SPACECOM'S INAUGURAL
COMMERCIAL SPACEPORT SUMMIT
SUMMARY OF MEETING
NOVEMBER 17, 2015

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OVERVIEW

The first annual Commercial Spaceport Summit was hosted at SpaceCom, the Space Commerce Conference and Exposition, in Houston Texas on November 17th 2015.

With the encouragement and support of NASA, Rice Space Institute and the Houston Spaceport, SpaceCom organized the summit with spaceport executives and interested parties from around the world participating. Twenty executives representing 14 spaceports were in attendance. Also in attendance were 5 executives from RS&H, ISPCS and the FAA Office of Commercial Space Transportation. (The roster of actual and planned attendees is attached).

There were several goals for this inaugural event:

1. To bring together key decision makers from the growing spaceport industry to discuss the many issues faced by the industry, to share knowledge, operating status, obstacles to growth and ideas to help develop profitable spaceport enterprises.
2. To consider the development of a global spaceport network that, over time, would define common objectives, create collaborations and promote world-wide commercial spaceport activity. In particular, a key discussion point was how such a spaceport network would interface with other transportation network modes around the world: air, rail, marine & road.
3. To allow spaceport executives to have an opportunity to meet and develop relationships with one another to pursue mutually advantageous alliances and to learn from each other.

The program began with opening remarks by James Causey, SpaceCom Executive Director, Arturo Machuca, General Manager of Houston Spaceport, and Steven Gonzalez, Deputy Strategic Opportunities and Partnership Development at NASA JSC. The Summit was moderated by Dr. David Alexander, Director of the Rice Space Institute.

These comments were followed by a short presentation from each spaceport on their respective operational capabilities and outlook for the future. Presenting spaceports included:

- Boca Chica Spaceport (Texas)
- California Spaceport at Vandenberg (California)
- Cecil Spaceport (Florida)
- Front Range Spaceport (Colorado)
- Houston Spaceport (Texas)
- JAXA Space (Japan)
- Kennedy Space Center (Florida)
- Kodiak Launch Complex (Alaska)
- Manassas Regional Spaceport (proposed) (Virginia)
- Mid-Atlantic Regional Spaceport (Virginia)
- Midland International Air & Spaceport (Texas)
- Oklahoma Air and Spaceport (Oklahoma)
- Prestwick Spaceport (United Kingdom)
- Spaceport America (New Mexico)

The largest question that permeated much of the discussion was how spaceports can be commercially viable when there are more spaceports than potential customers and that in some respects the stage of spaceport development is such that there remains an element of competition between them.

There was a mutual desire to see a comparative matrix of each spaceport's advantages and an assessment of future customers' segments for potential spaceport infrastructure beyond government agencies from each spaceport.

DR. GEORGE NIELD REPORT FROM THE FAA

Dr. George Nield, Associate Administrator of the FAA Office of Commercial Space Transportation presented "Commercial Spaceports: 5 Ideas to Accelerate our Progress".

1. Increased federal funding for spaceports. The FAA gives $3.5 billion in grants each year for airport and spaceport improvements. Congress has previously passed legislation for a grant-matching program, but the funding was never appropriated.
2. Create more prizes. Similar to the model of the Ansari X prize, a point-to-point transportation prize could accelerate innovation.
3. Conduct more research. More research is necessary through partnerships between government, industry, and academia.
4. Education and training. Offer an opportunity for spaceports to diversify revenue sources. Spaceports should offer a one-stop-shop for commercial spaceflight. One example of service spaceports could provide is G force training.
5. Pass HR 3038, the SOARS Act, would authorize non-launch space operations. Activities such as flying former military or experimental aircraft for compensation are currently illegal. The proposed legislation would allow for such and open up opportunities for spaceports to facilitate services like NASA's T-38 astronaut training flights.

In the question and answer session following his presentation, several spaceport representatives asked about the strings attached to accepting federal funding as well as the status of National Income and Product Accounts (NIPA) in their development efforts.

At the conclusion of his remarks, Dr. Nield noted that he had never been in the room with so many spaceport executives before and was heartened at the prospects for the future.

MESSAGE FROM MARIO DIAZ, DIRECTOR OF AVIATION IN THE CITY OF HOUSTON

Mario Diaz, the Director of Aviation in the City of Houston, spoke on the topic of: "Opportunity for Laying the Foundation for International Space Commerce." Following the cutbacks in NASA funding at the end of the Shuttle program, cities that were involved in supporting space exploration were forced to realign their long-term strategies. The solution for Houston, Mr. Diaz explained, was the creation of a spaceport. The Houston Spaceport is aimed at creating an innovation hub of aviation and aerospace companies, universities, and government agencies targeting spaceport business opportunities. Mario Diaz maintained that in the long term, there will be many ways for spaceports to be profitable but in the short term, commercial viability will be a challenge. He went on to say that there are four operations that spaceports can conduct at the present: microsatellite assembly, UAV flights, satellite data analytics, and advanced materials development. His presentation also outlined the current state of Houston Spaceport development.

