



APMT Aviation Environmental Portfolio Management Tool

AIR TRANSPORT GROWTH AND THE ENVIRONMENT

Air transport is growing rapidly and is expected to double, or even triple, by 2025. This dramatic increase in traffic will bring significant economic benefits and significant environmental challenges. In order to select the most efficient environmental policies and R&D options, we need to be able to assess the complete impact of each suggested policy.

Aviation environmental effects result from complex interdependent technologies, operations, policies, and market conditions. Current modeling tools only allow policy and R&D options to be considered in limited contexts such as noise alone, local air quality alone, or climate change alone.

Further, only partial economic effects are considered. This approach can lead to the selection of suboptimal policies and R&D options because actions in one domain may produce unintended negative consequences in another.

The *Aviation Environmental Portfolio Management Tool* will model these complex interdependencies, and assess more fully the impact of aviation environmental policies. APMT will enable intergovernmental and national agencies to select the most efficient policies and R&D options that balance society's environmental and economic needs.



Goals

- More effectively assess and communicate environmental effects, interrelationships, economic consequences based on integrated analyses
- Facilitate international agreements on standards, recommended practices, and mitigation options
- Enable more informed international and U.S. policy and budgetary decision-making
- Cost-effectiveness analysis *and* benefit-cost analysis
- Desired characteristics
 - internationally accepted
 - inclusive, not competitive
 - transparent
 - rigorous
- Explicitly represent uncertainty and different viewpoints

Model elements

- Partial equilibrium model of primary markets
 - model policy impacts on fares, passenger demand, airline operating costs, aircraft prices and costs
 - forecast future air traffic scenarios
- Aviation Environmental Design Tool (AEDT)
 - model local and global emissions
 - model noise levels around airports
- Benefits valuation
 - model impact of aviation emissions and noise on human health and welfare and the ecosystem
 - Monetize impacts

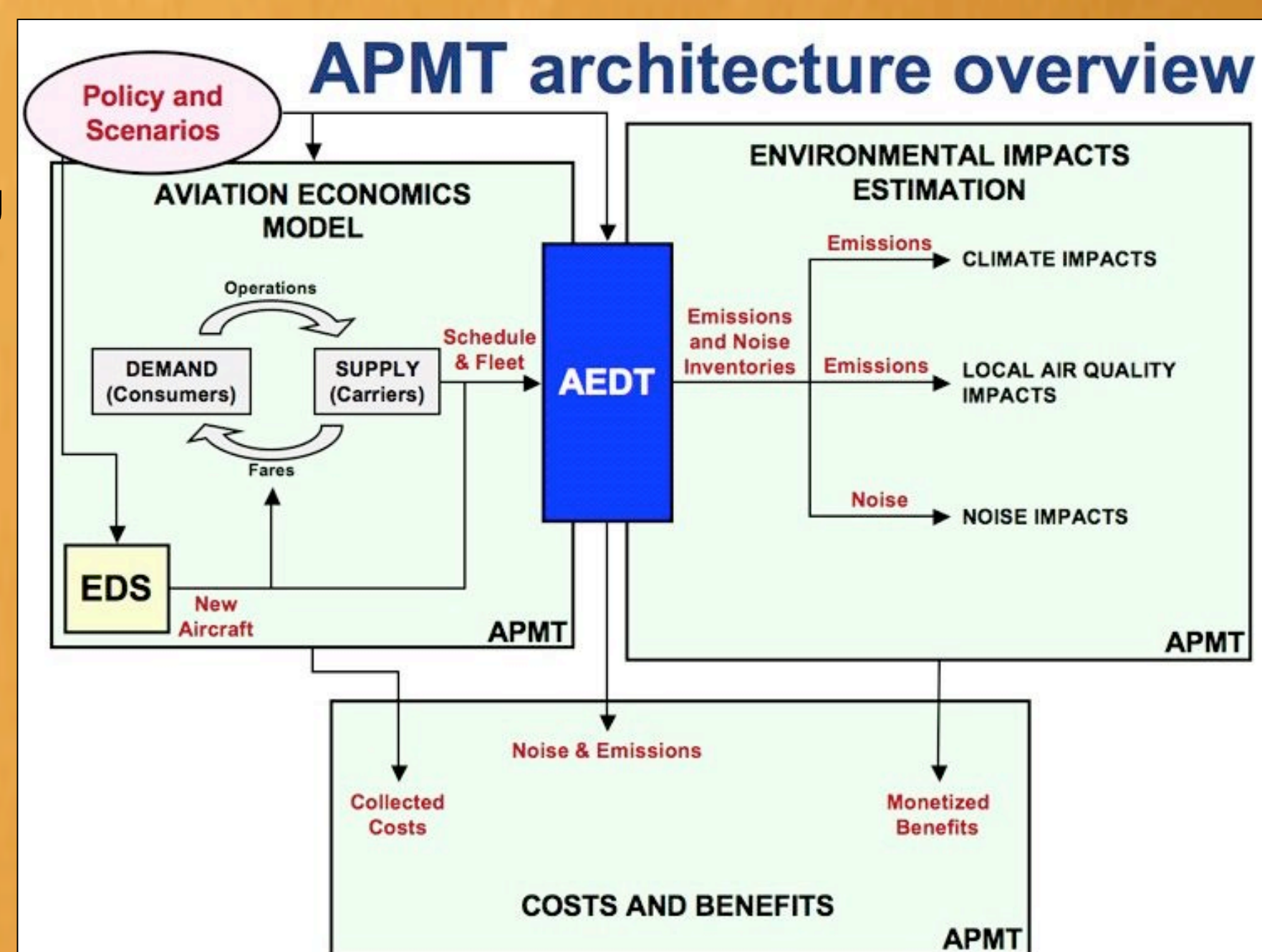
- General economy
 - model interdependencies between aviation market, general economy
- Analysis and display
 - create effective user-interface, clearly communicate results

Key challenges

- Integration of model elements created by team members worldwide
- Assessment of model fidelity
- Effective communication of methods and results to policy makers

Approach

- Collaborate with international partners to develop comprehensive suite of software tools to allow thorough assessment of aviation environmental impact
- New capability to assess the interdependencies between aviation-related noise and emissions effects and associated environmental costs



- Other suite components: Aviation Environmental Design Tool, Environmental Design Space

Current research

- Develop tool to value aviation benefits under different environmental policies
 - Geographical Information Systems modeling
 - assess uncertainties in benefits valuation
- Aircraft price and cost modeling
- Model local air quality
- Application of techniques to sample problems