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FAA Air Transportation Centers of Excellence

Highlights

Center of Excellence for Commercial Space Transportation (CST)

Established: 2010

Technology Areas:
- Space Traffic Management & Operations
- Space Transportation Operations, Technologies & Payloads
- Human Space Flight
- Space Transportation Industry Viability

Sponsor: Office of Commercial Space Transportation

Web: www.coe-cst.org

Genesis of the Center of Excellence for Commercial Space Transportation

In August 2009, the FAA Administrator signed a memo agreeing to the creation of a Center of Excellence for Commercial Space Transportation (COE CST) that would be supported at a minimum level of one million dollars per year for 10 years. A public announcement was made in August 2010 that two of the proposing teams had been selected to be combined into a single center. The FAA entered into cooperative agreements with each of the COE CST member universities in September, 2010. The FAA distributed two million dollars among the COE CST university members to fund research tasks during the initial years of operation. Additionally, the team members provided a comprehensive distribution of geographical coverage representing the entire Commercial Space Transportation industry. Combined, the nine universities bring over 50 other government, industry and academic organizations as research partners.

The Emerging Commercial Space Transportation Industry

On October 4, 2004 Burt Rutan won the $10 million Ansari X PRIZE with SpaceShipOne, his suborbital reusable launch vehicle to an altitude of 100km (328,000 feet). This feat was immediately recognized as a milestone in flight by the Smithsonian's National Air & Space Museum, and it led to the creation and announcement of Virgin Galactic, the first commercial company designed to provide frequent and safe flights to take private individuals to the edge of space and back.

Armadillo Aerospace and Masten Space Systems, after claiming all two million dollars in the Lunar Lander Challenge by October 2009, announced plans to begin flight testing of rocket-powered vehicles with the stated goal of commercial operations for frequent suborbital flight and recovery of scientific payloads to altitudes near, to, and above 100 kilometers.

Meanwhile, the intentions and accomplishments of other companies, e.g., Orbital Sciences, Space Exploration Technologies (aka SpaceX), Blue Orgin and XCOR Aerospace, provide strong

examples of the emerging commercial space transportation sectors that differentiate themselves from the more established sectors of expendable launch vehicles.

As of June 2011, the next chapter of the SpaceShipOne story has already begun to unfold. SpaceShipTwo (christened VSS Enterprise), a vehicle six times larger than its predecessor and carried by its mothership White Knight Two, has already conducted more than a dozen free-flight glide tests.

COE CST Member Universities

Like the eight FAA Center teams previously selected by FAA Administrators, this COE will encourage and facilitate the collaboration of world class scientists and the leveraging of shared resources and capabilities to maximize the synergy amongst government entities, academic partners, and industry affiliates. COE CST members universities will coordinate efforts to define and conduct research, disseminate results and engage in technology transfer for public purpose while they educate, train, and prepare the next generation of commercial space transportation professionals.

The nine member universities are:
• Florida Institute of Technology
• Florida State University
• New Mexico Institute of Mining and Technology
• New Mexico State University
• Stanford University
• University of Central Florida
• University of Colorado at Boulder
• University of Florida
• University of Texas Medical Branch at Galveston

COE CST Research Areas

The four major research areas and their component technical domains to be addressed by the COE CST include:

Space Traffic Management & Operations
• Orbital Space Traffic Management
• Suborbital Space Traffic Management
• National Air Space Integration
• Spaceport Operation
• Integrated Air/Space Traffic Mgt

Space Transportation Operations, Technologies & Payloads
• Ground System & Operations Safety Technology
• Vehicle Safety Analyses
• Vehicle Safety Systems & Technologies
• Payload Safety
• Vehicle Operations Safety

Human Space Flight
• Aerospace Physiology and Medicine
• Personnel Training
• ECLSS
• Habitability and Human Factors
• Human Rating

Space Transportation Industry Viability
• Markets

• Policy
• Law
• Regulation
• Cross-Cutting Topics

During 2011, two workshops were held the resulted in a FAA COE CST Research Roadmap report that describes these research areas in more detail. This report is available on the COE CST web site (www.coe-cst.org) under the Publications tab.

COE CST Research Accomplishments

During the first year of COE CST operation, 25 individual tasks were funded in all four research areas supported by the efforts of 27 Principal Investigators and 31 students from the nine member universities. An Executive Summary of the COE CST Year 1 Annual Report provides summary charts for each of these tasks and is available on the COE CST web site (www.coe-cst.org) under the Publications tab.

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