Issues and Challenges for Airports in the New Millenium

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Airspace and Airports in the New Millennium

- A1J05 “Millenium Paper”
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Progression of Air Transport

- Progress and development of transportation defined the road map of civilization and mankind
  - Connecting products and services with marketplace
  - Speed and capacity keys to market expansion
- Greatest technological leaps realized by the military
  - Aircraft Airframes and Engines
  - Surveillance Radar
  - Satellite-based Navigation and Air Traffic Control

21st Century Marketplace

- Internet today's time-to-market catalyst
  - Instantaneous marketing and purchasing
  - Pressure to reduce time between order and receipt of goods purchased
- Integration of road vehicle, ship, rail, and air transport of passengers and cargo
  - Seamless, inter-modal transport service
- Automation and digital communication streamlining air traffic control and navigation
  - Free Flight, ADS-B, RNAV, ATM, etc.

Changing Roles in Aviation

- Deregulation of the Air Transport Industry
  - Markets served from federal government to air carriers
- United States 1990's focus on balancing the federal budget
  - Reduced budgetary support of FAA in relation to industry needs
  - Introduction of the Passenger Facility Charge (PFC) as a means of financing traditional capacity improvements
  - Finance from federal government to air carriers to airports
- NASA strategic initiative to support commercial aviation
- Airports transition from custodian/landlord to Economic Engine and Service Provider

Questions For The 21st Century

- What is the “end game” in the evolution of the new global air transport and civil aviation systems?
- What technologies, systems, and approaches will be or should be adopted?
- What are the logical roles and responsibilities of the stakeholders in this new environment

Airport Capacity

- Micro-level (Airport) Measures
  - Traditional capacity improvements i.e., runways for independent arrivals/departures
  - Procedural Changes and Technology Innovation to allow simultaneous use of existing runways
  - Delay-driven Demand Management to reduce inter-arrival and inter-departure spacing
- Problem: each airport knows its needs, what is lacking is a NAS-wide estimate of the impact of delays/improvements at specific airports
  - Potential Solution - mandatory publication of research funded by AIP/PFC

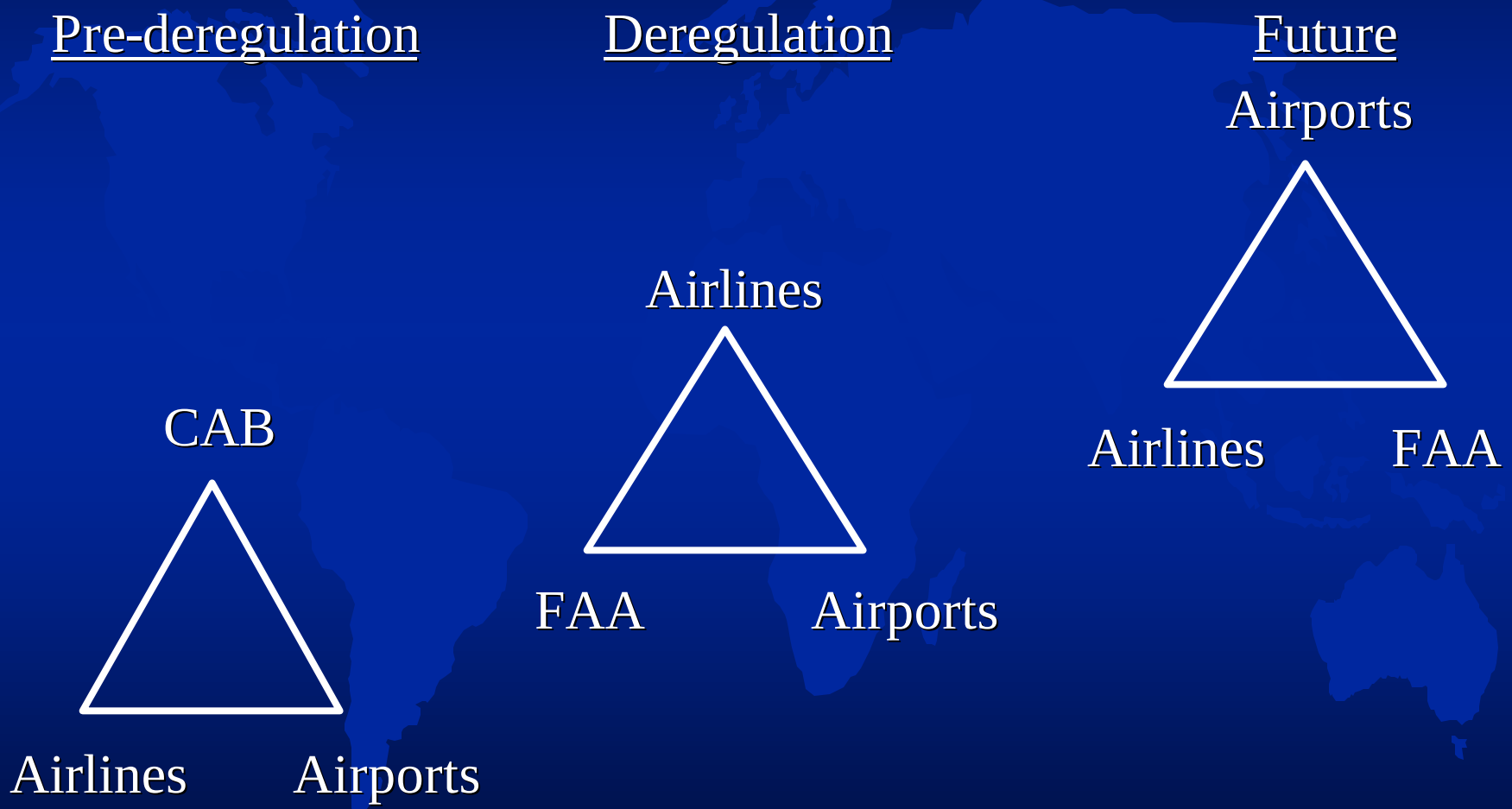
Macro-level System Capacity?

