Air Transportation Forms a Complex Dynamic System
Driven by Economic, Societal & Technical Factors

Pax & Cargo
- Baseline Demand
- Effective Mile
- Trip Time
- Market Clearing
- Effect on GDP
  
  Trips offered
  
  Travel costs
  
  Travel times

Fleets & Schedule
- Passenger & Flight Delays
- Flight Cancellations
- Scheduled
- Fleet Finances
- Aircraft Flows
  
  Capacity offered
  
  Services offered

IIAS
- Airport Capacity
- Enroute Capacity
- ATC Infrastructure
- ATC Controllers
- FAA Budgets
- Aviation Trust Fund

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What Does The System Look Like in 2018?

Transition to NextGen: The Path is Extremely Complex
System Dynamics - NextGen Development & Implementation

Complex Dynamic System Optimization

Design Variables → Optimization Processes → Constraints → Optimized Solutions with Maximized Benefits → Objectives
Optimized Implementation Must Account For……..

…Needs of All Constituencies

Objectives Reflect Both Common Goals & Diverse Interests

NextGen Objectives Include…

- Improved Access
- Stakeholder Equity
- Return on Capital
- Industry/Government Partnership
- Operational Efficiency
- Reduced Delay
- Noise Reduction
- Reduced Emissions
- Enhanced Safety
- Improved Flexibility
- Global Harmonization
- Improved Travel Experience
Constraints Also Reflect Diverse Factors

- Environmental Impacts
- Economic Landscape
- Funding & Capital
- Political Climate
- Policies
- Technology Insertion
- Local Community Needs
- Industry Investment
- Aircraft & Equipment Capability
- Geography
- Maintenance Requirements
- Training Requirements

NextGen Implementation is Advancing
**New NextGen Infrastructure is Emerging**

Automatic Dependent Surveillance-Broadcast (ADS-B) & Wide Area Multilateration (WAM)

- **FY10-11 Coverage**
- **ATC Services**
  - Nov 2009
  - March 2010
  - July 2010
  - Broadcast Services

- **Automatic Dependent Surveillance-Broadcast (ADS-B)**
  - In-Trail Demo
  - Integrated with ASDE-X

- **ATC Services**
  - Sept 2009
  - Nov 2009
  - April 2010
  - Jan 2010
  - Broadcast Services

- **Planned ADS-B Coverage**
- **Planned ADS-B Ground Stations**

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**Incremental Approach to Implementing NextGen**

Produces Benefits and Builds a Foundation

- **Best Equipped Best Served Prototyping**
- **Surface Management**
- **GBAS**
- **UAS**
- **4-D FMS**
- **Staffed NextGen Tower**
- **3D PAM**
- **Tailored Arrivals**

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New NextGen Integration and Evaluation Capability (NIEC)

Allows Early Exploration & Assessment of Integrated System Dynamics & Interfaces

NextGen Work Plan Matures Capabilities for Implementation and Operational Benefit
NextGen Benefits  
Significant Public Benefits & Improved Passenger Experience

Maximize Carbon Reduction  Minimize Delays

Maximize Safety  Maximize Savings

2018 ESTIMATES
Reduce Delays 21%
Reduce CO₂ Emissions 1.4 Mt Cumulative
Reduce Fuel Use 1.6B Gallons Cumulative

Surface Traffic Management - Ripe for Optimization
Nationwide Data Dissemination Infrastructure Enables Surface Data Sharing

Constraints & Operational Practices Led to Inordinate Delays at New York JFK

Excessive queues and taxi delays

Surface situation before collaborative management

- Space Availability
- Competitive Factors
- Airport Capacity
- Geography
- Flight Over-scheduling
- Lack of Situational Awareness
- Demand
- Airport Coupling
Collaborative Departure Management
JFK Runway 31L/13R closed for reconstruction March 1 through June 28, 2010

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Collaborative Departure Management
Effective Optimization in Real Time by Operators, Airport Authority & FAA

Successful new management framework built upon NextGen concepts & technologies

Benefits
1. Reduced delays
2. Reduced fuel consumption
3. Reduced CO2 emissions
4. Improved passenger experience
Optimization Utilizing Metroplex Integrated Airspace and Procedures

Metroplexes are the origin of most system delays

Power of Performance-Based Navigation – a Key Tool to Optimize the Use of Airspace

Increased:
- Efficiency
- Predictability
- Utilization
Example of Metroplex Optimization
De-conflicting O'Hare & Midway Enables Greater Efficiency and Access

FAA Implementing NextGen with Practical Optimization Approach

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NextGen Benefits
Significant Public Benefits & Improved Passenger Experience

Maximize Carbon Reduction

Minimize Delays

2018 ESTIMATES

Reduce Delays 27%

Reduce CO₂ Emissions - 14M Tons Cumulative

Reduce Fuel Use - 1.4B Gallons Cumulative

Maximize Safety

Maximize Savings

Resources Available to Stay Informed

www.faa.gov/nextgen

NextGen Implementation Plan Summarizes:
- Target for NextGen - 2018
- Work accomplished
- NextGen benefits
- FAA’s work plan through 2015

Online:
- Overviews
- News
- Videos
- NextGen Documents
- And more...

Interactive Flash Map:
- NextGen Deployments
- NextGen Demos
- And more...