ARES

Astromaterials Research and Exploration Science Directorate

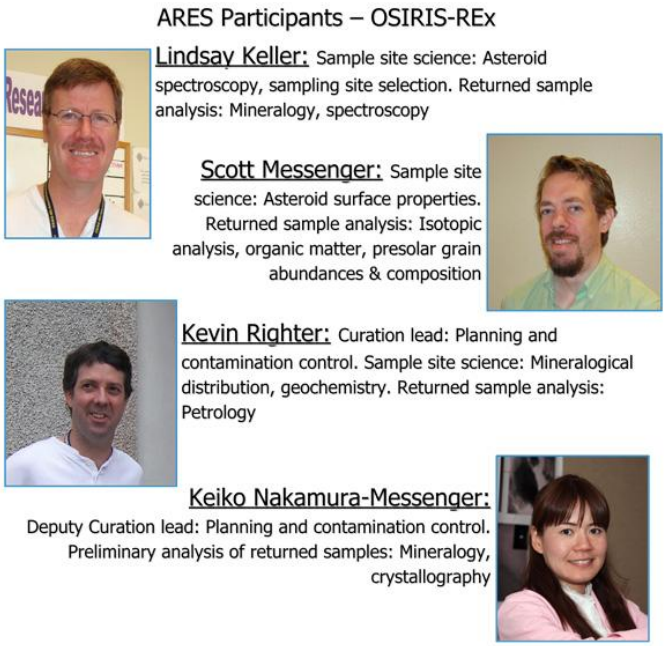
Newsletter – November 2011

The ARES Newsletter is a snapshot of current events within the Directorate, highlighting a small sample of the remarkable breadth and variety of the research activity and facilities in ARES and the people who do the work. Send Newsletter inputs and feedback to Greg Byrne.

In the News

Yes, We Do Science Missions

A new asteroid sample return mission named "Origins-Spectral Interpretation-Resource Identification-Security-Regolith Explorer" (OSIRIS-Rex) was recently selected for NASA's New Frontiers Program. The announcement of the selection was met with much excitement around ARES – it's a great mission, and ARES will be directly involved in the mission and its results for years to come. OSIRIS-Rex will be the first U.S. mission to carry samples from an asteroid back to Earth. Launching in 2016, the spacecraft will rendezvous with asteroid RQ36 and use a robotic arm to collect samples from the asteroid's surface. Four members of ARES, **Lindsay Keller**, **Scott Messenger**, **Keiko Nakamura-Messenger**, and **Kevin Righter** are Co-Investigators for the mission. The returned samples will be curated by ARES for world-wide distribution to investigators, and ARES research facilities will engage in the sample analyses with a goal of better understanding our solar system's formation and how life began. See more on OSIRIS-Rex at: http://www.nasa.gov/centers/johnson/home/osiris-rex.html.



OSIRIS-Rex is just one of several NASA science missions with ARES participation, including the ambitious and exciting Mars Science Laboratory (MSL) mission which launched on November 26, 2011. MSL is a rover with an advanced, on-board suite of scientific instruments designed to assess whether Mars is or ever was habitable for life, microbial or otherwise. The ARES participants in the MSL mission include **Doug Ming**, **Dick**

Morris, and **John Jones** as Co-Investigators and **Brad Sutter, Doug Archer, Trevor Graf, Liz Rampe**, and **Cherie Achilles** as Collaborators. All will be active in several aspects of the mission, including calibrations of the MSL instruments, daily rover operations, and analysis of the returned data. Stay tuned for MSL's August 2012 arrival at Mars, and the opening of what is sure to be an exciting new chapter in Mars exploration science. See more on the MSL mission at: http://www.nasa.gov/centers/johnson/exploration/key_roles_mars.html.

