

Accelerating an Information-Driven Aviation Ecosystem

Air Transportation Information Exchange Conference

Gregg Leone, Vice President and Director
Center for Advanced Aviation System Development

September 23, 2019

established
1958

not-for-profit

conflict-free
environment

science &
technology



Part of the ecosystem of federal research centers

**Our customers benefit from
our breadth of experience**



**Homeland
Security Systems
Engineering and
Development
Institute**

**National
Security
Engineering
Center**



**Judiciary
Engineering and
Modernization
Center**



**Center for
Advanced
Aviation System
Development**



**CMS
Alliance to
Modernize
Healthcare**

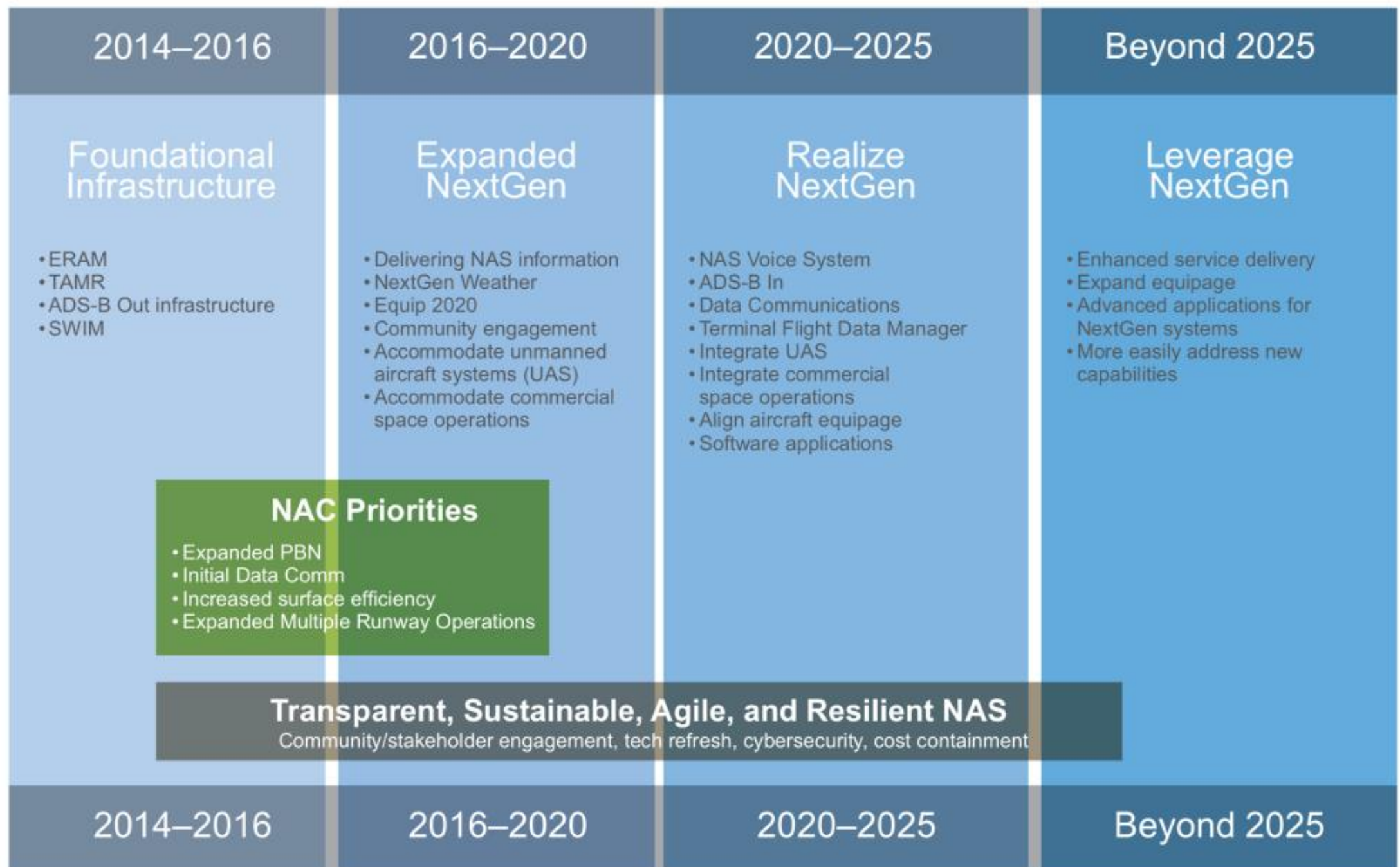


**Center for
Enterprise
Modernization**



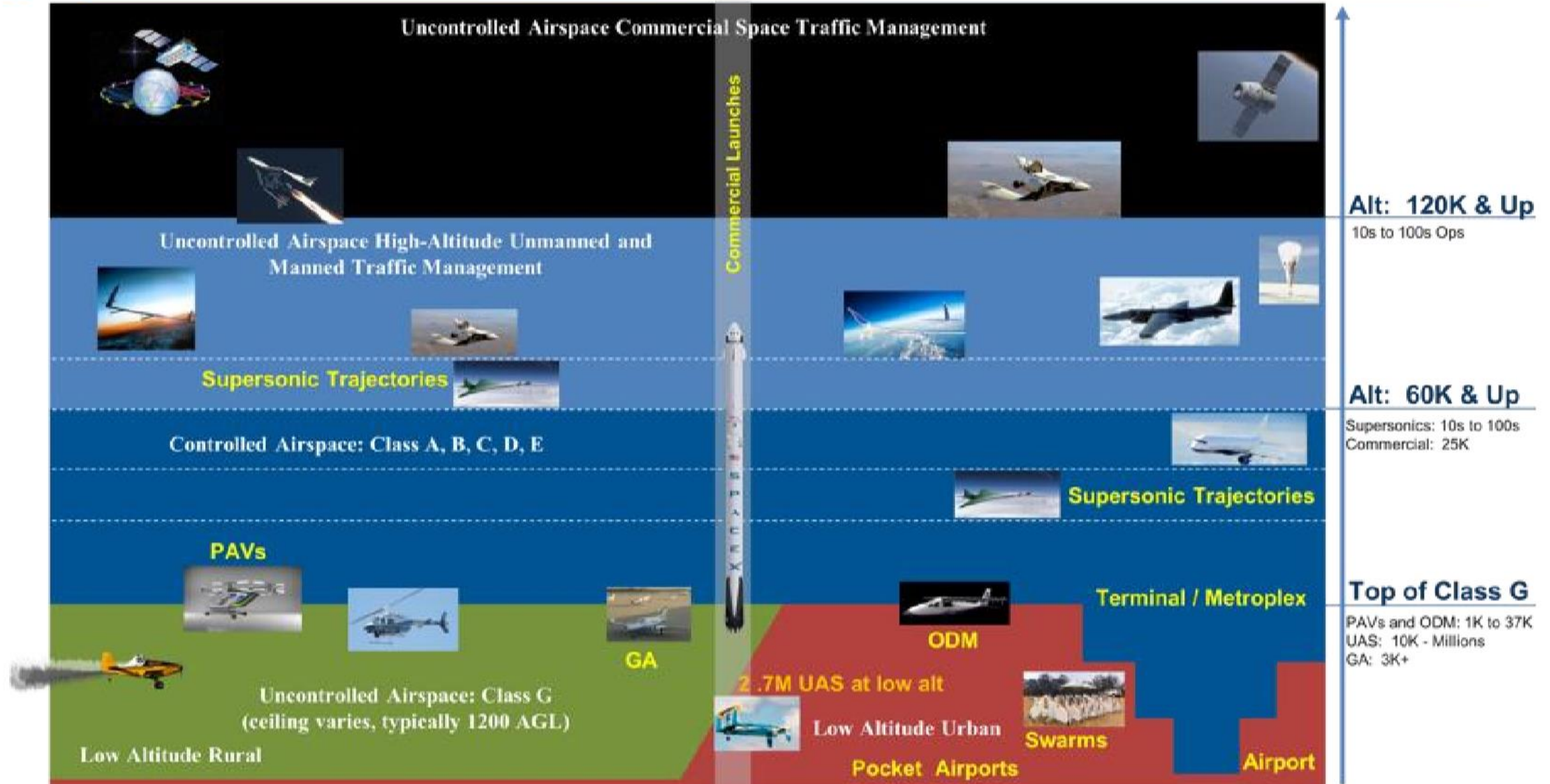
**National
Cybersecurity
FFRDC**



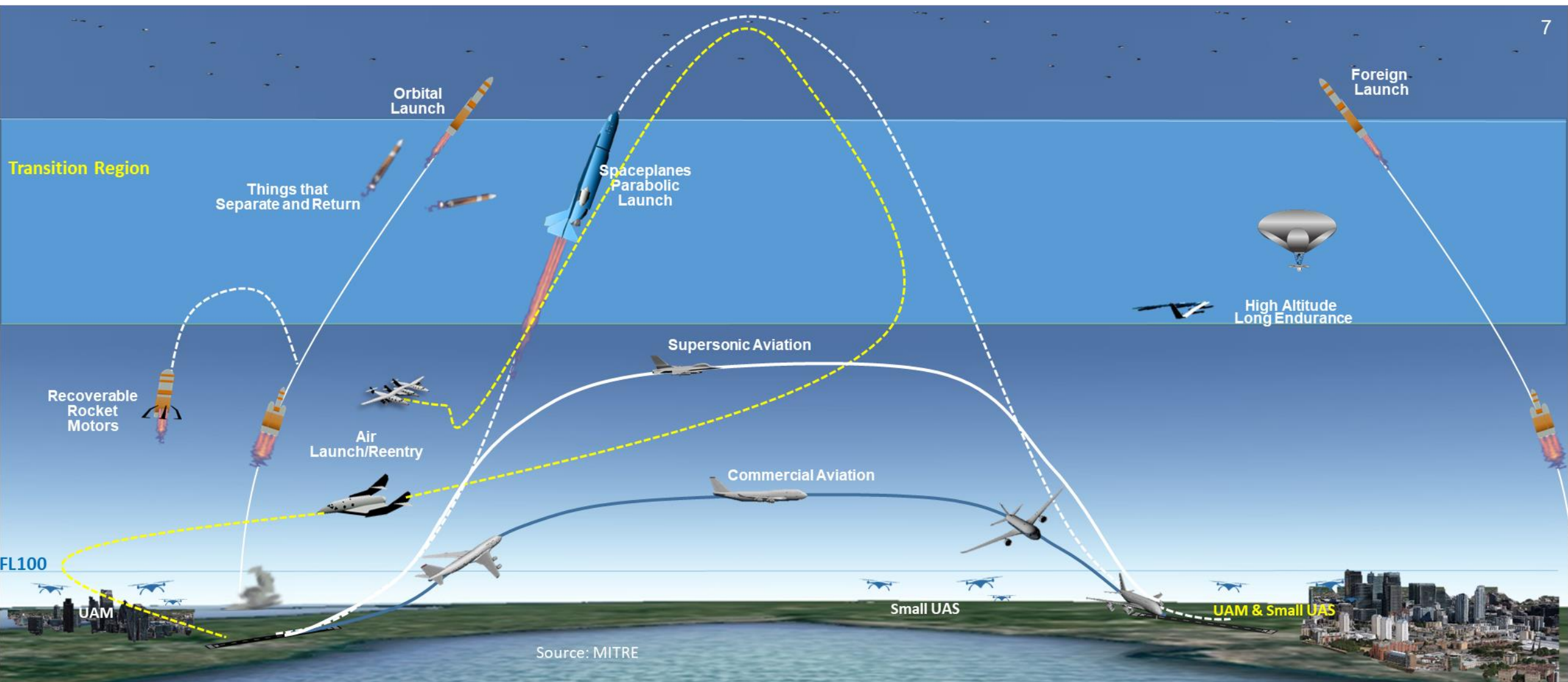




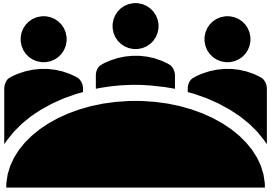
Daily Flight Demand for All Users in 2025



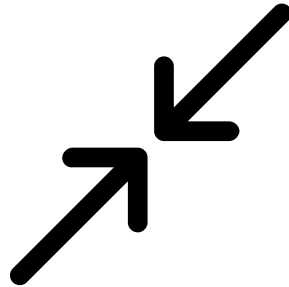
Diversity of missions is growing



Future Environment Drivers



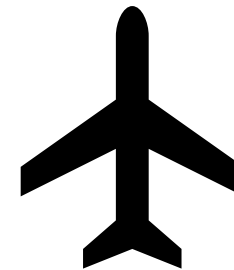
**New business
models and
stakeholders**



**Continuous and
ubiquitous data
exchange**



**Increasing use
of artificial
intelligence**



**Expanded
autonomous
aircraft operations**



**Evolving regulatory
environment**

Real-Time Data from Pilots

Preferred airborne trajectories
Departure readiness
Passenger status
Aircraft status
Turbulence encounters
Weather encounters

Real-Time Data from Operators

Crew experience
Crew health measures
Historical schedule analysis
Equipage
Preferred routes
Departure readiness information
Launch information

Real-Time Data from Passengers

Connecting modes of transportation
Purpose of trip
Customs information
Luggage information
Currency exchange needs
Reservation information

