



# Space Technology Game Changing Development

## Monthly Highlights

January 2013

## Robotics Shine at NASA HQ

Robonaut 2, the new Exo-Skeleton, Hand-in-Space and Robo-Glove were featured at NASA HQ Friday, Jan. 18, during an Open House as part of a weekend of inaugural activities held in Washington D.C. NASA Johnson's Bill Bluethmann, Jonathan Rogers and

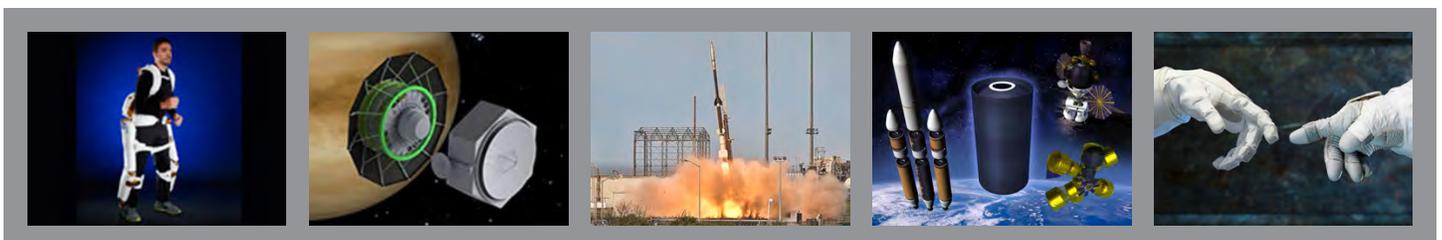
Roger Rovekamp supported the event. The event took place in the James Webb Auditorium. Administrator Charles Bolden and Deputy Administrator Lori Garver, along with senior managers and astronauts engaged with the audience on topics including: Plans for Humans Space Flight; Importance of Technology and Innovation for our Economic Future; Science on the International Space Station; and Curious about Mars: NASA's ongoing and future missions to the Red Planet.



Bill Bluethmann, left, Roger Rovekamp, center, and Jonathan Rogers, all engineers at NASA Johnson Space Center, perform a demonstration of NASA's exoskeleton technology during the NASA Open House. Photo Credit: (NASA/Paul E. Alers)



The @AstroRobonaut team talks to kids about robotics.



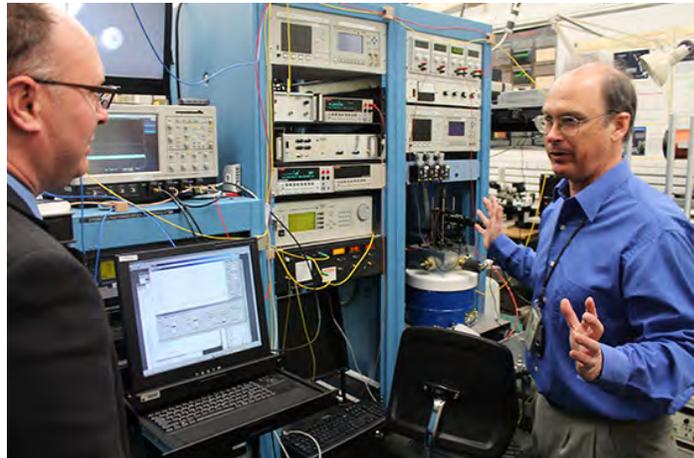
# Center Reviews Continue

Game Changing Development Program management continued its center reviews in January, visiting Goddard Space Flight Center Jan. 10-11 and NASA's Jet Propulsion Laboratory Jan. 22-23. At both centers, management heard overviews on existing projects, including SEXTANT,

Satellite Servicing, Nanotechnology, Deep Space Optical Communications, BIRD, and others. Management also toured labs and heard presentations on emerging technologies and unique center capabilities. Management will travel to NASA Marshall Feb. 12-13 for the next center visit.



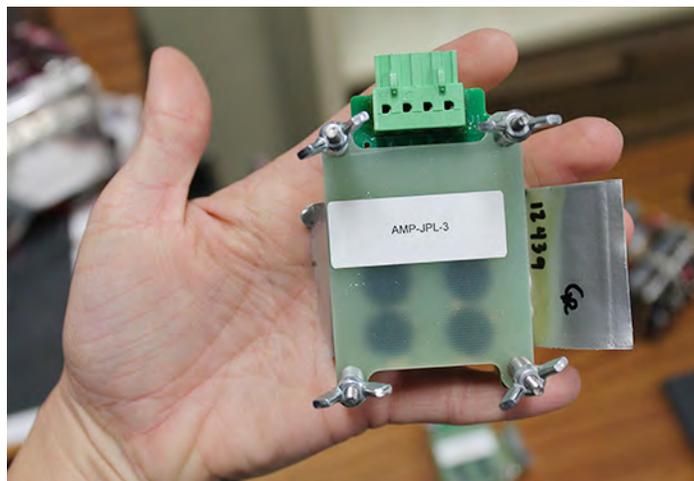
Game Changing program management toured the Detector Development Lab at NASA Goddard.



At JPL, Bill Farr (right) discussed optical communications with Program Director Steve Gaddis.



