path.

(New Business continued on page 24)

(New Business continued from page 23)

Looking to the future…

Discovery Mission AO – In the near future the Center will ramp up its capture team efforts for the Discovery-class mission concept proposals. The planetary missions will offer our workforce community with excellent opportunities to participate in a competitive Pre-Phase A pre-formulation project effort. Please keep these capture team opportunities in mind as you examine options for your career development.

Organizational Changes…

In-House Instrument New Business Activities – On November 3, 2013, the Center's reorganization of in-house instrument management became official; and, as a result, FPD activities associated with capturing new in-house instruments became the responsibility of the 401/Advanced Concepts and Formulation Office (ACFO). To integrate this new function into the ACFO, we have elected to augment our existing organization with two new groups: the Instrument Capture Group and the Project Resources Formulation Group. The Instrument Capture Group will specialize in the development of in-house instrument proposals. Teams successful at capturing new instrument work for the Center will naturally feed into the 490/Instrument Projects Division. The Project Resources Formulation Group recognizes the critical role of the Directorate's Resources Management community. By centralizing study, instrument and mission resources formulation considerations into this new group, practitioners now have a focused location to bring their talents into the FPD New Business community. The chart on the next page presents the new and enhanced ACFO. A hearty "Welcome!" to all our newest members.

Recollections…

I write this New Business News article on the date of MAVEN's successful launch. What a thrill it was to see that huge rocket climb into the heights on its way to studying the "Red Planet". As I watched the launch I could not help but think of the Project Team that made it possible and the fact that MAVEN was a mission competitively won by the Center. Yes…the time and effort – and it is a lot of effort – put into the mission and instrument concepts of today's proposals culminates in days like today.

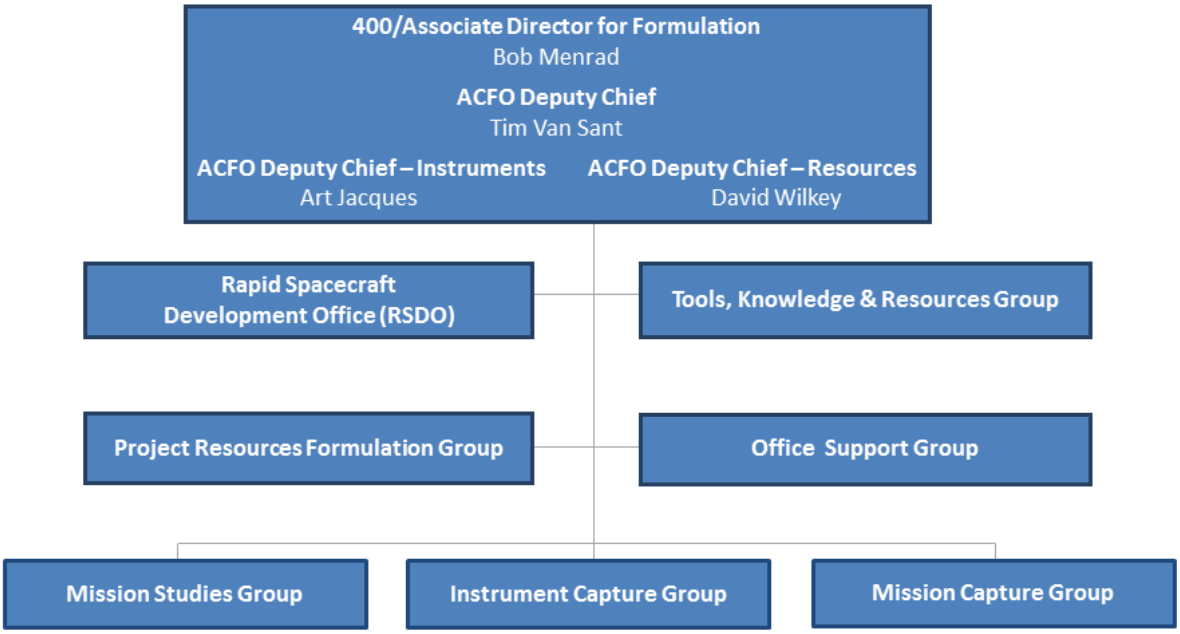
(New Business continued on page 25)

(New Business continued from page 24)

Congratulations to the entire MAVEN Project Team on the milestone of your successful launch…and thank you to the MAVEN Capture Team for your efforts years ago to make today possible.

