

AVIATION CO₂ REDUCTIONS



STOCKTAKING SEMINAR

TECHNOLOGY · OPERATIONS · SUSTAINABLE AVIATION FUELS



Air Operations



Arthur Orton,
Deputy Program Manager, Continuous
Lower Energy, Emissions and Noise
(CLEEN) Program – U.S. Federal Aviation
Administration (FAA)



NextGen

NextGen is the FAA-led modernization the United States air transportation system. It aims to increase the safety, efficiency, capacity, predictability, and resiliency of American aviation. Since its inception, the overarching goal has been to modernize the National Airspace System (NAS) to be flexible and agile in order to support the growing demand and changing needs of NAS users.



Procedural – Control based on Where We **Think** the Aircraft Is

Before 1950



Surveillance – Control Based on Where We **Know** the Aircraft Is

1950-2010



Trajectory Based Operations – Control Based On Where We Know the Aircraft **Will Be**

2010-Beyond

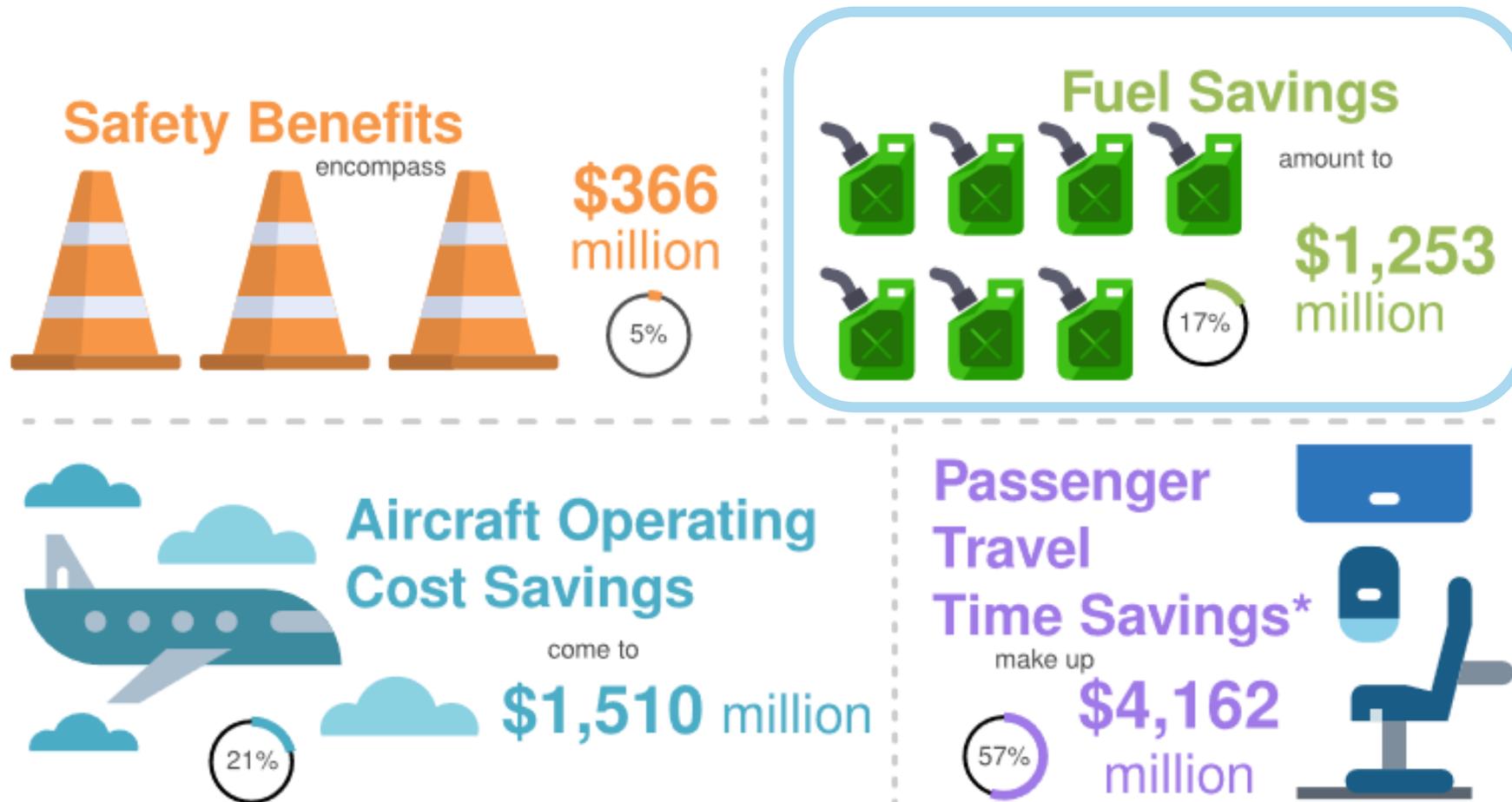
Elements of Transformation

Aircraft Managed Based on Improved Position Information and Time

Past Practices	Enabling Infrastructure	NextGen Improvements
<p>Communications: Controllers communicate by voice to each individual aircraft</p>	Data Communications	<p>Communications: Controllers communicate via digital messages to multiple aircraft at a time, which increases efficiency and improves safety by reducing misunderstandings</p>
<p>Aircraft Routes: Routing limited by ground-based navigational infrastructure</p> <p>Aircraft Location: Future time and position of the aircraft not known by all parties</p>	Performance Based Navigation and Automatic Dependent Surveillance - Broadcast	<p>Aircraft Routes: More efficient flight routes and aircraft performance based procedures using GPS navigation, reducing delays, fuel burn, and carbon emissions</p> <p>Aircraft Location: Future intended time and position of aircraft known for optimal flight and traffic flow, improves safety and increases efficiency</p>
<p>Operations: Tactical and reactive air traffic control</p> <p>NAS Efficiency and Traffic Flow: Operational choke points across phases of flight</p> <p>Information: Controllers and operators do not have same information to inform decisions</p>	Automation and System Wide Information Management	<p>Operations: Strategic air traffic management, which improves National Airspace System efficiency and reduces delay</p> <p>NAS Efficiency and Traffic Flow: Operations integrated across phases of flight for gate-to-gate efficiency, improving schedule predictability</p> <p>Information: Shared information (e.g., weather, traffic, system status) for collaborative decision-making, improving efficiency and predictability</p>

Achieved Benefits

Between 2010 and 2019, implemented NextGen capabilities generated **\$7 Billion in benefits** (2019 dollars)



NextGen Air Traffic Modernization

Operations

Main characteristics: benefits to all operations in airspace



Copyright © ICAO 2020. All rights reserved



	CO₂ reductions per flight	17% avg. measured 2010-2019
	Level of finance required	\$20.6 Bn (est. through 2030)
	Timeframe	2010-2030
	Main challenges	Aircraft Equipage Dependencies Operational Transformation

*All numbers are specific to U.S. application of full suite of modernization improvements



Thank You



ICAO
Headquarters
Montréal

European and
North Atlantic
(EUR/NAT) Office
Paris

Asia and Pacific
(APAC) Sub-office
Beijing

Middle East
(MID) Office
Cairo

Western and
Central African
(WACAF) Office
Dakar

North American
Central American
and Caribbean
(NACC) Office
Mexico City

Asia and Pacific
(APAC) Office
Bangkok

South American
(SAM) Office
Lima

Eastern and
Southern African
(ESAF) Office
Nairobi