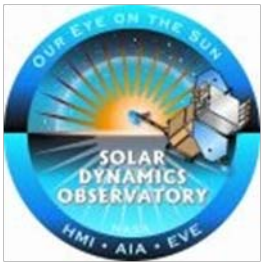
A Flight Projects Directorate Publication
A Newsletter Published for Code 400 Employees

Volume 18 number 1
2010 Spring/Summer

INSIDE THIS ISSUE:

SDO--The Best Mission Ever!
A Project Manager's Perspective

(Although I am sure everyone agrees with me)



First, let's talk about what SDO (Solar Dynamics Observatory) is, and why it's important. SDO is the first mission in NASA's Living With a Star (LWS) Program, a program designed to understand the causes of solar variability and its impacts on Earth. SDO is designed to help us understand the sun's influence on Earth and Near-Earth space by studying the solar atmosphere on small scales of space and time and in many wavelengths simultaneously.

(SDO Continued on page 4)

Tracking and Data Relay Satellite Successfully Completes Two Major Reviews

(TDRS Continued on page 16)

Message from the Director Of

Greetings:

Our 2 year launch marathon continued since my last report with the successful launches of both the Solar Dynamics Observatory (SDO-see story on page 1) and the Geosynchonous Operational Environmental Satellite – P (GOES-P). That brings our launch total for the last 2 years to 10 successes and no failures. Outstanding!

Solar images from SDO stunned the crowd at the First Light press conference on April 21 and Dr. Richard Fisher, Heliophysics Division Director at NASA HQ, said "This mission will have a huge impact on science, similar to the impact of the Hubble Space Telescope on modern astrophysics." Congratulations to the entire SDO team!

On GOES-P (now designated as GOES-15), all deployments are complete as is the initial engineering evaluation, and the first Infra-red image will be released shortly. Congratulations to the entire NOAA/ NASA GOES-15 team! Glory remains on schedule for launch in November and will round out the 2 year launch marathon.

Major milestones continue to be ticked off as well on missions in development. Mission Critical Design Reviews for both the Tracking and Data Relay Satellite – K (TDRS-K/see story on page 1) and the James Webb Space Telescope (JWST) were successfully completed, as were the Key Decision Point - C (KDP-C) gates for the Global Precipitation Mission (GPM) and the Landsat Data Continuity Mission (LDCM). The Ice, Cloud, and Land Elevation Satellite – II (ICEsat-II), also successfully completed KDP-A.

Of particular note is being given responsibility for the new Joint Polar Satellite System (JPSS) Program as a result of an Office of Science and Technology Policy decision directive in January. JPSS is the PM orbit segment of the NPOESS program. NOAA is the responsible Agency for JPSS with NASA/GSFC as the program management and acquisition organization. Within Code 400, there will be a JPSS program office headed by Preston Burch, his deputy Liz Citrin, a JPSS flight segment project headed by Ken Schwer, and a ground segment project headed by Dan Devito.

It is very hard for me to believe that I was there supporting the project at the time but HST just celebrated its 20th anniversary on-orbit in April. Where does the time go? I can't even imagine the world without the impact of the marvelous discoveries and scientific understanding that have come from this Great Observatory.

I want to congratulate Michelle Renaud, David Carter, Kevin McCarthy, and Jahi Wartts who recently graduated from the Project Management Development Emprise Program (PMDE). Also, please be sure to read all about the Code 400 Diversity Council and the wonderful impact they are having in the article by Nicole Turner in this issue.

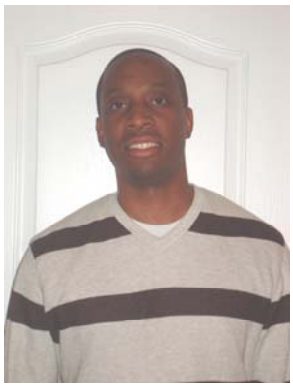
Lastly, I would like to acknowledge the passing of a former Director of Flight Projects, Bob Bourdeau. Bob was the Director in the mid 60s and early 70s and was responsible for shaping the early Flight Projects organization and setting the high standard by which we still live today.

As we move into the summer season, please take the opportunity for vacation, rest and relaxation.

George

PERSONALITY TINTYPE

Jahi Wartts



Jahi Wartts started as the Financial Manager for the Landsat Data Continuity Mission's (LDCM) Thermal Infrared Sensor (TIRS) project in May 2009.

Born: Saint Paul, MN

Education: Bachelor of Science degree in Business Administration from Florida A&M University; Masters of Business Administration degree from Howard University; Project Management Professional (PMP) certification

Life at Goddard: Jahi began working at GSFC as a cooperative education student in 2002. Upon completing graduate school, he converted to a civil servant in 2003. In his first assignment, Jahi worked as a Resources Analyst in AETD's Business Management Office supporting in-house R&D instruments. Jahi supported numerous projects, most notably IRAC and JWST Microshutters. In the spring of 2005 he accepted a position as a Program Analyst. In this position, Jahi was able to complement his R&D knowledge by gaining institutional experience supporting the Internal Research & Development (IR&D), the Exploration Technology Development Program (ETDP), the NASA Engineering & Safety Center (NESC), and the Innovative Partnership Program (IPP).

In 2006, Jahi was accepted into GSFC's Project Management Development Emprise Program (PMDE), a highly competitive project management program that provides

(Wartts Tintype Continued on page 18)

Mary Ann Esfandiari

Mary Ann has been the Associate Director for the Exploration and Space Communications Projects Division within the Flight Projects Directorate since May 2008. Under her direction, ESC (Code 450) is responsible for space communications, including the Tracking and Data Relay fleet of satellites (build for K, L in progress) called the Space Network, the Near Earth Network of ground stations, optical communications development (Lunar Laser Communications Demonstration for Lunar Atmosphere Dust Environment Explorer), Express Logistics Carriers for Shuttle/ISS, and the next generation of exploration communications and carriers.

Born: Washington, D.C.

