

EISD

EXPLORATION INTEGRATION
AND SCIENCE DIRECTORATE



Lyndon B. Johnson Space Center • Houston, Texas

NEWSLETTER

JUNE 2016

FROM THE ASSOCIATE DIRECTOR

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A directorate on the go

Associate Director is a title that could create questions such as “what exactly do you do?” For me it was an opportunity to come alongside Steve Stich and Eileen Stansbery, two leaders I greatly respect, and to help provide an additional resource so that this organization could grow to its potential. That opportunity hasn't changed a bit now that Vanessa is at the helm of this amazing organization.

My daily routine is typically anything but routine, but it is an honor to serve this Directorate as we accomplish the main reason I came to work for the government: To Explore! I am a second-generation NASA geek, as my daughter calls me, following in my father's footsteps here at the Johnson Space Center. His area of expertise was pressure suits. He honed his skills when suits were just getting their start in the early X-15 days assisting Scott Crossfield and Chuck Yeager in being “suited up.” I recall getting to stay up late on July 20, 1969 to watch the astronauts in suits my father worked on venture out onto the Moon. I was hooked right then. Space would define my future.

It was a privilege to join the ranks of civil servants working at JSC and it is still one to this day. We in EISD are poised to continue a long legacy of exploring our universe and I am excited to do so. We have all of the building blocks needed right here in EISD! It begins with foundational scientists who define for our Agency where we need to go, what we need to look for when we get there, and then steward/study our assets when we bring home our discoveries. Then it is over to big picture thinkers developing initial architectural plans “to go,” which are executable and do not re-write the laws of physics. We turn what many consider science fiction and determine how to make it reality. Next up is our amazingly sharp analytical cost estimators who accurately scope all aspects of our proposed approach and provide Agency leaders fact-based projections that shape how programs and projects are run. We also have expertise in integrating all the aspects of a program to ensure that these challenges succeed because we put in the work to plan out our journey.

NASA no longer takes on these efforts solely as a monolithic entity. It has grown beyond that model and for that, we need to reach out and build alliances and partnerships. Our folks in SPO wrote the book on how this is done and are benchmarked routinely. We steward, as well, what technologies need to be developed to accomplish our mission. We ensure that gaps between what we know we can do to explore and what needs to be done to explore are closed in an informed manner. And finally, we will be asked to safely put the human being in an unforgiving environment to do what only humans can do... to EXPLORE! And our colleagues in the EVA office are premier in this endeavor.

So look across our next All-Hands and see what I see when I look at this team. Some of the very best JSC has to offer, doing what it takes to put humans in the business of discovery and exploration. That is why I came to work at JSC. Thanks for letting me join you in this effort as we lay the foundation for great things to come.

Glenn Lutz

Elevator Ice Breakers

*The EISD team
shares June
highlights in
the form of
elevator pitches*



JSC Chief Scientist, Eileen Stansbery, XA

An important function of the Chief Scientist position is to support integrating Science and Human Exploration. To that end, we recently held the first meeting of the Human Exploration of the Proving Ground Special Action Team (HEP-G SAT). The team is comprised of subject matter experts drawn from the NASA, academic, and commercial communities. The goal is to gather a broad set of perspectives on human exploration that allows high priority science to be conducted, but cuts across science, technology, and exploration.

The SAT is tasked with deriving a potential set of basic and applied science objectives for Phase I exploration of cis-lunar space based on architectures currently being considered for the Exploration Excursion Missions. These include short-duration crewed missions interleaved with periods of remote (uncrewed) operations. The set of objectives should prioritize those that would most benefit from having human presence in cis-lunar space. We are targeting a report on objectives in the fall.

JSC Chief Technologist Office (CTO), XA

In June, JSC CTO continued to pursue innovation and technology initiatives with an overarching strategy to align with Agency and human space-flight capability needs.

The JSC CTO and the JSC Technology Working Group (JTWG), comprised of representatives from the Center's technology development directorates, opened the FY17 Center Level Independent Research and Development (CL IRAD) Request for Proposals (RFP). Approximately 10 funding awards, each with a maximum value of \$100K and up to 0.5 Civil Servant FTE, are expected to be allocated for this solicitation.

Additionally, CTO announced the opening of the Science Innovation Fund (SIF) Call for Proposals for all civil servants at JSC and WSTF! The SIF is designed to fund innovative, exploratory, high-risk/high-return research activities that are aligned with the Agency's strategic goals and objectives. Project durations are 12 months or less, with deliverables due per SIF schedule.

Exploration Development and Integration Office (EDI), XS

The ESI Build-To-Sync (BTS) kick-off meeting was held at JSC, representing the fourth major integration review for initial capabilities of the SLS, Orion, and GSDO enterprise. BTS will review approximately 170 products over six weeks to address integration at a system level with focus on the architecture, systems, processes, and plans in support of the EM-1 Mission.

