

**Government/Industry**

# **NGATS CNS Test Bed**

Proving Next Generation  
Technical Feasibility &  
Operational Viability  
in a Real World Environment

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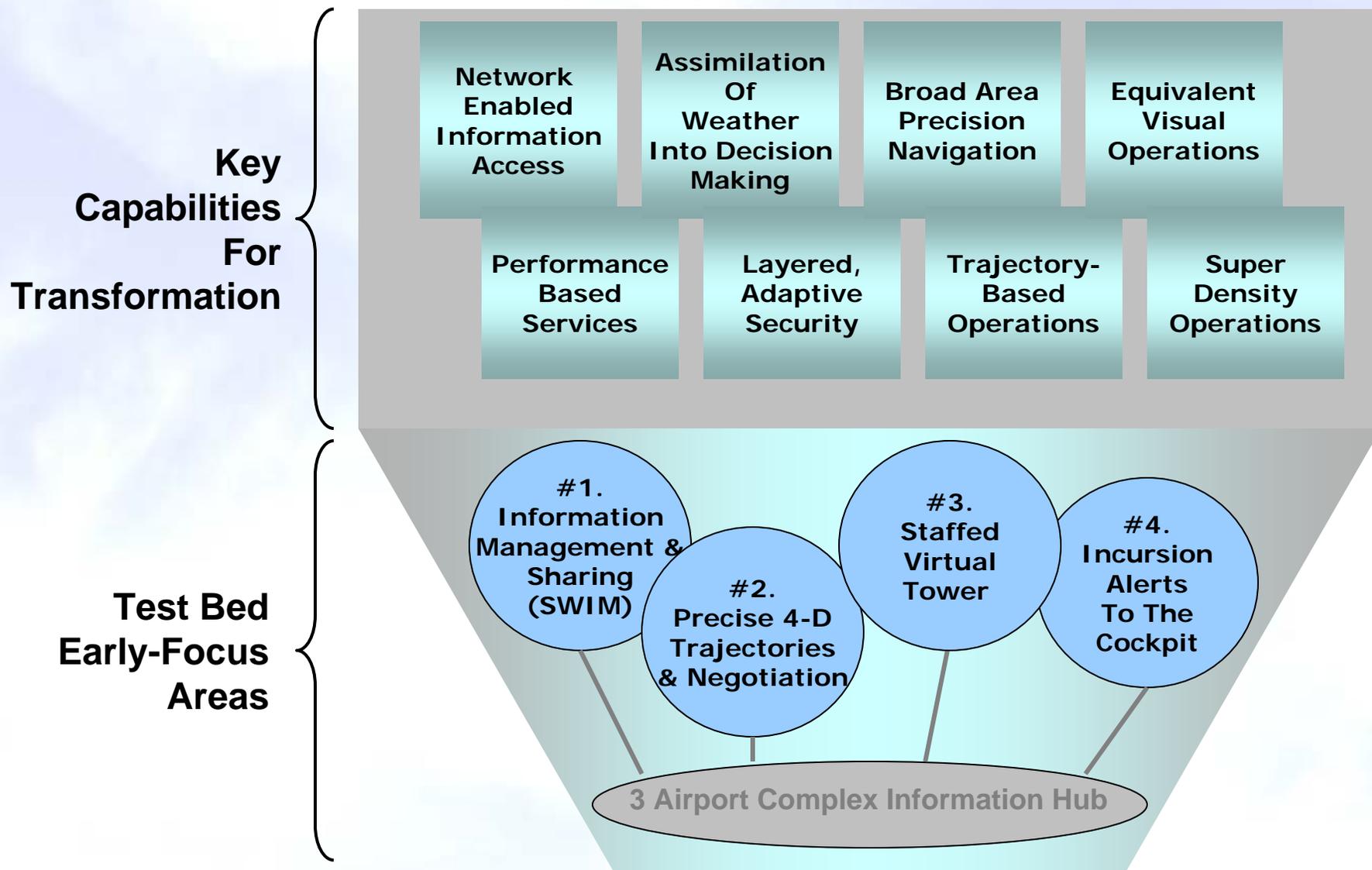
*Detect the Difference*

