



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

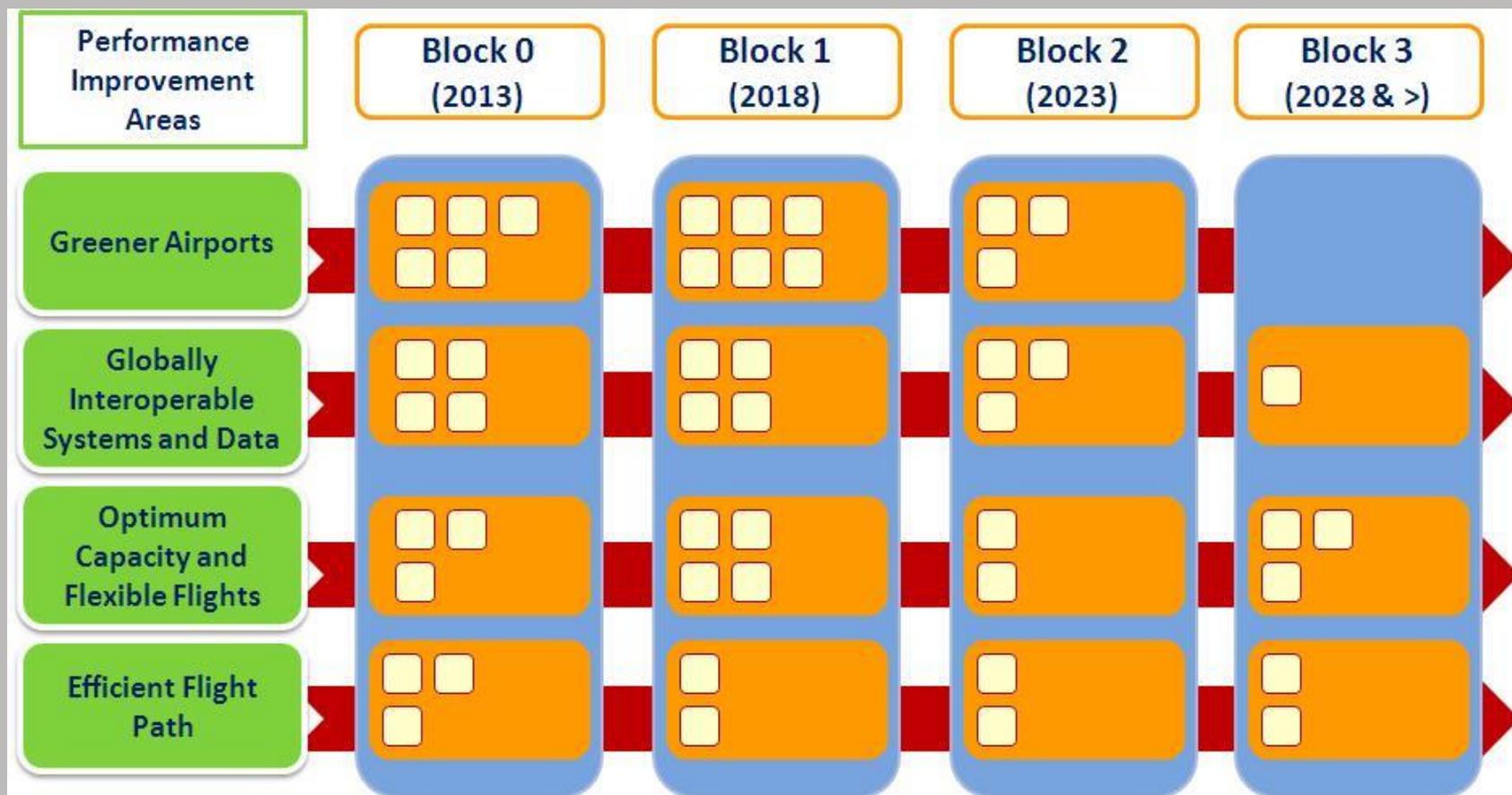


ASBU Design

- “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





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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