

The Next Generation Air Transportation System

Overview

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October 3, 2005

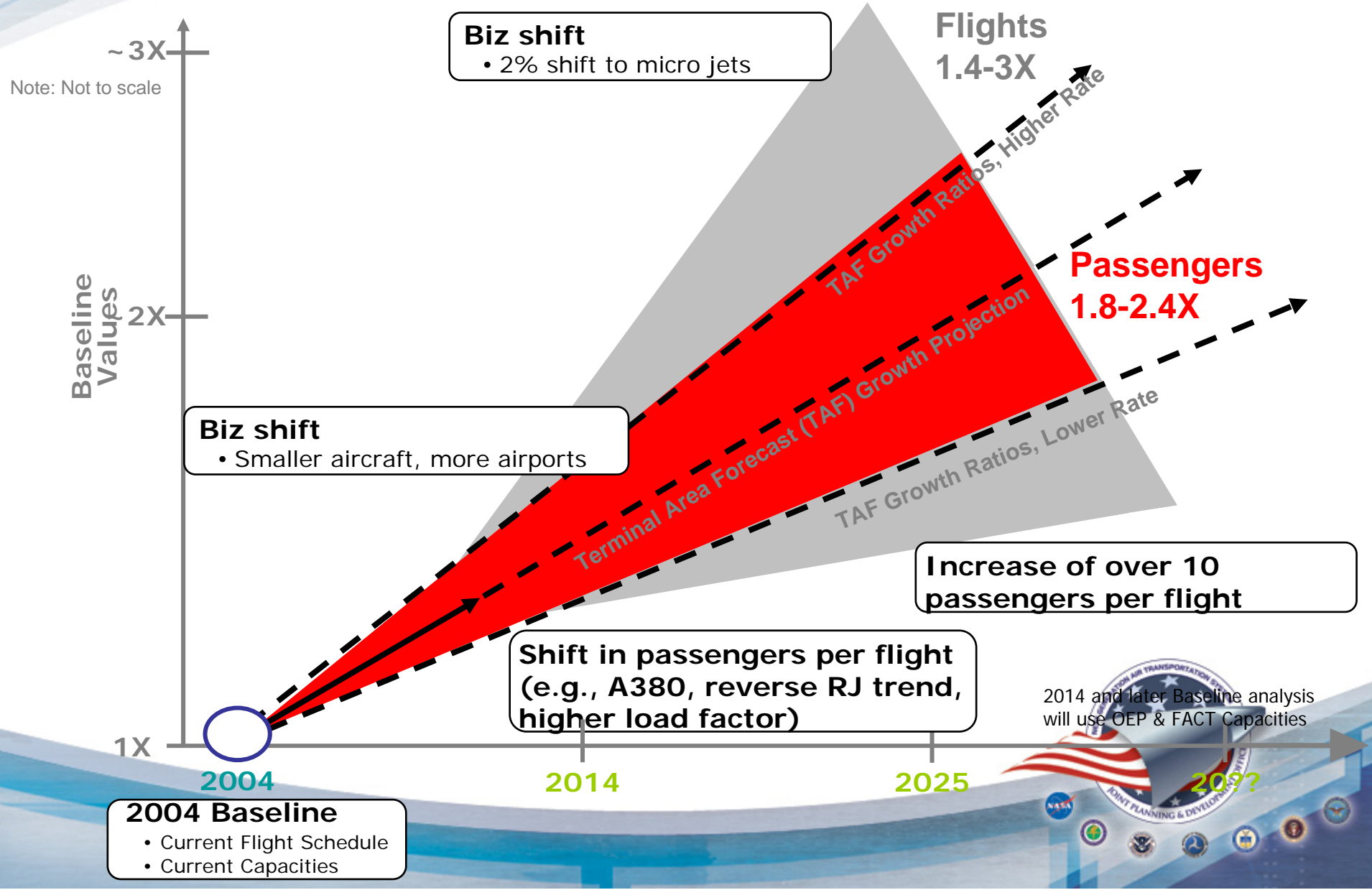




A Potential Crisis in Our Air Transportation System: Turning Up the Volume

- The metrics are scary: 3x everything
- More O'Hare's are just waiting to happen
- Security systems are challenged





