Report of the Commercial Space Committee

NASA Advisory Council

Ms. Patti Grace Smith

Marshall Space Flight Center
November 29, 2012

Commercial Committee Members

- Patti Grace Smith, Chair
  - Former FAA Associate Administrator for Commercial Space Transportation and consultant/advisor to space and aerospace companies
- Maj Gen Donald Hard (USAF, Ret.)
  - Independent consultant to government and industry
- 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
- *Thomas Rathjen, Executive Secretary*
  - *Commercial Space Development Office, Human Exploration and Operations Mission Directorate, NASA HQ*

Agenda

- Recent Highlights of NASA's Commercial Space Programs
- Committee's 2012 Strategy and Accomplishments
- Summary of Recent Meetings
  - September 18, 2012
  - November 26, 2012
- Proposed Finding and Recommendations
- Next Steps

Recent Highlights of NASA's Commercial Space Programs

- SpaceX completed the first commercial cargo resupply mission to the ISS, October 7 – 28, 2012

Video: SpaceX

Recent Highlights of NASA's Commercial Space Programs

- Commercial Crew Development Round 2 (CCDev2) near completion
  - Objective: Mature the design and development of elements of U.S. crew transportation systems, such as launc vehicles and spacecraft.
  - Four companies selected in April 2011
    - Blue Origin awarded $22M
    - Boeing awarded $113M
    - Sierra Nevada Corporation awarded $106M
    - SpaceX awarded $75M
  - One milestone remaining:
    - Sierra Nevada's free flight landing test, planned for early 2013

Blue Origin Pad Escape Test

Boeing Parachute Test

Sierra Nevada Dream Chaser Test

SpaceX Crew Cabin Test

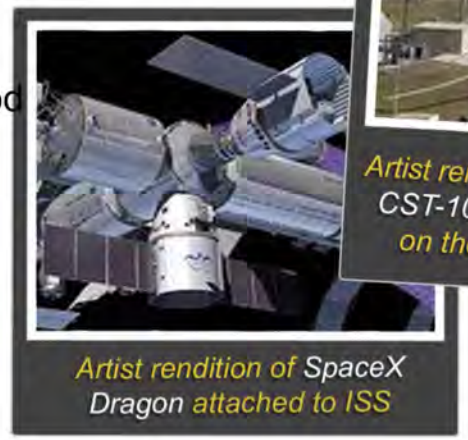
Video: Commercial Crew Program CCiCap Partners

Recent Highlights of NASA's Commercial Space Programs

- Next phase of Commercial Crew, "Commercial Crew Integrated Capability" (CCiCap) awarded
- Goals:
  - Advance multiple integrated crew transportation systems
  - Commercial Provider investment
  - Affordable development costs leading to cost-effective access to LEO
  - Develop a CTS capability to LEO that supports a commercial market
- Base Period: 21 months, August 2012 – May 2014, culminating in a level of maturing approximately equivalent to a Critical Design Review (CDR).
- Optional Milestones Period: Following the Base Period through orbital crewed flight demonstration.
- Awards made to three companies in August 2012:
  - Sierra Nevada Corporation – $212.5 million
  - SpaceX – $440 million
  - Boeing – $460 million

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

Artist rendition of Boeing CST-100 and Atlas V on the launch pad



Artist rendition of SpaceX Dragon attached to ISS

Committee's Strategy and Accomplishments for 2012

- Committee was charged in December 2011 by Administrator Bolden to visit NASA Centers to review and assess examples of best practices of centers embracing commercial vision – or not
  - Perceptions and promotion of Agency's Commercial Space strategy
  - Plans for transition
  - Excess capacity plans
- 2012 Meetings included:
  - Feb 22-23, 2012, NASA Marshall Space Flight Center, Huntsville AL
  - April 30 – May 1, 2012, NASA Glenn Research Center, Cleveland OH
  - July 23-24, 2012, NASA Goddard Flight Research Center, Greenbelt MD
  - Sept 18, 2012, NASA Ames Research Center, Moffett Field, CA
  - Nov 26, 2012, NASA Headquarters, Washington DC
- Receive briefings on various commercial space topics (in addition to Center Director briefings)
  - Emphasis on areas where there are opportunities for the Committee to provide meaningful and timely advice
- Periodic one-on-one meetings between Committee Chair, other committee chairs, and NASA leadership
  - The NASA Administrator is pleased with the direction our Committee is going in
  - Regular meetings with Mr. Gerstenmaier on his thoughts regarding commercial direction
- Findings and Recommendations
  - One proposed finding and five recommendations presented to NAC at July 2012 meeting:
    - The finding and one recommendation were carried forward to NASA
    - Two other recommendations changed to findings and forwarded to NASA
  - One additional finding to be presented today, as well as a proposed reconsideration of NASA's response to the earlier recommendation

