Cyber – Physical Systems in the NextGen Environment

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Eight primary focus areas in NextGen

NextGen operational vision calls for information sharing and collaboration across domains

Shared data will include aircraft, airport, airspace, safety, security, and weather

Net-Centric Operations will be the critical foundation for NextGen
NextGen’s Info Sharing Challenge

- Systems & Network interoperability
- Culture change for operational staff
- Inter-agency policies are not aligned
- International harmonization
**NextGen Capabilities / Concepts**

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<th>Concept</th>
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<td>Balanced Airspace and Airport Demand</td>
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<td>Collaborative Flow Contingency Management</td>
<td>Strategic Flow Management</td>
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<td>Flexible Separation Management</td>
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<td>Effective Information Sharing Environment</td>
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<td>Integrated Regulatory and Risk Management</td>
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<td>Flexible Airport Facility &amp; Surface Operations</td>
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**NextGen: The future aviation system is viewed as a complex and evolving ecosystem of operators, policies & procedures, and technical enablers.**
CPS Challenges in a NextGen Environment

- **Legacy ATC/ATM Automation Systems**
  - Civil, Military
  - Flow, Terminal, EnRoute

- **Future Aircraft & Flight decks**
  - 787 Dreamliner, Very Light Jets, UAVs, Commercial Spacecraft
  - Electronic Flight Bag
  - Health & Safety Management Systems

- **Information, Communications, & Visualization**
  - Surface Management, Cockpit Display Traffic Information

- **Manned vs. Autonomous Vehicles**
  - Sense & Avoid, TCAS

*Evolving micro and macro concepts for day-to-day operations and for major system perturbations*
**Summary**

- NextGen is large, complex, evolving ecosystem
- Safety, Security, and Reliability will be designed into the architecture (end-to-end)
- Shifting the decision making to a shared Command & Control environment (Air/Ground)
- Exploiting cyber-physical systems development will support NextGen goals for the U.S. and globally