



Boeing Technology  
Phantom Works

Phantom

# Air Traffic Management

## George Mason University Briefing

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# Airspace Transformation II

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## National Airspace System (NAS)

1950's

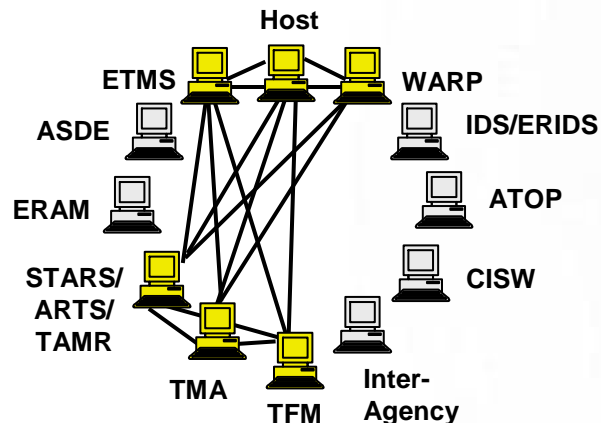
Drivers:

Safety

Defense



**Control by Radar**



Traffic Growth

Scalability  
Limit

## Next Generation Air Traffic System (NGATS)

2010's

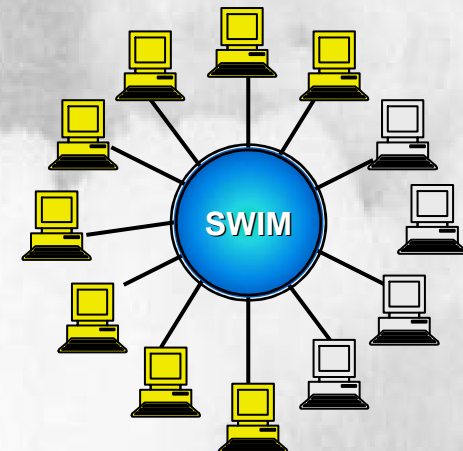
Drivers:

Capacity

Security



**Management by Trajectory**



# Transformation vision

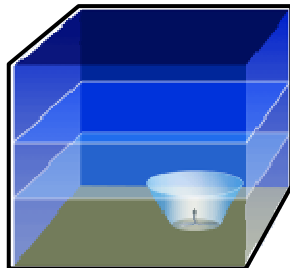
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**Capacity,  
with safety & efficiency**



4-D trajectory-based management

**Simplified airspace design**



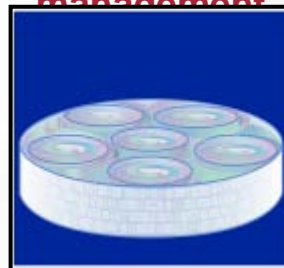
**Flexibility,  
with security & economy**

**Precision flight  
anywhere**



Satellite-enhanced CNS

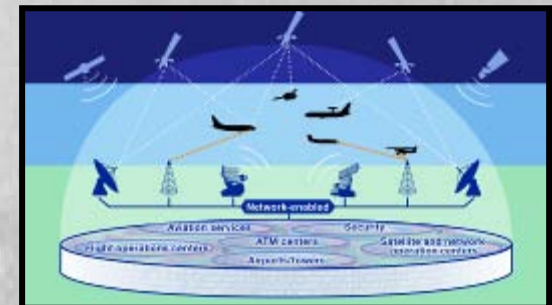
**System wide information  
management**



**Precision common  
awareness**

## Benefits

- \$10-30B/yr global savings
- Economic stimulus
- Threat deterrence
- Accident reduction
- **Global interoperability**