# Motivation for NGATS CNS Test Bed

- **Validate NGATS concepts, technologies, policies and procedures in a real, operational environment**
- **Quantify stakeholder benefits to support business cases (e.g., ADS-B, SWIM investments)**
- **Continue the airport wireless network research efforts that were initiated under the ACAST program.**



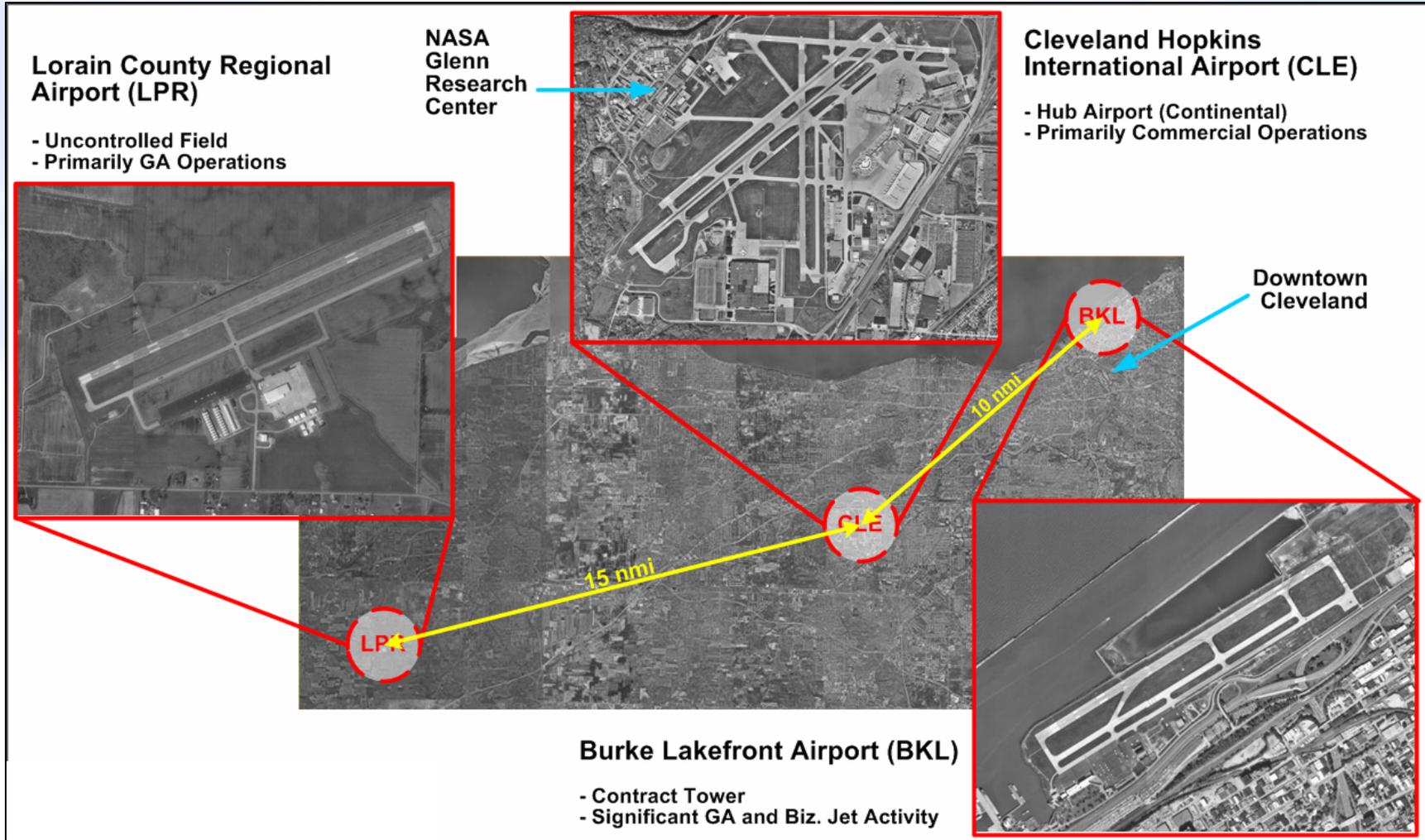
# NGATS Test Bed Designed to Fully Support JPDO



