

# Opportunities from Evolving Technology

## Operations in an Info-Centric NAS

Presented to: Spring 2022 FPAW Meeting

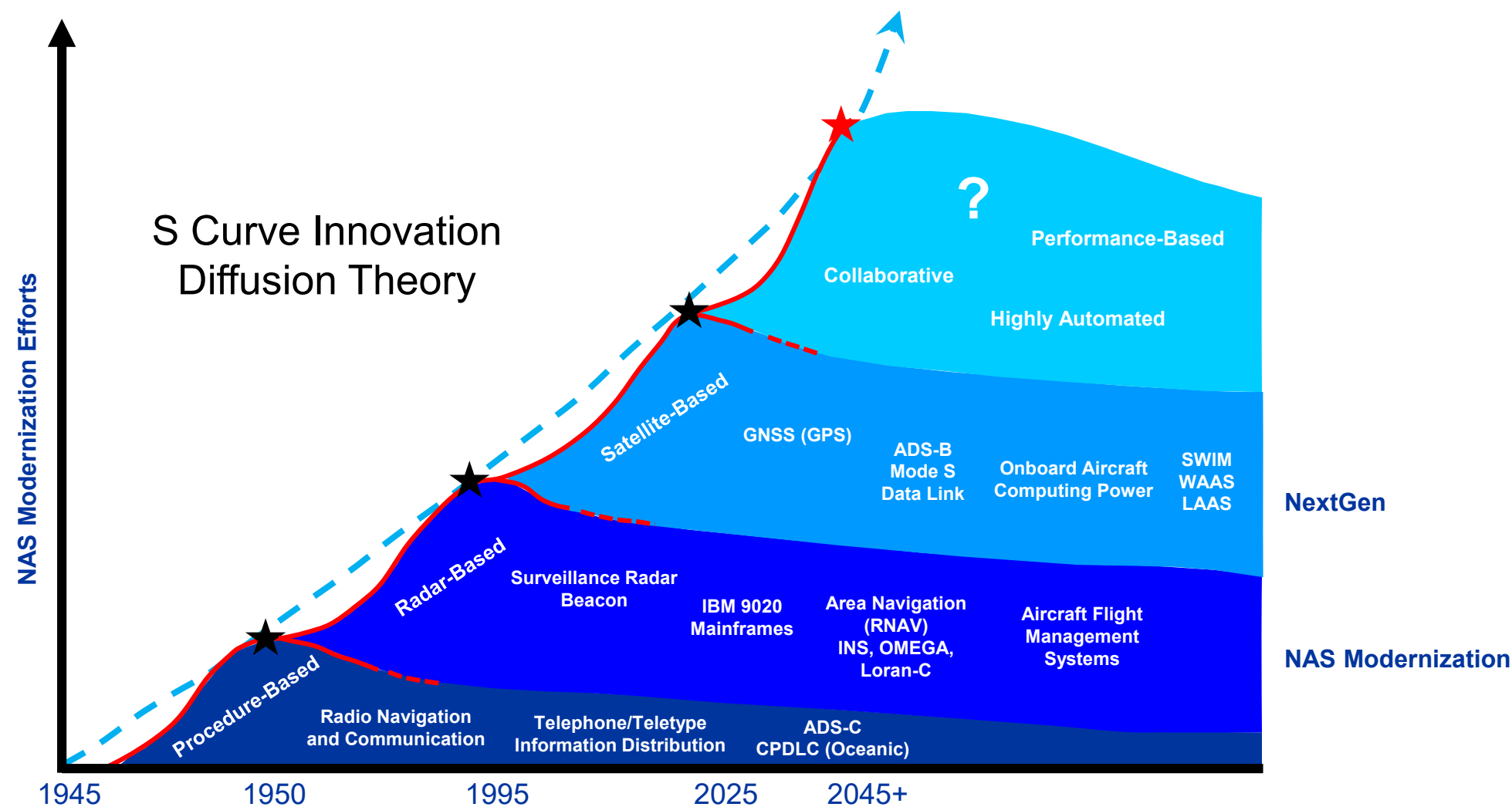
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Date: April 20, 2022

