ICAO – UNOOSA AeroSPACE Symposium

LEGAL AND REGULATORY ASPECTS OF US-DEVELOPED SUBORBITAL SPACEPLANE FLIGHTS FROM INTERNATIONAL SPACEPORTS

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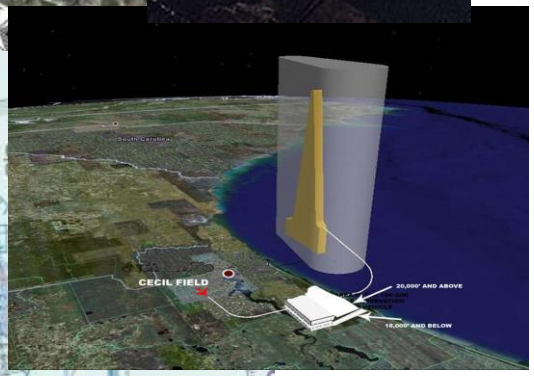
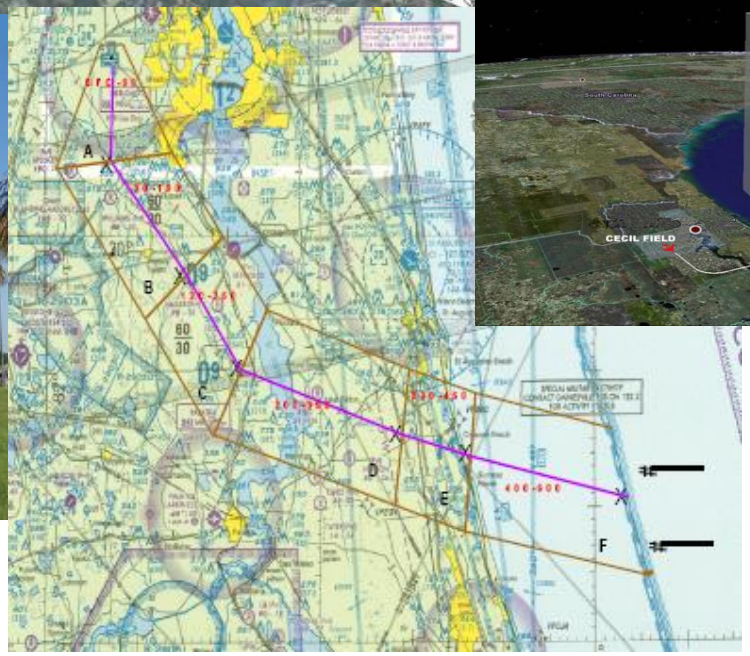
Cecil Spaceport - JAX FAA/AST License

ROCKETPLANE GLOBAL

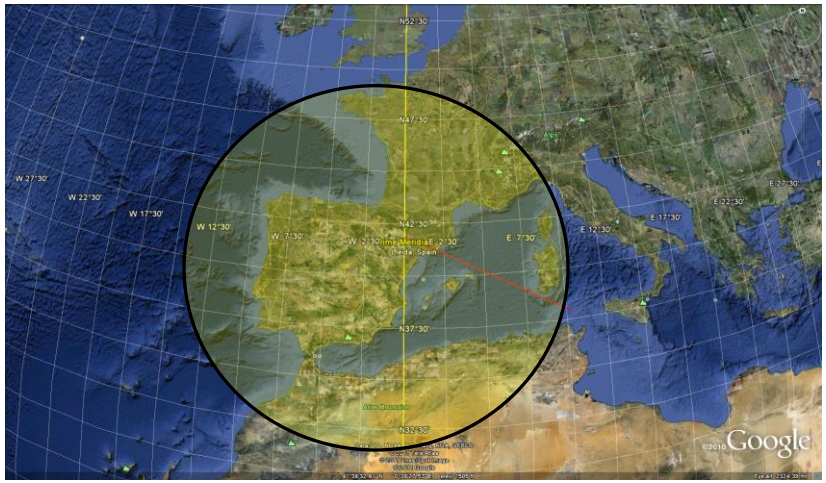


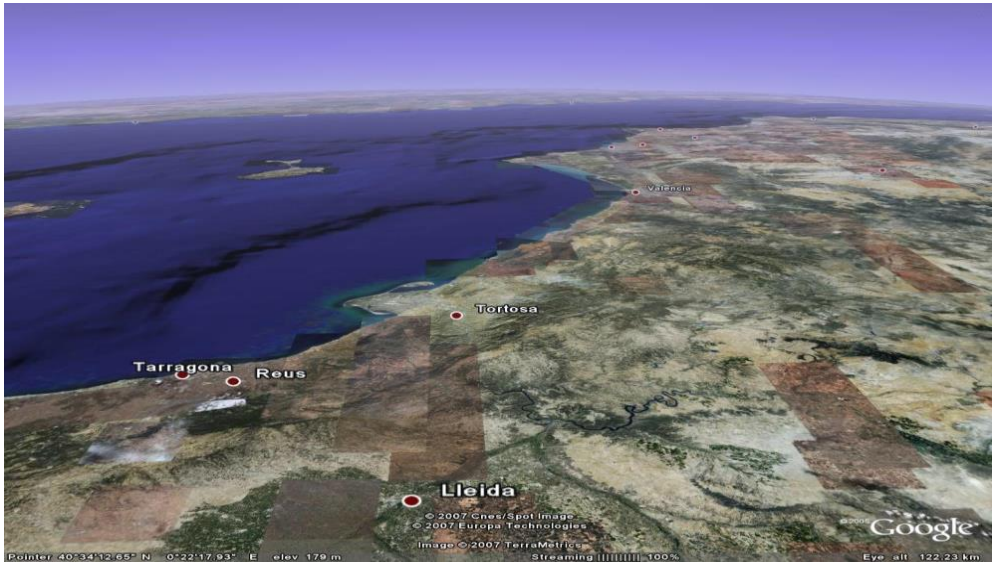


The First URBAN Spaceport!