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# NGATS CNS Test Bed: A National Asset

*Real World Environment For Proving  
Technical Feasibility And Operational Viability*



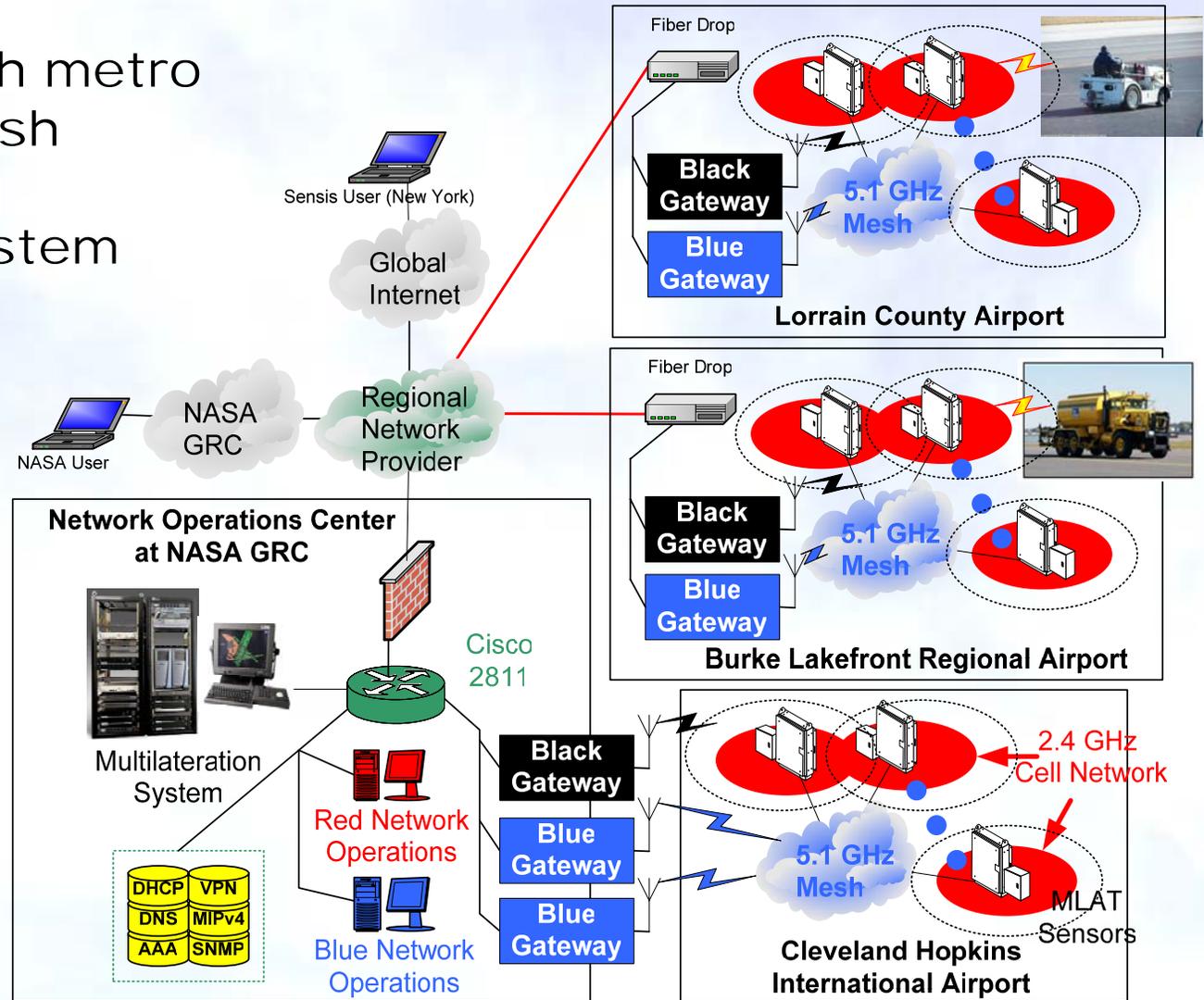
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# Testbed Communication Infrastructure