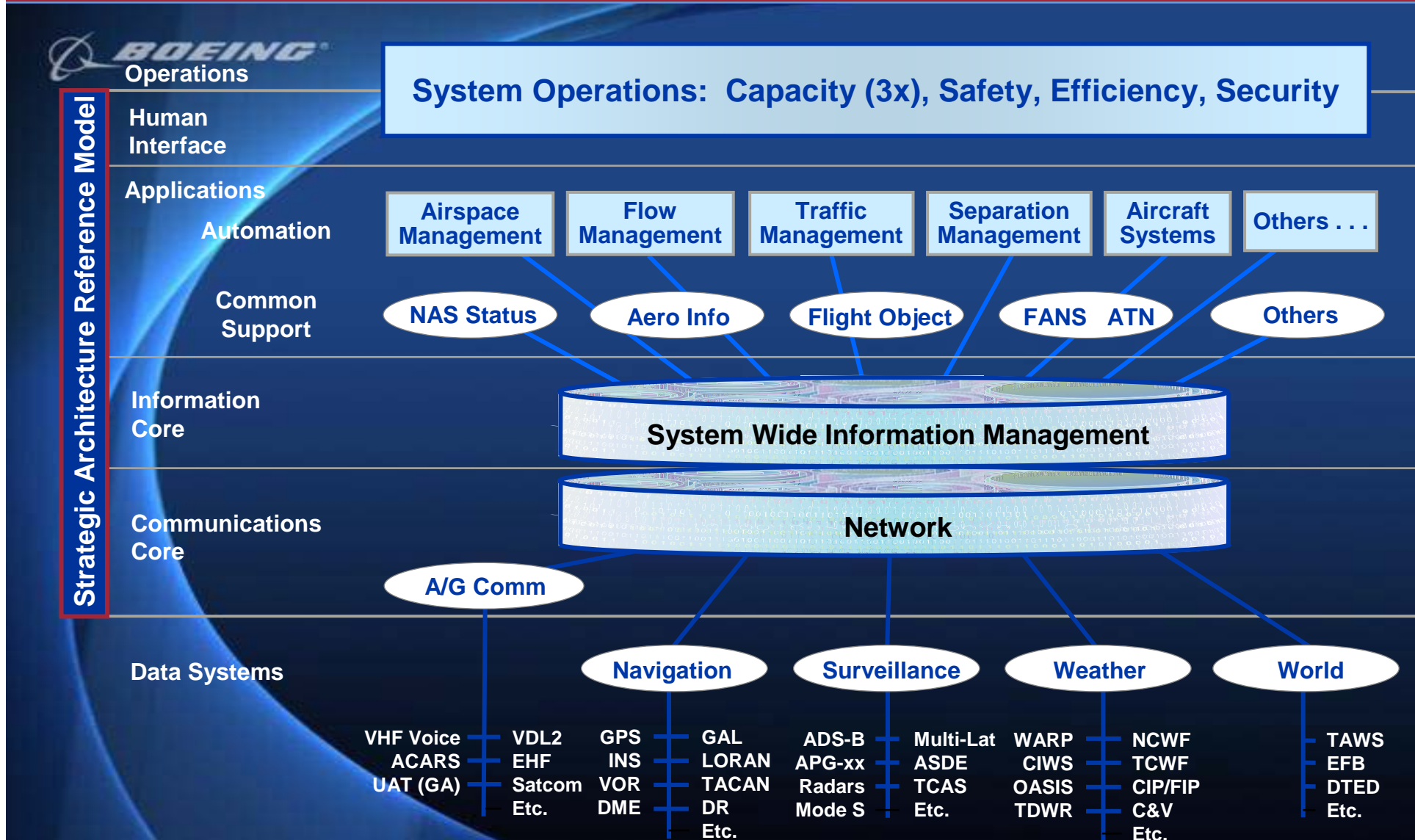
Network-enabled ATM

## Integrated systems

- Operations
- Evolution
- Growth

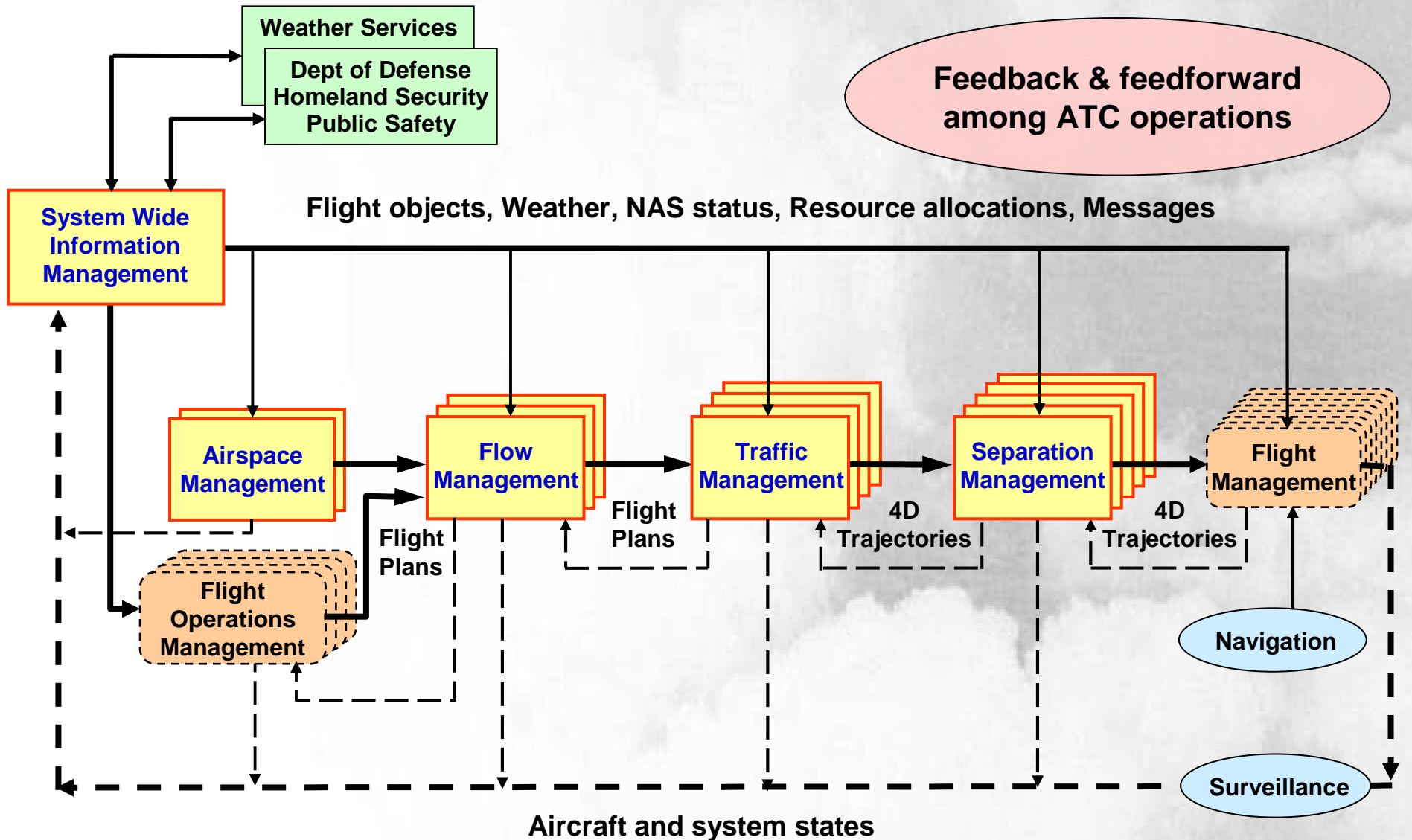
# Performance-based Operations Framework

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# SWIM Closes the Loop in ATC

