

Aerion Supersonic Business Jet

Environment-Driven Technology

Richard R. Tracy
Chief Technology Officer
Aerion Corporation

FAA Conference on
Supersonic Noise and Research
Washington, DC,

7/14/11 July 14, 2011

Aerion Brief - FAA Conference



Supersonic Design Dichotomy

- **Two approaches** to civil supersonic flight:
- **Low sonic boom** is the primary goal of most programs
- **Maximum fuel efficiency** and operational flexibility are Aerion goals, with boom reduction secondary
- **FAA and ICAO** require compliance in either case with airport noise and engine emissions regulations



Aerion Design Criteria

- Best possible supersonic cruise efficiency & range
- Equal or greater range at high subsonic speed
- Current production proven engine and systems
- Operationally similar to subsonic aircraft
- Mach 1.6 minimizes technical and business risk



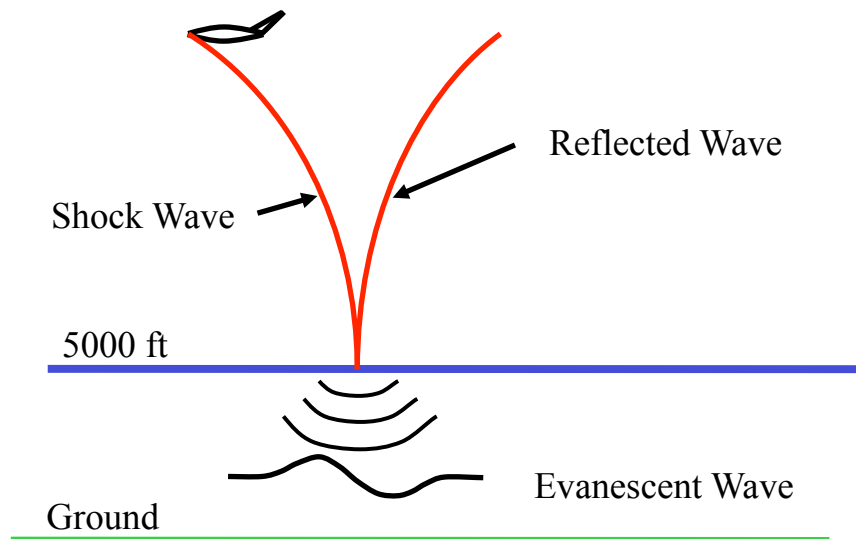
Sonic Boom Approaches

- Low Boom
 - Some time savings over populated areas
 - Pending “low boom” regulations and design technology
- No Boom
 - Maximize cruise range and efficiency
 - Meet all current regulations (sonic boom, noise, emissions)
 - Supersonic “boom cutoff” overland, when permitted



“Boom Cutoff” Over Populated Areas

- Current
 - FAA: Mach 1 or less over U.S.A.
 - ICAO: “No unacceptable situation on the ground” (no boom?)
- Aerion complies with both rules
 - Efficient subsonic flight over US
 - No boom at Mach 1.1+ where permitted





Traditional Approach

- Delta Wing
 - Lower lift-related drag at supersonic cruise
 - High sweep, short span and less effective flaps
- Result
 - Longer runways and high angle of attack
 - Less efficient at SS cruise and high subsonic speed



7/14/11



Aerion Brief - FAA Conference

Aerion Technology



- Laminar Flow Wing
 - Lower overall supersonic drag
 - Low sweep and powerful flaps
- Additional Benefits
 - Shorter runways and flat approach
 - More efficient subsonic cruise