Spaceport Barcelona Regional Context

The View from 100km in Catalonia

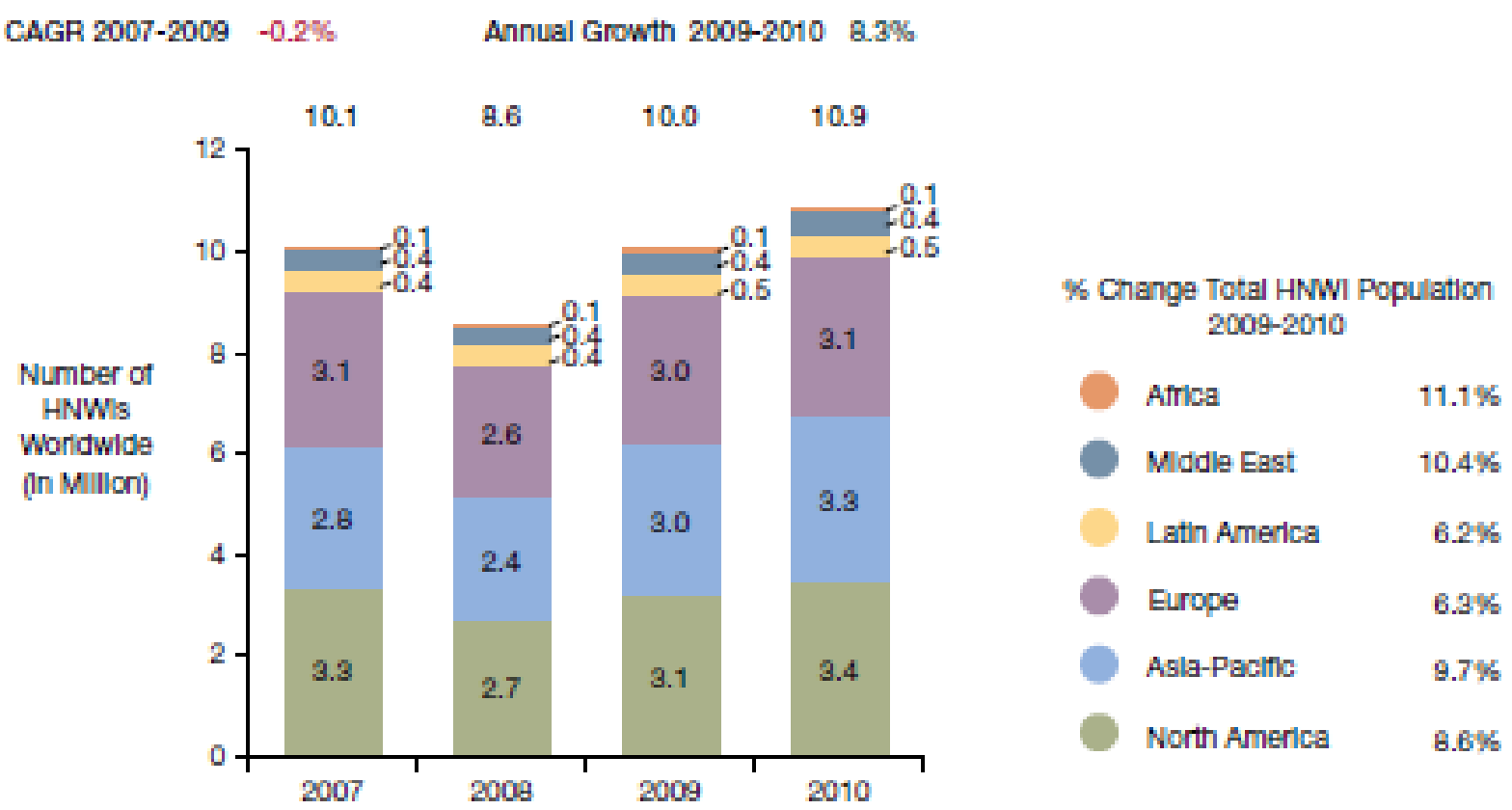




Space Tourism Market Drivers

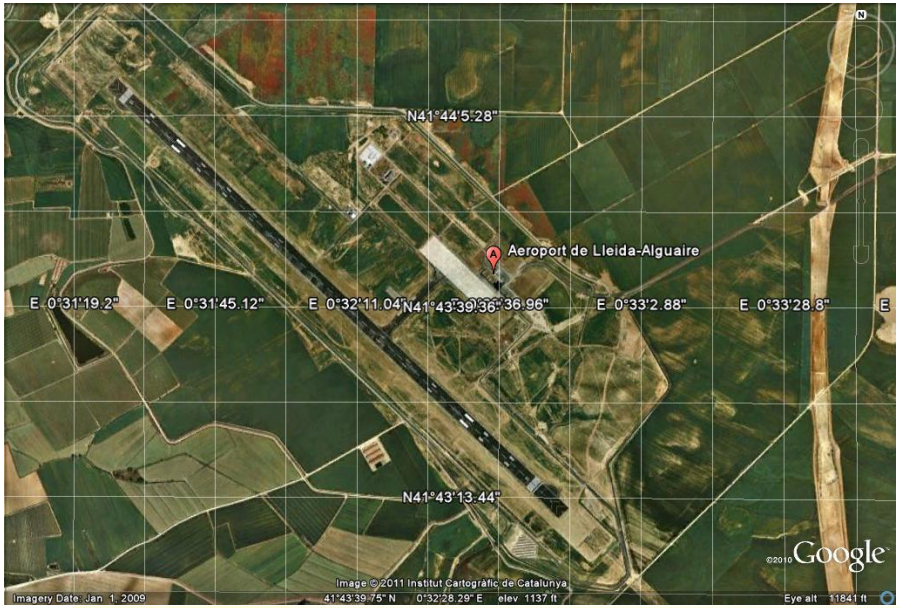
FIGURE 1. HNWI Population, 2007 – 2010 (by Region)

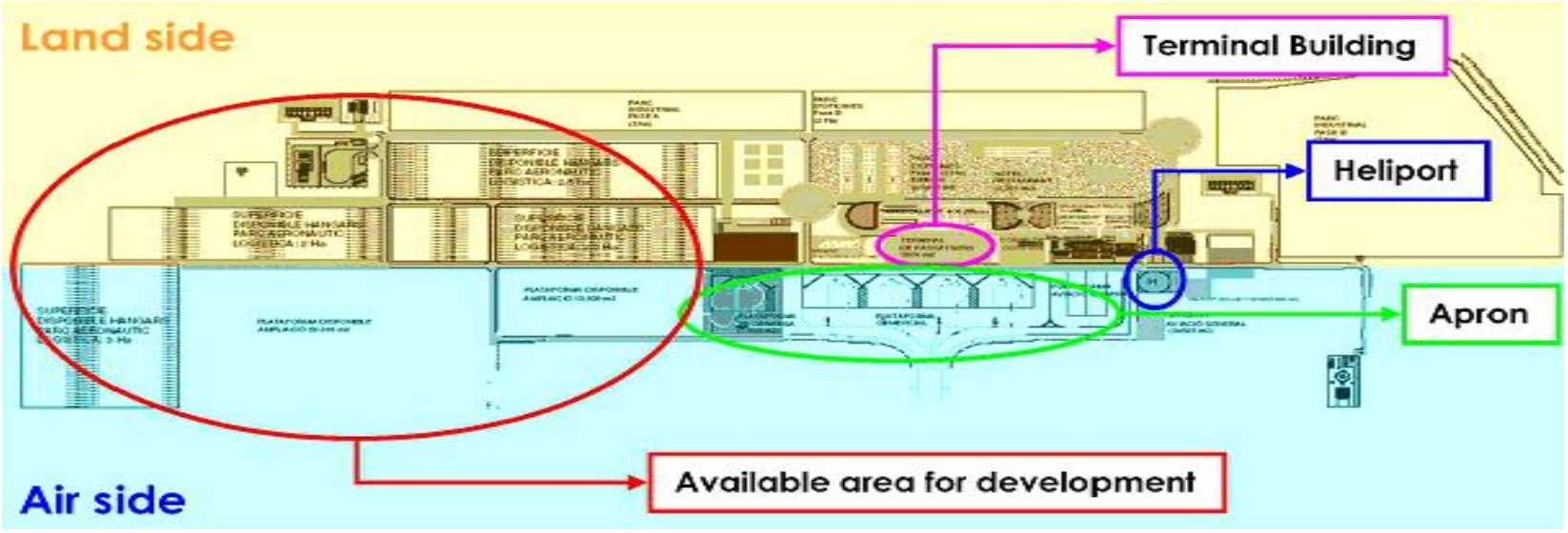
(in Million)



