NASA Commercial Space Transportation Workshop Overview

Presented at
COMSTAC RLV Working Group Meeting
October 10, 2007

Long Yip
NASA Langley Research Center
Hampton, VA
Workshop at a Glance

• Attendance => capacity (65) at National Institute of Aerospace

• Participation from:
  – NASA (ARC, GRC, MSFC, GSFC/WFF, KSC, JSC, LaRC, and HQ)
  – Industry (21)
  – Other entities (8)

• Unified/Common message => NASA ready to support this industry

• 1st day => COTS and IPP overview talks, industry perspectives/interests, NASA center capabilities, and technical challenges

• 2nd day => a panel discussion on public-private partnerships followed by private meetings and Langley facility tours
Workshop Objectives

• Workshop Purpose: to bring together the commercial space community and NASA center representatives

• Workshop Focus: space vehicle technologies - challenges and opportunities

• Desired outcomes include:
  – Better understanding of industry needs
  – Better understanding of NASA center capabilities and services
  – Defining common technical barriers for the community
  – Better communication between NASA centers and the community
  – Initial discussions of potential SAAs between NASA centers and industry wrt collaboration on technology developments (cost-shared, partial-, or fully-reimbursable efforts)
Morning Speakers
Billie Reed Stirring Things Up

Anecdotal Lessons

- “Government can't act like a business and business can't act like the Government”
  (colleague, 1999)
- “Commercial Space - that is an oxymoron”
  (Board Member, 2000)
- “…if you weren't here, I wouldn't have to deal with this” (NASA HQ Attorney, 1997)
- “I'm part of the reason that change is impossible and I know it” (NASA Manager, 2004)
Wallops Team Relaxing at the Hampton Convention Center Terrace Reception
Good Workshop Interactions
NASA’s Odd Couple from Glenn and Marshall
**Private Meetings with Industry**  
*(Example)*  

<table>
<thead>
<tr>
<th>Industry/Contact</th>
<th>Area of Interest / Requests</th>
<th>Follow Action(s)</th>
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</table>
| • ILC Dover - Cliff Willey, Program Manager, Space Inflatables | • Working many technology partnership opportunities at Langley  
• Desired single POC to help coordinate activities, develop strategic plans and technology roadmap | • Damodar Ambur will work with action with SED, SACD, and RTD orgs at Langley |
Langley’s Core Competencies

Aerosciences
Research for Flight in All Atmospheres
(Includes Entry, Descent & Landing)

Characterization of all Atmospheres
(Agency = Lasers & LIDAR)

Engineering & Safety
(One NASA)

Aerospace Systems Analysis

Aerospace Structural and Material Concepts
Major LaRC Wind Tunnels and Facilities

14 x 22 Foot Subsonic Tunnel
Subsonic, Alternate Uses

National Transonic Facility
High Reynolds Number Flow
Nationally Unique

LaRC Unitary Plan Wind Tunnel
Supersonic Speed Range

Aerothermodynamic Complex
Exploration Workhorse

Subsonic  Transonic  Supersonic  Hypersonic

National Assets needed to meet the needs of the Agency, DoD, and Industry

Electromagnetics Labs

20-Foot Vertical Spin Tunnel
Spin Characteristics & Dynamic Stability
Nationally Unique

Transonic Dynamics Tunnel
Aeroelasticity & Flutter
World Unique

8-Ft High Temperature Tunnel
Large-scale Hypersonics & Propulsion

Specialty Facilities
Collaboration Opportunities

Robert J. Shaw
Chief, New Business and Partnership Office
NASA Glenn Research Center

Demonstrated excellence in power, propulsion and communications
Science, technology and engineering products of excellence
Premier Facilities
Available for Testing and Evaluation

Space Vacuum Facility

Microgravity Testing: Drop Towers

Wind Tunnel Testing

Communications
MISSION: Promote the vision of the President, Congress, and NASA to establish a self-sustaining commercial space economy and infuse entrepreneurial practices into the civil space program

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August 2nd, 2007
Marshall Space Flight Center

A Gateway to the Moon

Commercial Space Transportation Workshop:
Developing Space Vehicle Technologies

K. Bruce Morris
Exploration Programs and Projects Manager
August 1, 2007

www.nasa.gov
Marshall Space Flight Center at a Glance

- **Employees:** 7,000 (2,600 Civil Service; 4,400 contractor)
- **Location:** 1,841 acres on Redstone Arsenal in Huntsville, AL
- **Buildings:** 237 with 4.5M sq ft of space
- **One-of-a-kind facilities:** 50
- **Nearby resources:**
  - National Space Science & Technology Center
  - Cummings Research Park
  - Alabama A & M University
  - University of Alabama in Huntsville
  - U.S. Space & Rocket Center
  - Von Braun Center for Science and Innovation

- $2.7B budget (FY07)
- Part of NASA’s nearly $1B annual Alabama impact
- Payroll since 1960: $6.1B
- Engages 20,800 people in 47 states
- Manages Michoud Assembly Facility near New Orleans
Kennedy Space Center
Spaceport Operations & Technology

Commercial Space Transportation Workshop

National Institute of Aerospace
Hampton, Virginia
August 1-2, 2007

Jim Ball
Spaceport Development Manager
NASA Kennedy Space Center
Kennedy Space Center - Offering Spaceport Operations & Technology

- Sites are being assessed and identified for commercial launch, recovery, processing, & support operations
- Underutilized facilities are available at market-based rates
- Technical expertise and test facilities available to support industry in areas such as:
  - Cryogenic propellant systems
  - Vehicle health management
  - Launch facility design
  - Operating procedures
  - Payload processing
Commercial Space Flight Opportunities at Wallops Flight Facility

Bruce Underwood
Chief, Advance Projects Office
NASA/Wallops Flight Facility
Collaboration Opportunities

- Launch Range Operations
- Engineering & Testing Labs
- Advanced Range Technologies
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<tr>
<th>NASA Center / POC</th>
<th>Areas of Interest for Follow Up Contact</th>
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Concluding Remarks

• Workshop Positives
  – Langley and NIA worked well together to conduct this workshop
  – Convention Center/Embassy Suites provided an excellent venue for reception/dinner
  – Better communications including inter-center networking
  – Tours provided good venue for our guests
  – Other centers are engaging with this industry

• Next steps
  – Follow up discussions with industry
  – Glenn Research Center is planning to host the next NASA Commercial Space Transportation workshop. It’s major themes will be:
    • NASA-DoD/AFRL-Commercial Space partnership building
    • NACA model and other commercial space transportation alliance strategies
    • Technology areas of mutual interest
    • Glenn Research Center facilities and tours
    • Industry meetings with NASA centers
At the End of the Day