Education: BS Physics and Astronomy from University of Maryland
MS Computer Science from George Washington University

Life at Goddard: Mary Ann started working as a co-op student in Flight Electronics in 1974. She has held many interesting and unique opportunities at Goddard. One of her earlier experiences includes working in the Micro-Electronic Lab doing oxide growth studies on silicon wafers. She then went on to the Lab for High-Energy Astrophysics where she spent 12 years serving as the science data systems manager and lead programmer for a variety of science instruments.

(Esfandiari Tintype Continued on page 18)

(SDO Continued from page 1)

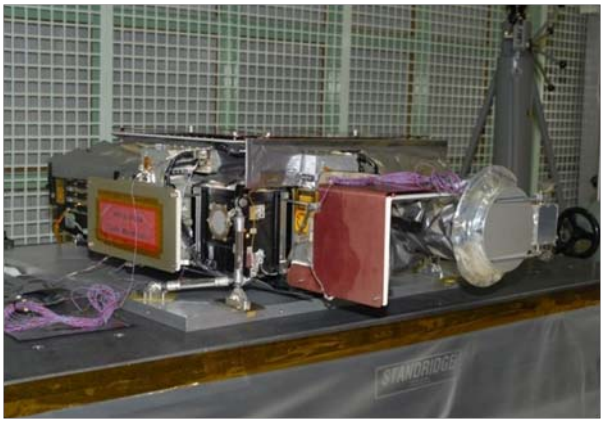
SDO's goal is to understand, driving towards a predictive capability, the solar variations that influence life on Earth and humanity's technological systems by determining:

- how the sun's magnetic field is generated and structured
- how this stored magnetic energy is converted and released into the heliosphere and geospace in the form of solar wind, energetic particles, and variations in the solar irradiance.

SDO will fly three scientific experiments to achieve these goals:

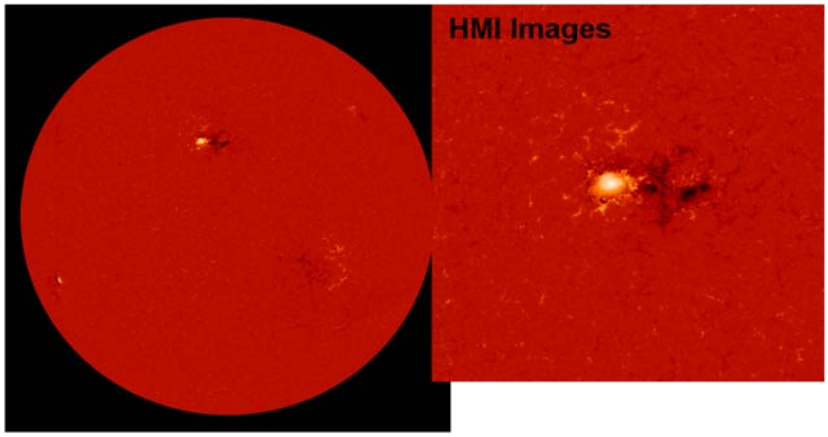
- the Helioseismic and Magnetic Imager (HMI)
- the Atmospheric Imaging Assembly (AIA)
- the EUV Variability Experiment (EVE)

Each of these experiments performs several measurements that characterize how and why the sun varies. These three instruments will observe the sun simultaneously, performing the entire range of measurements necessary to understand the variations on the sun. The instruments are all provided by Principal Investigators and institutions that are well-known in the heliophysics and space physics arena, and who are experienced in building space investigations.



HMI

HMI extends the capabilities of the SOHO/MDI instrument with continual full-disk coverage at higher spatial resolution and new vector magnetogram capabilities. HMI is provided by Stanford University, and Phil Scherrer is the Principal Investigator (PI). Stanford contracted with Lockheed Martin Solar Astrophysics Laboratory (LMSAL) to design and build the flight hardware. LMSAL also provided the AIA Instrument (see below), so there was quite a bit of synergism at LMSAL for these two instruments.



When HMI opened its door for the first time, everyone was holding their breath! The sun slowly came into view, and what did we see—a sunspot! Yes, confirmed, we were looking at the right sun!

And HMI can see INSIDE the sun and look THROUGH the sun to see the far side--Superman has nothing on HMI!

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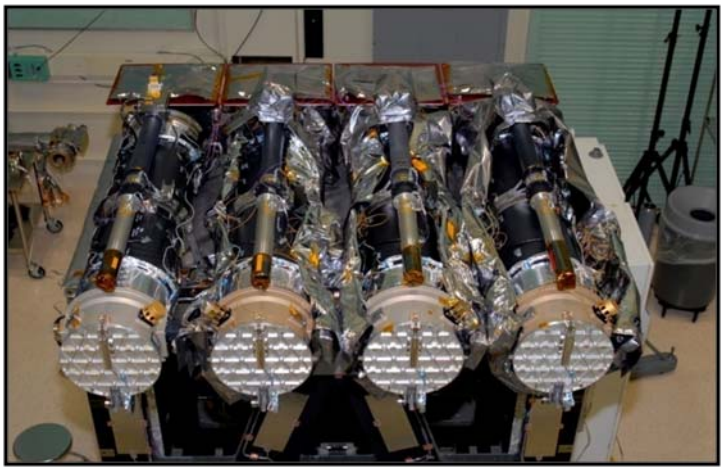
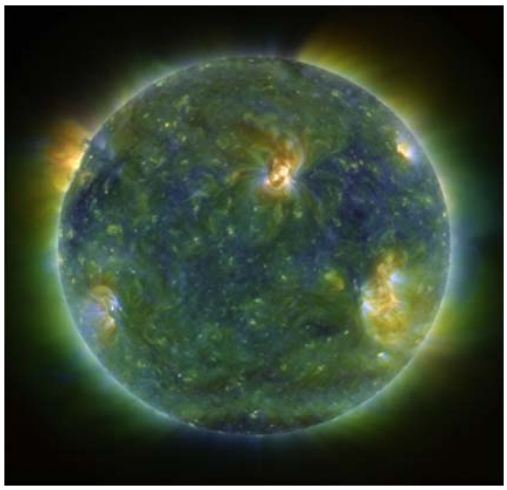
(SDO Continued from page 4)

