

Report of the Commercial Space Committee
NASA Advisory Council

Ms. Patti Grace Smith
Chair

NASA Headquarters
April 25, 2013



Commercial Space Committee (CSC) Members

- ▶ Patti Grace Smith, Chair
 - ▶ Former FAA Associate Administrator for Commercial Space Transportation and consultant/advisor to space and aerospace companies
- ▶ Bernard A. Harris, Jr., M.D.
 - ▶ CEO of Vesalius Ventures, former NASA astronaut, and former SPACEHAB executive
- ▶ Lon Levin
 - ▶ Co-founder of XM Satellite Radio and other satellite businesses
- ▶ Steve Oswald
 - ▶ Founder and President of Syzygy Enterprises, former NASA astronaut, and former Boeing executive
- ▶ Franceska Schroeder
 - ▶ Principal attorney with Fish & Richardson
- ▶ Wilbur C. Trafton
 - ▶ Former NASA Associate Administrator for Space Flight and executive at ILS and Kistler Aerospace
- ▶ Joseph Boyle **NEW MEMBER**
 - ▶ Consultant. Former Colonel in the U.S. Air Force Space and Missiles Command
- ▶ David M. Lengyel, **NEW Executive Secretary**
 - ▶ Risk & Knowledge Management Officer, Human Exploration and Operations Mission Directorate, NASA HQ



Agenda

- ▶ Recent Highlights of NASA's Commercial Space Programs
- ▶ Summary of Recent Meetings
 - ▶ February 28, 2013 – March 01, 2013
- ▶ Proposed Findings and Recommendations
- ▶ Committee Plans for 2013

Recent Highlights of NASA's Commercial Space Programs Pt. 1

- ▶ SpaceX completed their second commercial cargo resupply mission to the ISS, March 1-26, 2013



Credit SpaceX

SPACEX



Credit NASA



Credit SpaceX



Recent Highlights of NASA's Commercial Space Programs Pt. 2

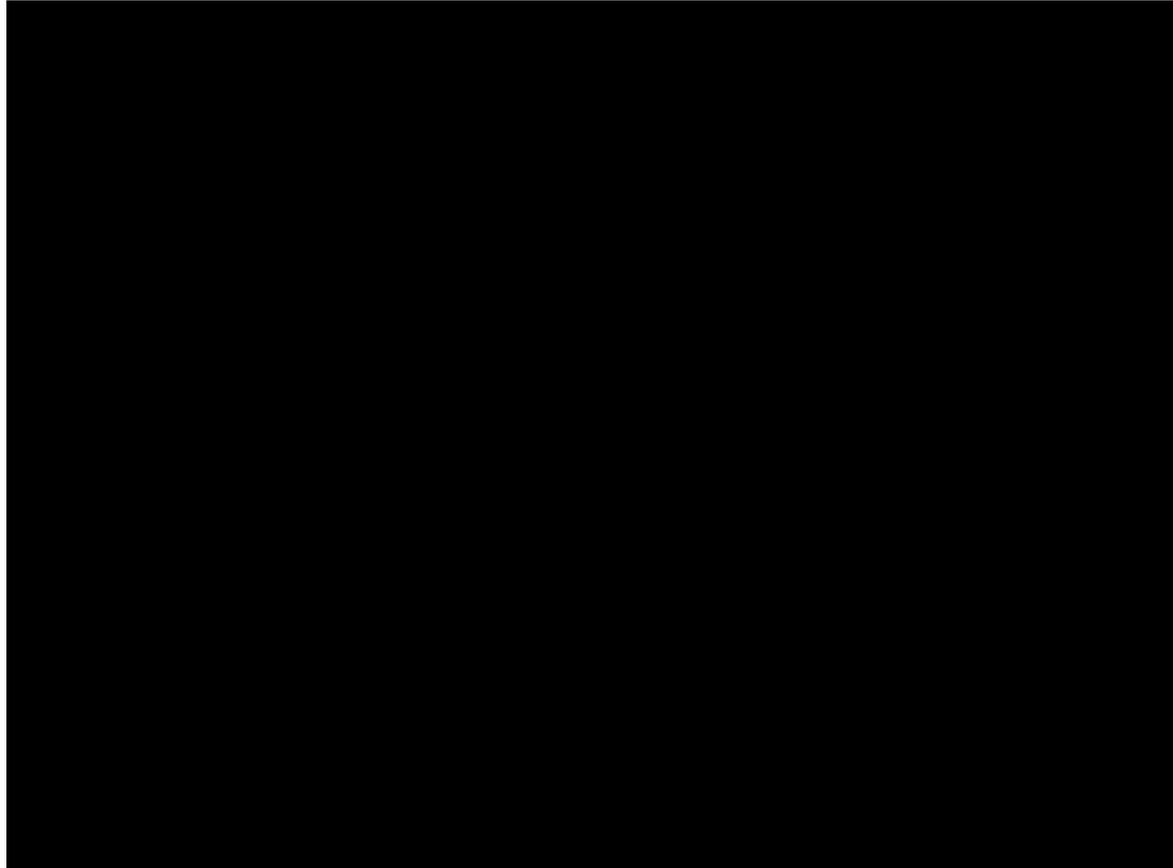
NASA commercial space partner Orbital Sciences Corporation launched its Antares rocket at 5:00 p.m. EDT on Sunday 21 April 2013 from the new Mid-Atlantic Regional Spaceport Pad-0A at the agency's Wallops Flight Facility in Virginia