Regards,
Bob

Advanced Concepts & Formulation Office (ACFO), Code 401



Approved by: _____ *November 4, 2013*
Robert J. Menrad *(Date)*

Bob Menrad / Code 401
Associate Director for Formulation

Knowledge Management Corner

Goddard's Informal Network of Risk Management Practitioners: Learning from the Diversity of Projects and Experiences

The Risk Management community at Goddard consists of a core group of full time risk managers, those who fulfill risk management functions on top of other functions, and a diverse group of professionals from varied backgrounds who have an interest in risk management across disciplines and across the Center (and not only within flight projects), or who might have some responsibility for risk management within their position. The Office of the Chief Knowledge Officer (Code 100) and the Flight Projects Directorate (FPD/Code 400), in conjunction with the Reliability and Risk Analysis Branch (Code 322) have been hosting occasional face-to-face gatherings to bring this community of practice together. A Community of Practice (CoP) is simply "a group of people who share a craft and/or a profession" (Wikipedia). To this day, the network formed by this community has been dynamic, with an evolving leadership and membership. This article will highlight some of the benefits of such communities of practice, with specific reference to topics discussed in two recent face-to-face workshops.

On smaller projects, the risk management function may be the responsibility of the Systems Engineer or the Deputy Project Manager while larger projects are likely to benefit from the full-time support of a risk manager. Even then, the full-time risk manager may be relatively new to the role and may come from an administrative or technical background. Risk management isn't something people get a degree in. It is primarily learned on the job and with supplemental training. Within NASA, a risk manager must also become very familiar with both NASA (NPR 8000.4A), and Center-specific (GPR 7120.4D) policies and requirements.

As a community or network, risk managers can benefit from meeting face-to-face on a regular basis to exchange experiences, seek advice, discuss policy changes and their impact, and share lessons learned. More experienced risk managers can share their experience and lessons learned. Less experienced risk managers should feel comfortable seeking advice. Indeed, risk managers—and others across Goddard with an interest in risk management—have, over time, organized and participated in a range of knowledge sharing workshops. Beyond these informal workshops, risk management training is also important since, as mentioned above, not everyone comes to the position with extensive formal training and/or experience, and there are changes in Center and Agency-wide policies that require occasional training to ensure that any new requirements are fully understood at all levels. For example, the FPD, Applied Engineering Technology Directorate (500), and Safety and Mission Assurance Directorate (Code 300) have been collaborating to develop a risk management module for Product Development Lead (PDL) training. Key objective of this module is to allow the product team to identify risks throughout project life cycle and to manage risks using the Goddard Risk Management Process.

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In the context of two recent informal risk management workshops, variations across programs and projects in terms of implementation of risk management processes were observed and discussed. Beyond the common NASA and Goddard requirements mentioned earlier, the manner in which each project implements risk management, first by developing its risk management plan and then by implementing the plan throughout the project's life-cycle is subject to variations. "By levying requirements, rather than dictating implementation," Jerry Klein (Code 470) notes, "the individual projects have the freedom to innovate and design a process (and tools) tailored to meet, not only the NASA/GSFC Risk Management requirements, but also the specific project requirements and *desirements*."

There is no "one-size-fits-all" risk management plan and therefore no template plan that could work for all projects. There are, however, sample plans from previous projects that can be used as a starting point. Some of the variations across projects may be the result of necessary tailoring for risk management processes and practices to match the unique characteristics of a project, and some of the variations are the result of preferences of the project management team and the risk manager.

