

Spaceport Challenges & Milestones



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Aerospace Cluster of Catalonia

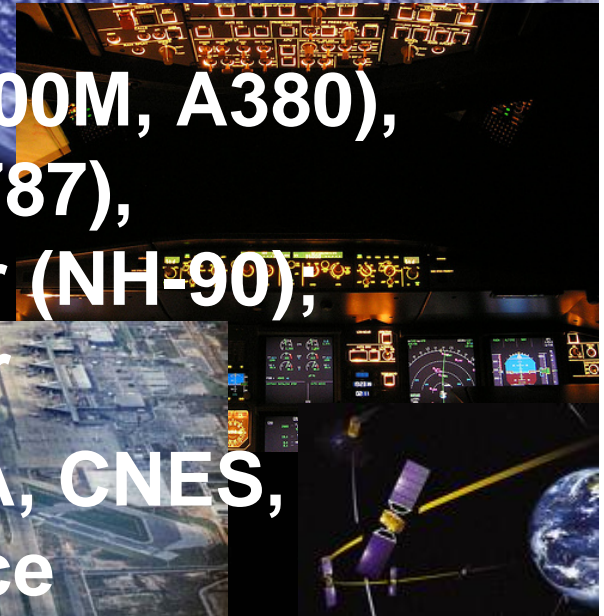
- **Non-profit public-private Consortium established in 2000 by Academia, Government and Industry**
- **73 Associates**
- **Objective: to Represent and Promote Aerospace Activities in Catalonia**

- **BAIE is a member of:**
 - **European Aerospace Cluster Partnership (EACP)**
 - **Ariane Community Cities (CVA)**
 - **ASD of Europe (Aeronautics, Space and Defence Industries of Europe)**

Areas of Expertise



- Airbus (A400M, A380), Boeing (B787), Eurocopter (NH-90), Eurofighter
- ESA, NASA, CNES, Arianespace
- ...



Why a Spaceport in New Mexico ?



History of Space Commerce

1970's: Communication satellites...

1980's: Earth observation satellites...

1990's: Navigation (GPS), internet
(Iridium, Globalstar...)


2000's: Space tourism (Ansari X-
Prize)

2012's: Commercial space stations?



Few Ideas related to Spaceports...





Barcelona relationship with Space Tourism: a Chronology of Steps...

Milestones Accomplished...

- Lobbied local Administrations and been successful in implementing a generalization of the Catalan General Airports Plan that allows to use airfields and airports also for space activities. Also generalization into the Catalan General Airports Law
- Team-up with local Industry and Academia to identify synergies and capabilities
- Team-up with local tourist firms to provide add-ons to the experience
- General professional papers on Space Tourism and Spaceports published in professional Journals
- Case Study completed for a Spaceport in Catalonia gathering all former elements, including an economical feasibility study, technical feasibility study, as well as social and legal considerations
- Support of the current Administration on this Case Study
- First contacts and introduction of the Case Study have been conducted to main operators.
- Public awareness towards Space Tourism in our region
- 2 Space Tourists in the Barcelona area have already signed-up with Virgin Galactic
- A Virgin Galactic Accredited Space Agent in exclusivity for the countries of Spain and Andorra is located in Barcelona

Design Drivers

Design Considerations:

- **Location:** Principally driven by the customer's needs and requirements (which include orbit inclination and latitude)
- **Market:** The portion of the commercial space market the spaceport will serve
- **Public interest:** Spaceport impact on the immediate community and environment
- **Safety and Security**
- **Spaceport authority:** Responsible of managing, controlling, and directing spaceport operations
- **Operators**

Questions:

- Is the spaceport's location compatible to the mission ?
- Will the spaceport be designed for RLVs, ELVs, or both?
- Will the spaceport support only existing launch vehicle designs?
- Will the design plan take into account possible innovative launch systems ?
- Will payloads be processed onsite or elsewhere and transported to the spaceport?
- Will the spaceline operator be willing to share operations with other operators / also current airlines ?