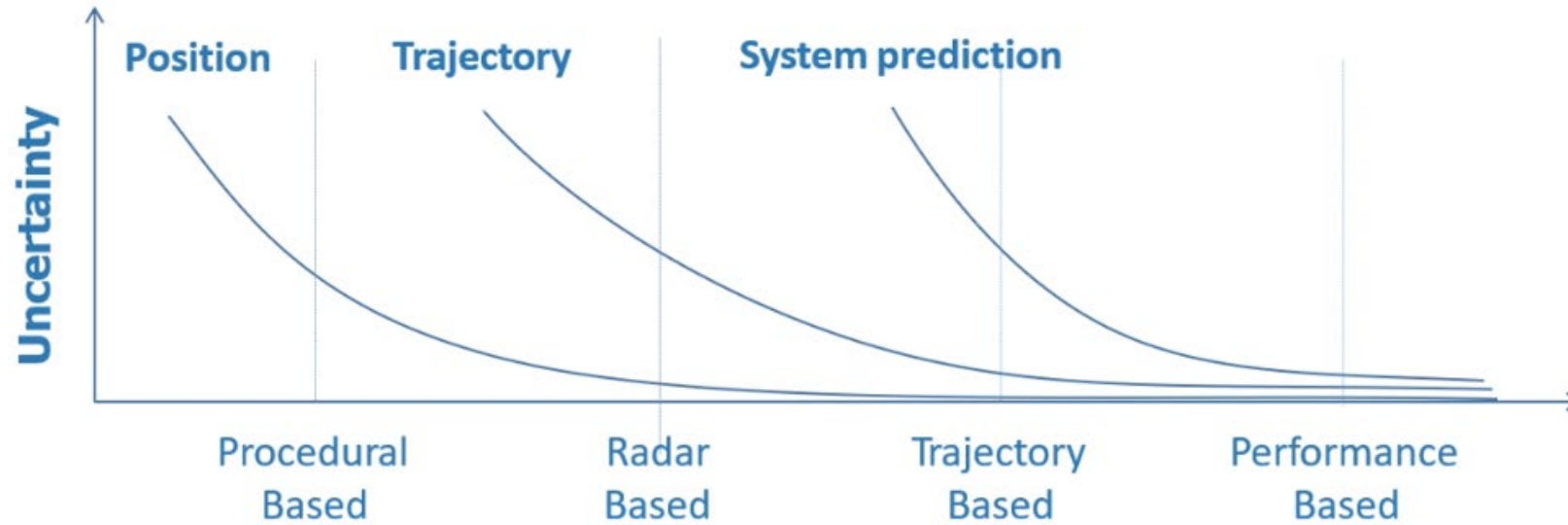


**Federal Aviation  
Administration**

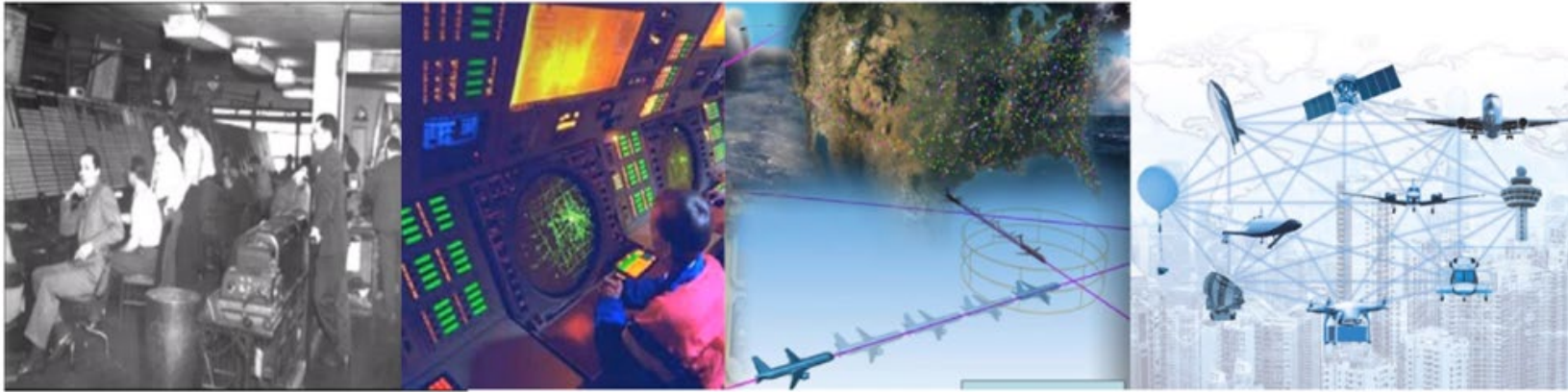
# What's the next epoch for aviation?



# Moving Towards Performance-Based



NextGEN



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Administration