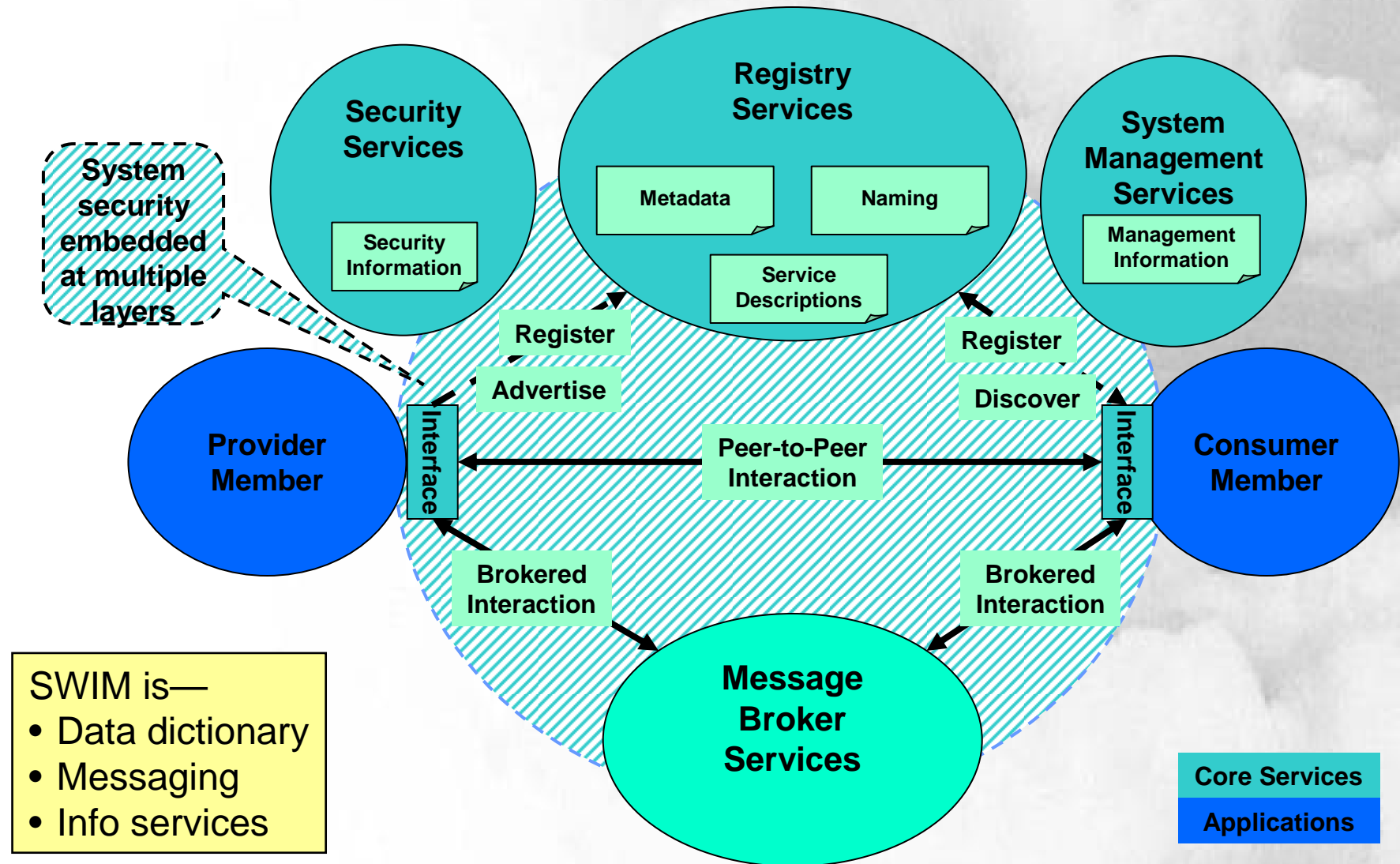
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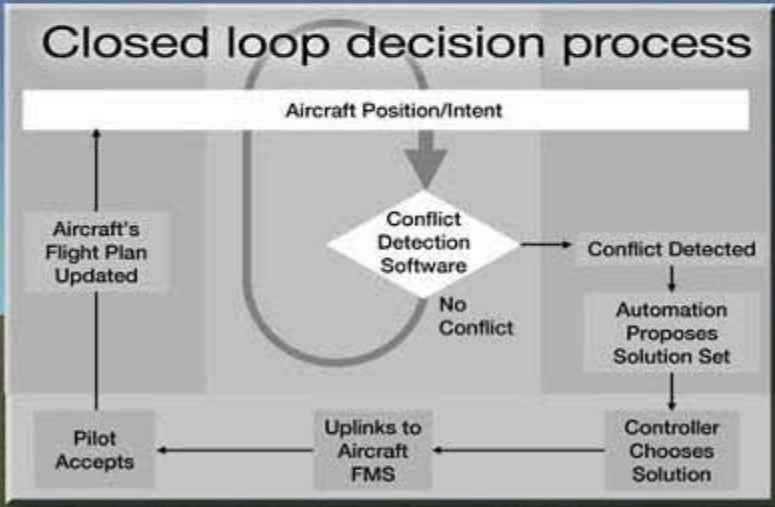


