

## ASCENT Project 57



# Support of Supersonic Aircraft En-route Noise Efforts in ICAO CAEP

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Cost Share Partners:

Boom, Global SST, Gulfstream, Exosonic

Key contributor: NASA



## Objective:

- Research continues to support FAA in the development of technical standards for civil supersonic aircraft under the ICAO CAEP
  - Task 1: Efforts focus primarily in the area of en-route sonic boom noise assessment
  - Task 2: Exercising capability of PCBoom software to model secondary sonic booms

## Project Benefits:

- Predictive capabilities for sonic boom impacts
- Continued study of secondary sonic boom prediction
- Applicability of certain metrics
- Testing of signal processing methodologies for sonic boom signals
- Scheme assessment for sonic boom certification

## Research Approach:

- Task 1: Simulate the effects of turbulence on shaped sonic boom within the atmospheric boundary layer (ABL)
  - Propagate from cruise altitude to ABL with no-turbulence tool and ABL to ground with turbulence tool (involving both vector and scalar contributions to turbulence)
  - Examine effects of Reference Day atmosphere
- Task 2: Predict secondary sonic boom using realistic meteorological data up to 100 km height; measure secondary sonic booms, if possible
- Task 3 (Volpe): Support PCBOOM & recover Concorde secondary boom signatures recorded by Volpe in 1979.

## Major Accomplishments (to date):

- Extended KZKFourier software to eliminate artifacts from some "turbulized" signatures
  - Used visualization to help find artifacts
  - Provided recommendations to avoid artifacts in future
- Conducted new Reference Day crosscheck in WG1
- Confirmed monthly secondary sonic boom predictions provide sufficient detail for coastal buffer predictions
- Initiated work to measure secondary booms

## Future Work / Schedule:

- Extending KZKFourier to incorporate inhomogeneous atmosphere
- Improving secondary boom predictions
- Trying to measure secondary booms in conjunction with X-59 flights (if possible)