## We know:

State & Intent, Constraints, Performance, Uncertainty

Avoid the guesswork → real-time data analytics

## Fully Integrated Information Regime

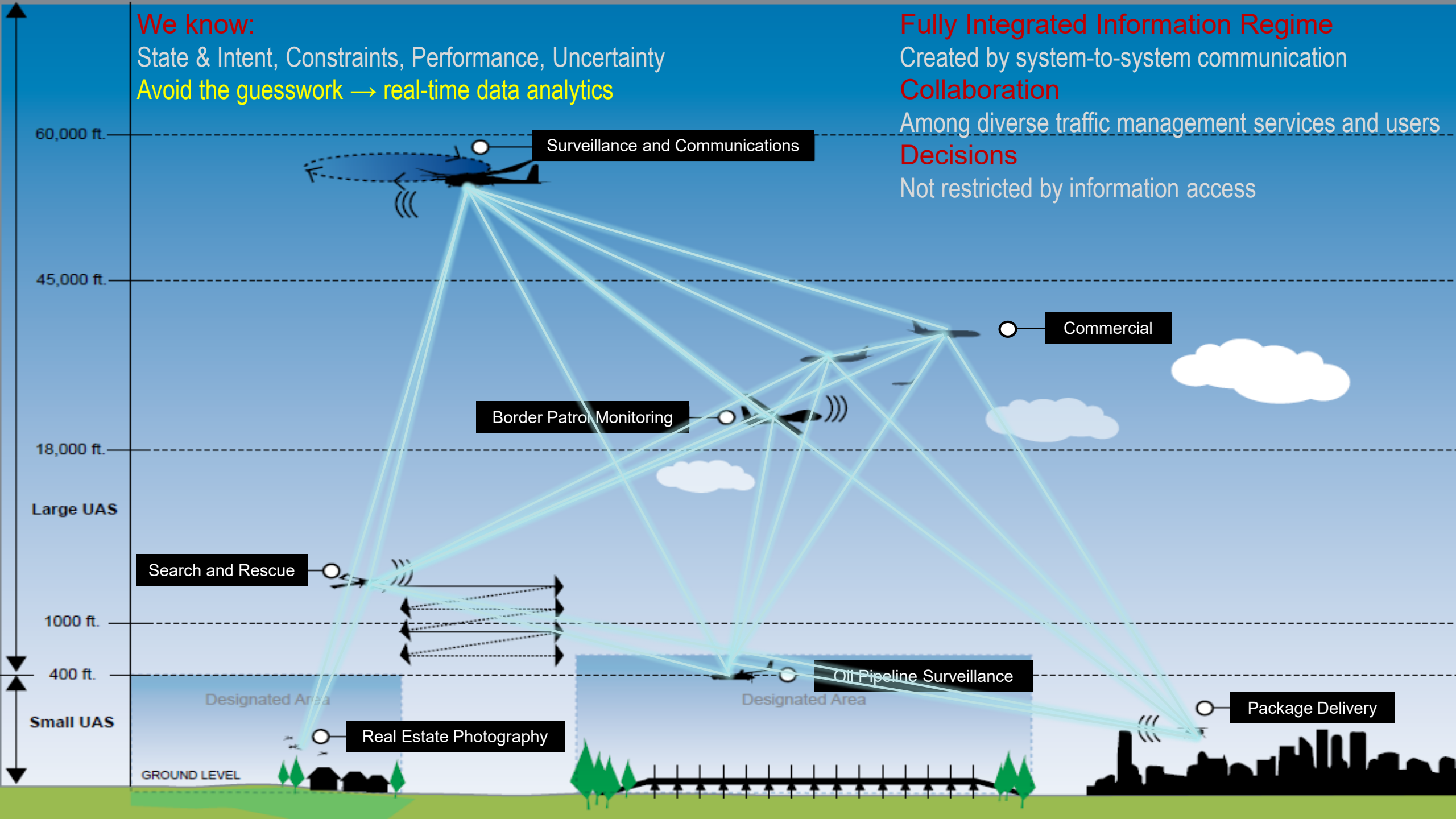
Created by system-to-system communication

