System Engineering Challenges & Opportunities in Delivering NextGen Capabilities

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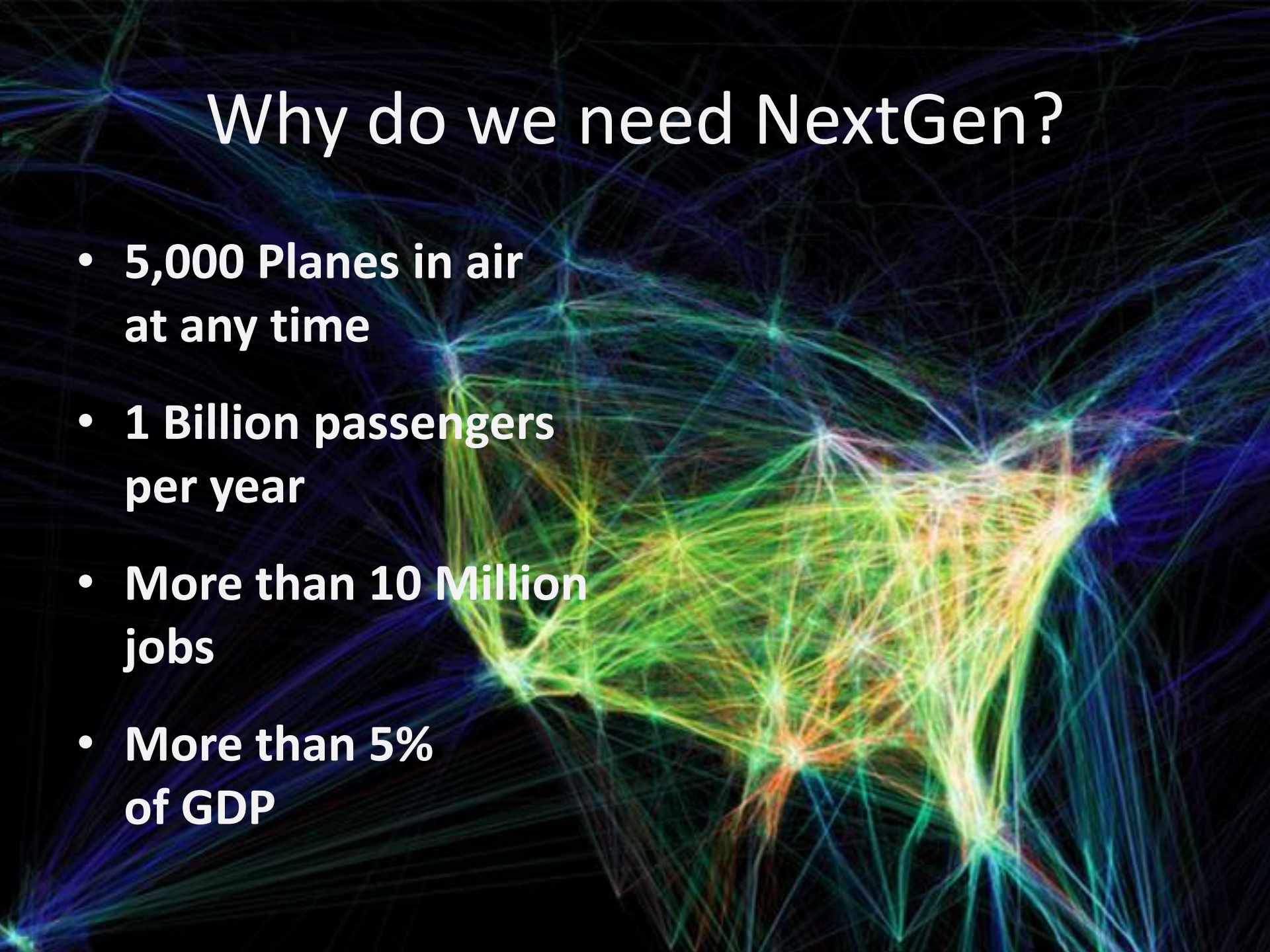
Why do we need NextGen?

