

## ASCENT Project 57



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

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Cost Share Partners: Boom, Gulfstream,  
Exosonic (new for 2022!)



## 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: Testing 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)
- Task 2: Currently looking at prediction of secondary sonic boom for supersonic aircraft approaching U.S. coastlines, using flight conditions similar to Concorde using realistic meteorological data up to 100 km height
- Task 3 (Volpe): 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
- Updated and expanded database provided to WG1/SSTG/PrSG for C609 in February 2022
- Learning new things about secondary sonic boom predictions
  - Effect of different aircraft headings
  - Understanding PCBoom’s current predictions of caustics

## Future Work / Schedule:

- Running KZKFourier for wider range of altitudes, atmospheric profiles, & turbulence conditions
- Improving secondary boom predictive capability focusing on coastal buffer distances