Other missions – NASA's *Dawn* spacecraft is currently orbiting the asteroid Vesta, and as reported in the December 2010 issue of this Newsletter, **David "Duck" Mittlefehldt** is a Dawn mission Participating Scientist. Duck is a member of the Gamma-Ray and Neutron Detector (GRaND) instrument team responsible for measuring the composition of Vesta's surface and ultimately producing maps of its geology and mineralogy. And as also reported in the December 2010 Newsletter, **Mike Zolensky** is a Science Team member of the recently-completed JAXA Hayabusa mission. *Hayabusa*, the first spacecraft to make physical contact with an asteroid and return to Earth, collected samples from the surface of the asteroid Itokawa and landed safely back on Earth in June 2010. Itokawa samples from that mission are scheduled to arrive at ARES for curation and analysis in December 2011. Then there is the ongoing Mars Exploration Rover (MER) mission – the over-achieving *Opportunity* rover rolls on – with the "three DMs" **Doug Ming**, **Dick Morris**, and **David Mittlefehldt** participating as MER Science Team members. And don't forget the highly-successful Mars Phoenix lander mission with Science Team members **Doug Ming**, **Dick Morris**, **Paul Niles**, **Brad Sutter**, and **Doug Archer**. The Phoenix mission operations are complete, but data analysis and research publications continue. And finally, the Lunar Reconnaissance Orbiter (LRO) is in orbit around the Moon, with **Carl Allen** as Co-Investigator for the onboard Diviner Lunar Radiometer Experiment. The LRO Diviner instrument was designed to map the lunar surface temperatures and identify potential ice deposits on the Moon.

Whew. Yes, we do science missions – lots of them.

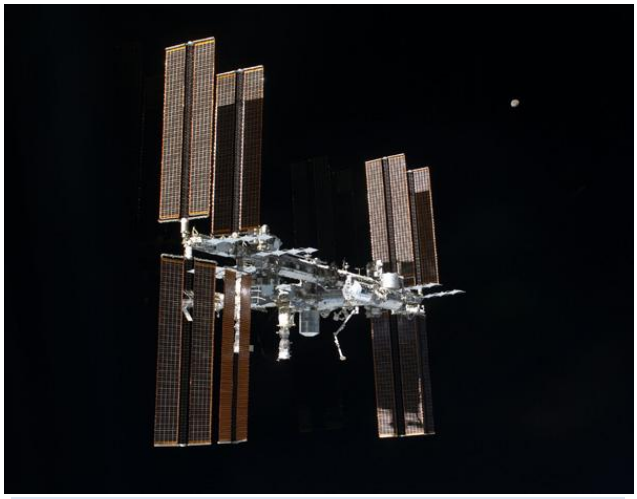
Fly-Around Finale

There were 37 Space Shuttle missions to construct and supply the International Space Station, beginning with STS-88 in December 1998, and ending with STS-135 in July 2011. For each mission, the Shuttle did a fly-around of the Station to view its exterior. Thirty-six of those fly-arounds were an "in-plane" Shuttle maneuver, providing basically the same views of the Station – the forward, zenith, aft, and nadir surfaces. But, the 37th and final fly-around during STS-135

was uniquely valuable, thanks to the initiative of **Robert Scharf** and **Dwight Osborne** of the **Image Science and Analysis Group**.

During a training session on ISS viewing with the STS-135 crew a few months before the mission, Rob and Dwight discussed how little was known about the conditions of the port and starboard sides of the ISS because of the lack of images of those areas from previous missions. They discussed a concept for a modified fly-around as a last opportunity to obtain such images. The Commander departed the class with a plan to discuss the idea with the Flight Directors. In the meantime, Rob and Dwight set up informal meetings with personnel from Flight Design and other mission-related teams to brainstorm about possible fly-around scenarios. From these discussions sprang a multi-discipline working group to attack the concept full force.

The working group down-selected different ideas into two fly-around options. The first option would leave the ISS in its usual orientation, while the Shuttle would circle the ISS canted 60 degrees out of the orbital plane. This option was favored by ISS personnel concerned with conserving ISS propellant, but meant that new and elaborate Shuttle procedures would need to be developed and verified in the short time before STS-135 launched. The second option would maneuver the ISS 90 degrees out of plane, with the Shuttle performing its usual in-plane maneuver. This option was of course favored by Shuttle mission designers but imposed ISS thermal concerns. Nothing is ever simple when it comes to space flight, and after much discussion, the mission managers eventually opted for the latter scenario.



The Shuttle's final fly-around of the ISS produced one-of-a-kind perspectives like this one.