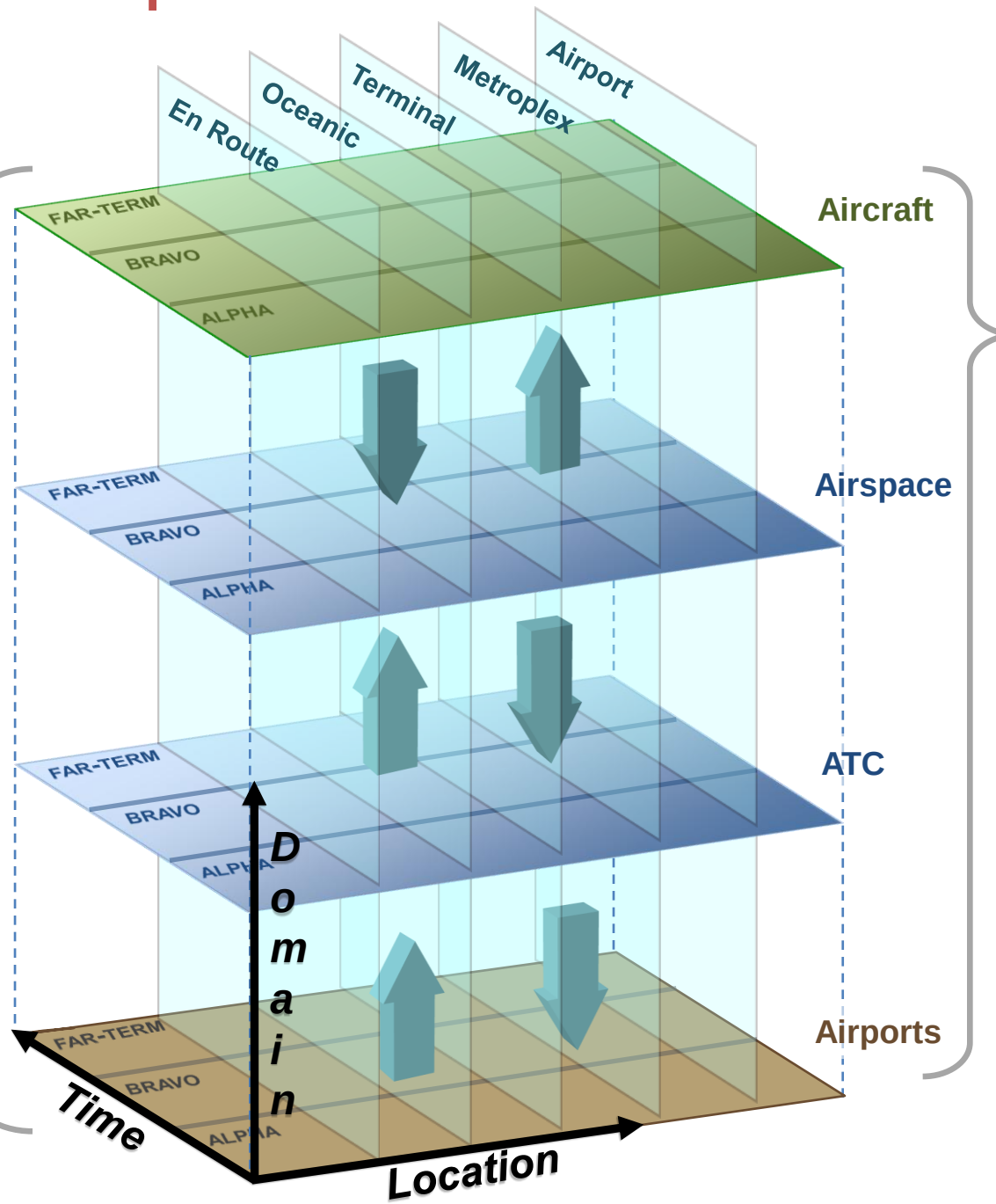


- **5,000 Planes in air at any time**
- **1 Billion passengers per year**
- **More than 10 Million jobs**
- **More than 5% of GDP**

NextGen – A Transformation

Today's National Airspace System		NextGen
Ground-based Navigation and Surveillance	→	Satellite-based Navigation and Surveillance
Air Traffic Control Communications By Voice	→	Routine Information Sent Digitally
Disconnected Information Systems	→	Information More Readily Accessible
Cognitive-Based Air Traffic "Control"	→	Decision Support Tools
Fragmented Weather Forecasting	→	Forecasts Embedded into Decisions
Airport Operations Limited By Visibility Conditions	→	Operations Continue Into Lower Visibility Conditions
Forensic Safety Systems	→	Prognostic Safety Systems
Focus on major airports	→	Focus on metropolitan areas
Inefficient routes & fuel consumption	→	Shorter flight paths/ fuel saving procedures; alternative fuels; reduced noise