> *Typically, GSFC Project Management Teams consist of managers coming off several different projects, resulting in a mix of past experiences, all contributing to a unique collective-perspective on Risk Management implementation.*
>
> ~ Jerry Klein, Risk Manager, JPSS Program

Since Goddard projects range from Class D (low rigor, high risk) to Class A (extreme rigor, low risk), a one-size-fits-all Risk Management implementation isn't feasible. For example, programs such as the Joint Polar Satellite System (JPSS) and the Geostationary Operational Environmental Satellite R-Series (GOES-R)—both close collaborations with the National Oceanic and Atmospheric Administration (NOAA)—are likely to have risk management structures reflecting the respective roles of NOAA and NASA within the program, whereas projects like the OSIRIS-Rex (Origin Spectral Interpretation Resource Identification Security Regolith Explorer) and GPM (Global Precipitation Measurement) will have risk management structures that reflect their respective, unique organizational partnerships.

Even within the NOAA/NASA partnerships, there are differences in how risk management boards are organized. On the JPSS program, NASA and NOAA operate distinct sets of risk management boards and actively participate in each other's boards. GOES-R operates under a shared NOAA/NASA Program/Project Management approach and as a result, the risk management function is more fully integrated across the two agencies.

Another way in which risk management can be implemented slightly differently across projects has to do with the types of relationships with partners and contractors. Even within

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the realm of contractors, there may be variations due to the specific nature of the contract, but also the contractor's prior experience working with NASA, and existence (or lack thereof) of rigorous risk management processes at the corporate level within the contractor organization. Jerry Klein noted that "Contractor Risk Management processes seem to run the gamut from the completely institutionalized corporate-dictated variety to none whatsoever. In every case, it has paid huge dividends to visit the contractor site, convey Goddard expectations, assist wherever needed, and initiate a dialogue that needs to be sustained for the entire project life cycle."

> *The GOES-R risk process is fully integrated with individual/separate boards at the Project level (Flight Project and Ground Project) that culminate in a joint Program level risk board.*
>
> ~ Adrian Rad, Risk Manager, GOES-R Program

What are some Implications and further questions for discussion?

- **The role of Harmonization and Standardization**
  Some level of harmonization of risk management processes is already mandated through the NPRs and GPRs to ensure, in particular, that reporting is standardized. This is critical to providing a common language and common metrics. "One of the reasons for a standard risk reporting matrix is to enable apples-to-apples risk comparisons between projects. This practice should also help us to understand the impact of cross-cutting risks more clearly," says Tony Diventi (Code 322), who currently leads center-wide risk management functions. "Translation" is still required when dealing with an international partner in order to understand and assess the risk information reported to the project. NASA cannot impose any requirements, including its own risk matrix, on the international partner. An example was provided by Kelly Catlett (Code 422), the risk manager on the Global Precipitation Measurement (GPM) mission, which involves collaboration with JAXA, Japan's aerospace agency. Kelly noted that "Prior to and at delivery of the instrument, JAXA reported instrument risks to GPM at monthly status reviews and interface reviews and NASA reported interface risk status to JAXA at the same reviews." Since delivery of the instrument, NASA has assumed ownership of the risks and reports the status to JAXA monthly.

- **Learning from the Diversity of Projects and Experiences**
  In organizations such as Goddard, where many projects take pride in being one-of-a-kind, people can find it challenging to see how lessons from their project could possibly apply to any other project. In the realm of risk management, diversity across programs and projects does not mean that there are no lessons applicable across programs and projects. For example, regardless of the exact structure of the risk management boards, there are lessons about managing risk management board meetings that can apply across projects and programs. One such lesson, articulated by Jerry Klein at one of the work-

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shops based on his experience as risk manager for Solar Dynamics Observatory (SDO) and Magnetosphere Multiscale Mission (MMS), might be that to make the risk management boards more effective, risks should be reviewed and refined with the risk manager before they are presented to the risk boards. This lesson was recently added to the FPD's Knowledge Exchange, which includes a Knowledge Map (K-MAP) highlighting risk management lessons across a range of past and ongoing projects.