FACILITATED DISCUSSION WITH DR. DAVID ALEXANDER

Spaceport Diversification of Services

Dr. Alexander introduced a discussion on diversifying revenue streams for spaceports.

- Carl Frushon, a former Air Force Commander, spoke about how to develop a sustainable spaceport network. He used the analogy of creating gas stations before automobiles were invented. It would therefore be advantageous, Mr. Frushon argued, for the spaceports to diversify their infrastructure in order to accommodate all future launch methods and the services needed to support them.
- Building from that, the spaceport representatives spoke about their business models. Some spaceports had chosen to specialize in the horizontal or vertical launch markets whereas as others sought to accommodate both systems.
- Potential markets in the short term included small satellite launch services as well as unmanned aerial systems.
- Frank DiBello from Space Florida and Mario Diaz from the City of Houston discussed how the business of spaceports should be integrated into the economies of their host cities and regions. It was generally felt that having a robust network of roads, air and rail in close proximity could be advantageous.

Revenue Diversity, Grants & Funding

The general consensus was that every spaceport site is unique but in the long run they need to build a network to survive, generate a broader customer base, and develop diverse revenue streams.

Christine Anderson, CEO of Spaceport America, then brought up that airports currently do very well at diversifying their revenue streams and the discussion moved towards how airports

generate revenue and how that can be applied to spaceports. Patricia Hynes. CEO of ISPCS, agreed. It was suggested that having some data from airport executives might be an interesting element to add to the next meeting.

Spaceports around the US have vastly different funding models depending upon location and the interest of the local community and businesses. Mario Diaz briefly touched on the concept of an 'aerotropolis' and how that can be applied to spaceports. This spurred further conversation about how to engage the community around a spaceport, and what it means to be a spaceport. For instance, Space Florida works well because Florida has a vibrant space economy. Mike Machula, FAA, then suggested making spaceports eligible for Airport Improvement Program (AIP) funding. Mario Diaz briefly expanded upon where AIP funding goes for the Houston Spaceport.

For the Prestwick airport in Scotland, Stuart McIntyre, CEO of Prestwick Spaceport, has found it to be very useful to properly educate the politicians and the surrounding community on how a spaceport will help the local economy. In Britain, there was a document created and disseminated by the UK government that expounded upon the positives of the space industry, and in the US, the FAA has developed similar documents.

Caryn Schenewerk, of the Boca Chica Spaceport, noted that one of the things that brought SpaceX to Texas was the amiable political environment. Also, when people start flying it will be an enormous boon for the area, industrially as well as culturally.

Government Regulations

Caryn Schenewerk then expressed concern about airspace issues and asked if there will be conflicts between the aviation industry and the spaceport industry. For the Houston Spaceport, the FAA license was granted only after talks with air traffic control about corridors and conflicts were resolved. For other spaceports, though, what happens when the corridors get set up but there is no operator? Caryn Schenewerk and Herbert Zucker, CEO Manassas Spaceport, then discussed the competing elements between spaceports and airports.

A Spaceport Council Idea

Carl Frushon then suggested that SpaceCom' s Spaceport Summit might be a precursor to a Spaceport Council that could continue to address issues facing the entire group and culminate each year with the Summit at SpaceCom. This moved the conversation to who should attend such a council and what issues it should address. Everyone from ATO to airports was suggested as invitees and policy was a central theme for content.

ACTION ITEMS (James Causey and Steve Wolfe to follow-up)

1. Hold follow-up teleconference meeting(s) throughout the year
2. Host Commercial Spaceport Summit at SpaceCom 2016 and each year thereafter
3. Invite broader range of participants to future Summits, including potential spaceport customers

4. Develop a “blind” comparative matrix of each spaceport’s advantages and an assessment of future customers’ segments. This could be done by a simple survey of willing participants.
5. To evaluate a point-to-point Spaceport Summit “XPrize”.
6. Develop relationship and participation as appropriate from APO, ATO & AST groups
7. Spaceport America volunteered to make available a Spaceport Directory
8. Evaluate the relationship with Commercial Spaceflight Federation and other relevant organizations
9. Part of future agendas should have launch services included
10. Consideration to having a report from airport executives on revenue diversification.
11. Explore the formation of a Spaceport Council to address common issues

SUMMIT PARTICIPANTS AGREE:

- That diversification of spaceport services is key to overall economic success
- There is the need for regulatory clarity regarding airspace use
- There is a need for more support from FAA and government (involves more funding from Office of Commercial Space Transportation and access to Airport Improvement Program funds)
- There is a need for increased communication and interaction within the spaceport system community
- To endorse H.R. 3038, the Suborbital and Orbital Advancement and Regulatory Streamlining Act or SOARS Act that amends commercial space launch licensing requirements