# SWIM Functional View (Core Services)

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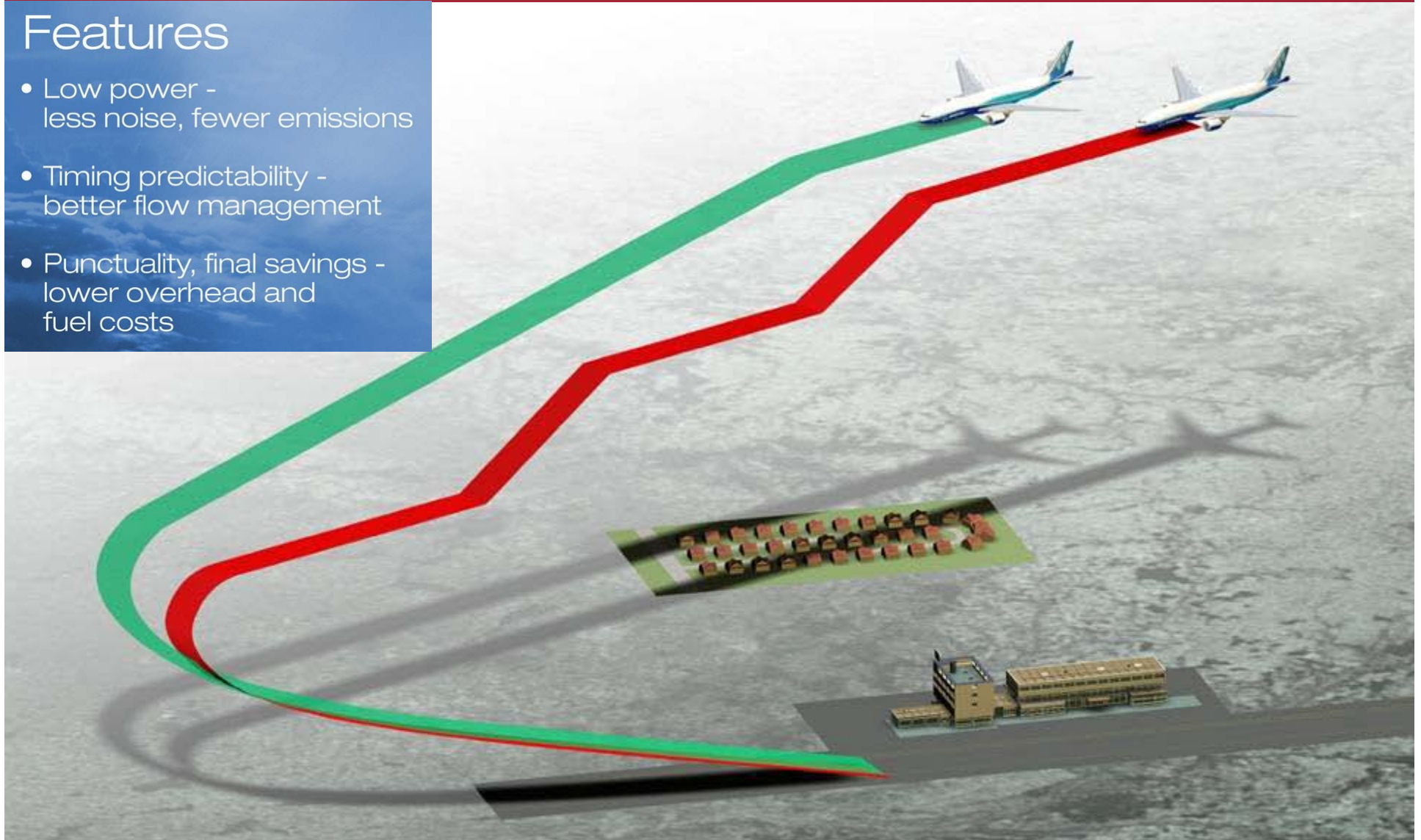