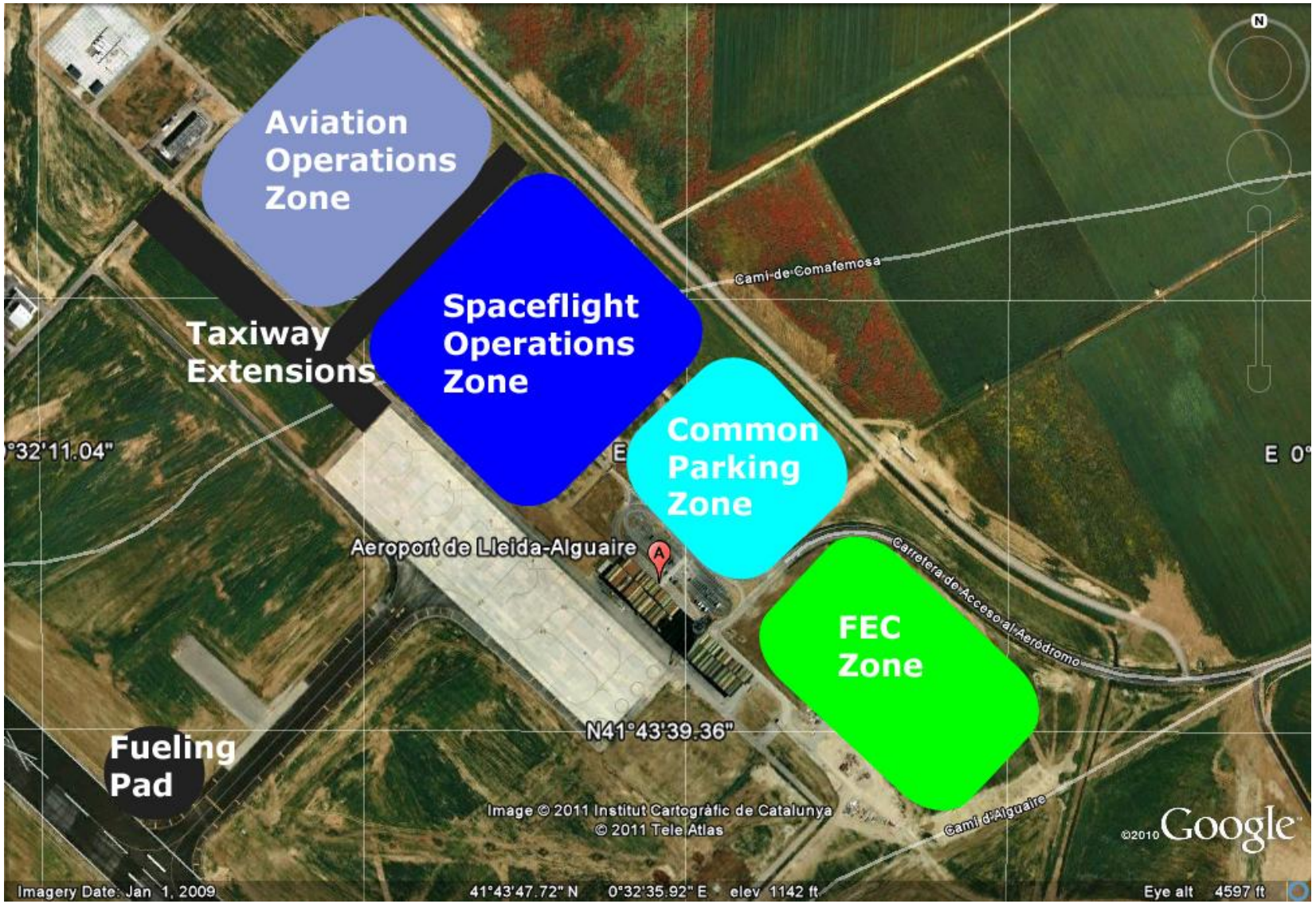
Note: Chart numbers and quoted percentages may not add up due to rounding
Source: Capgemini Lorenz curve analysis, 2011