The completed flight paves the way for a demonstration mission by Orbital to resupply the space station later this year. Antares will launch experiments and supplies to the orbiting laboratory carried aboard the company's new Cygnus cargo spacecraft through NASA's Commercial Resupply Services (CRS) contract.

Credit Orbital

Falcon 9 and Antares Videos





▶ **Sierra Nevada Corporation**

Sierra Nevada and NASA Dryden Flight Research Center completed a Flight Readiness Review of the Dream Chaser Engineering Test Article's flight termination system, in support of upcoming free flight drop tests.

▶ **SpaceX**

- The Merlin 1D engine has achieved flight qualification, a major milestone for the next generation Merlin engine. Through a 28 test qualification program, the Merlin 1D accumulated 1,970 seconds of total test time, the equivalent run time of over 10 full mission durations, and is now fully qualified to fly on the Falcon 9 rocket – 20 Mar 2013

▶ **Boeing**

- The structure that will join the CST-100 spacecraft to an Atlas V rocket has successfully completed a preliminary design review – 5 April 2013



Artist rendition of Sierra Nevada Dream Chaser in low-Earth orbit



Photograph of Boeing CST-100 spacecraft and Atlas V launch pad



Artist rendition of SpaceX Dragon attached to ISS



Summary of Recent Meetings

February 28 – March 1, 2013

Sierra Nevada Corporation, Louisville, CO and United Launch Alliance, Denver CO

▶ **Attended by:**

- ▶ Patricia Smith, Chair
- ▶ Bernard Harris
- ▶ Lon Levin
- ▶ Steve Oswald
- ▶ Francesca Schroeder
- ▶ Will Trafton

▶ **Agenda:**

- ▶ Tour of Sierra Nevada Corp's facilities (Committee only)

▶ **Non-FACA:**

- ▶ Briefing and discussion: Sub-Orbital Utilization Opportunities , Ms. Carissa Christensen, The Tauri Group

▶ **FACA:**

- ▶ Briefing: ISS Utilization Status and Plans , Mr. Joel Montalbano, ISS Program and Mr. Brian Harris, CASIS
 - ▶ Briefing: Description of NASA's Agency level Commercialization Study Plans, Dr. Rebecca Spyke-Keiser, Associate Deputy Admin for Strategy & Policy
 - ▶ Tour of United Launch Alliance (ULA)'s facilities (Committee only)
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Summary of Recent Meetings

February 28 – March 1, 2013

▶ **Key take-aways:**

▶ **Sierra Nevada Corp (SNC):**

- ▶ Highly motivated team – Called “JSC North” by some - Excellent technical progress on *Dreamchaser*
- ▶ Well-established safety and mission assurance and risk management processes
- ▶ SNC is using multiple Space Act Agreements (SAA) with NASA for testing and analysis

▶ **Sub-Orbital Study:**

- ▶ NASA can benefit from sub-orbital space tourism
- ▶ NASA can benefit from participating in the sub-orbital commercial market (technology opportunities)