> *One Project's issue could be another Project's risk.*
>
> ~ Tony Diventi, GSFC Risk Management Lead

- **Maintaining and Growing the Risk Management Community**
  What is needed to nurture and support the risk management community? Continued leadership at the Center level? Engagement of the core network of risk managers? Engagement of the broader community? Coordination of efforts across multiple directorates to leverage related activities such as training? The answer is "all of the above". Ongoing communications and regular face-to-face informal meetings such as knowledge sharing workshops provide opportunities for risk managers to engage in a continuous dialogue around implementation challenges, policy interpretation and operationalization, training needs, etc.

Related Resources

- Risk Management POC at the Center Level: Tony Diventi (Anthony.diventi@nasa.gov)
- FPD Knowledge Exchange: https://fpdspi.gsfc.nasa.gov/sites/400KE/
  - Risk Management Resources (links to policy documents, case studies, articles and more)
  - Risk Management Knowledge Map (lessons and insights from Goddard projects)
- Risk Management Practitioners' Working Group & Risk Management Lessons Learned and Stories (internal virtual space within the AETD wiki) https://aetdwiki.gsfc.nasa.gov/display/WIKI/AETD+Wiki

Barbara Fillip, Code 400
Knowledge Management Project Manager

With special thanks to John Decker (Code 400), Jerry Klein (Code 470), Adrian Rad (Code 400), Kelly Catlett (Code 422), Tom Bagg (Code 433) and Tony Diventi (Code 322) for their contributions to recent Risk Management Workshops and this article.

2013 Agency Honor Awards
Code 400 Awardees

The Agency Honor Awards Ceremony was held on August 27, 2013. Noted below are awards to Code 400. *

DISTINGUISHED PUBLIC SERVICE MEDAL

Holland Ford/Johns Hopkins University/400

For leadership in the development of three generations of outstanding Hubble Space Telescope instruments and the leadership role played in restoring Hubble Space Telescope's spherical aberration.

OUTSTANDING LEADERSHIP MEDAL

Jamie Dunn/443

For exceptional leadership guiding the Integrated Science Instrument Module Team, from hardware inception through delivery and the beginning phase of integration and test.

Jeffrey Gramling/454

For unwavering integrity, attention to detail, negotiation skills, and grace under pressure while managing a multi-Agency, concurrent build effort for Tracking and Data Relay System-K (TDRS-K), -L and –M missions.

Keith Parrish/443

For exceptional leadership as James Webb Space Telescope's (JWST's) Observatory Manager in developing and executing a plan to tackle the largest and most complicated replan proposal the Goddard Space Flight Center has ever undertaken.

OUTSTANDING PUBLIC LEADERSHIP MEDAL

Brian Roberts/Jackson and Tull Inc./408

For unparalleled dedication, technical expertise, and interdisciplinary collaboration in delivering the groundbreaking Robotic Refueling Mission demonstration.

(Agency awards continued on page 31)

(Agency awards continued from page 30)

EXCEPTIONAL ACHIEVEMENT MEDAL

Dena Butler/403

For dedication in collaboration and superb contributions to advance Center management of travel, conference reporting, and monthly financial reporting.

Melinda Deyarmin/470

For outstanding leadership, foresight, determination, and teamwork in creating and operating the multi-agency Joint Polar Satellite System Facility.

Parameswaran Nair/405

For exceptional achievement in the design, development, and adoption of the Joint Confidence Level Modeling approach for Goddard Space Flight Center's Flight Projects.

Mark Voyton/443

For the successful delivery of the very first flight scientific instrument for the James Webb Space Telescope (JWST).

Ronnice Wedge/422

For exceptional creativity in establishing an efficient process for the Global Precipitation Measurement (GPM) budget development, annual updates, and executing the strategy for balancing the budget annually.

EXCEPTIONAL SERVICE MEDAL

Jacquelyn Fiora/422

For 39 years of sustained and exceptional ability to develop Goddard Space Flight Center's financial systems and successfully execute all business aspects of the Small Explorer (SMEX), Landsat Data Continuity Mission (LDCM), and Global Precipitation Measurement (GPM) missions.

Karen Halterman/421

For exceptional service as a Project Manager and for the exemplary execution of critical NASA Flight Projects.