Table Top reviews with the Standing Review Board (SRB) are scheduled during the week of July 26–29, where specific areas of interest will be addressed in further detail.

Exploration Mission Planning Office (EMPO), XM

For the Evolvable Mars Campaign (EMC) Mars Ascent Vehicle (MAV) Operational Volume: Cabin Testing we completed the build out and outfitting of the cabin 2A MAV mockup, including configuring the MAV with a full manifest of consumables, critical spares, medical kits, etc. to support a 5-day mission with four crew.

NEEMO 21 crew training was successfully conducted the week of June 6 at JSC with six prime crew members including NASA and ESA astronauts, as well as specialists from the Navy Postgraduate School, the Institute for Human and Machine Cognition, and VEGA Telehealth.

Also, the NEEMO 21 Mission Management Team presented a mission overview of the XA Strategic Council objectives that directly map back to ARES/XI, EVA/XX, Mission Planning/XM, and HAT.

Strategic Partnership Office (SPO), XP

The EISD Sustainability Partnership Team (SPT) is discussing potential synergies for the three sustainability STTR awards/projects currently being set up.

We met with Team Penske designers to look at technical issues with their racecars, along with a rep from HHP. We discussed potentially consulting with them on design solutions to address helmet and seat impact attenuation in return for receiving weekly car test data from the track. The data will help HHP address cockpit design.

We traveled to the Augmented World Expo where we worked with eight new Augmented Reality devices and initiated new partnership discussions with Caterpillar Automation & Enterprise Solutions, Atheer, Epson AR, and Osterhout Design Group.

SPO continues to work on the JSC integrated partnership strategy for technology advancement and we facilitated a retreat with EA, SA and XA to assess and identify approaches that will benefit the overall integrated partnership strategy.

EVA Management Office, XX

We are conducting test, teardown, and evaluation (TT&E) of EMU 3011, which experienced water in the helmet resulting in early termination of US EVA35 in January 2016. No root cause has been identified. The TT&E of the Fan Pump Separator is complete; performance was nominal. The TT&E of the sublimator is in work; performance was nominal. Some contamination was found in secondary slurper holes and its relation to EVA 35 water in the helmet is under evaluation, but likely is not the primary cause of EVA 35 failure.

The team is continuing to investigate the hardware. A forward plan with operational impacts is to outbrief to the ISS Program at the end of July. We are coordinating with ISS Program and together working toward two ISS EVAs in late summer.

Along with FOD and EVA Safety, we conducted a Joint EVA Working Group Technical Integration Meeting in Moscow with Russian EVA counterparts from Zvezda, Energia, and Gagarin Cosmonaut Training Center. Topics included, but were not limited to, U.S. and Russian EVA plans, next generation Orlan suit status, hydrolab refurbishment status, and EVA tools.

Performance Management and Integration Office (PMI), XP

We are always looking for ways to add to and refine our data sets with recent and relevant crewed space cost, schedule, and risk data. A new emphasis has been placed on gathering data in support of exploration missions as NASA prepares to transition into cis-lunar space and the journey to Mars.

PMI is strategizing on how best to begin gathering this data in a manner consistent with the well-established CADRe process. CADRe, is Cost Analysis Data Requirement. Read more about CADRe [here](#).

Astromaterials Research and Exploration Science (ARES), XI

We continue to move through strategic planning for the out years and are now at the point of integrating the findings from our five tiger teams. We are conducting interviews for the crit hire in Orbital Debris. We had nominal operations for missions currently underway - ISS, Curiosity, Opportunity, and Strata-1, with a [mineral discovery on Mars](#) with important implications. We prepped samples for the Biomolecular Sequencer launching to ISS on the next SpaceX. We successfully supported BEAM troubleshooting with imagery near-real-time analysis.

We are starting to receive feedback on our NASA research grant proposal submittals, with several positive outcomes. Construction for our new CT scanner lab is nearing completion and we are making progress on a construction plan for the lab for asteroid samples from OSIRIS-REx and Hayabusa 2. And our B31 lobby renovation is nearing completion and is almost ready for the messaging overlay by the JSC Exhibits Team.

CADRe Process Improves Planning for Future Missions

The Performance Management Integration and Science Directorate (PMI) is always looking for ways to add to and refine our data sets with recent and relevant crewed space cost, schedule, and risk data. A new emphasis has been placed on gathering data in support of exploration mission studies as NASA prepares to transition from ISS into cis-lunar space and the journey to Mars.