Three airports with metro scale wireless mesh infrastructure for multilateration system backhaul

Network Operations Center at NASA Glenn

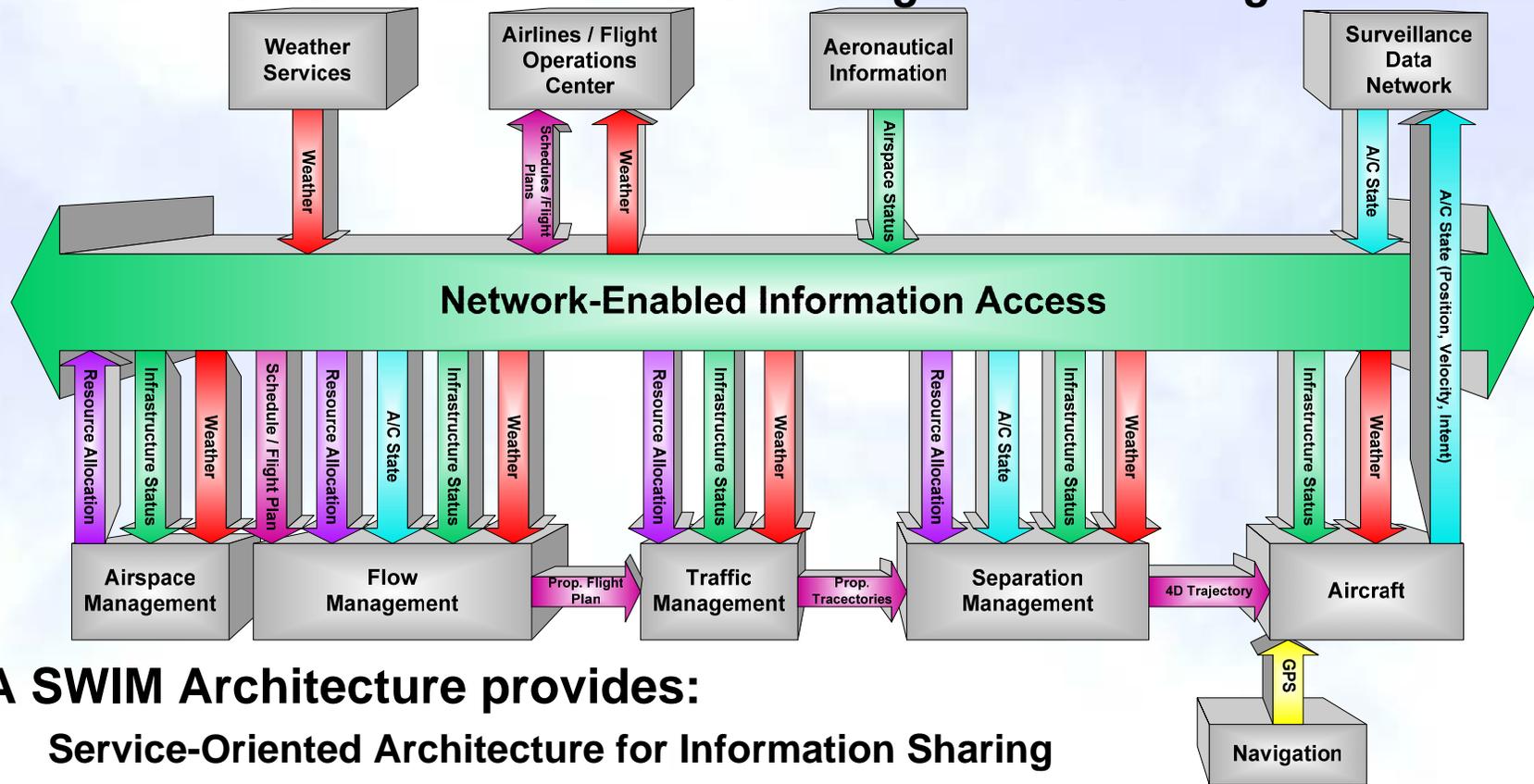
Access network for mobile assets planned