# Continuous Descent Approaches

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## Features

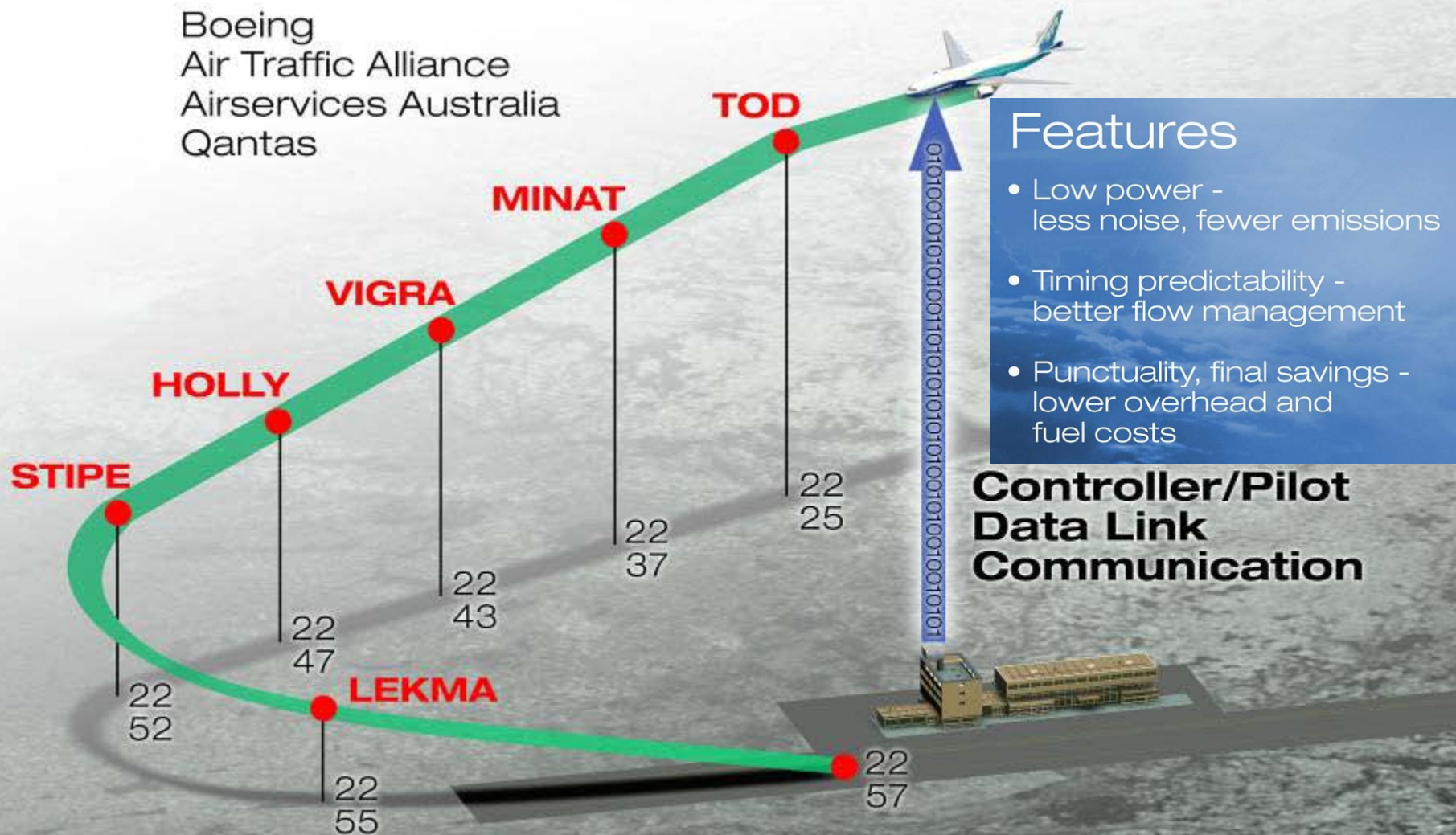
- Low power - less noise, fewer emissions
- Timing predictability - better flow management
- Punctuality, final savings - lower overhead and fuel costs





