

**NEXTOR** Annual Research Symposium

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Session III  
Issues for the Future of ATM

AATT Future Concepts Definition  
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# **AATT Future Concepts: Baseline Definition**

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# Proliferation of Operational Concepts

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- **1996 (Prior)**
    - **RTCA Task Force 3**
    - **NAS Architecture (v. 2.0)**
    - **Free Flight Action Plan**
  
  - **1997 (During)**
    - **FAA Operational Concepts (2005) (draft)**
    - **RTCA Select Committee Users Evolutionary Operational Concepts (2005) (draft)**
    - **NAS Architecture (v. 3.0) (draft)**
    - **“Flight 2000” Operational Concepts**
    - **European Ops Concept**
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# Objective and Approach

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- **Develop a baseline operational concept to help guide ATM and airport research priorities over the medium and long term.**
  - **Three-pronged approach:**
    - **Review existing proposed operational concepts**
    - **Develop a set of “first principles” to guide concept development**
    - **Survey stakeholders on perceived needs**
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# First-Principle Observations

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- **The goal of a new concept of operations is to improve the Capacity and Efficiency of the NAS while maintaining or improving Safety**
  - **The ATM system will transition through series of evolutionary steps**
  - **Management and responsibility for air traffic will remain a ground based function for the foreseeable future**
  - **The system and Con Ops must be capable of operating in degraded modes or in off-design conditions**
  - **Ground based ATM must become more efficient**
  - **Terminal area is key constraint in CONUS**
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## First-Principle Observations (2)

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- **Inefficiency often results from complex interacting processes and constraints**
    - **Dynamics of current NAS not well understood**
    - **Need diagnostic studies to ID constraints (e.g., Departure Planner Project)**
  - **Airspace and procedure design are a principal mechanism to improve efficiency. New technology should allow relaxation of airspace design constraints**
  - **Historical precedents indicate it will be very difficult to reduce separation standards**
  - **Safety and environmental issues will restrict transition to new Con Ops**
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## Stakeholder Needs - The Boeing Study -

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- Focused interviews
    - System users
      - Air Transport Association (ATA)
      - Regional Airline Association (RAA)
      - National Business Aviation Association (NBAA)
      - General Aviation Manufacturers Association (GAMA)
      - Aircraft Owners and Pilots Association (AOPA)
      - Helicopter Association International (HAI)
      - Department of Defense (DoD)
    - Service providers
      - Federal Aviation Administration (FAA)
      - Airports Council International - North America (ACI-NA)
      - Department of Defense (DoD)
    - Labor organizations
      - Air Line Pilots Association (ALPA)
      - National Air Traffic Controllers Association (NATCA)
    - Professional organizations
      - Airline Dispatchers Federation (ADF)
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## Capacity vs Efficiency

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- **Most inefficiencies (e.g., delays, miles-in-trail spacing) are caused by capacity constraints**
  - **Efficiency-based strategies tend to focus on user-specific cost- benefits which are difficult to support as a basis for national infrastructure investment**
  - **Capacity based strategies have benefits which are clearly accrued by the traveling public as well as distributed among the user community enabling improved operational efficiency**
  - **Conclusion: Capacity should be the key driver in NAS modernization**
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## Stakeholder Needs - The Boeing Study -

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- Results
    - Capacity
      - Terminal area
      - Airline scheduling practices
      - More runways
      - Requirements for separation standards
      - Wake vortex separation standards
    - Efficiency
      - Collaborative decision making
      - Exchange of real time information
      - Automation tools for air traffic controller productivity
      - Airspace redesign
      - Exchange of same weather information
      - Surface guidance
    - Safety
      - Human factors research
      - Surveillance and communication in low altitude
      - Cockpit display of traffic information
      - Icing
      - Exchange of same weather information
      - Surface guidance
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## Stakeholder Needs - The Boeing Study -

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- Results (cont.)
    - Affordability
      - Cost transfer to users
      - Global interoperability
    - Procedures
      - Development of new TERPS criteria
      - New procedures for existing technology
      - New procedures for new technology
    - Access
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# Overall Observations

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- **FAA Operational Concept (2005) is reasonable baseline**
  - **Treat Operational Concept 2005 as the baseline and ID refinements and issues**
  - **Consider 2005-2015 evolution**
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## Operational Concept 2005 Refinements & Issues

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- Capacity considerations (e.g., airspace design)
  - Implications/content of “Flight Object”
  - Other-than-normal operations
    - Emergencies
    - Communications failure
    - “Flight Object” data integrity
    - Secondary navigation
  - Role of decision aids
  - Transition plan/issues
  - Incentivization
  - Mixed equipage
  - Implications for architecture
  - Role of “Flight 2000” ?
  - Compatibility with ICAO
  - International interoperability
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