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# Enabling the NGATS Transformation

## Focus Area 1 – Information Management & Sharing

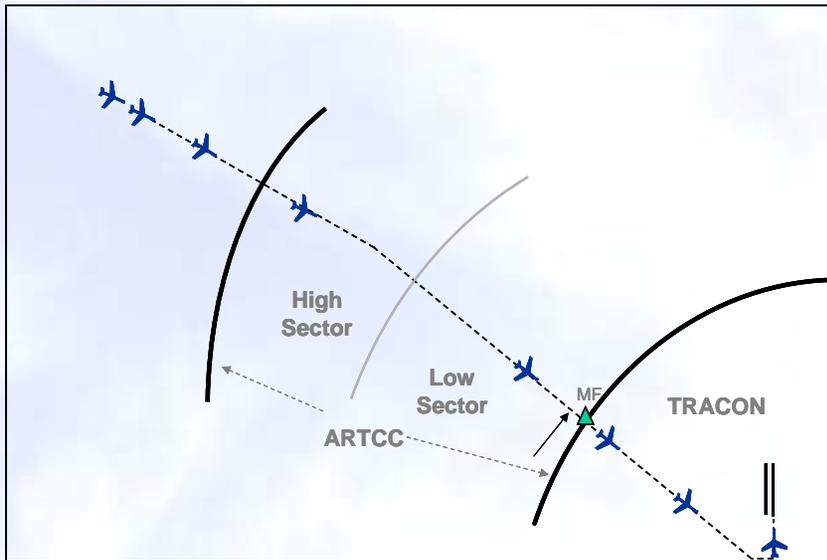


### A SWIM Architecture provides:

- Service-Oriented Architecture for Information Sharing
- Role-based access control
- Weather, Flight Data, Aeronautical, & Surveillance Information Management
- Network-Enabled Air Traffic Management
- Collaborative Decision Support
- Standardized Information Interface

# Enabling the NGATS Transformation

## Focus Area 2 – Precision 4D Trajectories & Negotiation

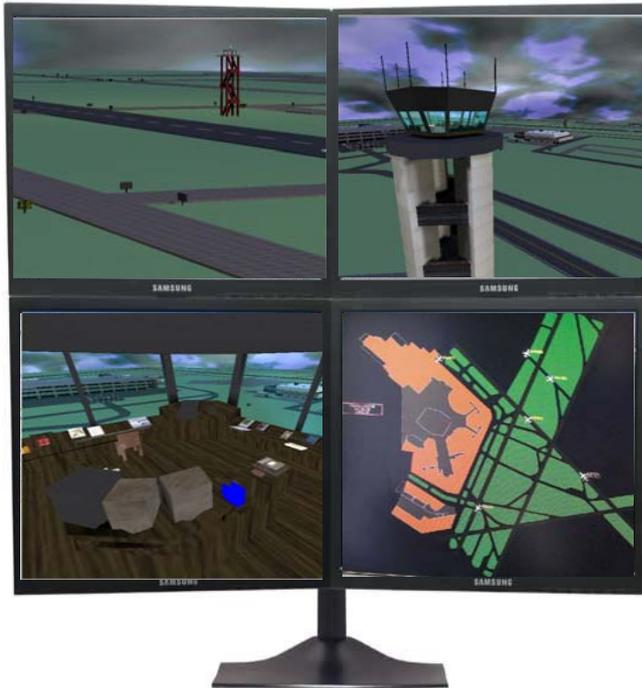


- **Integrated air & ground automation**
  - Two-way trajectory negotiation exploiting 4D capable avionics
  - Fuel and time efficient approach profiles
  - 4DT-prioritized operational procedures