The three months between this decision and the STS-135 launch were packed with preparations for this unique fly-around: Lighting studies were conducted to optimize photography, ISS thermal studies continued, ISS teams assessed feathering the solar arrays to minimize blocking views from the Shuttle, and crew instructors choreographed the photography between the four-person Shuttle crew instead of the usual seven. The intense prep was worth the effort. The modified fly-around, the last major mission objective for the Space Shuttle Program, was a great success – unprecedented imagery of the port and starboard Station surfaces were obtained. Thanks to the initiative of Rob and Dwight, this unique fly-around is now history, and its one-of-a-kind imagery will be valuable to Station operations for years to come.

Reflections, from the Editor

In 2008, I participated in the Smithsonian Festival's "NASA 50 Years" event on the National Mall in Washington, DC as a JSC representative. After the event, I was contacted by the organizers for my "thoughts or reflections" on my Festival experience. In particular, the organizers were looking for stories to help market the Festival's mission of "personal connections." I replied with the following:

Dear Sirs,
I had a great experience at the 2008 Festival as a NASA participant. Below are my thoughts on it. I realize that this highlight might not be what you were looking for to advertise the Festival, but the experience was as real as it gets.
Thanks,
Greg Byrne, NASA Johnson Space Center

At the Festival, I was struck by the amazing variety of people with diverse backgrounds that have a great interest in NASA. For the week that I was there, manning a booth highlighting the International Space Station, I experienced one fascinating conversation after another with visitors from all over the world who were deeply interested in what we do and have done in space. Although the heat and long hours of talking were exhausting, I came away that week with my spirits renewed that NASA is as relevant as ever in the eyes of the public. Thanks, Smithsonian Festival, for that.

Among the many conversations I had with visitors that week, one in particular I'll never forget. One hot afternoon, a man rode up to my booth on his bicycle. The NASA logo had caught his eye, and like so many others there, he was interested enough to stop and check it out. We talked for at least 45 minutes. He was a real space enthusiast and very knowledgeable in NASA's past and current missions. We had an informed exchange about the Space Station, Space Shuttle, and the new Constellation Program. For a time I felt as if I was talking with another NASA colleague, but the reality of his situation sunk in when he offered his hard-luck story. He was homeless, literally, living on the "mean streets of DC" (as he put it) – educated with a technical background, but then had a series of bad breaks, mostly self-induced, to the point where he was now utterly desolate. He carried a lead pipe strapped to his belt. When I asked him about it, he explained that it was for protection and even demonstrated how to wield it most effectively. He also gave me some simple tips he had learned on how to survive on the streets. Good info, I thought. I then realized that our conversation had turned from that of the highest level of human endeavors - manned spaceflight, to the lowest level - basic survival.

Have some reflections of your own, past or present, to share in the Newsletter? Send them to the editor.

I am not sure what the moral of the story is or even if there is one, but as the man rode away I felt like calling it a day. I thought nothing could top that experience for the rest of the afternoon, and I wanted to sit quietly to reflect on it a while. But there were many more visitors that wanted to talk...

Congratulations are in Order

Agency Individual Awards for 2011

Bringing home some "metal" again this year, the NASA Award recipients for 2011 include two Agency medal winners from ARES:

Gene Stansbery received the **NASA Exceptional Service Medal** for "*dedication, leadership, and creativity in establishing international preeminence in orbital debris observation, measurement, analysis, and modeling at NASA.*"

Dick Morris received his second medal in as many years, this time the **NASA Exceptional Scientific Achievement Medal** for "*outstanding scientific discovery of carbonate-rich outcrops on the surface of Mars*."

And receiving the **NASA Certificate of Appreciation** was **Paul Niles** for his "*outstanding contributions to understanding the history of water on Mars using results from the Mars Phoenix Scout Mission*."

Agency Group Awards for 2011

The **2010 Desert Research and Technology Studies (D-RATS) Science Team** was recognized by the Agency for *"outstanding contributions in developing and testing science operations for NASA human exploration missions to the Moon, Mars, and beyond."* Accepting for the team were **Dean Eppler** and **Fred Horz**, both of ARES.

The ARES **Image Science and Analysis Group** was also recognized by the Agency for *"outstanding contributions to crew safety and mission success through image analysis support to human space flight."* Accepting for the group were **Tracy Calhoun** and **Mike Snyder**, both members of the group.