Public Law 108-176

December 12, 2003

- Establishes Next Generation Air Transportation System Joint Planning and Development Office
- Series of responsibilities
 - Create and carry out the Plan
 - Coordinate goals, priorities, and research activities within Federal Government and across US aviation industry
 - Facilitate technology transfer from research to operational and private sector organizations
 - Review activities related to environment and safety
- Operate in conjunction with relevant programs in specified government agencies
- Consult with the public and ensure the participation of experts from a broad range of entities within the private sector



Inter-agency Governance



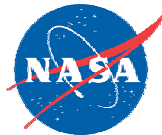
Senior Interagency Policy Committee

- Guides and approves the National Integrated Plan



Joint Planning and Development Office (JPDO)

- Develops and oversees implementation of the National Integrated Plan



Inter-Agency Integrated Product Teams

- Develops and oversees implementation of Action Plans



Integrated National Plan

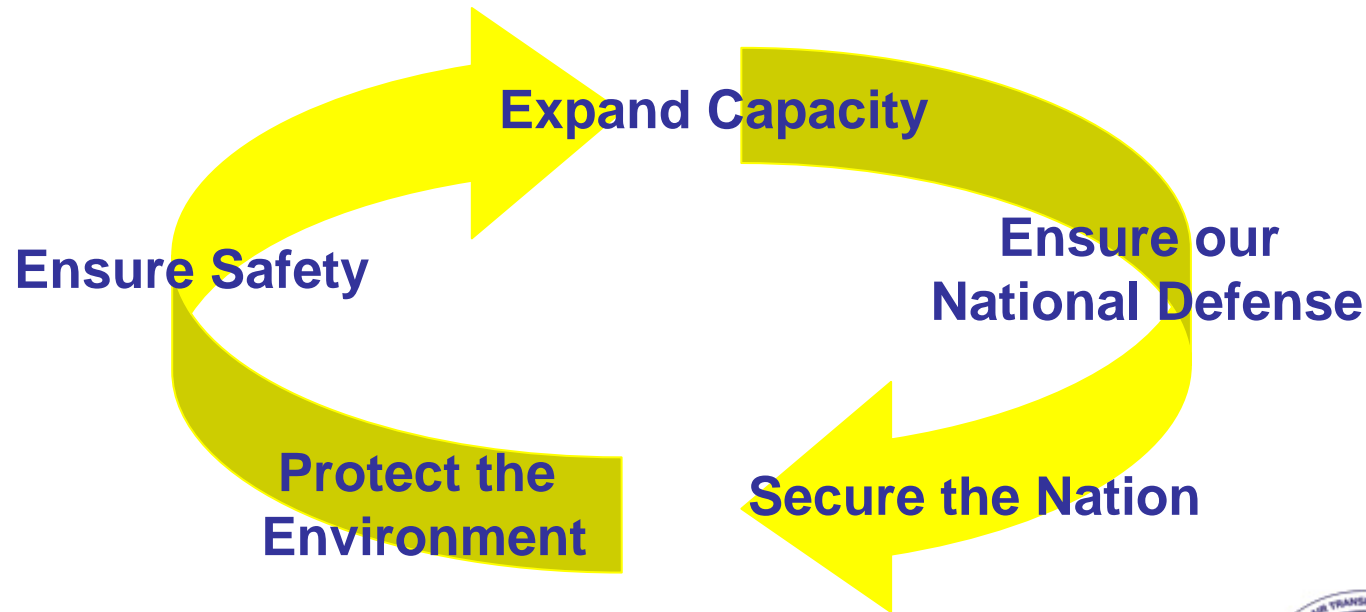


- Establishes National Goals
- Sets context for Transformation
- Sets direction for Transformation (8 Transformational Strategies)
- Creates governance model for multi-agency cooperation
- Delivered to Congress in December, 2004



