



# Game Changing Development

## Monthly Highlights

July/August 2012

## Test of Hypersonic Inflatable Heat Shield a Splashing Success



*“We are pushing the boundaries with this flight. We look forward to future test launches of even bigger inflatable aeroshells.”*

Lesa Roe, Director of NASA's Langley Research Center

The Inflatable Reentry Vehicle Experiment (IRVE-3) was launched by sounding rocket at 7:01 a.m. Monday, July 23, from NASA's Wallops Flight Facility on Wallops Island, Virginia. The purpose of the IRVE-3 test was to show that a space capsule can use an inflatable outer shell to slow and protect itself as it enters an atmosphere at hypersonic speed during planetary entry and descent or as it returns to Earth with cargo from the International Space Station.

The rocket with the inflatable on board shot up 288 miles (463.5 kilometers), and IRVE-3 and its payload were ejected into the atmosphere. The technology demonstrator inflated and fell back to Earth — cameras and temperature and pressure sensors monitoring its performance all the way down. After a total of 20 minutes — from launch to splash down — it landed in the Atlantic about 100 miles (161 kilometers) east of Cape Hatteras, North Carolina.

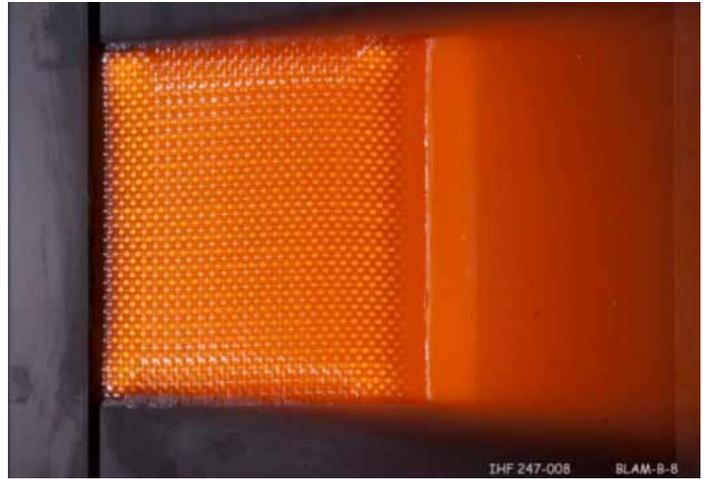


# Successful BLAM Arcjet Test Series for ADEPT

Engineers at NASA Ames successfully completed the Bi-axially Loaded Aerothermal Mechanical (BLAM) Arcjet test series of the Adaptable Deployable Entry and Placement Technology (ADEPT) project element of DACC (Deployable Aeroshell Concepts and Conformal TPS).

The team, led by BLAM test PI, Keith Peterson, met all test objectives by performing ten individual runs of the carbon fabric under varying aerothermal test conditions and tension loads of the fabric during the test.

The test conditions best approximate the expected heating conditions and mechanical (tension) loading the material is expected to see on a Venus entry mission scenario. A quick look at the fabric and data showed the material performed incredibly well and that the fabric was verified and held tension loads throughout the test duration.



Data verified the fabric held tension loads throughout the test duration.

## A “First” for Deep Space Optical Communications

Using technologies developed for near-Earth optical communications in the deep space domain would require that Mega-Watts of laser power be transmitted, for instance from Earth to Mars. One of the goals of the Deep Space Optical Communications (DSOC) Project is to reduce the required laser beacon power by a factor of 1000 or more, allowing the use of common industrial-class lasers as the beacon source.

A key technology component to achieve this goal is an imaging optical array to detect the laser beacon

that is sensitive enough to actually count individual photons and to time tag the photon arrival times with a precision of a few nanoseconds or better.

At NASA's Jet Propulsion Laboratory, the DSOC project has performed a first-ever demonstration of this laser beacon tracking function using a 32 photon counting detector array. The photon counting array is a part of a deep space optical receiver emulation testbed that is being used to develop and test hardware and algorithms for laser beacon acquisition, tracking, and data demodulation.



## Project Manager Debrief

On August 15-16, the Program Office held a Project Manager Debrief at the National Institute of Aerospace. Topics that were covered included Roles & Responsibilities, Integrated Project Management Plan, Communication Strategy, Project Closeout, and Monthly Reporting, among others. Thanks to everyone who attended!