- **Determine operational viability of 4DT negotiation**
  - Identify complexity of required automation
  - Explore alternatives
  - Identify airborne and ground human-automation & automation-automation interface issues
- **Assess trajectory accuracies (impact on separation standards)**
- **Evaluate airline prioritized services (based on 4D equipage)**

# Enabling the NGATS Transformation

## Focus Area 3 – Staffed Virtual Tower

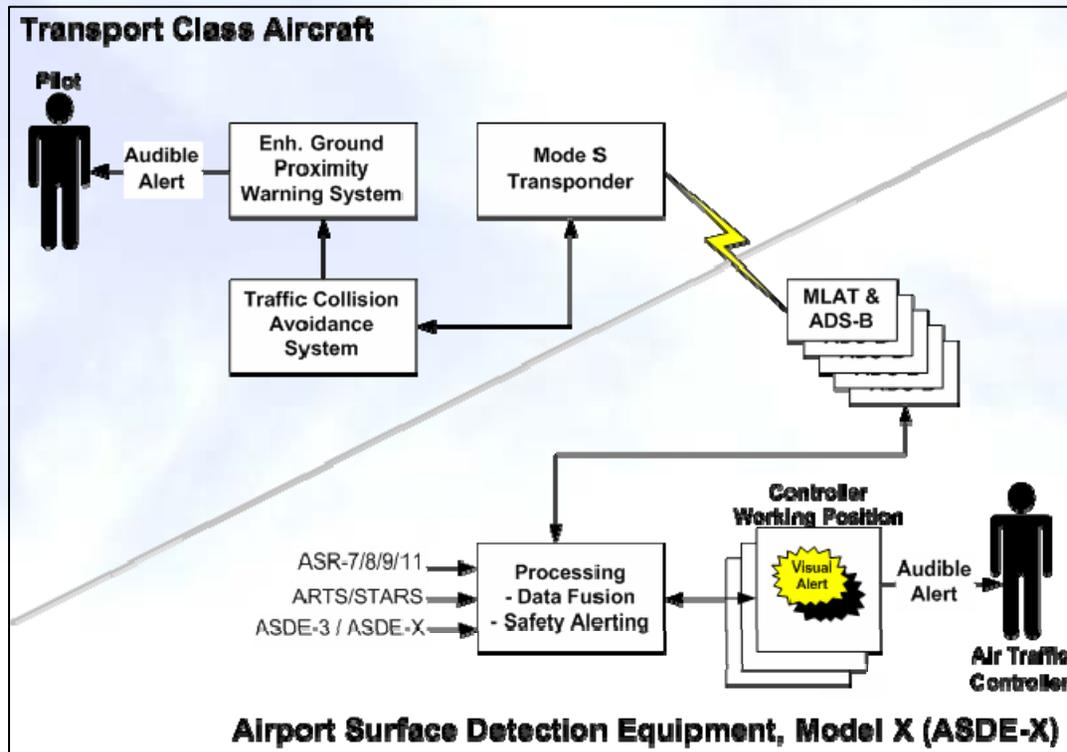


- **Geographically independent display of airport surface and local airspace**
- **Multiple perspectives of airport & airspace**
- **Enabled by surveillance data network (ADS-B, MLAT) in SWIM infrastructure**

- **Exploit technologies to remove dependency on physical tower.**
  - Full array of surveillance technologies
  - State of the art display technologies
- **Evaluate operational viability of virtual tower:**
  - Geographically separated situational awareness
  - In adverse weather conditions
  - Controlling multiple airports from one location
  - Enhanced awareness for obstructed areas