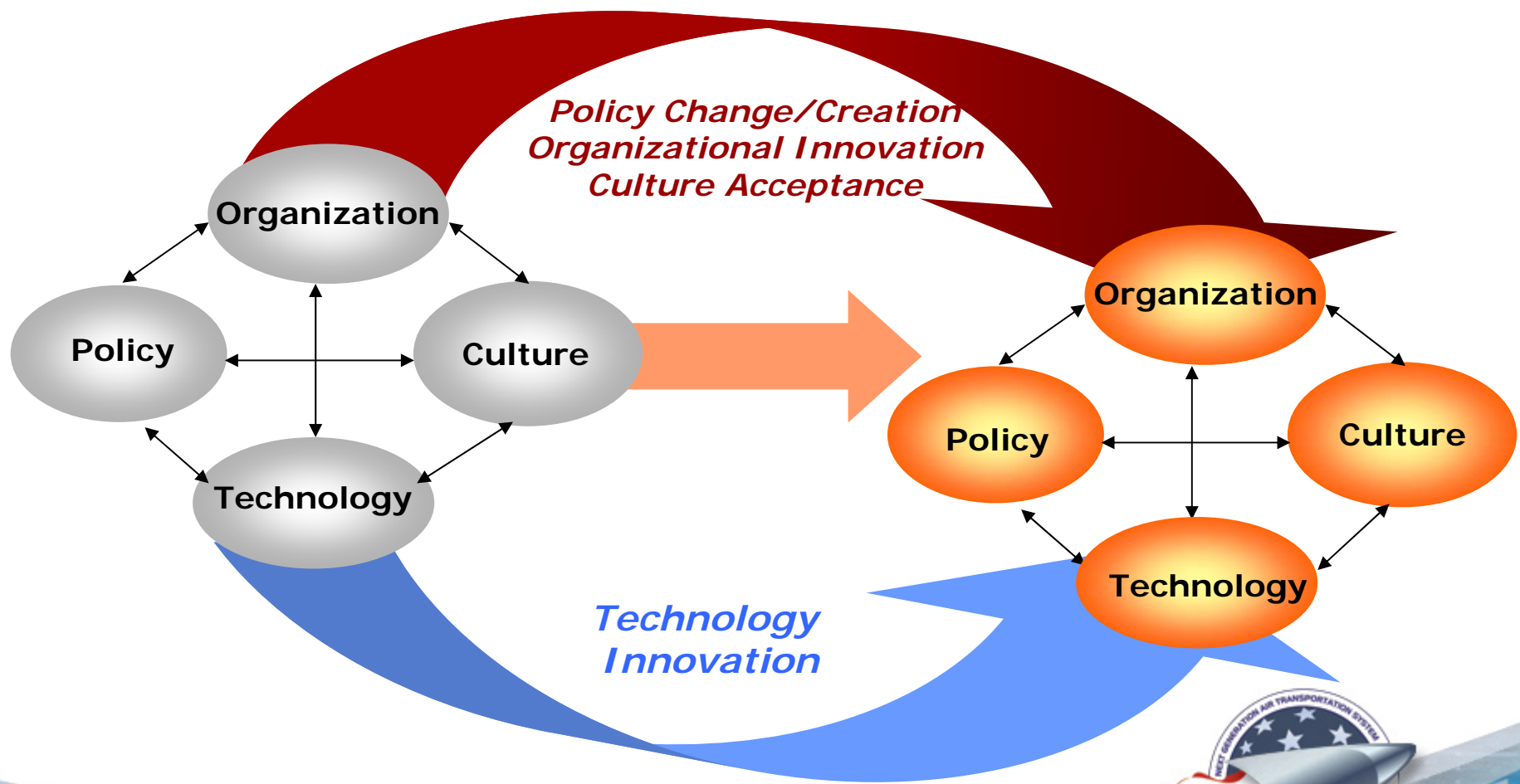
Vision / Goals

A transformed air transportation system that provides services tailored to individual customer needs, allows all communities to participate in the global economy, and seamlessly integrates civil and military operations



