An Overview of the Gulfstream Supersonic Technology Program

Gulfstream Aerospace Corporation
FAA Public Meeting – Supersonics
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Civil Supersonics / Concorde is Gone – What Now?

- Gulfstream Perspective… Quiet Supersonic Jet (QSJ)
  - Different Market
    - Business Jet: Speed is Important & Affordable
  - Different Requirements
    - High Speed Civil Transport: Mach 2.4, 600K airliner
    - Quiet Supersonic Jet: Mach 1.8, 100K transport
- Advantages
  - Smaller Aircraft → Reduced Sonic Boom
  - Lower Speed → Less Complexity (Inlets, Materials, Etc.)
Redefining the Speed Envelope

Cruise Speed

- 0.90 M
- 1.80 M

Environmental Considerations

- Boom Overpressure: Acceptable for Overland SS Flight
- Takeoff Emissions: ICAO with Margin
- Cruise Emissions: Minimum Impact
- Airport Noise: Stage 4 with 10dB Margin

Manage Environmental Impacts Through Design Requirements
Objective: Conduct basic research into reducing the impact of sonic boom on people and the environment to enable regulatory change for supersonic flight overland, domestically and internationally.
Sonic Boom Suppression

- Gulfstream Quiet Spike™
  - Extendable Nose Spike
  - Generate Series Of Weak Shocks
  - Propagate Parallel To Each Other
  - Transform Sharp Crack Into Quiet Whisper
Quiet Spike™ Flight Test

Comparison of CFD-Predicted vs. Measured Near-field Signature

Excellent Correlation & Validation of Sonic Boom Suppression

Photo: NASA Dryden Flight Research Center
Low Boom Simulation & Preliminary Flight Results Independently Point Toward Signature Levels ~ 70 PLdB
Global Impact Assessment

Low Boom Signature Robust in Non-Standard Atmosphere

Concorde, Std. Atm.: >105 PLdB
QSJ, Std. Atm.: <70 PLdB
Summary

- Continued Market / Industry Interest in Future Supersonic Concepts
  - Supersonic Overland Flight is Required
  - Manage Environmental Design Requirements for Success
- Promising Research Results in Sonic Boom Suppression
  - Validated Quiet Spike Technology
  - Acceptable Noise Level Achieved Through Low Boom Shaping
Questions?

SUPERSONIC ACOUSTIC SIGNATURE SIMULATOR II (SASS II)

Listening Area
Looking toward the Speaker

Operator's Station

Listening Area
Looking toward the Bass Trap

A MOBILE FACILITY FOR ASSESING SIGNATURE ACCEPTABILITY