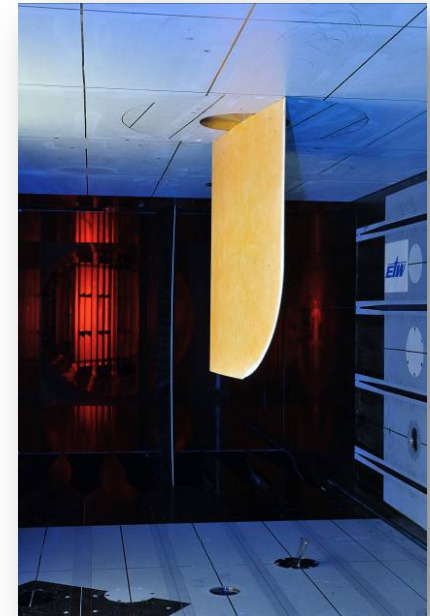
Laminar Flow Validation



- F-15 tests at NASA Dryden 1999-08
- Full-chord natural laminar flow (NLF)
- New F-15 tests underway since 2010
 - Flow calibration and larger surface



- European Transonic Wind Tunnel (ETW)
- Achieved full chord NLF to 30 million Reynolds no.



7/14/11

Design Overview

7/14/11

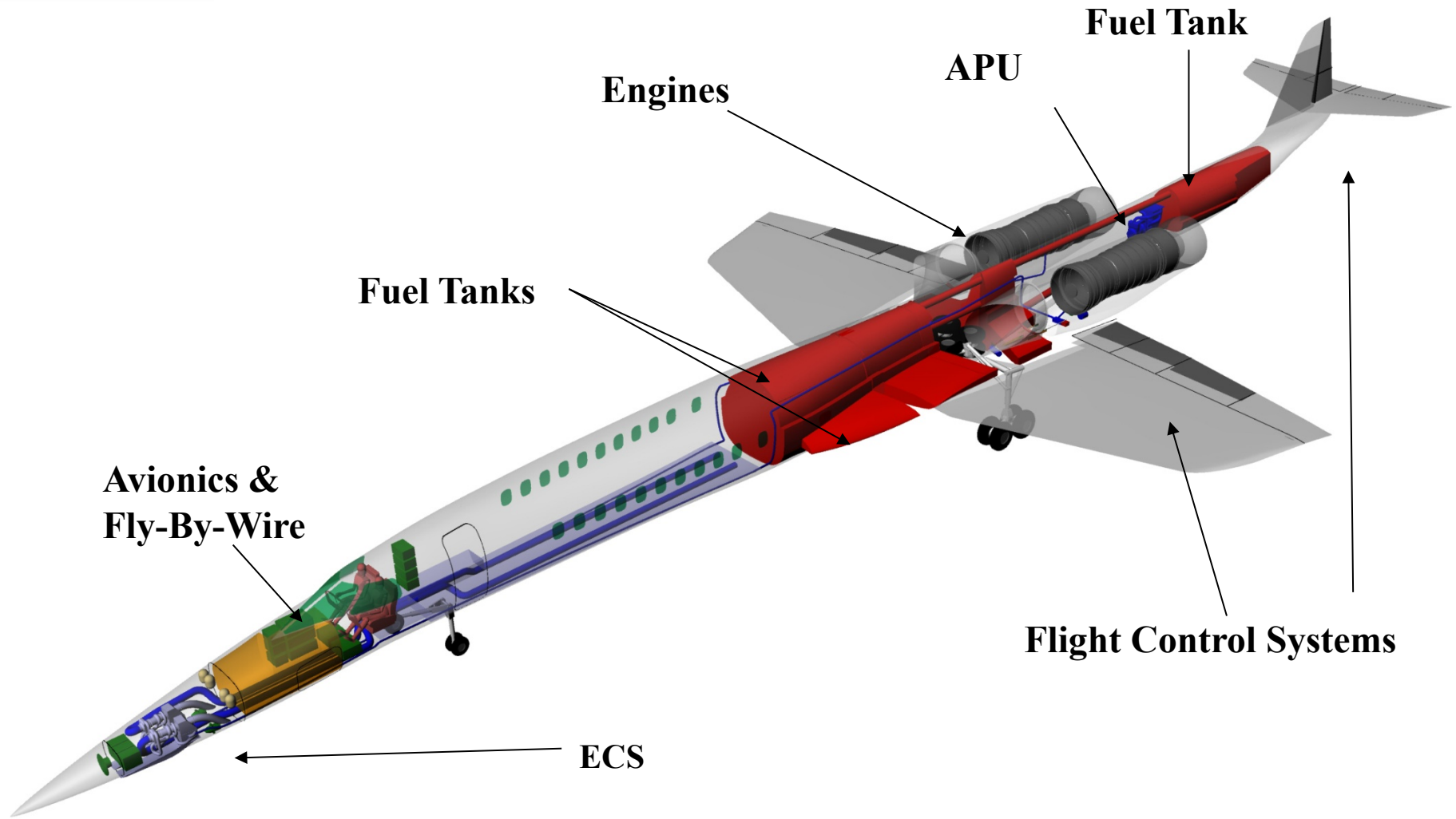
Aerion Brief - FAA Conference

9





Major Systems



7/14/11

Aerion Brief - FAA Conference

12



Interior



7/14/11

Aerion Brief - FAA Conference

11

Performance



