



# Aviation and Terrorism

Towards a safe, *SECURE* and efficient  
air transportation system

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# New Security Imperative

- **Unimaginable impact of Sept 11<sup>th</sup>**
  - » 5,000 killed due to failure of aviation security
  - » Air transportation shut down for days
  - » Airlines on verge of bankruptcy
    - ↳ Air travel off substantially due to fear
  - » 500,000 jobs lost
  - » Hundreds of billions economical impact
  
- **Aviation security imperative**
  - » Security has become highest priority
  - » Must address very broader threat
  - » Counter measures must not kill the industry



# Security Considerations

## ➤ Per Sept 11<sup>th</sup>

- » Hijacked aircraft for extortion
  - ↳ Passengers and crew at risk
  - ↳ Passive onboard response best defense
- » Conventional weapons and explosives threats
- » Security was a barely tolerated inconvenience

## ➤ Post Sept 11<sup>th</sup>

- » Hijacker aircraft as a weapon of mass disruption
- » Unconventional as well as conventional threats
- » Security mandatory and acceptable inconvenience



# Security Improvements

## ➤ Immediate

- » Increased airport security measures
- » Harden cockpit and air marshals

## ➤ Mid-term

- » Emerging technology, procedures and policy
- » Airlines financial inability to equip
  - ↳ \$500M appropriated for aircraft hardening measures

## ➤ Longer-term

- » 100% screening of passengers, employees, baggage, cargo, and mail - weapons, explosives, & chem/bio
- » Counter measures to aircraft as a weapon or for weapon delivery
- » Security with minimum disruption to aviation efficiency



# Implications for ATM

- **Traffic down but expected to rebound**
  - » Capacity concerns only delayed a few years
  - » Must continue capacity enhancements and R&D
- **Incorporate security requirements**
  - » Surveillance, communications, & command center
    - ↳ Transponder alternatives, unequipped aircraft, flight path deviation, and communications with DoD, intelligence and law enforcement agencies, AOCs
  - » Information security
  - » GA, business, air taxi, charter & emergency aircraft operations, procedures and policies
- **Included security factors in future concepts**
  - » SATS - small airport security, surveillance, etc.
  - » New concepts of operation and ATM concepts



# Aviation System After Next

- Innovative air transportation system concepts needed beyond 2020
  - » Capable of supporting ...
    - ∩ Cargo demand up 5 - 20 times (?)
    - ∩ Passenger demand up 2 - 10 times (?)
    - ∩ Personal air/road vehicles  $> 10^6$
    - ∩ Seamless air/ground transportation
    - ∩ Time efficient from origin to destination
  - » Environmentally compatible
  - » Safe, SECURE and affordable



# If New Innovations Needed ..

- Research and operational demonstrations could take 10 to 15 years (CTAS did)
- Infrastructure and fleet upgrades/replacement could take 15 to 20 years
- Revolutionary new vehicles/systems could take 20 years to become operational
- Global, Multi-modal, environmentally compatible solutions are necessary
- Safe/SECURE/economically viable transition is mandatory

**It's prudent to start R&D planning now!**

# What Innovations?

- **Security measures that provide safety, efficiency, or financial benefits, e.g.,**
  - » **Integrated universal access and credit smart card**
    - ↳ **Biometric validation of holder - employees & passengers**
    - ↳ **Credit card companies would finance**
  - » **Automated aircraft control for single pilot operations, formation take-off and landing to increase airport capacity and aircraft take-over if hijacked or pilot disabled**
  - » **Automated ATM for increased capacity and preventing operations in restricted airspace**
  - » **Encrypted global navigation system for validated users only and fee for service - commercial provider**
  - » **Baggage and cargo screening and tracking system that also enables fully automatic handling**





# R&D Implementations

- **Systems analyses to define potential innovative air transportation concepts and enabling R&D must include**
  - » All previous requirements, i.e., demand, safety, efficiency, environment, etc.
  - » Broadest security requirements
  - » Compatible national and global solutions
  - » Origin to destination efficiency
  - » Viable transition from today's system
- **National and International commitment**



# Conclusions

- **Must assure highest security**
  - » Inconvenience acceptable now
  - » Long-term - minimum disruptions
  
- **Must continue capacity enhancements and R&D**
  - » Incorporate new security requirements
  
- **Explore innovative concepts for aviation beyond 2020**
  - » Include security measure synergistic with safety, efficiency, economics and environmental concerns