Lleida Alguaire Airport





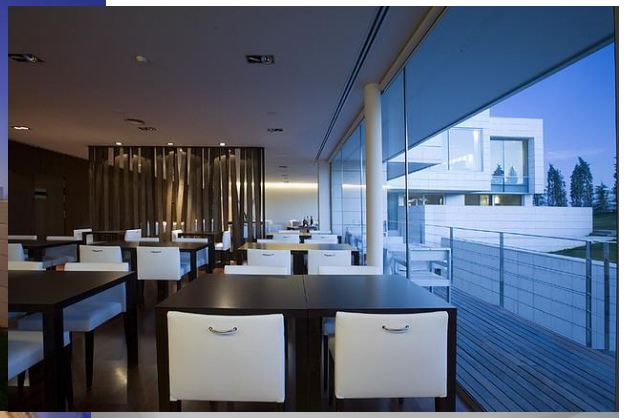
Spaceport Barcelona Overlay Plan

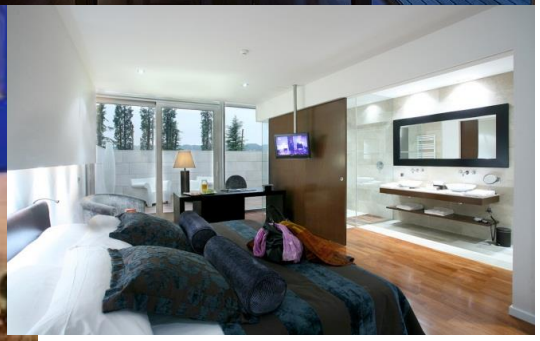


EXISTING 5 Star Lodging Nearby

ROCKETPLANE GLOBAL

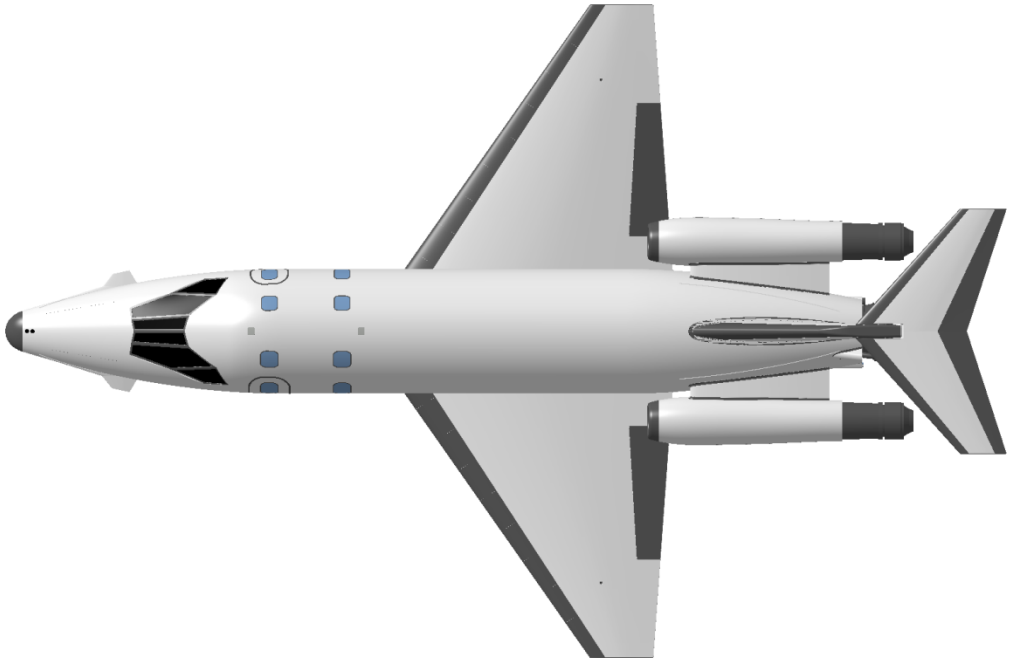
Finca Prats
HOTEL GOLF & SPA
★ ★ ★ ★ ★

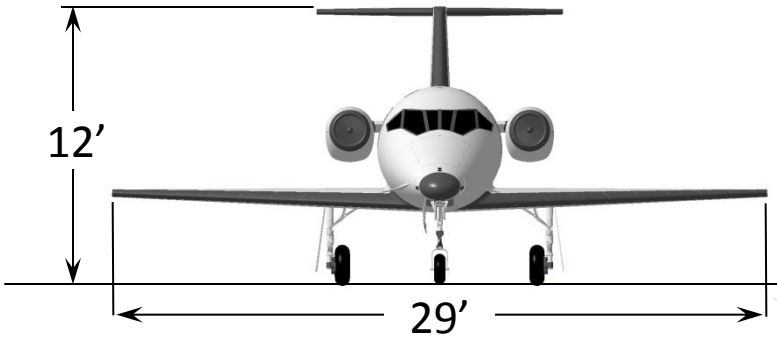


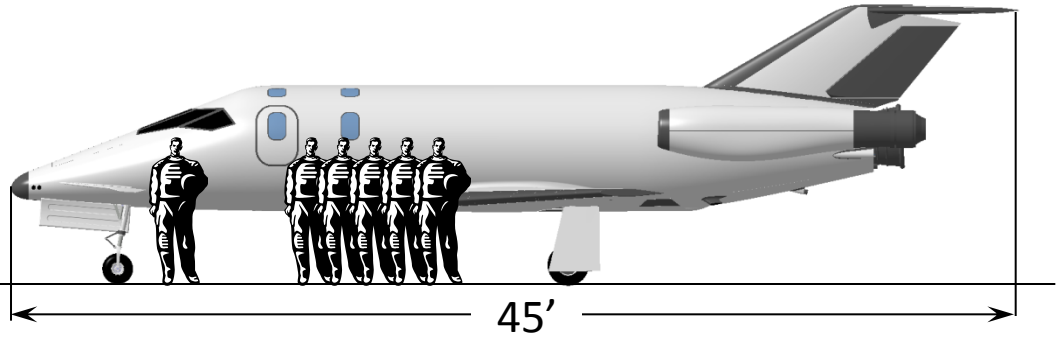


XP Specifications

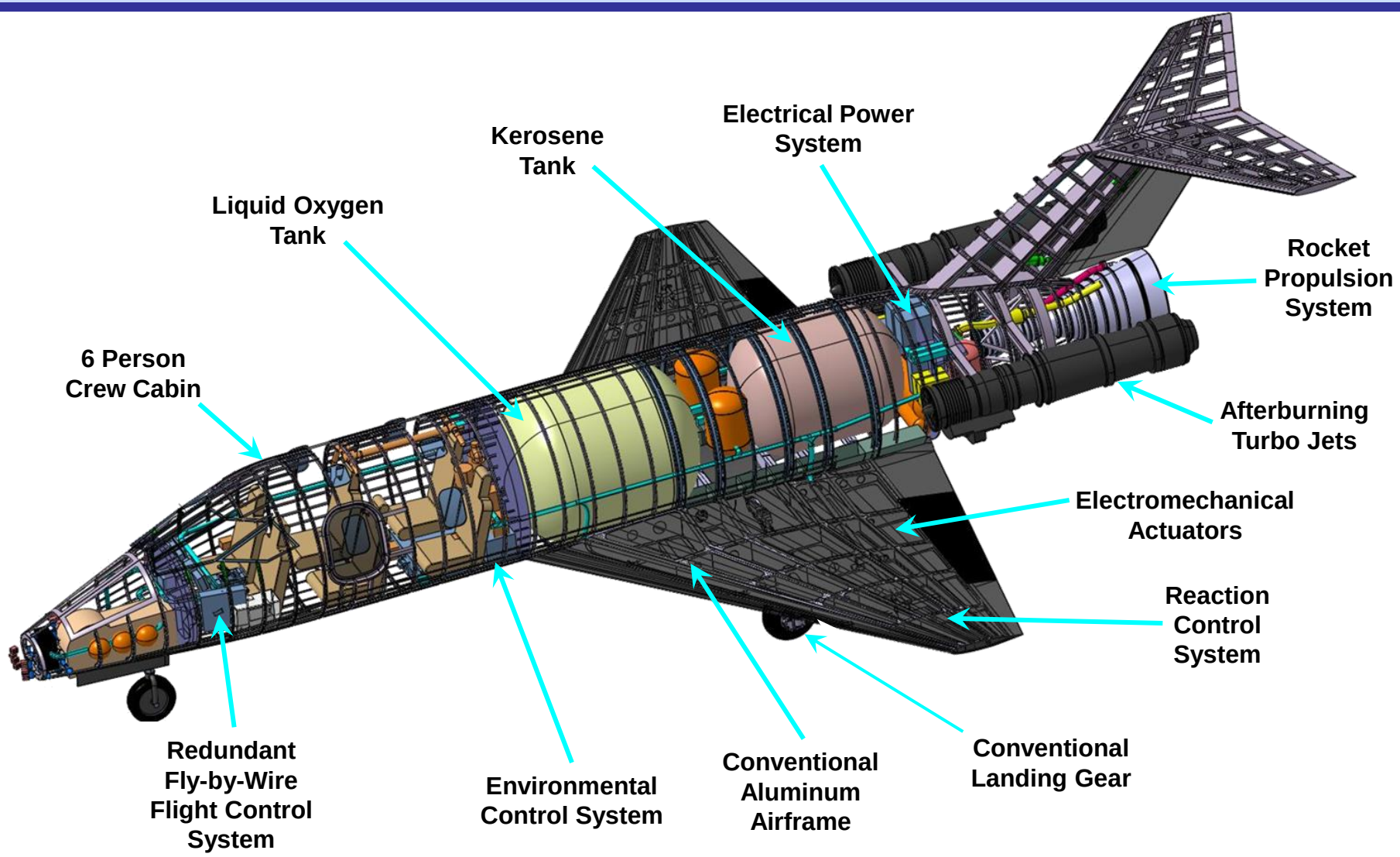
Cockpit Crew	1
Seating Capacity	5
Seat Pitch	36 in (0.91 m)
Takeoff Field Length	9200 ft (2800 m)
Landing Field Length	4300 ft (1300 m)
Max. Altitude	340,000 ft (104 km)
Mission Time (μG Time)	45 min (3+ min)
Jet Engine Type	GE J-85 w/ AB
Rocket Engine Type	Polaris AR-36