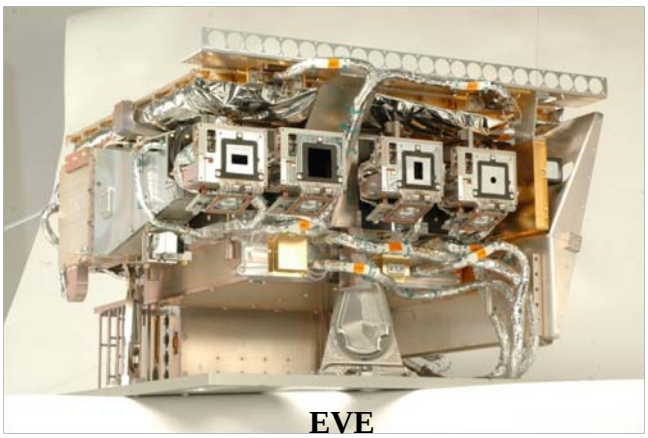


AIA images the solar atmosphere in multiple wavelengths to link changes in the surface to interior changes. Data includes images of the Sun in 10 wavelengths every 10 seconds. Lockheed Martin Solar Astrophysics Laboratory provided the Instrument; Alan Title is the PI. AIA images are fantastic, even frightening, as you can see the sun in action (in high definition) and watch violent events unfold.

AIA's telescope doors opened like clockwork—one, two, three, four—and revealed a beautiful and active sun. Soon after AIA started observing, the Sun rumbled! A Coronal Mass Ejection (CME) was observed by the instrument.



Building both HMI and AIA at LMSAL was certainly efficient; the instrument builds were able to share engineering, management and admin personnel, and even worked out shared procurements, for instance for the 4K x 4K CCDs, the biggest ones ever flown! These CCDs can image the full disk of the sun. AIA and HMI are also working together to capture and process data via the Joint Science Operations Center at Stanford. Their instruments are controlled at the shared Instrument Operations Center at LMSAL in Palo Alto. All in all, it has proven to be a very productive collaboration between the investigations, and a good deal for the Government.

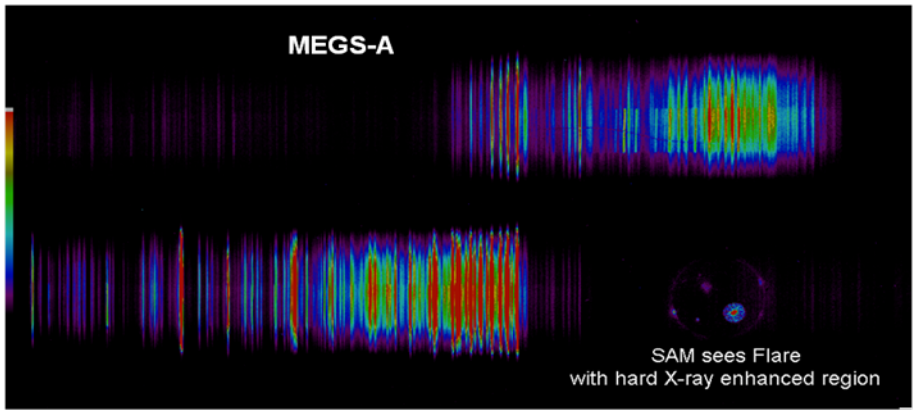


EVE

EVE measures the solar extreme-ultraviolet (EUV) irradiance with unprecedented spectral resolution, temporal cadence, and precision. This will help us understand variations on the timescales which influence Earth's climate and near-Earth space. Tom Woods is the PI, of the University of Colorado Laboratory for Atmospheric and Space Physics. So, although the EVE data is not as glamorous as the AIA and HMI images, EVE is measuring what actually affects us here on Earth—the solar irradiance that affects the ionosphere which in turn affects communications, power grids…space weather.

(SDO Continued on page 6)

(SDO Continued from page 5)



Here EVE observes a solar flare soon after opening its doors! Is this cool or what?

But, there is more to a mission than its instruments! SDO is one of the largest solar observing satellites ever placed in orbit—a total mass of 3000 kg (6620 lb) at launch, and dimensions of 4.5m x 2.2m x 6.25m (with the solar arrays deployed). The spacecraft is a robust 3-axis stabilized platform with full redundancy and cross-strapping. SDO's three instruments will send data back data at an astounding rate of 130Mbps, 24/7, for five years (with a goal of 10 years)! That's 1.5 Terabytes per day, every day! Do you know how much data that is—it is the equivalent of 500,000 iPOD song downloads per day!
Yes, SDO is BIG, in every way. And, it was built right here at GSFC, by you and your friends!

And just how do we get this data, really high definition videos of the sun, back to Earth! Well, the high gain antennas on the spacecraft point at SDO's ground antennas at White Sands all of the time, and transmit science data in the Ka-band frequency. Sounds easy, but it was extremely challenging to implement; GSFC engineers had to develop the first ever low-mass, low-power Ka-band transmitter! This will benefit not only SDO, but the entire space industry. LRO was able to take advantage of it even before SDO launched.

OK, so SDO produces a fire-hose of data, all of the time, and just what is catching it? SDO has two dedicated 18-m antennas at White Sands (where the NASA TDRSS antennas are also located, so they are not lonely). The science data is downlinked to both antennas simultaneously and the data is quality compared; only the best data is sent on to the Science Operations Centers. The antennas are placed a couple of miles apart, so that a localized shower or wind storm has a lesser chance of interrupting communications. SDO data is super critical; every bit is important—the requirements are that we get 99.99% of the data!