Management heard a presentation (also at Goddard) on robotic refueling from Ben Reed (right).



Seeing hardware (like this battery at JPL) and meeting the engineers working on Game Changing projects, is an important part of the reviews.

## In the News

**The Robotic Refueling Mission** was highlighted in "This Week@NASA" (Dated Jan. 25, 2013) as well as a segment on Manufacturing Innovation, which includes an interview with John Vickers of the **Composite Cryotanks** project.

Find it at [http://www.nasa.gov/multimedia/videogallery/index.html?media\\_id=159068121](http://www.nasa.gov/multimedia/videogallery/index.html?media_id=159068121).

The latest NASA X featuring the **IRVE-3** story is now available for download at [www.nasa.gov/nasax](http://www.nasa.gov/nasax).

The program features the efforts of the IRVE-3 team from the early days through the successful launch of IRVE-3. It will be on NASA TV soon as well as on our other 450 TV stations, airline partners, and other internet distribution sites (ex: iTunes).

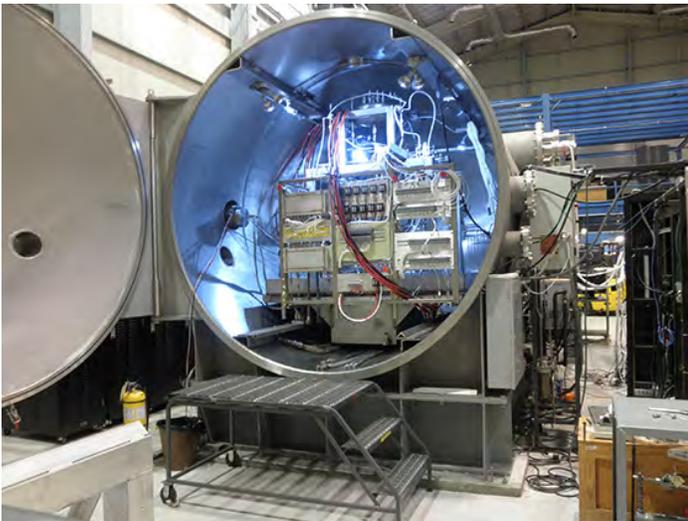
This program will also be up on hulu in the next few days at <http://www.hulu.com/nasa-x>.

# Milestones

## Got power? Nuclear Systems Reaches Milestone

The electrically-heated non-nuclear **Reactor Simulator (RxSim)** completed checkout testing at NASA's Marshall Spaceflight Center and was shipped to NASA's Glenn Research Center at the end of December. NASA Marshall, assisted by the Department of Energy

(DOE), built the RxSim to provide heat via a liquid metal NaK pumped loop to the Fission Power System Technology Demonstration Unit (TDU). The TDU will demonstrate readiness of fission power subsystem technology in a relevant environment (TRL 5).



## Composite Cryotank Milestone Reached

On Jan. 22-23, the Critical Design Review (CDR) was conducted for the **Composite Cryotank Technologies and Demonstration (CCTD)** project at NASA's Marshall Spaceflight Center. Approximately 50 participants, including NASA and Boeing management, as well as independent consultant/reviewers attended the review.

"The project team is making great progress in numerous challenging technical areas and is on track to demonstrate that the maturity of the design is appropriate to support proceeding with full-scale manufacturing and test," said Project Manager John Vickers of NASA's Marshall Spaceflight Center.



# Game Changing Education and Public Outreach

## Virtual Fuel Cell Display in Cleveland

Game Changing Development's **Space Power Systems** project at NASA's Glenn Research Center developed an interactive virtual fuel cell display that made its debut at NASA Technology Days in November. The exhibit was just recently installed in the Great Lakes Science Center in Cleveland, Ohio, where it will stay for six-months. The exhibit is already drawing large crowds.



## Hydrogen Refueling Station Media Day a Success

Despite frigid temperatures in the single digits, a media event was held Jan. 22 in downtown Cleveland, Ohio, in front of the Greater Cleveland Regional Transit Authority, or RTA, to show off a new hydrogen-powered bus served by Ohio's first operational electrolysis-based refueling station. Officials from RTA, Sierra Lobo, and NASA Glenn were on hand and spoke with representatives from local television stations about their role in making this capability a reality for the region. The bus will transport passengers 60-80 miles a day along various routes with emissions of only water and heat, and will be refueled at a station at RTA's Hayden bus garage equipped with technologies developed at Glenn. The project is sponsored by NASA's Game Changing Development Program.



Left to right: Valerie Lyons (retired Dec. 31, 2012), Division Chief of Power and Propulsion at Glenn, was instrumental in Glenn's role in making the hydrogen bus a reality; Robert J. (Joe) Shaw, Deputy Director of Glenn's Office of Technology Partnerships and Planning at Glenn; Brianne Scheidegger, Research electrical engineer and technical lead for hydrogen bus effort at Glenn who worked with Sierra Lobo, Glenn's contractor, to get the refueling station, including the fuel cell, installed; Carolyn Mercer, Project Manager for Power Systems Project at Glenn.

*Game On!*  
<http://gameon.nasa.gov>



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