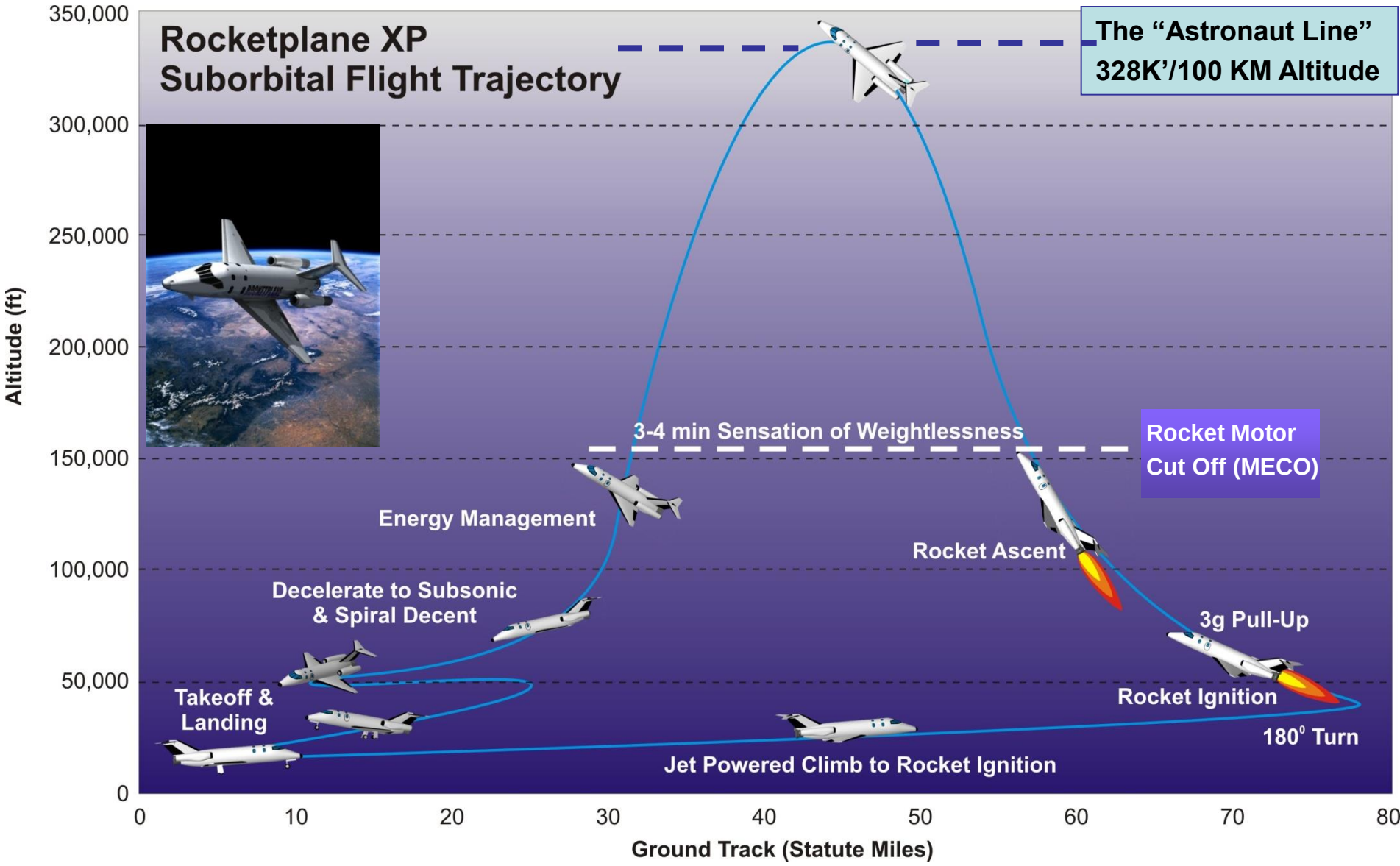




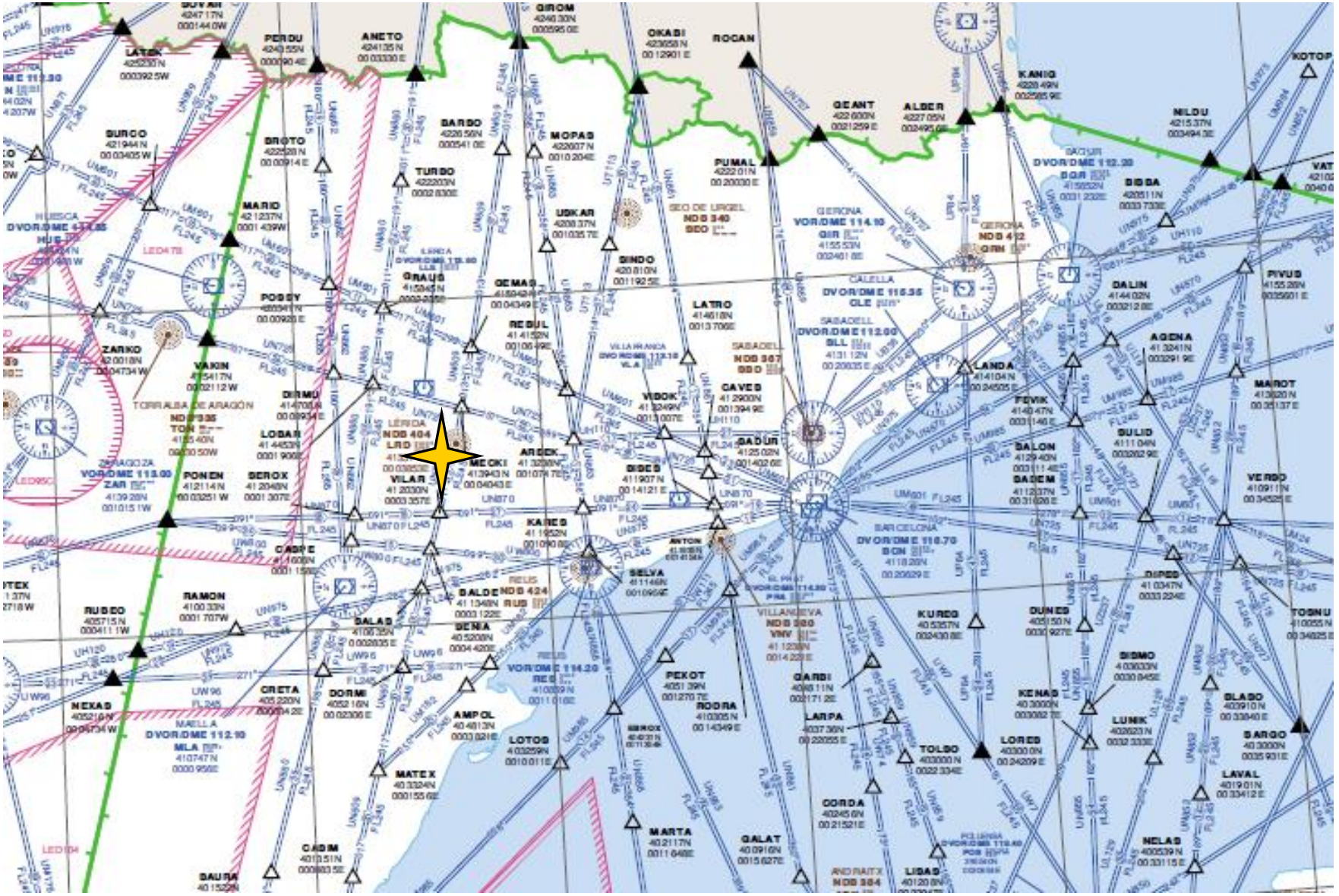
XP Systems Overview



The Rocketplane Flight Profile



Barcelona Region Airspace



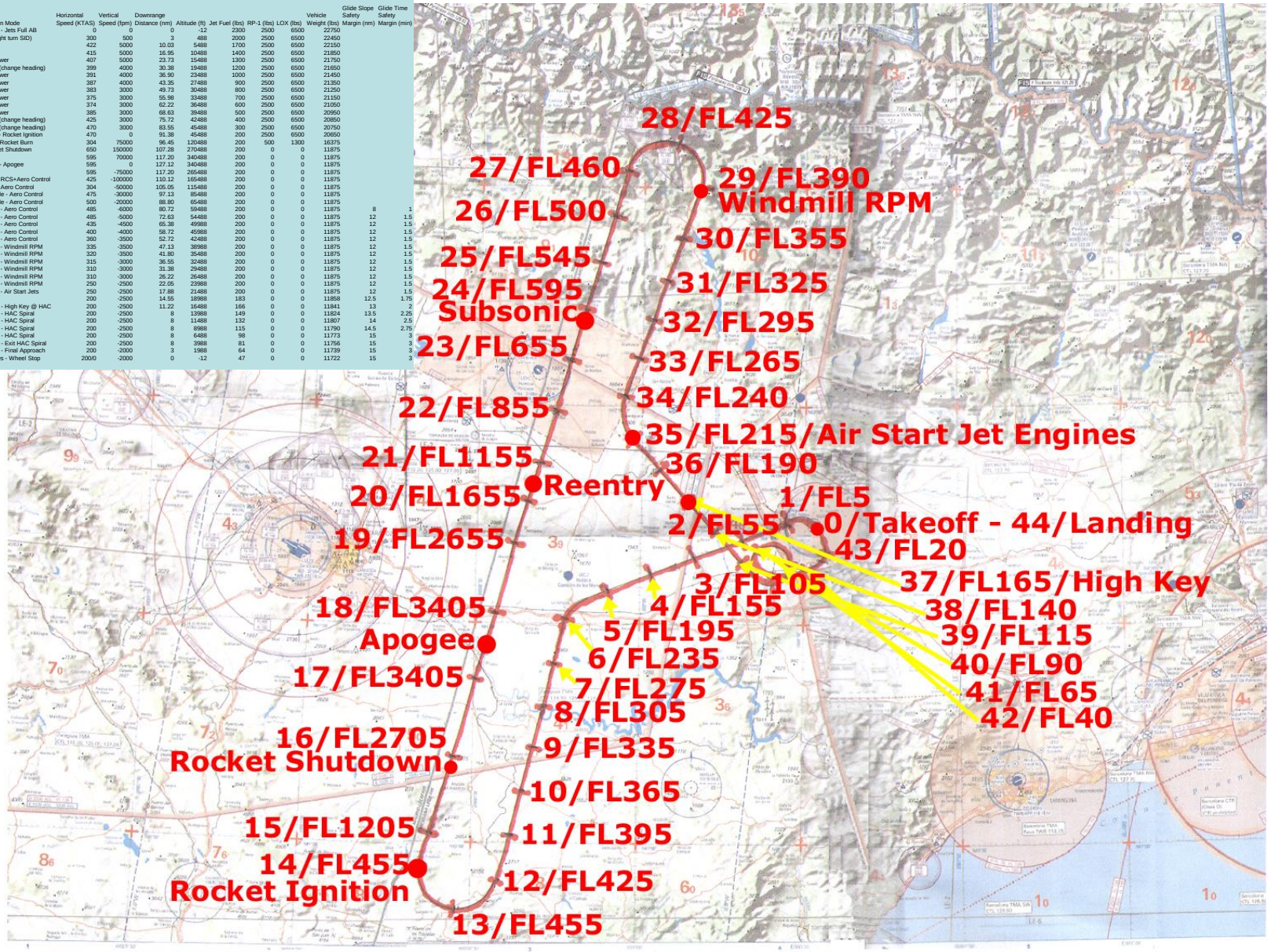
Spaceport Barcelona Flight Corridor

ROCKETPLANE GLOBAL

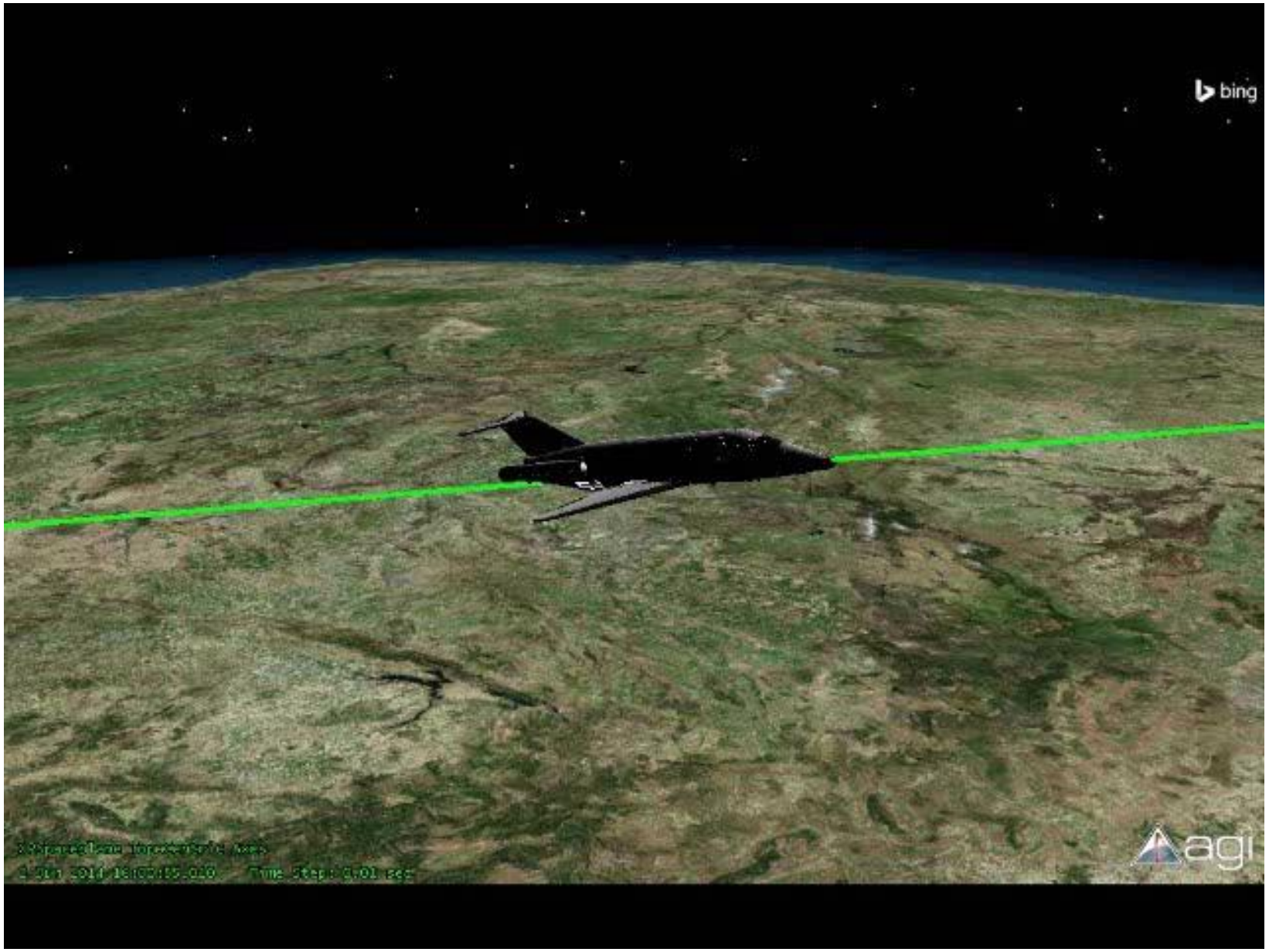
XP Flight Path Data

Flight Path 4

Time (min)	Flight Propulsion Mode	Horizontal Speed (KTAS)	Vertical Speed (fpm)	Downrange Distance (nm)	Altitude (ft)	Jet Fuel (lbs)	RP-1 (lbs)	LOX (lbs)	Vehicle Weight (lbs)	Glide Slope Safety Margin (nm)	Glide Time Safety Margin (min)
0	Brake Release - Jets Full AB	0	0	0	-12	2300	2500	6500	22750		
1	Jets Full AB (right turn SID)	300	500	3	488	2000	2500	6500	22450		
2	Jets Full AB	422	5000	10.03	5488	1700	2500	6500	22150		
3	Jets Full AB	415	5000	16.95	10488	1400	2500	6500	21850		
4	Jets Full Mil Power	407	5000	23.73	15488	1300	2500	6500	21750		
5	Jets Mil Power (change heading)	399	4000	30.38	19488	1200	2500	6500	21650		
6	Jets Full Mil Power	391	4000	36.90	23488	1000	2500	6500	21450		
7	Jets Full Mil Power	387	4000	43.35	27488	900	2500	6500	21350		
8	Jets Full Mil Power	383	3000	49.73	30488	800	2500	6500	21250		