(SDO Continued on page 7)

(SDO Continued from page 6)

You can imagine what the Joint Science Operations Center is like, with all of this data coming in all of the time. It has dozens of computers to process the incoming data, many, many disk arrays and robotic tape storage devices. Of course everything is redundant and with hot backups; we can't afford to be down for long because the data will be backing up at White Sands and will eventually spill over into the desert! All of those bits blowing in the wind—we wouldn't want that! It's quite an operation and mostly autonomous—science data arrives, a copy is made for the archive, and the data is catalogued and processed to a level that is useful and understandable to solar scientists around the world. Then the fun begins (at least for the scientists) as they mine this wealth of data to learn how the sun operates, and how to predict what it is going to do. The best ever science? At least the best solar science, for sure!

(Look how tall and elongated the EVE team is, almost alien! Just kidding, it's the editing.) [-errr….. the editor would say it's the photography]

Was it hard to build SDO and get it launched? Well, we did have our challenges. Fortunately, the SDO team was without a doubt one of the best teams ever put together (although I can't take credit for that, the original PM recruited the team), and they made short work of even huge problems. I won't go into the problems here, suffice it to say that on a mission of this size and complexity, the challenges were of commensurate size and complexity. But the team worked through every problem and resolved every issue to deliver this beautiful mission! They let nothing stop them, not even 5 ft. of snow on launch day! The best team ever? Certainly!

Was it nothing but work, work, work? Not at all! As a matter of fact (and I do mean fact, because it was reported in the Code 400 Flight Projects Weekly Report so it must be true), SDO had the best parties ever! Many of you will recall the Tropical Tiki Bar party held in our conference room, where we went "back to the islands," so to speak. Or the Last Best SDO Holiday Party (until the next one the following year)! And of course, the post-launch party in Florida! Who will ever forget that? Who will ever remember that?

(SDO Continued on page 8)

(SDO Continued from page 7)

And speaking of launch, let me tell you a little bit about the launch campaign, since it's fresh in everyone's memory. We shipped early, because it was time to leave GSFC. Everything that needed to be done here had been done: the spacecraft had been built and the instruments had been integrated; in a friendly rivalry, SDO raced LRO to the Thermal Vacuum chamber, and completed environmental testing first (of course we immediately had to stand aside and let LRO "play through"). Then, tiring of Pre-Ship Reviews, we bullied our way into the launch site processing facilities at Astrotech six months ahead of our LRD in December, 2009. Since SDO actually launched in February of 2010, we were able to experience the full range of seasons in Cocoa Beach—the hottest summer with temperatures reaching 100 degrees, and the coldest winter, where we feared for the oranges!

Some technical issues surfaced at the launch site—not unexpected since SDO was in a new environment, and doing some things for the first time—flight battery inserts had to be replaced, an AIA relay that opens one of the telescope doors misbehaved, HMI had to investigate a few (too many) corrupted images, a critical launch vehicle connection was suspect. These issues were not trivial, and required the sustained and focused attention of SDO's experienced and dedicated team. You already know the result—the problems were all resolved to deliver the highest quality flight observatory to orbit!

SDO's original launch attempt was on Wednesday, February 10, 2010, after being delayed by the Shuttle launch for a day. Speaking personally from my seat in the ASOC (Atlas Spacecraft Operations Center), this was just not SDO's day. The weather was always forecasted to be a problem, and it was—winds were routinely exceeding the constraints throughout the entire countdown. Other problems kept cropping up—a ground station computer outage, an Atlas issue. The launch team (me included) didn't have a good weather plan thought out in advance. Everyone was wearing a frown! And, although we resumed the countdown at 4:00 minutes, we had to scrub at 3:59 because of high winds.

In the meantime, back at GSFC, Maryland had just experienced 3 feet of snow over the weekend, with an additional 2 feet on Tuesday. It was touch and go—would our team be able to get to the Mission Operations Center at GSFC to support the power-up and launch shifts (and the following days of 3-shift coverage)? Yes! Despite dire predictions, the SDO team did what it does best—recognized the risks, developed mitigation plans, and carried them out when it became necessary. SDO team members organized the 4-wheel drive brigade to get people to work, took over the Greenbelt Holiday Inn (sharing it with the snow removal crews) for the duration, and even camped out in GSFC conference rooms. The GSFC snow crews came to the rescue also, clearing the lots closest to the control center, directing our guys to safe parking places, and helping out wherever necessary. All of these people are heroes!

Some might say that the best mission is always the most recent one. Perhaps. The bad times fade quickly and the glow of launch remains. In addition to the technical triumphs, this SDO team has another important legacy. This mission involves diverse institutions—NASA HQ, GSFC, Stanford, LASP, LMSAL, and many others—who have learned how to communicate effectively, to ac

(SDO Continued on page 9)

(SDO Continued from page 8)

The following day, February 11, 2010, we tried again, and it was clearly our day! The opening of the launch window was 10:26am. At the ASOC we were on-station at 5am (the power-up shift at GSFC was on at 2:00am), and the countdown was one of the smoothest ever, even according to the KSC and Atlas guys (and they are never happy about anything!). SDO launched at the first opportunity in the window, into a rainbow! How beautiful! How fitting!

knowledge and respect each other's talents, and to focus on the ultimate success of the mission. Here at GSFC, as our team moves into other endeavors, we will take this knowledge and experience with us to incoporate into our new activities. And the friendships that were forged during the mission will endure beyond SDO!

So, log on to the SDO website, http://sdo.gsfc.nasa.gov, look at the amazing images of the sun as it is TODAY, and sing the SDO theme song from Ace of Base (although you will have the words wrong): "I saw the sun, and it opened up my eyes—I saw the sun."!

Returning to Active Duty

Mark Allen is leaving PAAC this month to assume his new role as Master Chief Petty Officer of the Coast Guard Reserve Force. To achieve this prestigious position you must be "a living example of the Coast Guard's core values of honor, respect, and devotion to duty." Mark's skills, attitude, and smiling face will be sorely be missed at PAAC HQ. His tour of duty will last 4 years and then we hope to see him back at PAAC!