JSC Director's Commendation and Innovation Awards

The Director's Commendation and Directors Innovation Awards are JSC's highest awards, and each comes with an attractive, framed certificate. The ARES recipients for 2011 include five individual awards and two Team awards:

Tracy Calhoun is recognized with a Director's Commendation, "*for outstanding leadership of NASA JSC's Image Science and Analysis Group to ensure Shuttle, ISS, Orion, and Commercial flight safety and mission success*."

Lindsay Keller is recognized with a Director's Commendation, "*for exemplary leadership in cutting-edge research in planetary science and outstanding contributions as Deputy Manager of the Astromaterials Research Office*."

A Directors Commendation also goes to **J.-C. Liou**, "*for outstanding leadership and contributions in active debris removal policy, concepts and modeling*."

Donn Liddle is a recipient of the Director's Innovation Award, "*for outstanding innovations in the application of photogrammetry to human space flight programs and projects*."

And **Scott Messenger** receives the Director's Innovation Award, "*for outstanding achievement in identifying near-future opportunities for stratospheric collection of dust from a specific short-period comet*."

Receiving the Director's Innovation Team Award is the ARES **Robert M. Walker Laboratory for Space Science Team**, "*for exemplary scientific discovery of the new mineral Wassonite in an Antarctic meteorite*." Team members include **Keiko Nakamura-Messenger**, **Simon Clemett**, **Lindsay Keller**, and **Zia Rahman**.

Also receiving the Director's Innovation Team Award is the ARES **GeoLab Team**, "*for outstanding design, construction and integration of the GeoLab glovebox into the Habitat*

Demonstration Unit, and for successful field testing during the 2010 Desert RATS field campaign." Team members include **Cindy Evans**, **Michael Calaway**, **Trevor Graff**, and **Mary Sue Bell.**

Society Fellow

Being elected as a "Fellow" to any particular scientific Society is a bestowed honor that means you've made the grade – that in the eyes of your peers, you've distinguished yourself in that Society's field of scientific endeavor.

So it is with great pride that ARES can boast a newly elected Fellow of the Geological Society of America – **Dean Eppler**. Dean joins the ranks of several other distinguished ARES scientists previously elected as Fellows to one Society or another.

Antarctic Service Medal

The Antarctic Service Medal of the United States of America is an award bestowed jointly by the National Science Foundation and the Department of Defense in recognition for service in Antarctica. **Doug Ming** has received his medal in "r*ecognition of valuable contributions to exploration and scientific achievement under the U.S. Antarctic Program*," specifically for his key role in simulations of the Mars Phoenix Lander mission operations conducted in the Dry Valleys of Antarctica in 2007-08.

Welcome to ARES

Ryan Zeigler comes to ARES from Washington University where he worked as a research scientist. Ryan has begun mentoring with KT/Curation staff in order to eventually assume Curator responsibilities for the Apollo Lunar sample collection. He also brings a strong astromaterials research background to ARES, including conducting geochemical analysis of the Apollo lunar samples and lunar meteorites.

Joe Hamilton has taken a reassignment to ARES from the Space Shuttle Program. Joe joins the KX/Orbital Debris Program Office where he will apply his experience with debris-tracking radars used during Shuttle launches to debris-tracking radars used in orbital debris research. He also brings a broad range of experience in project management at JSC.

ARES welcomes two new Electro-Mechanical Technicians to its ESCG staff. **Salomon "Sal" Vega** joins ARES with over ten years of experience in his field. And **Thomas Garza** joins ARES with over 30 years experience in a wide variety of electrical and mechanical systems, including clean room equipment. Both Sal and Tom will be supporting the technical operations across the Directorate.

Marissa Herron comes to ARES on rotation from the Mission Operations Directorate where she served in leadership roles in the development and management of a number of projects. She is assigned to KX, and responsibilities will include developing imagery integration for ISS,

commercial, and Orion programs, conducting hands-on image analysis training, and planning trajectories and operation activities for Near-Earth Object missions.

Parting Shot

Gator Whisperer

Don't try this at home. Merrell Skipper is federally permitted to do stuff like this.