9	Jets Full Mil Power	375	3000	55.98	33488	700	2500	6500	21150		
10	Jets Full Mil Power	374	3000	62.22	36488	600	2500	6500	21050		
11	Jets Full Mil Power	385	3000	68.63	39488	500	2500	6500	20950		
12	Jets Mil Power (change heading)	425	3000	75.72	42488	400	2500	6500	20850		
13	Jets Mil Power (change heading)	470	3000	83.55	45488	300	2500	6500	20750		
14	Jets Mil Power - Rocket Ignition	470	0	91.38	45488	200	2500	6500	20650		
15	Jets Windmill - Rocket Burn	304	75000	96.45	120488	200	500	1300	16375		
16	Jets Off - Rocket Shutdown	650	150000	107.28	270488	200	0	0	11875		
17	RCS Thrusters	595	70000	117.20	340488	200	0	0	11875		
18	RCS Thrusters - Apogee	595	0	127.12	340488	200	0	0	11875		
19	RCS Thrusters	595	-75000	117.20	265488	200	0	0	11875		
20	Reentry Glide - RCS+Aero Control	425	-100000	110.12	165488	200	0	0	11875		
21	Reentry Glide - Aero Control	304	-50000	105.05	115488	200	0	0	11875		
22	Supersonic Glide - Aero Control	475	-30000	97.13	85488	200	0	0	11875		
23	Supersonic Glide - Aero Control	500	-20000	88.80	65488	200	0	0	11875		
24	Subsonic Glide - Aero Control	485	-6000	80.72	59488	200	0	0	11875	8	1