RE-INTRODUCING……..
THE FLIGHT PROJECTS DIRECTORATE (FPD) DIVERSITY COUNCIL

From left to right:
Evette Brown-Conwell, Andre Dress, Sandra Cauffman, Priti Vasudeva, George Barth, Nicole Turner, George Morrow, Jane Liu, Dave Scheve, Steve Dobrosielski, Roberto Aleman, Helen Sullivan, Patricia Fogleman

Not pictured: Vince Gioliotti and Gilberto Colon

Though the Flight Project's Diversity Council has been serving as an advocacy group for diversity issues (within the Directorate) since its inception in 1996, when asked, only a few FPD employees were able to articulate the council's purpose.

So one may ask: "What is the Council's role?"

COUNCIL'S PURVIEW:

The Diversity Council is chartered to assist the Director of in creating an environment that is conducive to the recognition, development, understanding and utilization of each employee's skills, knowledge and abilities to achieve maximum productivity. To those ends, the Council:

- provides guidance and recommendations to the Director of in planning, implementing, monitoring and evaluating the Directorate's Diversity Programs;
- serves as a focal point for the concerns of employees with regard to diversity;
- provides educational forums for employees and managers on diversity and diversity-related matters and,
- helps to identify emerging trends that could impact realization of an inclusive environment and culture.

STRATEGIC PLAN UTILIZATION:

To aid the Council in fulfilling the above objectives, a strategic plan (modeled after the Center's Diversity Council Strategic Plan) is utilized. The FPD Strategic Plan contains measurable steps that address Three Key Diversity Strategies: develop employees to their maximum potential; create an inclusive environment and culture, and work towards being an "Employer of Choice".
As an evolving document, the Flight Project's Strategic Plan is continuously updated to reflect the changing needs of the Directorate.

(Diversity Continued on page 11)

COUNCIL MEMBERSHIP:
Council membership is comprised of Flight Project employees who are selected, across organizations, by the Directorate to serve term appointments.

ADHOC INITIATIVES:
In conjunction with the Council's efforts in assisting the Director of, the Council is active in Center-Level Diversity Initiatives such as Celebrate Goddard Day, Diversity Dialogue Project and Power and Privilege: Race.

Cognizant of the benefit that benchmarking provides, the Council's leadership meets with other directorate diversity councils and industry to study and adopt best practices.

If you are interested in effecting change within the directorate, consider being a member of the FPD Diversity Council. Contact any council member or refer to our website, http://fpd.gsfc.nasa.gov
The Council members are as follows:

Name	Code	Extension	Email address
Helen Sullivan, Chair	420	6-9177	helen.s.sullivan@nasa.gov
Nicole Turner, Vice Chair	423	4-5252	nicole.d.turner@nasa.gov
Roberto Aleman	461	6-6280	roberto.m.aleman@nasa.gov
George Barth	400	6-5894	george.barth-1@nasa.gov
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Priti Vasudeva	444	6-5152	priti.vasudeva-1@nasa.gov

Nicole Turner, Code 423
Financial Manager

THANKS!

The Editor wishes to thank The Critical Path (TCP) Editorial Assistant Paula Wood, and Production Assistant/Photographer Nancy White for their many years of dedicated and proficient service in the preparation of the TCP.

Engineering Boot Camp

Now here's a really novel idea for supporting engineering internships at Goddard.

You bring in students from all engineering disciplines and all levels from Freshmen to Graduates and have them work together in one big lab on multiple projects for the entire 10-week summer session. You create a small core of experienced students to provide the day-to-day spoon-feeding and oversight that most undergrads require to be productive in this short session. And, you have

Part of the Summer 2009 Boot Camp Team working with Mike Comberiate (left), Code 400.0

engineers from all disciplines come in when they are available to mentor. It's called, "Engineering Boot Camp". But why would this be any better than what we've always done? Well, generally we ask engineers if they'd like to mentor a college engineering student for the summer. If they agree they'll submit a project and students will apply for the opportunity on-line. Mostly this is a way of helping the students, not of getting help for the engineer. Problems arise when reality sets in. The

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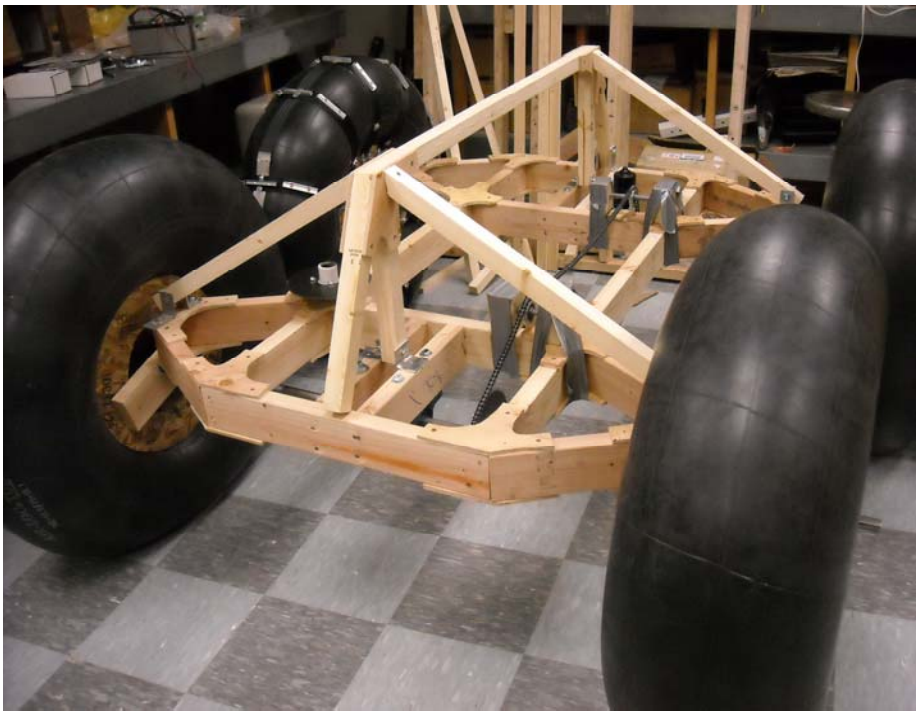
(Boot Camp Continued from page 12)