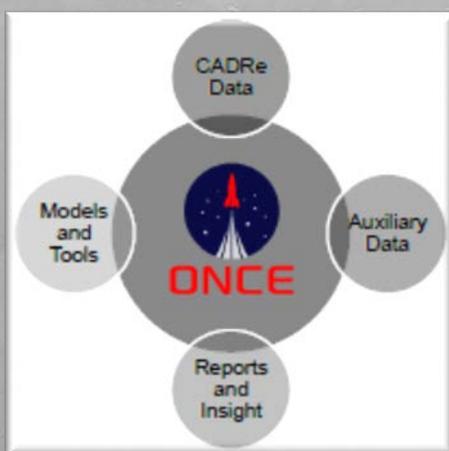
PMI members have been strategizing on how best to begin gathering this data in a manner consistent with the well-established CADRe process. CADRe (Cost Analysis Data Requirement) is a 3-part document that describes a NASA project at each milestone, contains key technical parameters, and captures the estimated and actual costs in a WBS structure. The CADRe provides a historical record of cost, schedule, and technical project attributes so that estimators can better estimate future projects.



Journey to Mars

By using the CADRe process and template as a guideline, we can ensure that the manned space data is collected in a way that fits with the One NASA Cost Engineering (ONCE) database and can be readily used for cost and schedule analysis, and to update and calibrate our estimation tools.

The CADRe process has been well socialized with the MPCV Program, and CADRe documents have been produced for the KDP-B (SRR) and KDP-C (PDR) milestones. A special task is underway to capture EFT-1 data within the CADRe template. However, the long time horizon for the development of the Orion Vehicle means that it will be many years before a complete dataset can be assembled for that mission. As a result, the PMI team has been looking to supplement the Orion data with projects that have been recently completed and/or will be completed within a short (next 1-2 years) time horizon.



CADRe relationship to ONCE

The ISS Program has been identified as having the most potential to fill this need. Although it is an operational program, there are a number of sizeable development projects underway within that program that lend themselves well to the CADRe template. ISS projects also offer the bonus that we will be able to get data on key aspects of the new paradigms of running manned space programs, namely the cost and schedule impacts of working with international partners and commercial providers.

Work has now begun on two CADRe efforts: the ISS Common Communications for Visiting Vehicles (C2V2) and the Orion EFT-1.

Titan Transtage Arrives at JSC for ODPO Research

A Titan Transtage arrived at JSC in late May for study by EISD's Orbital Debris Program Office (ODPO). The Transtage, an American upper stage used on Titan III rockets, was the world's first "space tug" developed to deliver multiple spacecraft to precise orbits in a single mission.

The stage was found by ODPO at the U.S. Air Force's 309th Aerospace Maintenance and Regeneration Group, "the Boneyard," at Davis-Monthan Air Force Base in Tucson, AZ. Although likely an engine test article, rather than an unflown vehicle, it will provide valuable information to factor into ODPO's environment models, increasing our understanding of how things break up when they explode and how dangerous debris fragments from this rocket body are to satellites. The Transtage will be inspected at its temporary berth in B9S.



*The Titan Transtage arrives at JSC outside B9S.
(Image credit: Jacobs/D Shoots)*

How did we find this?
Click [here](#) for a JSC Feature
on the Trans Stage!



*JSC team members prepare to unload the
Titan Transtage for inspection in B9S.
(Image credit: NASA/David DeHoyos).*

Mars Explorers Wanted

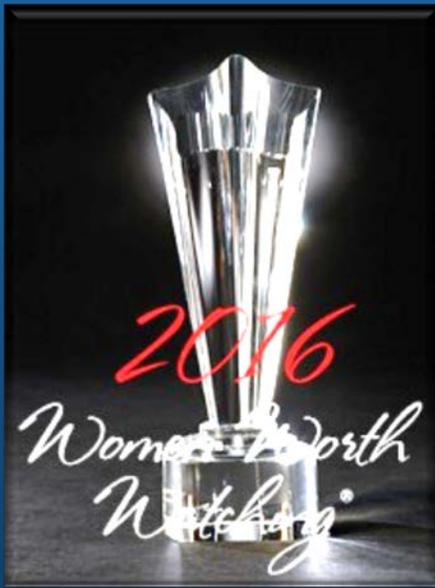
Posters originally commissioned by NASA for an exhibit at the Kennedy Space Center Visitor's Complex in 2009 are now available electronically.

Perfect enhancements to communications on EISD's charter!

<http://mars.nasa.gov/multimedia/resources/mars-posters-explorers-wanted/>



ANNOUNCEMENTS & EVENTS

CONGRATULATIONS
TO OUR DIRECTOR

Vanessa Wyche, EISD Director, has been selected to receive a **2016 Women Worth Watching Award**. Winners are regarded as trailblazers that are leading the way to excellence in the workplace, marketplace and the world.

<http://www.diversityjournal.com/16423-announcing-the-2016-women-worth-watching-award-winners/>

NEW TEAM MEMBERS

**Alyssa Manis**

As an Orbital Debris (OD) scientist with the OD Modeling Team, Alyssa helps predict future space environment and collision activity. She previously worked in the Ocean Engineering Department at Texas A&M University, Galveston.