# Enabling the NGATS Transformation

## Focus Area 4 – Runway Incursion Alerts Direct to Cockpit

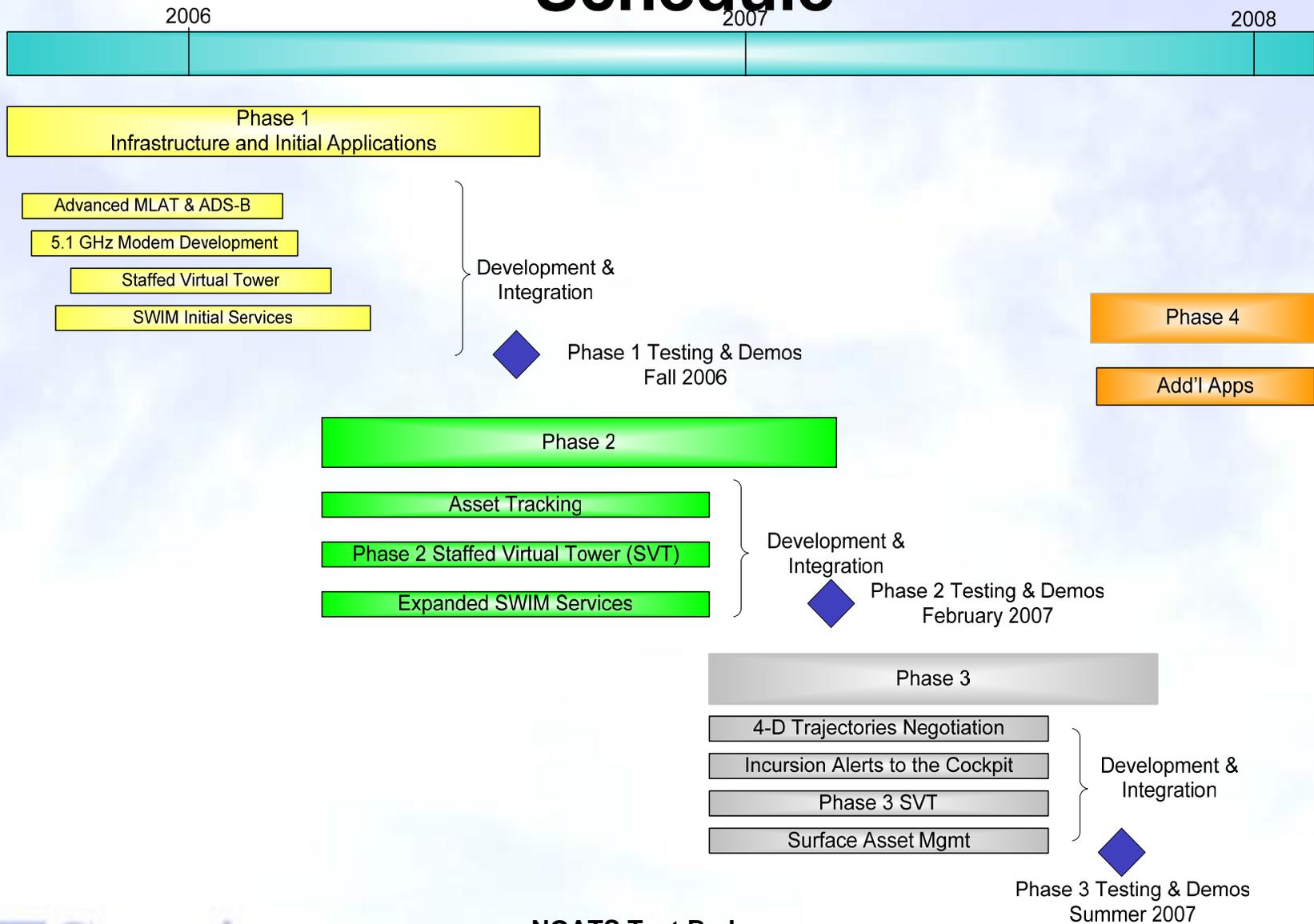


Evaluate effectiveness of simultaneous alerts to ATC and flight deck

- Operational viability
- Alerting technology (trade offs)
- Impact on existing automation systems
- Certification pathway

- Accurate detection of runway incursions
- Timely alerts to pilots and controllers
- Avionics and ground system impacts

# Phased, Multi Year Testbed Program Schedule



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# **Workshop A1 : NGATS CNS Test Bed**

**Questions and further discussion**

**Thank you**