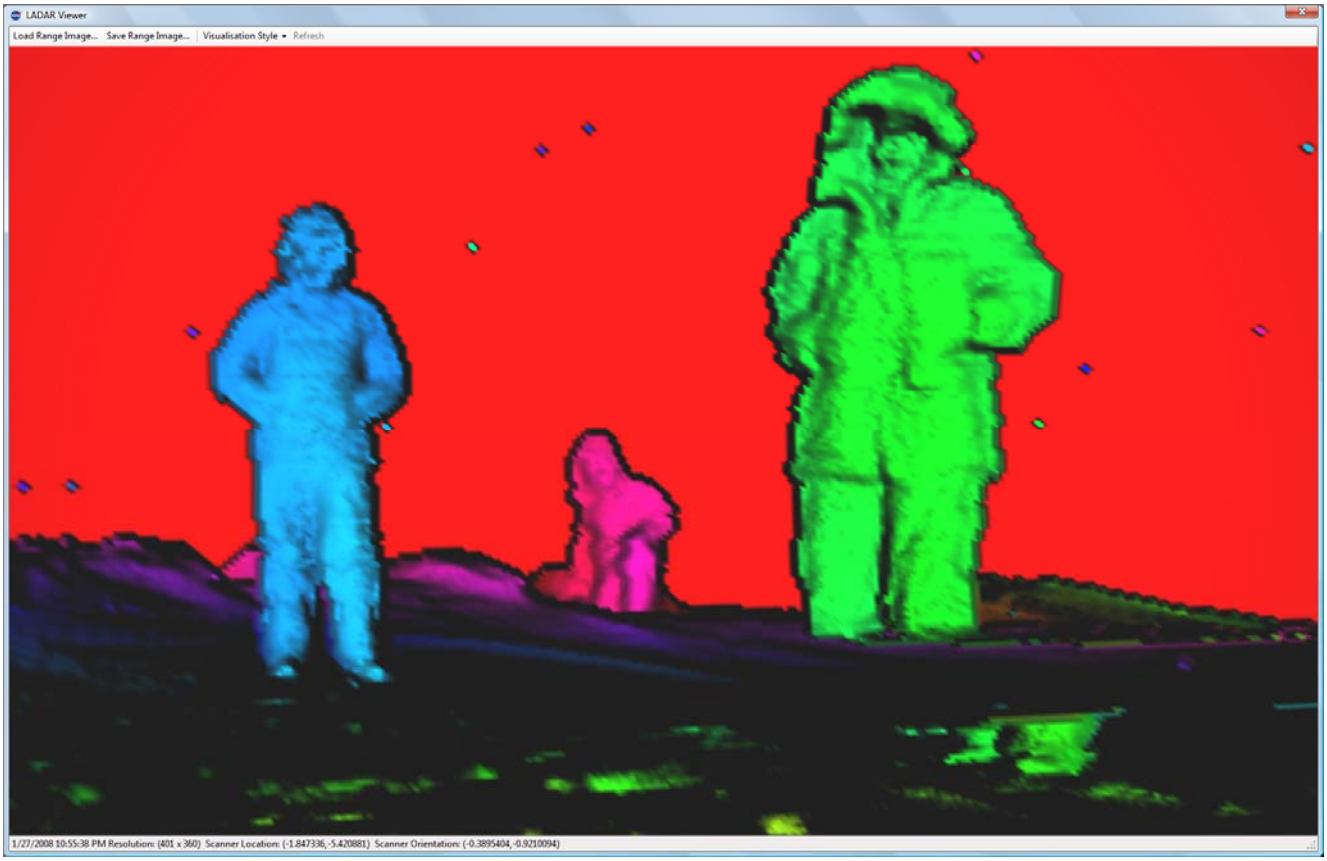
Engineering Model of the Greenland Tractor Robot under development at University of Alaska

project may be slower than expected and the student not well versed in using the necessary tools, even though they have good grades. The engineer needs to be working 36 out of 40 hours a week in meetings, travel, or vacations, etc. and there's no one to assist this young intern most of the week.

Now consider the Boot Camp scenario. The intern, who needs daily help, will have a number of experienced students around him continuously. Now he is in a situation where there is constant activity on several projects at all times. He can always find a place to fit in and someone to coach him. Plus this is a "Fail & Fix" operation, where hands-on work is required and the interns can break things as long as they fix them. They don't have to be afraid to try. What an opportunity to learn! Meanwhile, the mentors are free to come in when they are available and they know that things are moving smoothly otherwise. When they are there, they can observe many interns working in teams and get a real feel for the ones, who they might like to see working at GSFC someday. These they can recommend for a co-op program. And, there are some grad students also, who are doing the day-to-day lead roles, who our engineers might well want to hire directly, if points are available. To see these interns in action, working hands-on with all disciplines, on multiple projects is the ideal way to sort out the "Go-to-Guys".

Semi-autonomous Terrain-Mapping Robot operated in Antarctica from GSFC

(Boot Camp Continued on page 14)



An example of the LIDAR 3D Imaging taken at - 40C in dark on the Frozen Arctic Ocean

(Boot Camp Continued from page 13)

So how does all this work? It turns out that Code 400.0 has been running a Robotics Boot Camp for five years right here on Center. During the year schools take on team projects that we sponsor, where each senior gets 5 academic credits towards their Engineering Degree. We have weekly telecons with the teams and we can spot the outstanding performers during the school year. We often invite some of the best and brightest to come to GSFC for the summer. We've received help to support these internships from a few flight projects in Code 400, or from their school, or from their State Space Grant. This small group of 4 or more, forms the core of experienced interns, who will handle the daily mentoring of the less-experienced undergrads. We also take a few, unpaid rising high school seniors.