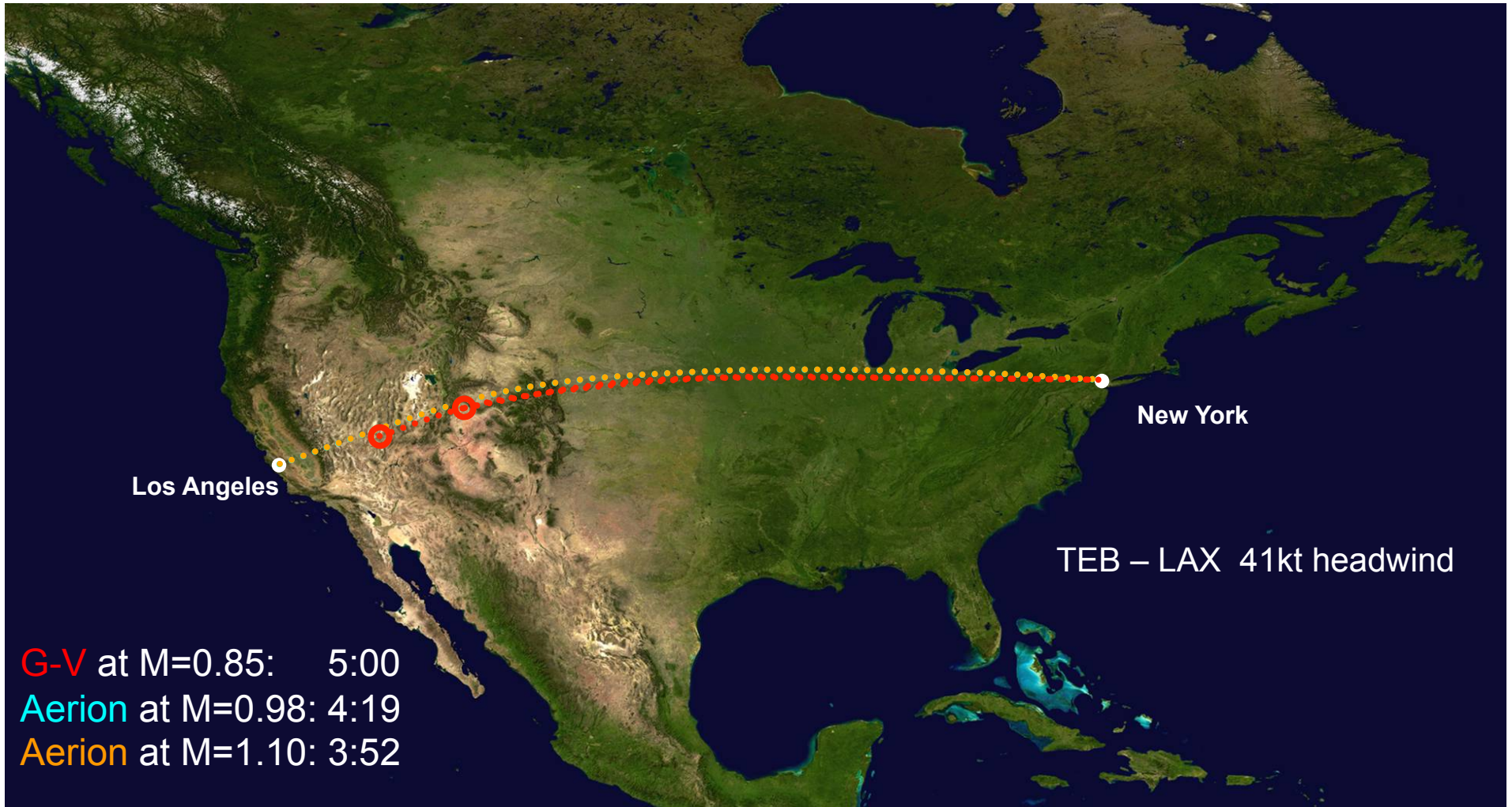
7/14/11

Aerion Brief - FAA Conference

12



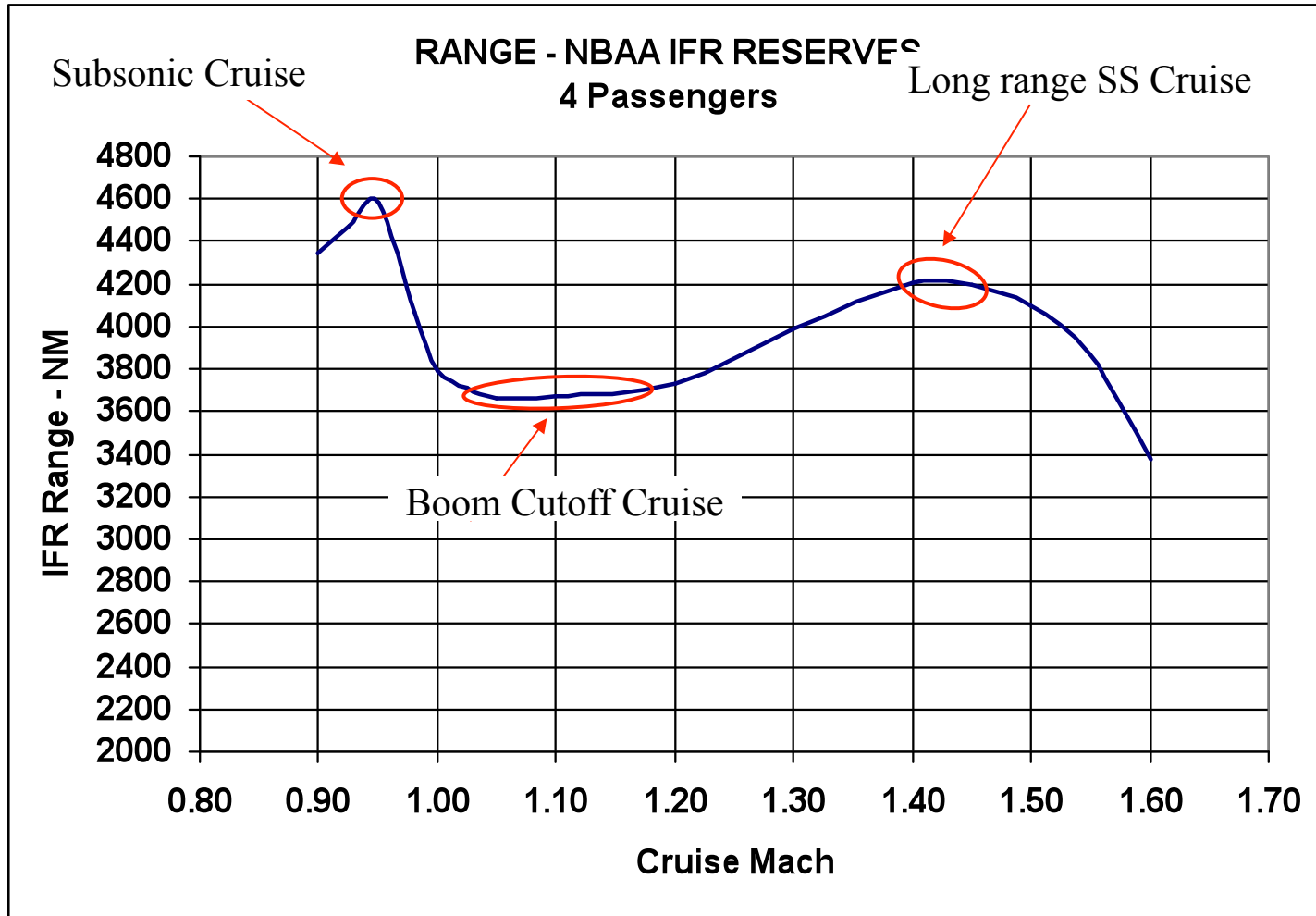
Supersonic Overland: NY-LA Mission



7/14/11



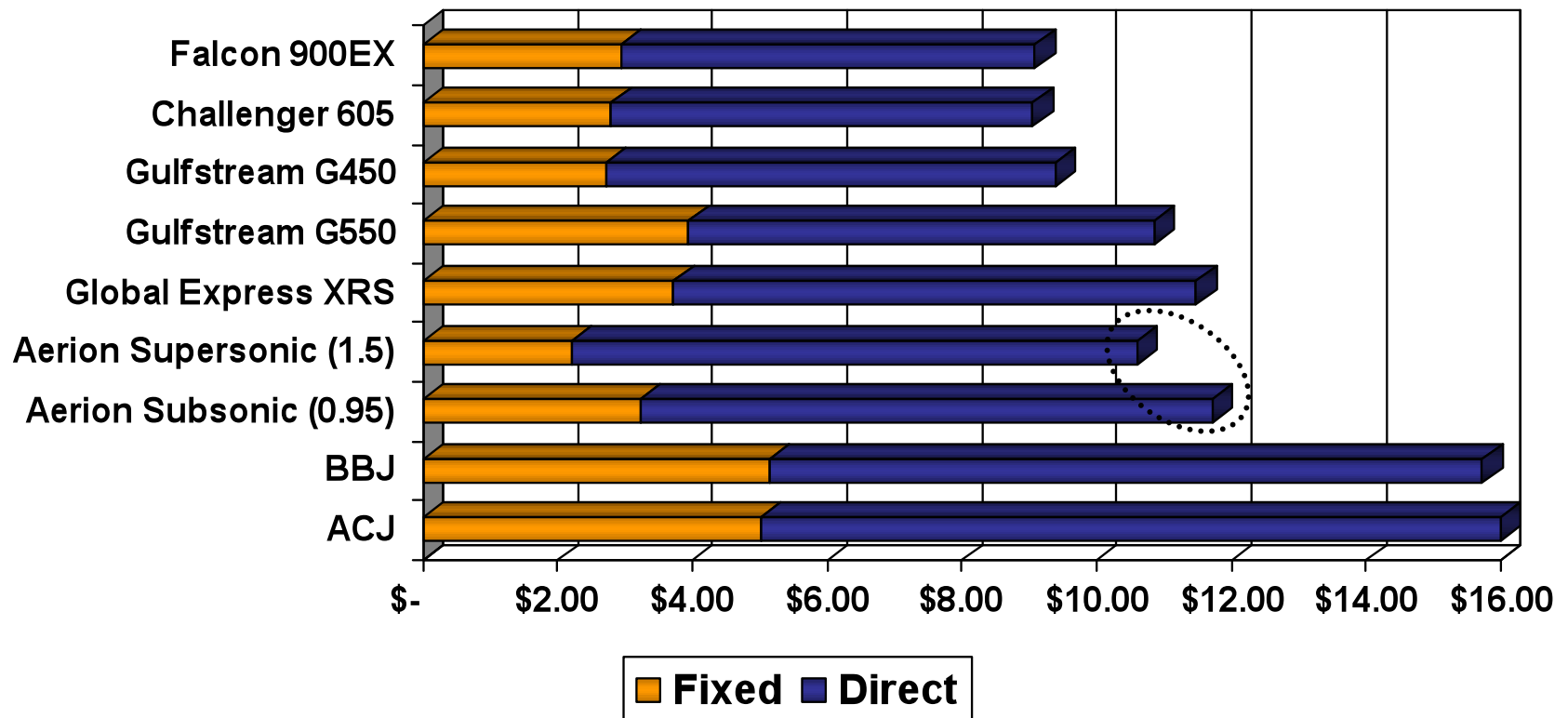
Range





Economics

Operating Expense per NM, 550 hrs/yr Utilization *