(Agency awards continued on page 32)

(Agency awards continued from page 31)

EXCEPTIONAL PUBLIC ACHIEVEMENT MEDAL

Walter Majerowicz/Walter Majerowicz Consulting/403

For exceptional collaboration, development, and dissemination of Goddard Space Flight Center's Flight Projects scheduling and planning guidelines, best practices, and training.

EXCEPTIONAL PUBLIC SERVICE MEDAL

Charles Calhoon/SGT, Inc/443

For years of indispensable service to the James Webb Space Telescope program, to the Goddard Space Flight Center, and to NASA.

Christopher Connor/G&N Corporation/470

For 25 years of exceptional service to NASA astrophysics and Earth science missions.

SILVER ACHIEVEMENT MEDAL (TEAM)

JWST Thermal Systems "Return-to-Green" Team

For identifying innovative solutions to one of JWST's most significant thermal challenges through the "Return-to-Green" assignment, preserving JWST's top science objective.

GROUP ACHIEVEMENT AWARD

HST Attitude Observer Anomaly Mitigation Team

For devising and implementing an innovative solution that enhances the robustness of the HST pointing control system and increases the expected system lifetime.

JWST ISIM Flight Software Team

For the exceptional ISIM flight software engineering achievements attained from more than ten years of unparalleled dedication to JWST, one of NASA's flagship missions.

(Agency awards continued on page 33)

(Agency awards continued from page 32)

NASA-ESA Earth Science Data Change Team

For the successful collaborative effort resulting in exchange of NASA's Moderate Resolution Imaging Spectroradiometer (MODIS) and Sea-viewing Wide Field-of-view Sensor (SEAWiFS) data collections for the ESA Medium Resolution Imaging Spectrometer (MERIS) Data Collection.

Robotic Refueling Mission (RRM) Team

For unparalleled dedication, technical expertise, and interdisciplinary collaboration in successfully performing the groundbreaking RRM demonstrations.

* Although Agency Awards were noted in the previous issue of The Critical Path, citations were not available for printing at that time.

Addendum to 2013 Peer Award Winners

Mission Impossible Peer Award **Linda Greenslade / 470**

Apologies to Linda for being omitted in the previous issue of The Critical Path.

Cultural Tidbits

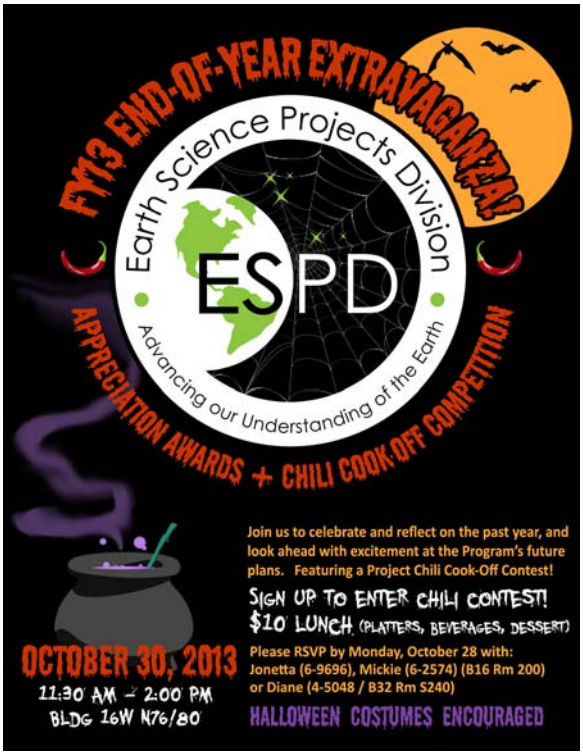
Did you Know……

... that Buddhists have a significant holiday in December? Bodhi Day is celebrated on December 8th in Japan or on the 8th day of the 12th lunar month on the Chinese calendar. Bodhi Day celebrates the day that the historical Buddha (known as Siddhartha) found enlightenment and became a Buddha or "Awakened One." The experience of enlightenment was found after meditation through discovering the roots of suffering and how to liberate oneself from it. Bodhi Day is traditionally observed through meditation, chanting of Buddhists texts and performing kind acts toward others.