System-Wide Transformation

Innovation Across All Lines of Development



Strategies

- Develop Airport Infrastructure to Meet Future Demand - **FAA**
- Establish an Effective Security System without Limiting Mobility or Civil Liberties - **DHS**
- Establish an Agile Air Traffic System - **NASA**
- Establish User-Specific Situational Awareness - **DoD**
- Establish a Comprehensive, Proactive Safety Management Approach - **FAA**
- Develop Environmental Protection that Allows Sustained Aviation Growth - **FAA**
- Develop a System-wide Capacity to Reduce Weather Impacts - **DOC**
- Harmonize Equipage and Operations Globally - **FAA**



2025 NGATS Concept

Operating Principles

- "It's about the users..."
- System-wide transformation
- Prognostic approach to safety assessment
- Globally harmonized
- Environmentally compatible to enable continued growth

Key Capabilities

- Net-Enabled Information Access
- Performance-Based Services
- Weather-Assimilated Decision Making
- Layered, Adaptive Security
- Broad-Area Precision Navigation
- Trajectory-Based Aircraft Operations
- "Equivalent Visual" Operations
- "Super Density" Operations



Prognostic Approach to Safety Management

National Culture, Standards & Scope

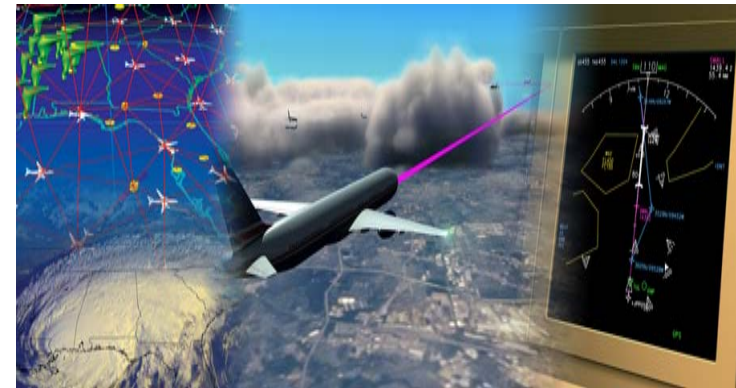
- National Safety Management Standard
- National Strategic Plan
 - National Goals and Prioritization of Safety Research
- Comprehensive Sharing and Analysis of Relevant Safety Information
- National Safety Culture
 - Continuous Improvement
 - Accountability for establishing a safety culture & making risk-based, data driven decisions
 - “Just Culture”
 - Median between a “Punitive Culture” and a “Blameless Culture”
 - Non-Punitive reporting system