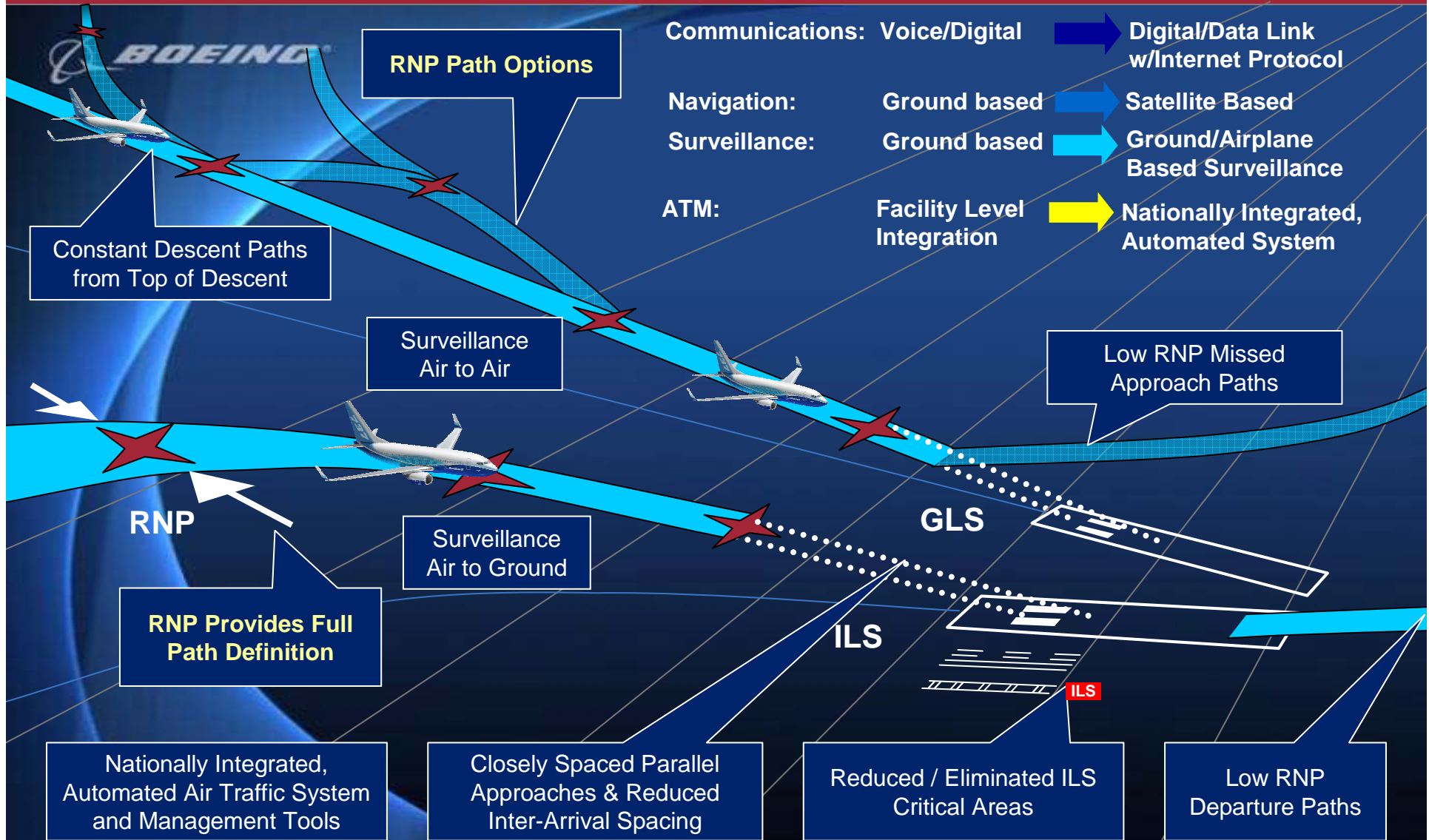
# Tailored Arrivals

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# Terminal Area Airspace Operations

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# What Is NCO?

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***Network Centric Operations are system functions created by webs of swift information interconnections among physically disparate entities***

**Synchrony of detail** + **Geographic in scope** → **Coherence at large scale**  
Data, Information, Knowledge

**...yielding “emergent” behaviors that are transformational**

# SWIM and Network Enabled Operations

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