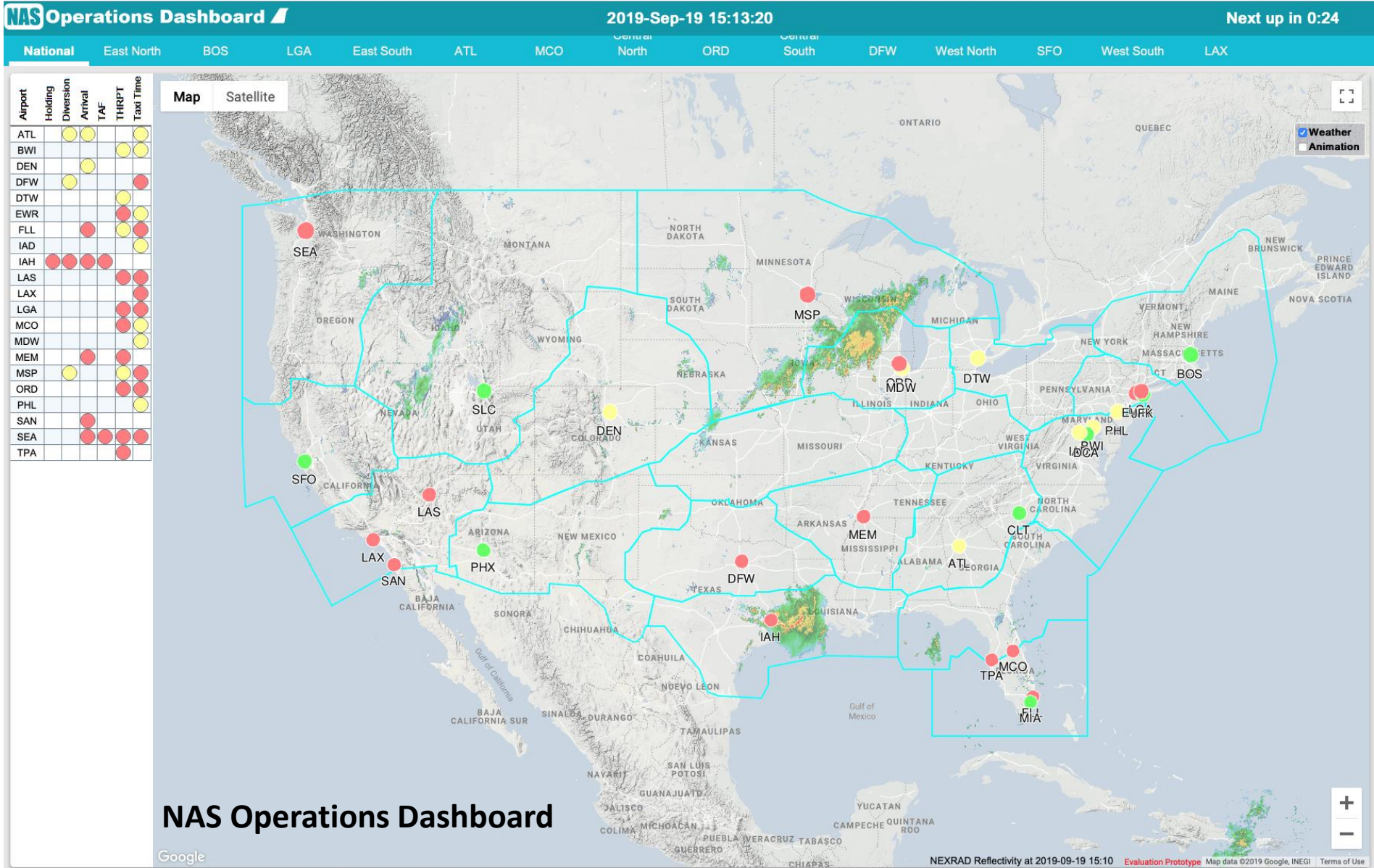
Real-Time ATM Data

Airport status
Airport and airspace information
Letters of agreement
NOTAMs
Weather forecasts
Cross-facility ATC restrictions
NAS systems status
Facility staffing and personnel

Real-Time ATM Assistance

Safety alerts for non-conformance
Safety alerts for pre-cursors to safety events
Adaptive routing based on crew experience
Adaptive rerouting due to weather or airspace blockage
Traffic management strategies based on facility staffing
Rapid and collaborative information sharing
Flexible reconfiguration of NAS resources

How do we get there?



How do we get there?