### Collaboration

Among diverse traffic management services and users

### Decisions

Not restricted by information access



## Legacy System

Radar  
Inefficient Routes  
Voice Communications  
Disparate Information  
Fragmented Weather Forecasting  
Weather Restricted Visibility  
Nationwide Focus

## NextGen

Satellite  
Performance Based Navigation (fuel savings)  
Voice & Digital Communications  
Automated Decision Support Tools  
Integrated Weather Information  
Improved Access in Low Visibility  
Prognostic Safety Systems  
Focus on Congested Metroplexes



Implementation

TFDM

PBN

TBFM

ASIAs

AIM

NWP

Transformational

ADS-B

CATM-T

SWIM

CSS-Wx

DataComm

Foundational

En Route Automation  
Modernization

Terminal Automation  
Modernization and Replacement



## NextGen

Satellite

Performance Based Navigation (fuel savings)

Voice & Digital Communications

Automated Decision Support Tools

**Integrated Weather Information**

Improved Access in Low Visibility

Prognostic Safety Systems

Focus on Congested Metroplexes

## Future - Weather

Data Assimilation

New Observing Systems

Digital Communications

Connected Aircraft

Highly Automated

Higher Resolution

Temporal

Spatial



Implementation

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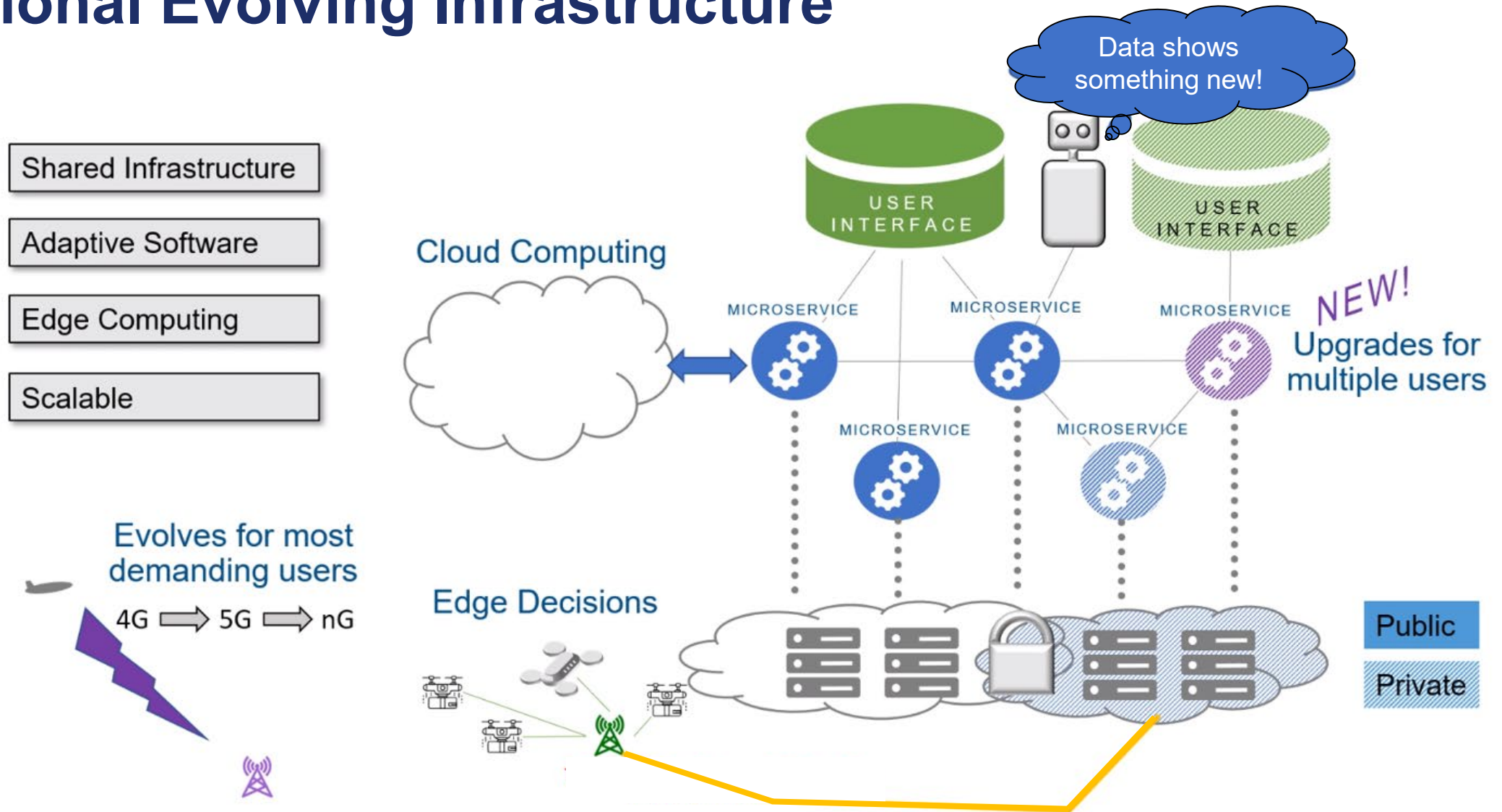
DataComm

Foundational

En Route Automation  
Modernization

Terminal Automation  
Modernization and Replacement

# Notional Evolving Infrastructure



# Notional Weather Support to Safety Risk Management



**CONTINUOUS  
DATA  
EXCHANGE**



**MACHINE  
LEARNING**



**AUTOMATED  
MONITORING**



**PROGNOSTIC  
RISK  
MODELING**



**ALERTING  
AND  
RESPONSE**



**Federal Aviation  
Administration**



# Opportunities for Collaboration

- Operations
  - xTM Community – provide weather services in places that currently does not exist
  - ATM Community – provide weather services – longer look ahead (supporting PBFM), greater fidelity (separation: Aircraft – Aircraft)
- Infrastructure
  - Innovation: Federated weather source(s), edge computing for now and forecasting based on local conditions and machine learning modeling, develop machine learn model for impact of weather on aircraft trajectories (e.g., icing map, turbulence map, etc.)
  - Infrastructure: Microservices, store, transport and delivery of weather on the cloud, connected aircraft as a weather sensor and receiver
  - Air-Ground data sharing
- Safety Management
  - Streaming weather data to support real-time monitoring

