

ASCENT Project 58

Improving Policy Analysis Tools to Evaluate Higher-Altitude Aircraft Operations

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Objective:

- Update the APMT env. impacts estimation tool to include **altitude sensitivity** and **region-specific impacts**
- Enable **rapid evaluation** of the economic consequences of **multiple subsonic** and **supersonic aviation scenarios**



Project Benefits:

- Enable **direct comparison of monetary impacts** associated with both **subsonic** and **supersonic operations**
- Allow **greater flexibility** and **improved speed** in cost evaluation

Research Approach:

- Update APMT to accept **location-specific** flight distance and emissions
- Calculate **sensitivity** of outcomes as a function of latitude and altitude using a **forward difference** approach:
 - **Region-specific** contrail forcing
 - **Country-specific** changes in surface air quality
 - **Time-resolved** climate impacts
- Integrate **gridded sensitivity** data into APMT for all major emissions components
- Transfer APMT into **Julia** for greater efficiency
- Evaluate sensitivity accuracy through a **multi-model intercomparison exercise**

Major Accomplishments (to date):

- Conversion of APMT to use Julia
- Update of CO₂ RF and impact handling based on IPCC AR6 SSPs
- Upgrade to allow gridded sensitivity output data
- Integration of NO_x, SO_x, and BC sensitivity data
- First evaluation of contrail impacts and determinative factors

Future Work / Schedule:

- Intercomparison with ASCENT 22: *Winter 2023*
- Role of non-aviation emissions: *Spring 2024*
- Evaluation of SAF effects: *Fall 2024*