Weather Assimilated into Decisions

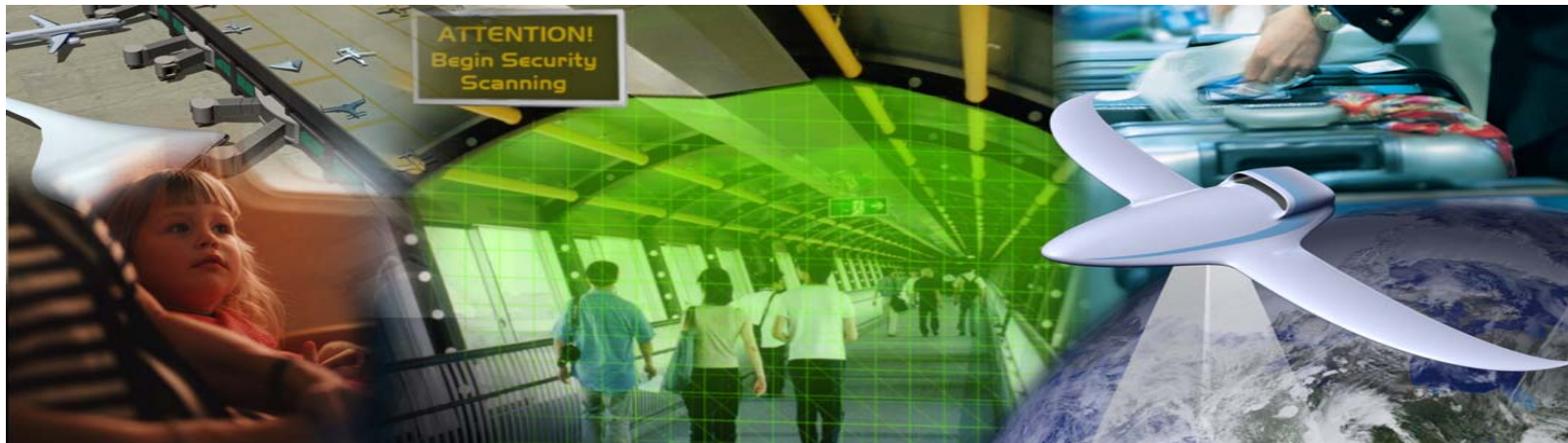
Common weather picture across NGATS

- Fuse global weather observations and forecasts into single database, dynamically update as needed
 - Tens of 1000's of sensors (airborne & ground) feed 100's of forecast models
- Learning automation accounts for weather and its uncertainties in managing aircraft trajectories
- Identify hazardous weather real-time
- Assimilated into NGATS “decision loops”
 - Total integration via machine-to-machine
 - Critical decision system time scales using both probabilistic and deterministic weather info
 - Optimized to maximize available weather-favorable airspace
 - Terminal weather impacts including ground/ramp ops and adaptability due to wind shift changes



Layered, Adaptive Security

Move people/goods expeditiously from "curb-to-curb" while ensuring protection from foreign & domestic threats

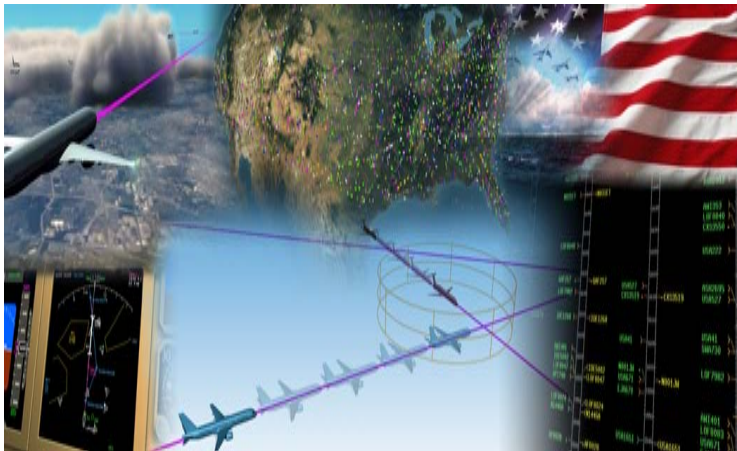


- Adaptive Security for People, Cargo, Airports and Aircraft
- Risk Assessment-Driven Evaluation and Response
- Positive Identification for People and Cargo
- Preventive Threat Detection and Mitigation