Do you have a cultural tidbit to share? Send it to the Code 400 Diversity Council c/o Matthew Ritsko at matthew.w.ritsko@nasa.gov and we'll publish it in a future issue.

Code 420 "Extravaganza"

The Earth Science Projects Division (ESPD / Code 420) held an FY13 End Of Year Extravaganza on October 30, 2013 in Building 16W.



First, and most importantly, it should be noted that George Andrew won the chili cook-off competition, closely followed by Curt Hess and Tom McCarthy.

12 Appreciation Awards were handed out after the chili was consumed.

Mike Honaker, Instrument Systems Engineer, Orbital Sciences
Citation: For undergoing endless immunizations against infectious diseases and traveling to harsh locations (Baikonur, Kazakhstan and Kourou, French Guyana) on behalf of the POES Project.

Nancy Dixon, Project Support Specialist and Resource Analyst, Vantage
Citation: For accepting additional responsibility as the Resource Analyst for the POES Project Assurance Technology Corporation instrument contract while continuing to perform all other Project Support and financial management functions.

Pam Carrick
Justification: Pam joined the GPM Project 6 months ago. In this short time, she has tackled many administrative support duties with ease. Most notably has been Pam's involvement with travel needs of the Project. GPM will be launching from a remote island in Tanegashima, Japan. The process of initiating travel orders and making accommodations on the island is a huge effort. Pam's ability to maneuver travel has been a valuable asset to the GPM project.

Marcy Stanley
Justification: Marcy is the IT Lead for GPM and has stepped in to provide support to the team in areas of travel and launch site support.

Code 420 IT Team
Citation: For the Seamless Shutdown and Start Up of our Code 420 IT Hardware before and since the 2013 Government Shutdown.

Ed Jones
Citation: For your ability to go without sleep in the development of the DSCOVR IMS for their Ground System Review.

(Code 420 continued on page 35)

(Code 420 continued from page 34)

Bill Paradis
Citation: For your ability to go without sleep in the development of the DSCOVR IMS for their Ground System Review.

Sheri Platt
Citation: For your perseverance in the development of the Inception to Date Obligation and Cost data for each of the Decadal Survey Study activities in support of the Pre-Formulation Workshop.

Carolyn Ellenes
Citation: For leading the ESPD through its first ever Integrated Baseline Review.

Joanne Clarke
Citation: For your can-do support in the deployment of IT services for the LDCM launch Team.

Steve Jenne
Citation: For your sharing with the ESMPO your Deep Understanding of the OMB Quarterly Process.

Hank Wong
Citation: For your perseverance to simplify the monthly reporting process on Project Cost and Schedule.

For a listing of Code 420 (ESPD) accomplishments in FY2013 and upcoming events in FY2014, see charts above and at right.

Margery Rich / Code 420
Project Support Specialist

"Ride 'em, Clown Girl!"

Colleen Quinn-House retired not too long ago after a long career at Goddard, and is now a part-time contractor supporting JWST. In addition to her regular duties, Colleen often dressed up in one of her clown costumes to perform at special occasions (e.g., Xmas parties). She also is a member of the National Active and Retired Federal Employees Association (NARFE). Every year NARFE sends out a calendar to all its members entitled: Photo Contest Winners Calendar. Colleen's submittal of the shuttle picture (without her sitting aboard of course) was a winner for the month of November 2014. It was entitled "Retirement of Shuttle Atlantis," followed by her name and chapter (1734) number.

Quotes To Think About

"Spending time with children is more important than spending money on children."
Anthony Douglas Williams

"October. This is one of the peculiarly dangerous months to speculate in stocks. The others are July, January, September, April, November, May, March, June, December, August and February."
Mark Twain

"Bad Laws are the worst sort of tyranny."
Edmund Burke

"America is the only country where a significant proportion of the population believes that professional wrestling is real but the moon landing was faked."
David Letterman

"New opinions are always suspected, and usually opposed, without any other reason but because they are not already common."
John Locke

"The first piece of luggage on the carousel never belongs to anyone."
George Roberts

"The true test of a man's character is what he does when no one is watching."
John Wooden

Social News

- Mike (Code 433) and Tracy Donnelly became grandparents for the first time on August 27th. Their grandson, Jackson Robert, weighed in at 6 lbs., 9 oz. at 8:31 p.m. with a full head of hair.