25	Subsonic Glide - Aero Control	485	-5000	72.63	54488	200	0	0	11875	12	1.5
26	Subsonic Glide - Aero Control	435	-4500	65.38	49988	200	0	0	11875	12	1.5
27	Subsonic Glide - Aero Control	400	-4000	58.72	45988	200	0	0	11875	12	1.5
28	Subsonic Glide - Aero Control	360	-3500	52.72	42488	200	0	0	11875	12	1.5
29	Subsonic Glide - Windmill RPM	335	-3500	47.13	38988	200	0	0	11875	12	1.5
30	Subsonic Glide - Windmill RPM	320	-3500	41.80	35488	200	0	0	11875	12	1.5
31	Subsonic Glide - Windmill RPM	315	-3000	36.55	32488	200	0	0	11875	12	1.5
32	Subsonic Glide - Windmill RPM	310	-3000	31.38	29488	200	0	0	11875	12	1.5
33	Subsonic Glide - Windmill RPM	310	-3000	26.22	26488	200	0	0	11875	12	1.5
34	Subsonic Glide - Windmill RPM	250	-2500	22.05	23988	200	0	0	11875	12	1.5
35	Subsonic Glide - Air Start Jets	250	-2500	17.88	21488	200	0	0	11875	12	1.5
36	Jets Idle Thrust	200	-2500	14.55	18988	183	0	0	11858	12.5	1.75
37	Jets Idle Thrust - High Key @ HAC	200	-2500	11.22	16488	166	0	0	11841	13	2
38	Jets Idle Thrust - HAC Spiral	200	-2500	8	13988	149	0	0	11824	13.5	2.25
39	Jets Idle Thrust - HAC Spiral	200	-2500	8	11488	132	0	0	11807	14	2.5
40	Jets Idle Thrust - HAC Spiral	200	-2500	8	8988	115	0	0	11790	14.5	2.75