Over the years we've had literally hundreds of interns working on-site or in schools throughout the entire year. During the Summers we'll have twenty or so together in the lab for 10 weeks. Last Summer (2009) a group of 21 built or modified 5 robotic vehicles and a brand new robotic arm. The learning is incredible. We brought in all kinds of GSFC engineers, scientists, managers and educators throughout the summer and had the interns individually explain what they were doing. We have found that public speaking is one area where many engineering students need a lot more practice.

The bottom line was that everyone who saw these interns in action was very positively impressed

(Boot Camp Continued on page 15)

(Boot Camp Continued from page 14)

by the Boot Camp approach; and that message went up the management line. Not only are we attracting some outstanding engineering prospects to work at GSFC, but we are providing incentive and real learning experiences to under-represented groups as well.

This year Code 500 has decided to sponsor more than a dozen interns in this program. In addition, Dr Lora Koenig, a Cryospheric Scientist in Code 614 who visited the Boot Camp last summer, now has a project ongoing at the University of Alaska at Fairbanks (UAF), that spun-off from our summer projects. UAF is designing and building a solar-powered, robotic tractor vehicle for academic credit this spring. It will be used to carry a Ground-Penetrating RADAR across the Greenland Ice Summit in June 2011. Students at engineering colleges in Maryland and in Vermont will contribute to this project by providing the Command, Data Handling, and Communications systems. All subsystems will be integrated onto the vehicle this summer and then the vehicle will be shipped back to Alaska for field testing during the school year.

In recent years, we've used our robots to demonstrate the Space Cube processing system in Antarctica and then in Barrow, Alaska at -40C. We've also controlled a robotic vehicle driving around Antarctica from Goddard, demonstrating the Disruption-Tolerant Networking Protocol that Codes 567 and 450 have been developing for communications to Mars and beyond. These projects were featured in several magazines recently including a cover article in Design World, http://www.linengineering.com/line/contents/stepmotors/3drobot.aspx .

Currently the group is looking for software developers to automate functions that the remote operator has been doing for two years. We want to demonstrate the practicality of using a LIDAR imager in place of a stereoscopic camera system for object recognition, obstacle avoidance, path-planning, image stitching, and control of a group of task-specific workerbots. We feel that GSFC would benefit from an opportunity to produce a flight version of our LIDAR system as a deliverable to the NASA Rovers that other Centers will build. Our software developed by students would be directly applicable to scale up for a Mars-qualified rover.

So these Boot Camp projects have potential to actually benefit GSFC. These kinds of "Way Cool" projects attract the best and brightest students, from around the country and some foreign nationals as well. We are currently looking for financial support from NASA HQ and from other flight projects in Code 400, so we can expand the program and do more projects that GSFC Science and Engineering will benefit from. However, our primary "Definition of Success" is based on connecting our engineers with outstanding prospects for eventually working at Goddard.

Mike Comberiate, Code 400
Senior System Manager

(TDRS Continued from page 1)

NASA's Tracking and Data Relay Satellites (TDRS) support over 50 earth-orbiting satellites everyday and have been doing so since the launch of TDRS-1 in 1983. Since then, the TDRS project has added eight more satellites to the fleet. Today, TDRS is ramping up to add two more, TDRS K and L, to the now aging fleet.

In February, the TDRS project together with its prime contractor, Boeing Space Intelligence Systems, completed a Critical Design Review and a Production Readiness Review for the K and L spacecraft. According to Jeff Gramling, TDRS Project Manager at Goddard Space Flight Center (GSFC), these two major reviews connect the design and manufacturing stages of the TDRS program. "With the successful completion of these reviews, Boeing Space Intelligence System will proceed with assembly of the TDRS K and L satellites," Gramling said.

These reviews, a very important step towards the launch of the new satellites in 2012 and 2013, were presided over by the Goddard Project Team, NASA Headquarters officials, and members of an Independent Review Team. The members of the team closely evaluated mission and spacecraft design of TDRS K and L, including spacecraft assembly, systems integration, and testing and safety requirements and plans.

Boeing, also credited with the construction of TDRS H, I, and J, will leverage heritage through the use of their proven spring-back antenna design. This innovative design consists of two single access antennas, 15 feet in diameter, with flexible membrane reflectors that are furled to fit inside the fairing for launch. These antennas are unfurled shortly after launch and spring back to their original shape for providing Space Network communication services.

TDRS K and L will expand and enhance the current TDRS Fleet, which serves as a means for continuous and constant high- rate communication for NASA's missions, both manned and robotic. TDRS' most prolific customers include the Space Shuttle, Space Station and the Hubble Space Telescope.

TDRS K is scheduled to launch in April, 2012, with TDRS L following in February, 2013. Both will be launched aboard an Atlas V rocket from Cape Canaveral Air Station in Florida. These two satellites will join the existing fleet of eight other satellites – seven currently in use, and one in on orbit storage. With their associated ground stations in White Sands, New Mexico and Guam, TDRS K and L will continue to provide unparalleled telecommunication services to NASA's most critical missions.

For more detailed information about TDRS-K and L spacecraft and the existing TDRS fleet, visit:

http://tdrs.gsfc.nasa.gov

Amber Hinkle, Code 450.1
Education and Public Outreach Specialist

Quotes To Think About

""You can always count on Americans to do the right thing, after they've exhausted all the alternatives."
-Winston Churchill-

"Strive not to be a success, but rather to be of value."
-Albert Einstein-

"Small opportunities are often the beginning of great enterprises."
-Demosthenes-

"There is nothing like a dream to create the future."
-Victor Hugo-

Social News

Congratulations:

Oswin Findlay (ASRC/460) and wife Gemma are proud to welcome Akeira, their first grandchild. She was born in the City of Nagoya, Japan on April 7, 2010. Through the modern marvel of video conferencing, they were able to share a brief moment with the family as they fed and burped her. She and her parents are doing fine.

Chasity Kisling (441) and her husband, Jeff welcomed their son, Nathan Jeffrey into their family on January 25, 2010, at 6:03 am. Nathan weighed 9 lbs. 1 oz. and was 21 inches long at birth. Big sister, Lillian is delighted to have a little brother.