(Horowitz Tintype continued from page 3)

exciting as GSFC and the rest of the NASA family were truly taking in-orbit satellite servicing to a new level.

Subsequent assignments included: Integration and Test Manager on the X-Ray Timing Explorer (XTE); Solid State Recorder PDL on the HST SM2 Mission, and Controller PDL on the HST Orbital Systems Test (HOST).

Steve also worked at NASA HQ for a few years in the early 2000s as a Program Executive. In that role he had an opportunity to observe and participate in how the Agency functions from the Headquarters perspective.

In 2004 he returned to GSFC as an Observatory Manager for the Global Precipitation Measurement mission. GPM is a partnership with the Japanese Space Agency to provide a global map of the Earth's precipitation content every 3 hours. GPM is preparing for launch in early 2014.

Steve joined the Explorers Program as ICON Mission Manager last summer. He is excited to be part of the team as the Explorers Program has a long and outstanding history of providing remarkable science and quicker access to space for a relatively lower cost.

Family

Steve is married to the beautiful Michelle Adato. Michelle works on international poverty reduction programs as Director of Social and Gender Assessment for the Millennium Challenge Corporation. They are the proud parents of almost two-year-old Alexander, perhaps the cutest baby on Earth, and proud dog parents to Franny and Zoe.

(Swann Tiintype continued from page 3)

Resources/Human Capital area. Her most challenging position was as Chief of the Talent Acquisition Office, where she led Goddard's staffing operations. Her most memorable position was as the Human Capital Strategist, a position in which she laid the groundwork for a Center Human Capital Strategic Plan.

Life Outside of Goddard

Donna lives with her husband, Jody, daughter, Samantha (20), and son, Adam (17) on their 200-acre produce farm in Calvert County, Maryland. Donna is excited that their oldest daughter, Jessica (25), son-in-law Joe, and granddaughter, Kinley (19 months) will soon be returning to the family farm to build their home. Donna is not your typical farmer's wife – although she loves to support the need for local farming, she leaves playing in the dirt to her husband! She is an avid sports fan. Donna and her husband love to support and brag on their daughter's collegiate volleyball prowess and their son, who is currently in the midst of the college recruitment process for football. Donna loves to take long walks on the farm, read, spoil her granddaughter, and clip coupons (she hasn't reached the EXTREME couponing ranks yet, but likes to save money all the same!).

*** NOTICE—THE CRITICAL PATH ***

Like so many other communications and newsletters, The Critical Path (TCP) will move to an electronic distribution in the future. Each edition will be sent as an attachment in individual e-mails to all our current recipients. We realize that this might take some time to accomplish, so it is important that our readers contact Paula Wood, TCP Production Assistant with their updated e mail addresses. Paula's e-mail address is: Paula.L.Wood@nasa.gov, or she can be reached by phone at: (301) 286-9125.

There still will be a limited number of hard copies made of the TCP. We will send hard copies of the next issue to those from whom we still have not received e-mail addresses, and/or who may not have means of receiving electronic data. Subsequent changes to e-mail addresses should be sent to Paula as well to receive future copies of the TCP.

The Editor

Wishing you Happy Holidays!!

The staff of The Critical Path hopes that all readers had a wonderful Thanksgiving and extend best wishes for a very happy Holiday season!!

FUTURE LAUNCHES CY 2014	
Tracking and Data Relay Satellite – L (TDRS-L)	JANUARY
Global Precipitation Measurement (GPM)	FEBRUARY
Magnetospheric Multiscale Mission (MMS)	OCTOBER

ATTENTION INTERNET BROWSERS:

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

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If you have a story idea, news item, or letter for The Critical Path, please let us know about it. Send your note to Howard Ottenstein via email: 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 April 7, 2014.