NAS Operations Dashboard

2019-Sep-19 15:13:20

Next up in 0:24

National

East North

BOS

LGA

East South

ATL

MCO

North

ORD

South

DFW

West North

SFO

West South

LAX

Airport	Holding	Diversion	Arrival	TAF	THRPT	Taxi Time
ATL						
BWI						
DEN						
DFW						
DTW						
EWR						
FLL						
IAD						
IAH						
LAS						
LAX						
LGA						
MCO						
MDW						
MEM						
MSP						
ORD						
PHL						
SAN						
SEA						
TPA						

MITRE Mobile Clearance Demo – ATC App

Connected

KRMN

KCJR

KHWY

KHEF

IFR Clearance Processing

IFR Release Processing

IFR Cancellation Processing

N416WB

KHEF → KHWY

N416WB	4674	KHEF	KHEF ARSNL5 CSN KHWY
SR22/G	P1310		
555	110		

Clearance Details

Initial Altitude

Departure Frequency

Remarks

Maintain 3000

126.1

CTC ATC ASAP 120.2

SEND

DUMP

CANCEL

History Log

Pilot @ 14:52:54

Flight logged in

Carrier

10:54 AM

MITRE Mobile Clearance Demo

N416WB

KHEF > KHWY

ESTIMATED DEPARTURE

Sat Mar 30th @ 1430Z

CLEARANCE AVAILABLE

< DEPARTURE CLEARANCE

ATC MESSAGE

Clearance Limit

Route

Altitude

Departure Frequency

Squawk

Remarks

WILCO

UNABLE

Flights

Settings

About

MITRE Prototype Controller App

MITRE Prototype Pilot App

How do we get there?

NAS Operations Dashboard

2019-Sep-19 15:13:20

Next up in 0:24

National

East North

BOS

LGA

East South

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North

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Airport	Holding	Diversion	Arrival	TAF	THRPT	Taxi Time
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IAH						
LAS						
LAX						
LGA						
MCO						
MDW						
MEM						
MSP						
ORD						
PHL						
SAN						
SEA						
TPA						

Map

Satellite

MITRE Mobile Clearance Demo – ATC App

Connected

IFR Clearance Processing

IFR Rel

N416WB

KHEF → KHQY

N416WB

4674

KHEF

SR22/G

P1310

555

110

Clearance Details

Initial Altitude

Maintain 3000

Departure Frequency

126.1

SEND

Demand Chart

KLAS (McCarran Intl)

June 12, 2019 - 12:00 PDT

LIVE

12:00

13:00

14:00

<

Now

>

June 12, 2019

Demand Predictions:

High

Moderate

Light

Pacer is a Federal Aviation Administration (FAA) funded research prototype developed by The MITRE Corporation. Use of Pacer and all predictions of demand and delay are for research purposes only. Pacer may not be used for any official flight planning purposes. The MITRE

QUEBEC

Weather

Animation

MITRE Mobile Clearance Demo

N416WB

KHEF > KHQY

ESTIMATED DEPARTURE

Sat Mar 30th @ 1430Z

CLEARANCE AVAILABLE

DEPARTURE CLEARANCE

Clearance Limit

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Altitude

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MITRE Prototype Pilot App

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2019-Sep-19 15:13:20

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Airport	Holding	Diversion	Arrival	TAF	THRPT	Taxi Time
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PHL						
SAN						
SEA						
TPA						

Map

Satellite

MITRE Mobile Clearance Demo – ATC App

Connected

QUEBEC

Carrier

10:54 AM

Weather

Animation

MITRE Mobile Clearance Demo

IFR Clearance Processing

WASHINGTON

SEA

OREGON

IDAHO

UTAH

N416WB

KHEF → KHQY

N416WB

4674

SR22/G

P1310

555

110

Clearance Details

Initial Altitude

Maintain 3000

Departure Frequency

126.1

LAX

PHX

SEN

BAJA CALIFORNIA

SONORA

BAJA CALIFORNIA SUR

ATM Operations Dashboard

Current Time: 2017-Oct-05 18:13:55

Threshold Set: CALIBRATED

System Status

Table View

Map View

Split View

Alert Thresholds

Live/Playback Mode

Contact

How to Use

Map

Satellite

ODISHA

VTCC

VTUD

VTDS

VTSS

VTSM

VTSG

WMKK

WSSS

ZJHK

ZJSY

ZGSG

ZGSH

Paracel Islands

South China Sea

Luzon

Mindoro

Isla han Samar

Panay

Negros

Mindanao

Sulu Sea

Palawan

Spratly Islands

Celebes Sea

WEST SUMATRA

RIAU

WEST KALIMANTAN

NORTH KALIMANTAN

EAST KALIMANTAN

NORTH SULAWESI

BAHANG

PERAK

PENANG

KEDAH

ACHH

ANDAMAN SEA

BAY OF BENGAL

GULF OF THAILAND

NAS Operations Dashboa

Google



**Global collaboration
and harmonization**

Thank You



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