

# NASA's Return on Investment Report

Issue 2

August 2011



*This bi-monthly newsletter of accomplishments, progress, and happenings in NASA's commercial spaceflight development programs is distributed by the Commercial Spaceflight Development Division at NASA Headquarters.*

## NEXT SPACEX CARGO DEMO FLIGHT

After the successful launch of the first SpaceX cargo demonstration flight (C1) in December 2010, SpaceX approached NASA with a plan to accelerate its cargo transportation capability by attempting to achieve the third cargo demonstration flight (C3) mission objectives on the second demonstration (C2) flight. C2 mission objectives include demonstrating ISS/Dragon communications and flight navigation, control, and contingency operations near ISS. C3 mission objectives include demonstrating ISS proximity operations, berthing with the ISS, cargo transfer, and return to Earth. Operationally, the plan would be for SpaceX to successfully complete all the C2 mission objectives and then be given approval to rendezvous and berth with the ISS during the same flight. According to Alan Lindenmoyer, Commercial Crew and Cargo Program Manager, "Combining C2 and C3 could accelerate cargo services to station by about two months." NASA will not relax or eliminate any technical or safety requirements; rather, the combination will allow SpaceX the opportunity to meet all the C2 and C3 milestone objectives in a single flight.



*Dragon Capsule being readied for the C2 mission*

At this point, NASA has not identified anything that would preclude combining the C2 and C3 mission objectives and is proceeding with mission planning. However, SpaceX wants to deploy two commercial satellites (Orbcomm) from the F9 second stage. The addition of Orbcomm's payloads to the combined mission is under review. If the risks associated with the

secondary payloads are determined to be acceptable, NASA will give formal approval to the combined mission execution.

The C2 Falcon 9 launch vehicle is currently at Pad 40, Cape Canaveral, and is undergoing final preparation for the mission. The integrated Dragon spacecraft is preparing for electromagnetic compatibility and thermal vacuum testing to verify the spacecraft's compatibility with ISS environments. The Dragon spacecraft is planned to be shipped from SpaceX's Hawthorne facility to Cape Canaveral in September.

## COMMERCIAL CREW KEEPS ROLLING THROUGH CCDEV2 MILESTONES

NASA's Commercial Crew Program (CCP), together with its industry partners, continued progressing toward commercial human spaceflight capability by mid-decade by successfully completing all five planned milestones during this 60-day period. Readiness of a new cockpit simulator for Sierra Nevada's Dream Chaser spacecraft was verified and is now being used for engineering development tests. The tip fin airfoil design for the Dream Chaser was also selected. CCP also successfully completed several important technical reviews:

- A launch abort system concept review for SpaceX's Dragon spacecraft, which showed feasibility of their design concept
- Boeing's CST-100 "phase zero" safety review, which identified initial safety considerations and controls
- Boeing's fourth CST-100 integrated design review, which established design trade studies to be conducted before Boeing's preliminary design review next year

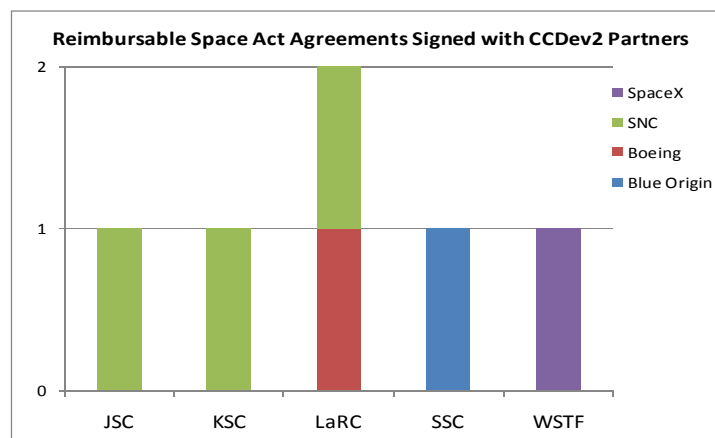


*Dream Chaser Cockpit Simulator*

A summary schedule showing all completed and planned CCDev2 milestones can be found at <http://www.nasa.gov/exploration/commercial/>.

## COMMERCIAL PARTNERS EXPAND COLLABORATION WITH NASA

Each of NASA's CCDev2 partners (Blue Origin, Boeing, Sierra Nevada, and SpaceX) has expanded their partnership with NASA through Reimbursable Space Act Agreements (SAAs). Reimbursable SAAs permit the CCDev2 partners to use NASA's unique resources and technologies such as facilities, personnel, expertise, or equipment to further advance their commercial crew transportation system concepts. In exchange for using NASA resources, NASA's associated costs are reimbursed by the CCDev 2 partner.



Reimbursable SAAs are beneficial to both parties in that they allow the commercial partner to have access to NASA's unique experience and infrastructure to help further advance their capabilities and increase competitiveness within the global aerospace market while providing NASA the ability to share skills and knowledge developed over the past 50 years of human spaceflight.

Currently, all of NASA's CCDev2 partners have reimbursable agreements negotiated with various centers (see graph on previous page) and several more center reimbursable agreements are being negotiated. These agreements encompass various skills and infrastructure including such areas as testing of rocket engine propulsion systems at Stennis Space Center's test facilities; conducting spacecraft hazardous propellant testing using NASA's White Sands Test Facility test methods, technology, and facilities; and collaborating with Kennedy Space Center engineers on spacecraft ground processing to include landing site operations analysis and pre/post flight flow development.

## NASA AND ULA FORM NEW PARTNERSHIP

Under a new agreement established last month, NASA and the United Launch Alliance (ULA) will share personnel, infrastructure and information to accelerate the potential use of the Atlas V as part of a commercial crew transportation system. The agreement is an "unfunded Space Act Agreement" which means no money will exchange hands, but each party will benefit.

"This unfunded SAA will look at the Atlas V to understand its design risks, its capabilities, how it can be used within the context of flying our NASA crew" said Ed Mango, NASA's Commercial Crew Program Manager.

ULA determined that it wanted to proceed with establishing its baseline compliance of the Atlas V as part of a commercial crew transportation system and approached NASA to establish a partnership to further that effort. NASA determined that the Agreement aligned well with the Agency's efforts to advance orbital commercial crew transportation system concepts. According to Phil McAlister, Acting Director of Commercial Spaceflight Development at NASA, "This Agreement demonstrates that U.S. companies and NASA are committed to the public-private partnership approach for developing commercial crew transportation systems."

A copy of the Agreement has been posted to the Kennedy Space Center Procurement Website at <http://procurement.ksc.nasa.gov/index.htm>.



*ULA's Atlas V, Launching the Juno Spacecraft on August 5<sup>th</sup>, 2011*

For more information on any of the articles in this report, contact Michael Braukus in NASA's Public Affairs Office at 202-358-1979.

Stay tuned for future editions of the *Return on Investment*. In the meantime, feel free to review some of NASA's other commercial space accomplishments at: <http://www.nasa.gov/exploration/commercial/>