NASA engineer Larry Pelham (right) checks out the 2.4-meter diameter composite tank test article.

## Composite Cryogenic Tanks Reach Important Milestone

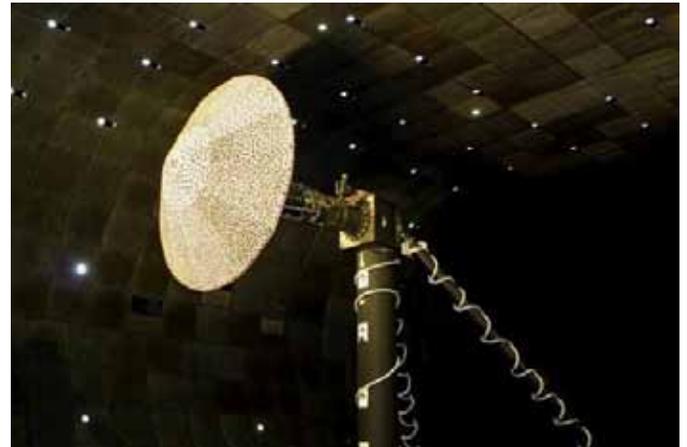
In July, NASA and Boeing successfully completed a critical manufacturing milestone toward the fabrication of one of the largest composite cryogenic tanks ever produced. This also marks the first time that out-of-autoclave materials have been used with robotic fiber placement to build a composite cryogenic pressure vessel. The effort is a part of the Composite Cryotank Technologies and Demonstration (CCTD) Project.

## Sextant Team Milestone



The Sextant team reached an important milestone by collecting the first light (X-ray photons) from the X-Ray concentrator optic Engineering Design Unit.

## Inflatable Structure Team Milestone



The Inflatable Structure team conducted the 3-m article testing in NFAC test series August 13-17. This was the first ground test of the 3-m Thermal Protection System as well. This effort completes a key milestone for the project.

## Woven TPS Receives Accolades for Poster

The poster, "Aerothermal Testing of Woven TPS Ablative Materials" presented by Dr. Mairead Stackpoole from NASA Ames was awarded best poster in the Space Exploration session during the National Space & Missile Materials Symposium, held June 25-28 in Tampa, Florida.

The National Space & Missile Materials Symposium brings together the Nation's technology leaders to review the critical challenges of materials, processing, and manufacturing for space, missile, and hypersonic systems.

# Game Changing Education and Public Outreach

## NASA Social

On August 3, NASA Langley took part in the first-ever multi-center NASA Social in support of the Mars Science Laboratory Landing. NASA Langley hosted 30 social media users who got a behind-the-scenes tour of the center. The Game Changing Development Program Office participated in the NASA Social, introducing the group to what NASA is doing for future space technology. Program Director Steve Gaddis gave an overview of Game Changing and principal investigator Neil Cheatwood spoke about HIAD and the recent IRVE-3 launch.



Members of the NASA Social pose with Neil Cheatwood (far right).



## Countdown to Curiosity

In preparation for the Mars rover landing, on Sunday afternoon, August 5, NASA's Glenn Research Center sponsored a "Countdown to Curiosity" public event, hosted in the Cleveland Museum of Natural History. In addition to children's activities and NASA Glenn research connections, a live webcast at the event featured Human Robotics Systems engineer Kyle Johnson, among other speakers. Johnson talked about the mobility research, which is sponsored by HRS at NASA Glenn.

## Congressional Visit to GCD

Game Changing Development Program Director Steve Gaddis and IRVE-3 Project Manager Mary Beth Wusk welcomed 28 congressional staffers from Washington D.C. on Thursday, August 23. Wusk gave an overview of the recent success of the Inflatable Re-Entry Vehicle Experiment 3 (IRVE-3) that launched from NASA's Wallops Space Flight Facility in July. The IRVE-3 heat shield technology could change the way we explore other worlds by accommodating larger payloads allowing for delivery of more science instruments and tools for exploration.



Steve Gaddis and Mary Beth Wusk welcome congressional staffers.

*Game On!*

<http://gameon.nasa.gov>



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