41	Jets Idle Thrust - HAC Spiral	200	-2500	8	6488	98	0	0	11773	15	3
42	Jets Idle Thrust - Exit HAC Spiral	200	-2500	8	3988	81	0	0	11756	15	3
43	Jets Idle Thrust - Final Approach	200	-2000	3	1988	64	0	0	11739	15	3
44	Landing - Brakes - Wheel Stop	200/0	-2000	0	-12	47	0	0	11722	15	3



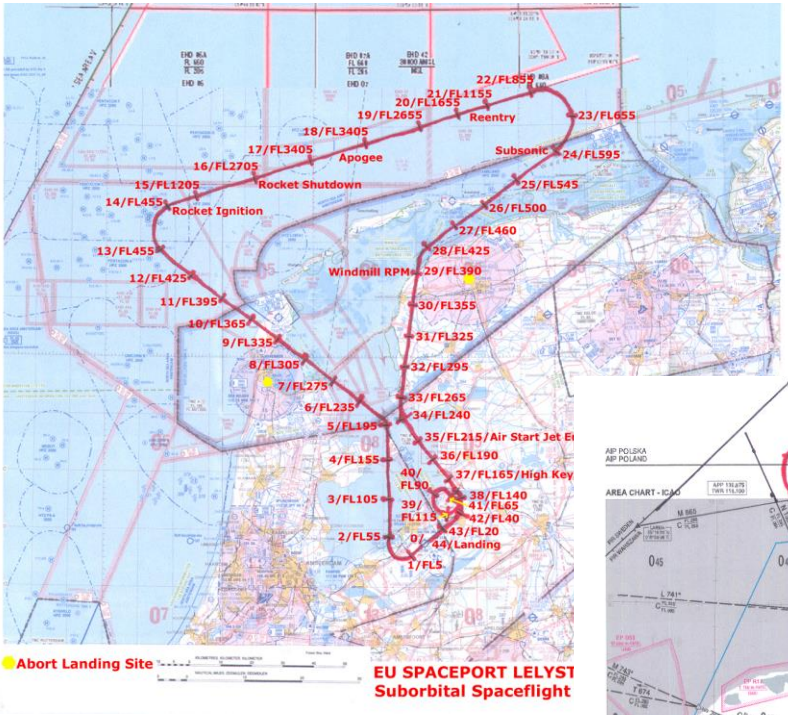
Spaceport Barcelona STK Suborbital Flight Simulation



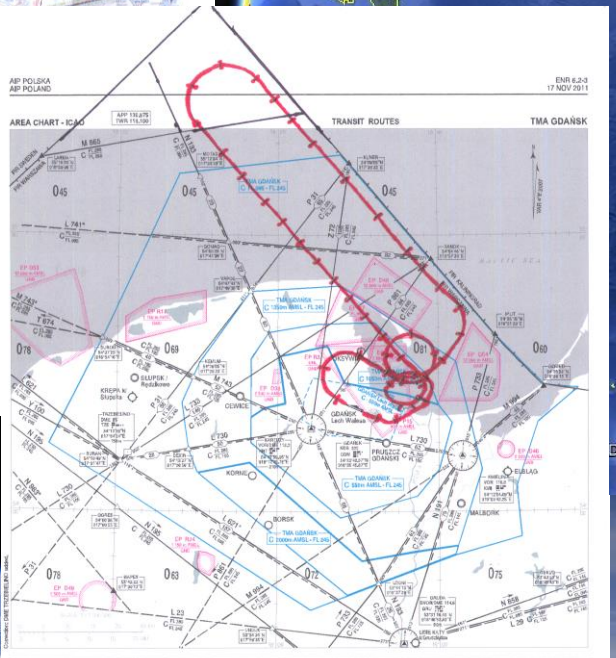
The Spanish Suborbital Spaceflight Regulatory Plan

- **Suborbital Spaceflight is determined to be a National Act under the Outer Space Treaty**
- **Catalonia Airport Authority signs MOU's with SRV Operators**
- **CAA and AESA sign G to G Coordination Agreements with FAA/AST**
- **Spanish Parliament adopts US model Human Spaceflight Enabling Legislation**
- **Spaceport Barcelona obtains US Model Spaceport Operator's License (Spain and US)**
- **SRV Operators Obtain Commercial Launch License (Dual Jurisdiction – Spain and US)**
- **Spaceflight Operations and Flight Plans coordinated through AESA and EuroControl with MoD approval**

Other EU Spaceport Proposals



Lelystad Spaceport NL



Gdansk Spaceport PL