NextGen Operations Focused on Phase of Flight



Cross-Cutting Factors

- Environmental
- Safety
- Information Security
- Economic
- International
- Regulation

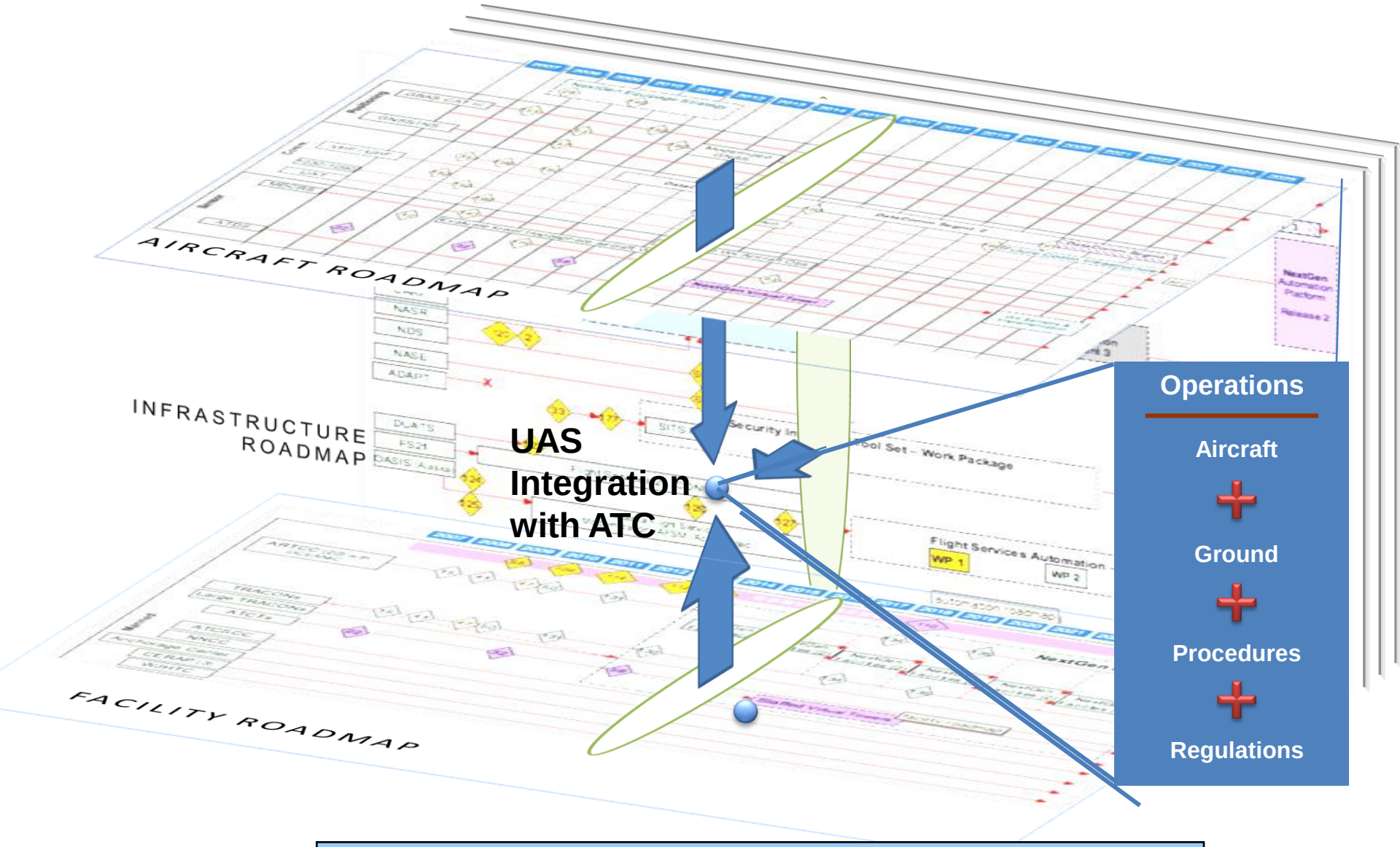
Enablers

- People
- Procedures
- Technology
- Data/Information
- Policy

Legend:

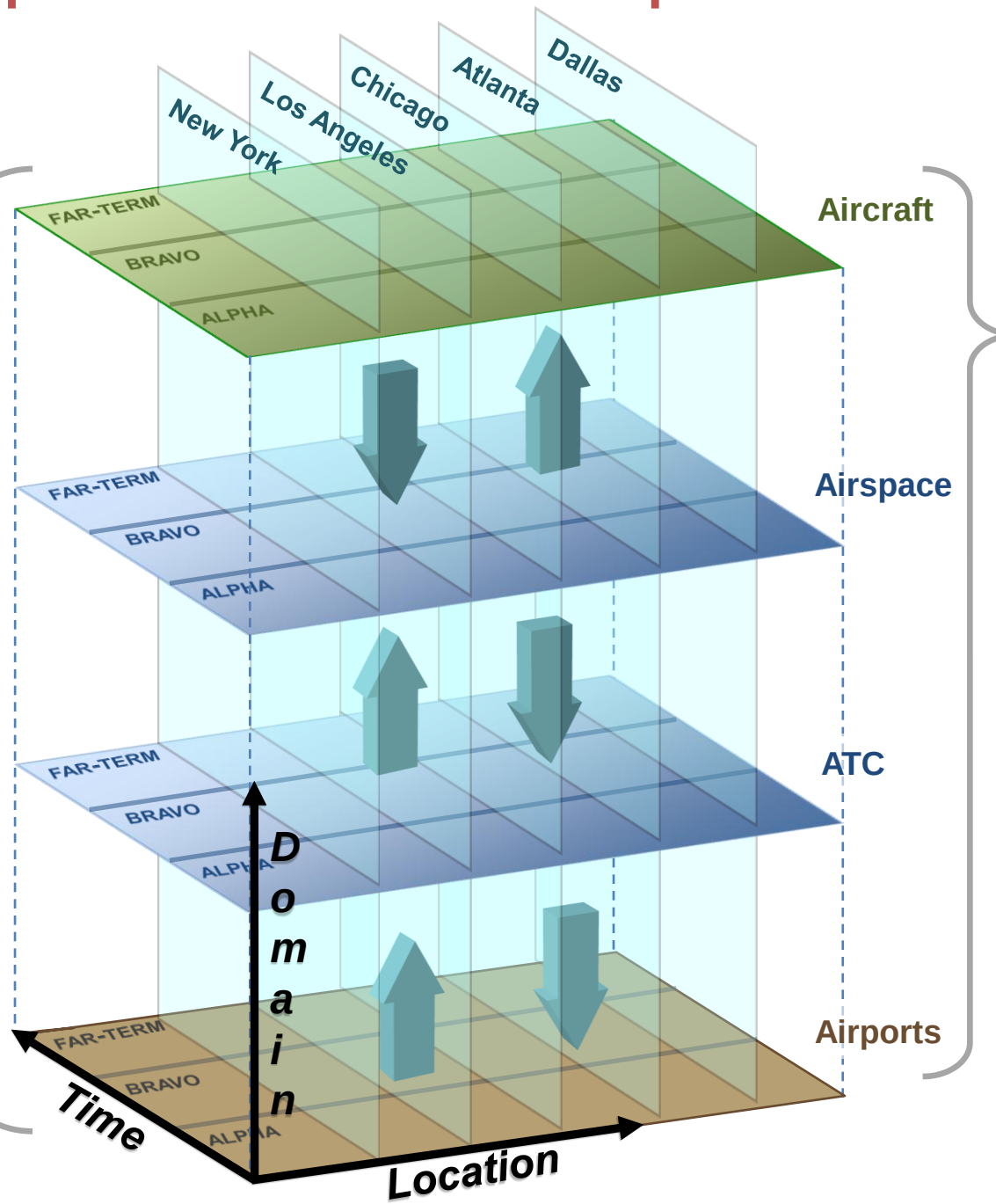
- Private Sector
- FAA (USG)
- Local entities

Complexity of Achieving Stakeholder Synergies



Right place, right time, right abilities!