▶ **ISS Utilization:**

- ▶ Timeline reduction to place research on ISS from 3 years to 9 months
- ▶ There is work to be done in communicating the scientific benefits of ISS (CASIS “Made in Space” Initiative)
- ▶ ISS life extension beyond 2020 may be needed to exploit long-term science interest

▶ **Commercialization Study:**

- ▶ Goal is to document process recommendations to better enable commercial space partnerships

▶ **United Launch Alliance (ULA):**

- ▶ Good partnership with Space Launch System (SLS) for first MPCV/Orion test flight in 2014
- ▶ Working on common avionics between Atlas V and Delta IV EELVs



Proposed Recommendation CSC-2013-R1

- **Short Title of Recommendation:** SAA Internal Coordination
- **Recommendation:** The Council recommends that NASA create a formal transparent process for Space Act Agreements that present novel issues and require coordination between headquarters and a center, including: (1) designating a person responsible at headquarters and the center for resolving the issues, (2) establishing a timeline for a headquarters decision, and (3) identifying to the potential commercial partner a person with sufficient authority to move the process toward resolution.
- **Major Reasons for the Recommendation:** Most ordinary SAAs are dispatched in a reasonable amount of time. SAAs presenting novel issues require additional coordination between a center and headquarters that can result in unusual delays without providing the commercial partner insight on when a decision will be made. The Committee discovered that the possible reasons for delay were not identifying NASA personnel at headquarters and the center who are responsible for the decision and not having an internal timeline to make a decision. Commercial partners seeking an SAA often do not have a point of contact with whom they can get actionable information.
- **Consequences of No Action on the Recommendation:** The most innovative SAAs will continue to face unnecessary delay and commercial partners will be frustrated when dealing with NASA.



Proposed Recommendation CSC-2013-R2

- **Short Title of Recommendation:** Explore Use of CRADAs
- **Recommendation:** The Council recommends that NASA explore use of Cooperative Research and Development Agreements (CRADAs) with its commercial partners. Initially, NASA should identify an office (or a person) at headquarters that would (1) identify the current number of active CRADAs between (a) a party and headquarters and (b) a party and each of the centers; (2) assess the success of each of these CRADAs; and (3) evaluate the benefits of promoting use of CRADAs.
- **Major Reasons for the Recommendation:** CRADAs were designed to promote technology transfer in a way that protects the intellectual property that the partner brings to the project and advances the commercial application of such technology. NASA should ensure that its commercial partners are aware of the CRADA option and use this tool to the maximum extent appropriate to encourage relationships with commercial partners.
- **Consequences of No Action on the Recommendation:** NASA and its commercial partners may miss an opportunity to work together if the parties do not realize that CRADAs are available.



Proposed Recommendation CSC-2013-F1

- ▶ **Short Title of Recommendation:** Collaboration of CASIS and NSBRI
- ▶ **Recommendation:** The Committee recommends that the Center for the Advancement of Science in Space (CASIS) develop a Memorandum of Understanding (MOU) for collaboration with the National Space Biomedical Research Institute (NSBRI). The results from NSBRI's support of human research which addresses future exploration risks could be assessed by CASIS for their potential to expand non-NASA-sponsored utilization of the ISS.
- ▶ **Major Reason for Recommendation:** There is synergy between the missions of CASIS and NSBRI whose responsibilities are to enhance the non-exploration related research uses of the ISS and lead a national effort to conduct the integrated, critical path, biomedical research necessary to support long-term human presence, development and exploration of space and enhances life on Earth by applying the resulting advances in human knowledge and technology respectively. They should be aware of each other's programs and work together to ensure the successful, sustainable, scientific research and technical output of the ISS.
- ▶ **Consequences of No Action:** Missed opportunities to collaborate in areas of common interest between CASIS and NSBRI



Committee Plans for 2013

- ▶ Next meeting July 2013 at NASA Headquarters
- ▶ CSC Areas of Focus in 2013
 - ▶ What should commercial space be in 20-30 years?
 - ▶ Success and Failure Modes for Commercial Space
 - ▶ Structure and expertise of NASA to facilitate commercial partnerships
 - ▶ Utilization of prizes
 - ▶ Commercialization lessons from Aeronautics
 - ▶ How can NASA gain support for commercial space enterprises?
 - ▶ Non-traditional commercial space ventures, e.g. weather satellites



QUESTIONS?