Summary of Recent Meetings

September 18, 2012

- NASA Ames Research Center, Moffett Field CA
- Attended by:
  - Patricia Smith, Chair
  - Bernard Harris
  - Lon Levin (by telecon)
  - Steve Oswald
  - Franceska Schroeder
  - Will Trafton
- Agenda:
  - Tour of ARC's commercially relevant facilities (Committee only)
  - Closed Session:
    - Briefing and discussion: HQ Perspectives on the Space Act Agreement Process, Ms. Courtney Graham
  - Open Session:
    - Briefing: Assessment of Commercial Suborbital Market, Ms. Carissa Christensen, Managing Partner, The Tauri Group
    - Briefing: Overview of Commercial Crew Integrated Capability Agreements, Mr. Ed Mango, Commercial Crew Program Manager
    - Briefing: Ames Research Center's Commercial Space Activities and Plans, Dr. Simon P. Worden, Center Director
    - Briefing: Dryden Flight Research Center's Commercial Space Activities and Plans, Mr. David McBride, Center Director
    - Briefing: Jet Propulsion Laboratory's Commercial Space Activities and Plans, Gen. Eugene Tattini, Deputy Center Director

Summary of Recent Meetings

September 18, 2012

- Key take-aways:
  - Ames Research Center has been especially forward-leaning in pursuing new opportunities for partnering with commercial industry
  - Google and Singularity are formidable strategic partners as NASA changes direction to commercial capabilities
  - Very visible among Ames employees that the commercial strategies are well understood and embraced

Summary of Recent Meetings

November 26, 2012

- NASA Headquarters, Washington DC
- Attended by:
  - Patricia Smith, Chair
  - Donald Hard
  - Bernard Harris
  - Lon Levin (by telecon)
  - Steve Oswald
  - Franceska Schroeder (by telecon)
  - Will Trafton (by telecon)
- Agenda:
  - Closed Session:
    - Follow-up Discussion on HQ Perspectives on the Space Act Agreement Process, with Ms. Courtney Graham
    - Discussion with Bill Gerstenmaier, Associate Administrator for Human Exploration and Operations Mission Directorate
  - Open Session:
    - Discussion: Status of NASA's Plans for Commercialization, Ms. Lori Garver, NASA Deputy Administrator
    - Overview of NASA's Facility Utilization and Disposition Planning, Mr. Calvin Williams, Acting Director, Technical Capabilities and Real Property Management Division
    - Deliberation on candidate findings and recommendations

Summary of Recent Meetings

November 26, 2012

- Key take-aways:
  - Excellent presentations of vision and path forward by senior NASA leadership
  - Positive examples of success stories involving commercial use of NASA facilities
  - Gained further insight into NASA's Space Act Agreement process; possible recommendation in-work for a future meeting

Proposed Finding CSC-2012-F2

- Title: Acceptance of Commercial Approaches at NASA Centers

- Finding: The Council finds that there is an increasing acceptance of commercial approaches across NASA.

- Major Reasons for Finding: With the retirement of the Space Shuttle and termination of the Constellation program, current Agency policy includes "commercialization" of low Earth orbit transportation. Initially, this transition was not widely accepted by many current or former NASA employees. Some former astronauts and contractors were particularly vocal in Congressional testimony and other public venues in resisting the change away from NASA's traditional method of developing, funding, and managing major programs. However, there is evidence that this is changing. Metrics for the progress include the messaging NASA delivers in press releases, public statements and testimony, and validation from NASA's partners. The increasing acceptance appears to be due in part to the widening realization that the change is necessary.

  Furthermore, after visiting four NASA Centers and talking with all ten Center Directors (or their deputies), the Committee finds that commercialization initiatives are in place at every NASA Center. These initiatives appear in various stages, depending on local factors such as facilities, Center geographical location, Center Director interest and communication; outside interests, and funding constraints. Most Centers are actively pursuing new opportunities for commercial partnerships, and are interested in removing impediments to quick and efficient implementation. Employees appear to accept that commercialization of low Earth orbit transportation is just one piece of a broader NASA strategy that includes challenging current in-house work to enable beyond-Earth exploration.

Proposed Reconsideration of Recommendation CSC-01

- Title: Workforce Skill Mix

- Original Recommendation: The Council recommends that as NASA evolves its workforce skill mix and human capital planning to accommodate the Agency's future direction in the post Space Shuttle era, the unique skills needed for effectively overseeing commercialization initiatives should be considered and secured.

- NASA Response Summary: The NASA response agreed with the intent of the recommendation, but did not agree that there is a lack of depth in the skills and expertise needed for effectively overseeing commercialization initiatives. The response also described at a high level the tools available for training and augmenting the workforce.

- Major Reasons for Recommending Reconsideration: The Committee continues to believe that there is a lack of depth in the skills needed for overseeing commercialization initiatives. In briefings and follow-up discussions, the Committee heard multiple examples of cases where lack of sufficient skills and/or depth impeded timely and effective progress. For example, the Committee believes that developing and overseeing commercial programs according to NASA's expressed vision requires significant outside experience in building entrepreneurial businesses, establishing new markets, competing for market share, and managing complex programs in a profit-motivated environment. The Committee has not seen evidence that these skills are being sought and embedded in the commercial programs' staffing (to augment and compliment the existing significant experience base in traditional space program operations execution and government contracting).

- Consequences of No Action on the Recommendation to Reconsider: The Agency will continue to lack the types and depth of skills required to fully assess its commercialization initiatives.

Committee Plans for 2013

- Committee meeting plans for 2013 will be determined soon
  - Next meeting likely Feb/March timeframe, at TBD location
  - Potential 2013 topics
    - Explore additional opportunities for space commercialization and NASA/ commercial partnerships (e.g., space imaging, satellite servicing)
    - Visits to commercial partner facilities
    - Explore means of enhancing commercialization of science utilization
    - Intellectual Property

QUESTIONS?
NASA