Mark Hubbard (442) is a grandfather again (4th time)! Mark's eldest son, Matt, and his wife, Mary celebrated the birth of their first child, a beautiful girl named Tula, on January 30th. Another grandchild is on the horizon by way of Billy & Becca Hubbard, who are expecting their third child in June.

Rick King's (443) daughter Alyssia is scheduled to graduate from Towson University this May with a degree in….what else……Business Management!

Cathy Fleshman (460.2) and husband, Bob, are the proud first-time grandparents of a new granddaughter, Devyn Tyler Fleshman. She was born on March 18, 2010, weighing in at 7 lbs. 2 oz., 19 ½" long, with lots of black hair. Devyn is doing well, and her parents are quickly adjusting to parenthood and their new bundle of joy.

Howard Ottenstein (ASRC/403) Editor of The Critical Path and his wife Marcia welcomed Isla Sloane to the family on February 18, 2010. At 6 lbs, 7 oz., and 19 3/4 inches long, she was called a 'perfect package' by the pediatrician as she handed off Isla to her first time parents, Steven and Karen O, as they left the hospital in Manhattan. Howard and Marcia's other grandchildren are in Jacksonville, Florida. Cori is finishing her freshman year at the University of North Florida, and Jared begins high school this fall.

(Wartts Continued from page 3)

multi-discipline work experiences, training and the guidance necessary for participants to assume key project management positions. Jahi joined the Independent Program Analysis Office in the Office of the Chief Financial Officer in 2008. This position afforded Jahi invaluable experience and insight into the roles and responsibilities of Goddard managed projects and the role of the Center and NASA Headquarters. In this position Jahi performed analysis associated with the preparation of phasing plans and the Planning, Programming, Budgeting and Execution (PPBE) process for GSFC's Exploration and Space Communications Projects Division and Education Programs. In addition, he analyzed project inputs, taking into account factors such as cost effectiveness, attainment of program goals and objectives, and compliance with Center and Agency guidelines.

Most recently Jahi works as the Financial Manager for the TIRS project. In this capacity, he is responsible for the resources management of a $134M in-house project. Jahi finds his new position to be both challenging and rewarding. In this position, Jahi works with his resources team to develop, execute, and monitor the project budget in support of LDCM. In 2010, Jahi graduated from the PMDE program.

On Family: Jahi recently was engaged and plans to get married in October of this year. Jahi and his fiancée enjoy travelling, watching professional football (Go Vikings), and spending time with friends.

(Esfandiari Continued from page 3)

Next, she joined the Flight Software Systems Branch where she worked on Hubble Space Telescope flight software until its launch in 1990. She then entered the management realm by first becoming a branch head in AETD, and then deputy division chief in the Software Engineering Division. Mary Ann was then selected as the EOSDIS Program Manager as well as selected into the SES Career Development Program. As part of her training, she spent a year in the Shuttle Processing Facility at Kennedy Space Center supporting return to flight. She also spent time at the NASA Headquarters Business Office before completing her requirements and assuming the EOSDIS Program Office role.

She says her favorite part about working at Goddard is being close to the science and the many opportunities to work with different people. She thinks Goddard is one of the best places to work in the Federal government and enjoys launching new missions and being on the cutting edge of new scientific discoveries. She particularly enjoys working in the Space Communications field because of the many missions she is able to support on a regular basis.

On Family: Mary Ann resides in Ellicott City and has been married to her husband, Pashang for 36 years.

Life Outside of Goddard: When she is not at work, she enjoys spending time in the kitchen with her Persian husband, and cooking Middle Eastern dishes for family and friends. Mary Ann enjoys bird watching, kayaking, snorkeling and SCUBA diving. She also enjoys gardening, running, and traveling.

Comings & Goings

Comings:

Christopher Caldwell to 454/TDRS Project, Resource Analyst
Karilys Montanez-Mojica to 460/Explorers & Heliophysics Projects Division, Co-op, Student Trainee
Laura Williams to 403/FPD Business Management Office, Resource Analyst
Charisse Dorrell to 422/GPM Project, Resource Analyst
Michael Bielucki to 452/Space Network Project, Spacecraft Systems Operations Manager @ White Sands
Valarie Mackritis, Code 603, detailed to 460/Explorers & Heliophysics Projects Division
James Morrissey, Code 599, detailed to 432/MAVEN Project
Antonios Seas to 401/Advanced Concepts & Formulation Office, Study Manager
John Deily to 422/GPM Project, Observatory Manager
Sharon Most to 453/Ground Network Project, Financial Manager
Deanna Bradel to 455/Exploration Systems Projects, Financial Manager

Goings:

Julia Knight Retires from 403/FPD Business Management Office, Project Support Specialist
Jule Johnson Retires from 460/Explorers & Heliophysics Projects Division, Deputy Program Business Manager
Ed Ruitberg Retires from 440/Astrophysics Projects Division, Deputy Program Manager
Roger Flaherty Retires from 452/Space Network Project, Project Manager
Beverly Switalski Retires from Earth Science Technology Office, Secretary
Keiji Tasaki Retires from 452/Space Network Project, Deputy Project Manager
Frank Snow Retires from 432/MAVEN Project, Instrument Systems Manager
Cheryl Carr-Huggins Retires from 450/Exploration & Space Communications Projects Division, Secretary
Lisa Callahan to 610/Associate Director for Mission Planning and Technical Development
Tina Wood to 603/Administrative & Resources Management Office, Resource Analyst
Jim Mcguire Retires from 401/Advanced Concepts & Formulation Office
Scott Lambros Retired from 443/JWST Project, Instrument Systems Manager
John Bolton Retired from 401/ACFO, Mission Manager
Katherine Krokos-Miller Reassigned to 603/Senior Resource Analyst
Mariann Albjerg Retires from 407/Earth Science Technology Office, Physical Scientist

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

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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 July 31, 2010.