NextGen Operations Focused on Operational Locations



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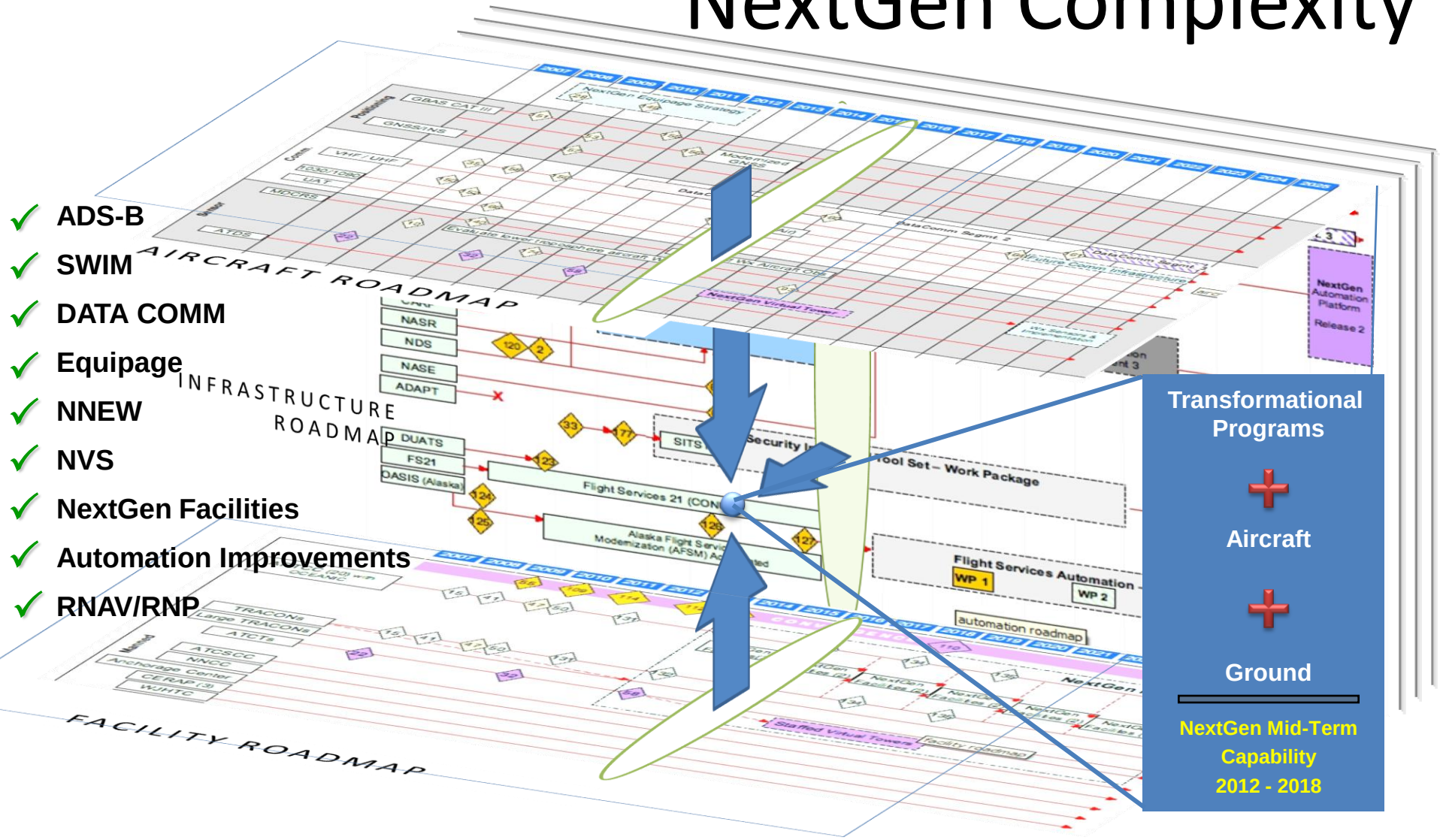
NextGen Complexity

- ✓ ADS-B
- ✓ SWIM
- ✓ DATA COMM
- ✓ Equipage
- ✓ NNEW
- ✓ NVS
- ✓ NextGen Facilities
- ✓ Automation Improvements
- ✓ RNAV/RNP



Just like real estate – It's all about integration, integration, integration!

Questions?

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For more details visit www.faa.gov/nextgen