General Spaceport Facilities

Class 1

Receiving, Temporary Storage and Maintenance

- Fire protection system and Maximize use of latest technology in fire detection
- Reliability, ease of servicing and maintenance of system
- Minimal or no obstruction to the hangar operations
- Size stipulated to be around 3000 to 4000 m²

Launching Facilities

- Horizontal Launch
 - ◆ Runway: Length of 3500 m (approx.)
 - ◆ Landing and Navigation Aids
 - ◆ Arresting System
 - ◆ Visual Landing Aids
- Vertical Launch
 - ◆ Launch Pad
 - ◆ Standardized mechanical, electrical and fluid interfaces
- Launch Control Center
 - ◆ Performs countdowns
 - ◆ Manages all launch operations
 - ◆ Has a clear view of flight vehicles
- Contingency Landing Site

Propellant Storage & Fuelling

- Need of two separate buildings:
 1. Storage
 2. Fueling
- Design
 - ◆ In a modular approach
 - ◆ Relatively distant from other buildings
- Propellants/Oxidizers expected:
 - ◆ Oxygen (LOX), Liquid Hydrogen, Kerosene, Hydrazine (N₂H₄), Hypergolic...

Launch Vehicle Transfer

Class 2

- Operational Intercom System Network
- Information Technology Support Center
- Security Center
- Meteorological Support Center
- Emergency Center



D4. Relax Day

Recreational packs to be booked well in-advance ○

Sports pack ▣

Taking part in a "Sailboat race"

Drive a Formula One Car at the Circuit de Montmeló

Extreme sports: Sky diving; Rafting & Kayak; bungee jumping

Beauty & Shopping pack ▣

Wine Route ▣

Opera. Transfer to dinner afterwards by private limousine ○

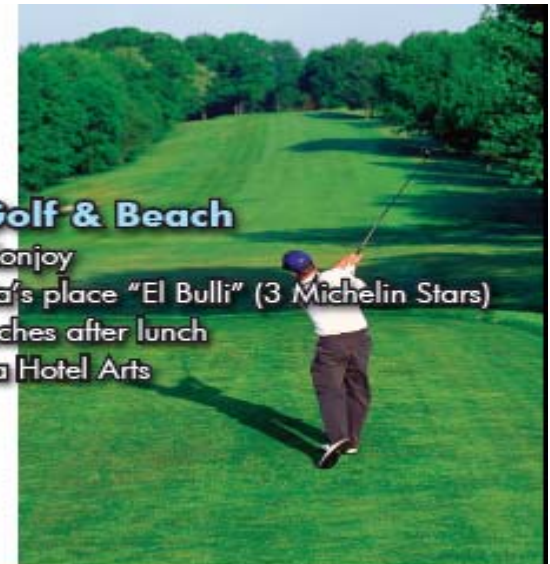
Gala Dinner with attendance of Mayor of Barcelona ○

Transfer to the Hotel •



D9. Relax Day: Golf & Beach

- Golf nearby Cala Monjoy
- Lunch at Ferran Adria's place "El Bulli" (3 Michelin Stars)
- Relax in nearby beaches after lunch
- Transfer to Barcelona Hotel Arts



Next Milestones...

Next imminent and near-term milestones for us include:

- **Continuing conversations with operators to customize the proposal to its needs**
- **Educationg the new Administration, as we are facing local elections in Catalonia (the 28 of November); and general Spanish elections are also coming in two years (by 2012)**

Mid-term milestones for us include:

- **To detail a specific legal framework, which will be part of the more general legal framework already worked-out, mentioned before**



Challenges Ahead...

Closing Remarks...



**We are in fact more complementary than competitors, and we
deeply need each other**



"The future cannot be predicted, but futures can be invented"

Dennis Gabor (1971, Nobel Prize Physics)