Sustainability in the Air: The Modernization of International Air Navigation

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The Challenge

• Sustainability requires finding balance between the dimensions of sustainability (environmental, economic, social, and financial) and the objectives of transportation (enhanced mobility, accessibility, and safety).

• Various solutions have been proposed to enhance sustainability in transportation including improved technology, policy changes, operations, taxes and subsidies and reduced use.
Difficulty of Sustainability in Aviation

- Air traffic growth has doubled every fifteen years since 1970, so reduced use is not a viable option.
- Airport expansion creates additional environmental impacts such as surface traffic, noise, ecological effects, and land contamination.
- The international nature of air travel creates governance challenges to policy implementation.
Leuenberger et. al. PWMP 2014

- Argue that sustainability can move from a normative principle to a tool for decision-making
- Propose a framework of new collaborative roles for public administrators: “With these transformed roles, transportation practitioners can make great contributions to build a better future”
Four tools to improve decision-making

1. “Strong leadership to move in the direction of sustainability,”
2. Practitioners “need to develop actionable strategies by incorporating sustainability into agency mission statements and strategic plans,”
3. Practitioners “should develop and use sustainable transportation performance measures to guide project selection and investment, track and monitor progress toward sustainability, and report performance to stakeholders,” and
4. “Advancing transportation sustainability necessitates an effective collaboration among stakeholders from a variety of disciplines and perspectives”
International Civil Aviation Organization (ICAO)

• ICAO Aviation System Block Upgrades (ASBU) initiative is a roadmap for the modernization of global air navigation. It is designed to keep infrastructure needs and improvements in pace with air transport growth.

• We find the implementation of this reform to be a good illustration of the Leuenberger et al. framework. It demonstrates the robustness of the framework and a lesson on how to proceed.
ICAO

• Specialized agency of the United Nations
• Global forum for civil aviation, sets policy, establishes standards and recommends practices for global civil aviation
• Mission: To achieve, safe, secure, sustainable development of civil aviation through the cooperation of member states
• 191 member states
Aviation System Block Upgrades (ASBU)

• Global framework for air navigation

• Goals:
  – develop a set of upgrades for air traffic management
  – establish transition plans
  – focus on global interoperability

• Flexible and scalable based on needs and level readiness of members states
ASBU

• Developed out of concern over ability of air navigation systems to meet global demands
• Collaboration with stakeholders a high priority throughout development
  – Representatives from ICAO member states and the aviation industry consistently played a role in development
  – Multiple conferences with stakeholders to develop the ASBU plan which was endorsed at the ICAO 2013 Assembly
ASBU Design

- “Module” is an operational improvement in the plan designed to increase performance capability. Not all modules will be necessary in all parts of the world.
- “Block” is a combination of modules in 5 year intervals.
- “Performance improvement areas” are a series of dependent modules across the blocks, representing the transition over time of linked capabilities.
Figure 1: Aviation System Block Upgrades

Performance Improvement Areas

- Greener Airports
- Globally Interoperable Systems and Data
- Optimum Capacity and Flexible Flights
- Efficient Flight Path

Block 0 (2013)
Block 1 (2018)
Block 2 (2023)
Block 3 (2028 & >)

Past
Future
ASBU and the Leuenberger criteria

• Relied on leadership from top ICAO leaders and other stakeholders
• Stressed collaboration with stakeholders across nations and professions
• Resulted in actionable strategies incorporated into ICAO mission by implementing the block upgrades on a specified schedule
• Included performance measures which allows for regular progress reports and holds nations accountable
ASBU and sustainability

• More efficient flight paths yield environmental benefits of less noise, reduced fuel burn, time savings and reduced environmental footprint
• Airline benefits include lower costs, increased capacity, cross border harmonization, opening the potential for new markets
• Advances both environmental and economic dimensions of sustainability
Conclusions

• Practice can be more sustainable by changing operations without relying on reduced use and by better harnessing technology.
• ASBU is a work in progress, so flexibility in implementation, learning by doing, and careful monitoring are important.
• Uses a planning approach to balance economic growth and sustainability
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