* Data from Business & Commercial Aviation 2006 Operations Planning Guide



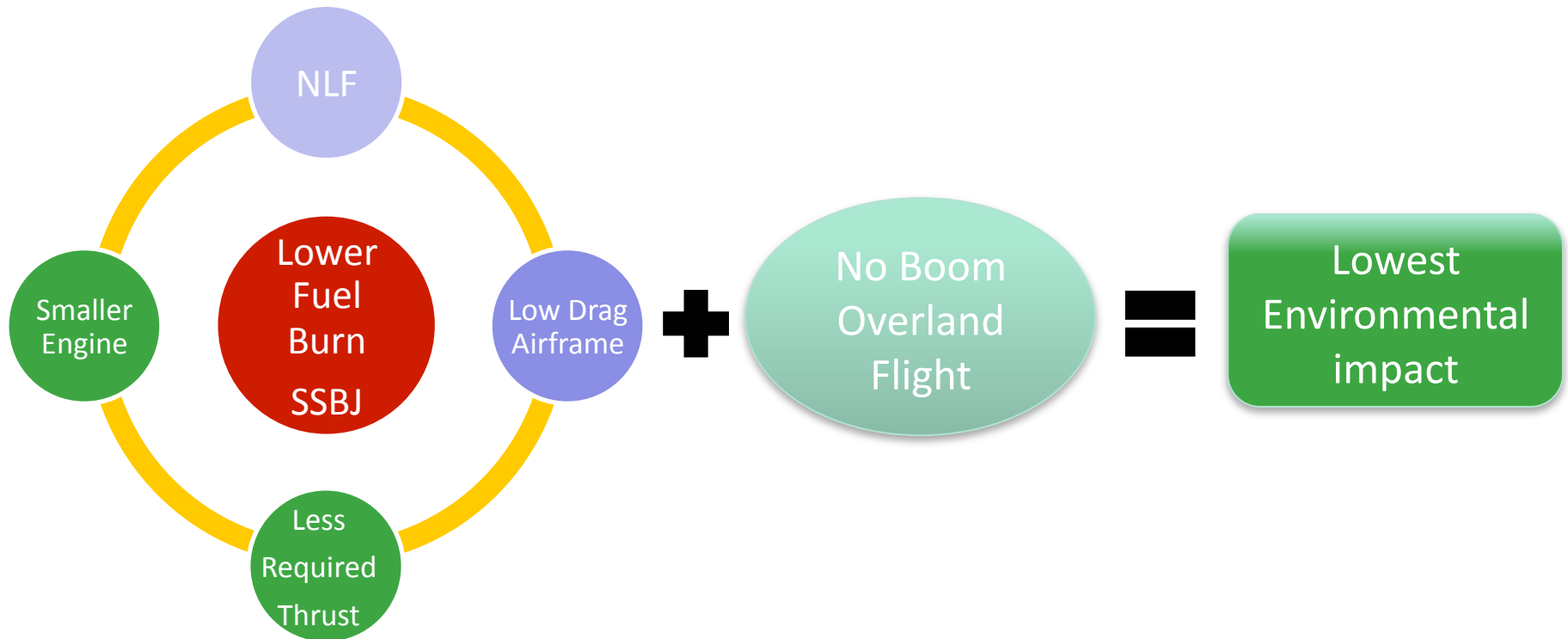
Conclusions

- Aerion SSBJ offers economics, operating characteristics and flexibility on par with current subsonic aircraft
- Maximum efficiency sub- and supersonic cruise results from NLF wing
- Complies with all regulations and reduces program risk
- Can be first to market



The Virtuous Circle

- Minimum SSBJ environmental impact :



Aerion Supersonic = Quiet, Clean and Economical



7/14/11

Aerion Brief - FAA Conference

18