- Air Transport Growth Since 1960
  - 6 x faster than ground modes
  - 4 x faster than GDP
- 51% increase in enplanements from 1997-2008
- “System” at 75% Capacity by 2010 (w/planned rwys)
  - Exponential delay beginning at 50% of capacity
  - Unacceptable annual delay cost
    - loss of 700B RPMs
    - loss of 400k Work Years
- Capacity Enhancements long overdue

Potential Solutions

- Privatization of Air Traffic Management
  - Civil Air Navigation Services Organization (CANSO) successes to date
  - Reduces strain on already constrained FAA Budget
  - Provides for effective funding and fielding of new communications, navigation and surveillance (CNS) technologies
- FAA to focus/fund NAS architecture and operation
- FAA/NASA to focus/fund NAS R&D and support regional ATM R&D augmented by Airports
- Airports to focus/fund regional ATM needs
  - One size does not need to fit all
  - Empower motivated parties to focus on success

Changing "Leadership" Roles
(Regarding Airport Capacity)



System Technologies

- Sept. 1991 ICAO endorsed transition to new CNS technologies
  - Satellite, data link, automation technologies
  - Issues remain to be resolved (e.g., national sovereignty, industry, etc.)
- U.S. - emerging consensus on CNS technologies
  - Issues remain to be resolved (e.g., GPS integrity, ADS-B role in the airspace system)
  - Highlight is Free flight-Phase 1
  - NASA-FAA Joint ATM Research and Technology Development Plan holds promise

Decision Support Systems

- Key to success reduce Controller/Pilot Uncertainty
  - ITWS
  - TCAS
  - NASA TAPS Program Technologies
- “Information Rich” Cockpits
- Transformation of Information into Intelligence
  - Decision support tools
- Air Traffic Controller and Pilot involvement in front-end system requirements/design
- Pilots and Controllers as “customers” of systems

System Performance

- Measures of Performance (MOPs)
  - RAM
  - Capacity (Delay)
  - Rates of Return on Investment
- Age of NAS equipment
- New Technologies
  - GPS, Data Link, ADS-B
  - CTAS, CASA, LLWAS, ITWS, LVLASO, TAPS
- Need for comprehensive NAS/Airport assessment and more effective reporting of performance

Conclusions

- NAS
  - Implementation NAS architecture will lead to harmonization of current system
  - Implementation of Free-flight will cause system to evolve into more effective *interactive airspace management*
- Regional ATC-airspace enhancement initiatives will be funded and supported by regional users
  - NASA's Terminal Area Productivity System (TAPS)
  - Integrated Terminal Weather system (ITWS)
  - Airports assume lead role in planning and funding

Conclusions (Cont'd)

- Pilots and Controllers will become the "Customers" of R&D initiatives
  - Goal to transform "information-rich" environment into an intelligence-based system
  - Decision support tools and effective situational awareness systems to aid user
- Air Transport Industry will continue to evolve from "global alliances" to global "seamless service" corporations
- Airports will assume the role of on-ground customer service provider
  - Assume roles no longer core businesses of FAA or Air Carriers
  - Ensure effective development of Economic Asset