Aircraft Trajectory-Based Operations

Adjust airspace configuration to meet user needs



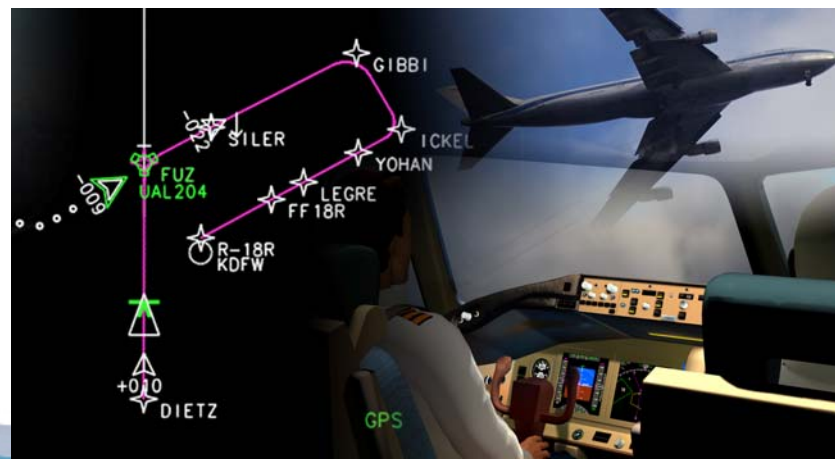
- 4D trajectories (including taxi and roll-out) are basis for planning and execution
- Machine-based trajectory analysis and separation assurance
- Includes environmental performance throughout all phases of aircraft ops
- Airspace configuration driven by: DoD/DHS requirements, domestic & international user needs, requirements for special-use airspace, safety, environment, overall efficiency
- Airspace reconfigurable during day of operations
- Users “contract” for airspace access & service



Equivalent Visual Operations

Increasing capacity from today's non-visual conditions

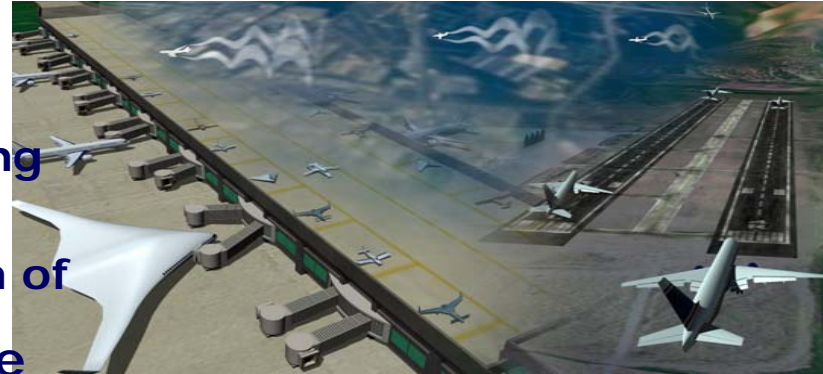
- Aircraft perform *"equivalent visual"* operations in non-visual conditions (achieve "VFR capacity" under these conditions)
- ATM provider delegates *"maintain separation"* responsibility to aircraft operators
 - Requires timely, high fidelity information on nearby aircraft, weather, etc
- System-wide availability at all air portals
 - With appropriately capable "landside" (including security)
- Greater predictability of operations at busy airports, including ground operations



Super Density Operations

Peak performance for the busiest airports

- **Maximized, environmentally acceptable runway capacity**
 - Reduced arrival/departure spacing
 - Equivalent Visual capability
 - Predictable detection/integration of wake vortex hazards
- **Reduce Runway Occupancy Time**
 - Aircraft energy management during rollout coupled with optimum turnoff selection
 - Situational awareness of “nearby” surface traffic and intent for high-speed turnoff
- **Simultaneous operations on single runway**
 - Multiple aircraft operate on single runway when sufficient “separation” exists
 - High-update rate surveillance info available to all aircraft
- **Incorporates required environmental performance during all operations**
- **Airport “landside” (including security) sized accordingly**



Net-Enabled Information Access

*Global secure access, information handled according to
"communities of interest"*



- **"Shared Situation Awareness"**
 - Real-time free-flow of info from private, commercial, & government sources, integrated internationally
 - Tailored, responsive and secure
 - Push/pull processes
 - Common awareness of day-to-day ops, events, crises
- Aircraft are integral "nodes" in network
- Integrated cooperative air traffic and non-cooperative national security surveillance



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