**Chris Blackwell**

Chris is a software scientist with the OD Radar Team, analyzing radar data and breakup events to define the current OD population. Chris supported the Missile Defense Agency in Huntsville, AL before joining EISD.

**Sam Lawrence**

Sam is a new planetary scientist with expertise on planetary cartography and remote sensing. He will also maintain his role as a member of the Lunar Reconnaissance Orbiter Camera (LROC).

CONGRATULATIONS
EISD ADMINISTRATIVE STAFF

Secretarial Excellence
Rebecca Valdez, XX

On The Spot Award
Melissa Sims, XA

On The Spot Award
Andrea Richardson, XA

On The Spot Award
Carla Burnett, XB

Newsletter Staff

Send comments, ideas, & submittals

Arne Aamodt	XI Reporter
Tracy Calhoun	XI Reporter
Blake Dumesnil	Graphic Artist
Vickie Gutierrez	XB Reporter
Tracy Hom	XS Reporter
Joy Judas	IT Coordinator
Holly Kurth	XP Reporter
Debi Shoots	Technical Editor
Stephanie Sipila	XX Reporter

ANNOUNCEMENTS & EVENTS

EISD IN THE NEWS

Disruption Tolerant Networking - Reliable Solar System Internet Connection

<http://www.nasa.gov/content/dtn>

<http://www.nasa.gov/feature/new-solar-system-internet-technology-debuts-on-the-international-space-station/>

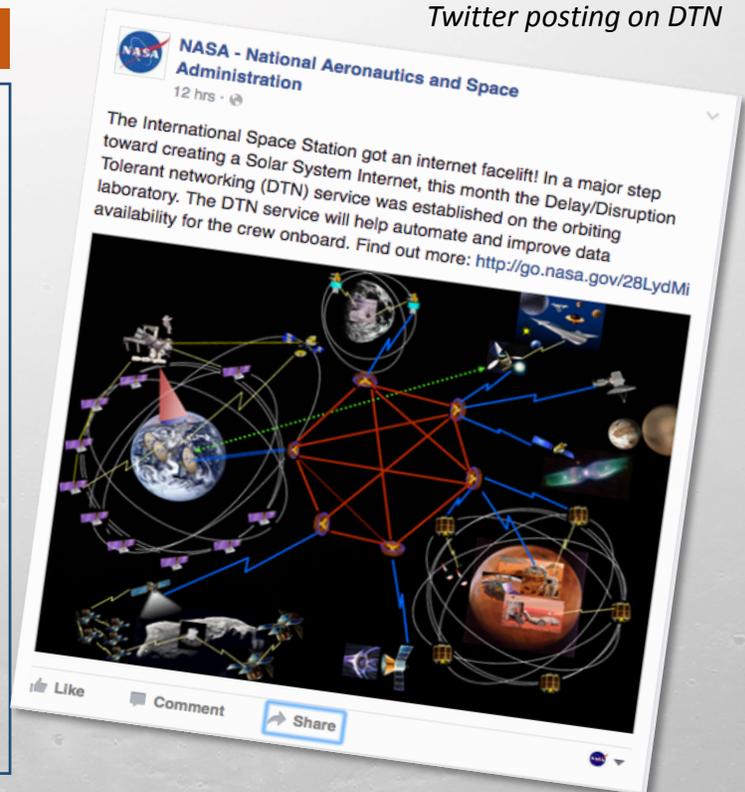
NASA Scientists Discover Unexpected Mineral on Mars

<http://www.nasa.gov/feature/nasa-scientists-discover-unexpected-mineral-on-mars>

New ARES Web Site

<http://ares.jsc.nasa.gov/>

Twitter posting on DTN

**Welcome EISD Summer Interns!****Andrew Danford, XI2**

The University of Texas Rio Grande Valley

Colleen Laird, XI2

Case Western Reserve University

Zoe Hodges, XI3

Durham University

Scott Eckley, XI3

The University of Tennessee Knoxville

Sarah Perry, XI3

Vassar College

Michael Cato, XI3

Western Carolina University

Brandan Neece, XI2

The University of Texas Rio Grande Valley

Andi Hollier, XI4

Texas State University

Matthew Garcia, XI4

University of Texas at El Paso

Joseph Aebersold, XI4

Texas State University

Jacqueline Reyes, XI4

University of Texas at El Paso

James Murray, XI4

The University of Texas Rio Grande Valley

Jessie Pease, XI4

University of Florida

Mauro Blanco Midulla, XP

University of Houston

Tobin Barnes, XP

Lone Star College

Faith Wenger, XP

University of Iowa

Betzy Ramirez, XP

Texas A&M University

Peter Grenfell, XP

University of California

Sam Jenpsch, XS

Stephen F. Austin State University