Data & Reasoning Fabric Minimum Viable Product

William R. Van Dalsem, Kenneth Freeman, Sandeep D. Shetye,
Aditya Das, Kalmanje S. Krishnakumar
NASA Ames Research Center, Moffett Field, California, 94035

Aaron J. Swank,
NASA Glenn Research Center, Cleveland, Ohio, 44135

Peter Shannon, Luka Tomljenovic
Radius Capital, San Francisco, California

Sandy Lozito, Helen L. Euler, Supreet Kaur, Channon Wong, & Joseph J. O'Brien
NASA Ames Research Center, Moffett Field, California, 94035

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MOBILITY CHALLENGES

- Transportation shapes society, enabling economic opportunities and social interactions

- The quality of life is impacted by ever growing commute time

- Transportation is increasingly driven by door-to-door challenges

Air Mobility can convert our 2D mobility system to a 3D mobility system, increasing mobility options for both people and goods

AIR MOBILITY DATA AND REASONING CHALLENGES

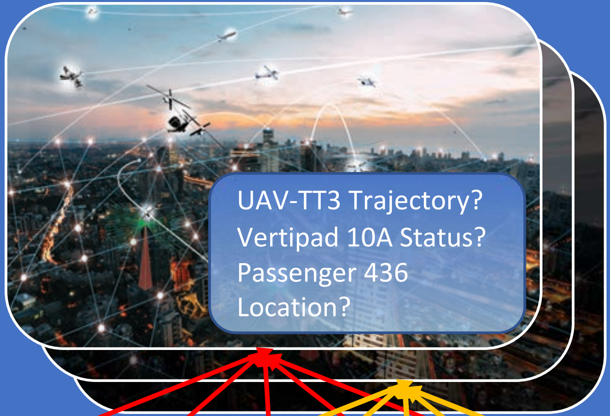
- Urban air operations require decisions based on diverse and dynamic data, including vehicle, airspace, weather, infrastructure, payload, and customer data
- Decisions need to be made where the data exist and, increasingly, data may be too large or dynamic to centralize
- The envisioned density of operations will only be achieved if decision processes continue to move from purely human decisions, to machine-intelligence based decisions with human oversight
- Machine-intelligence generally requires greater volumes of digital data of explicitly known applicability, quality, and many other “ilities.”

Air Mobility Planning, Operations, and Performance
- Current Trajectory -

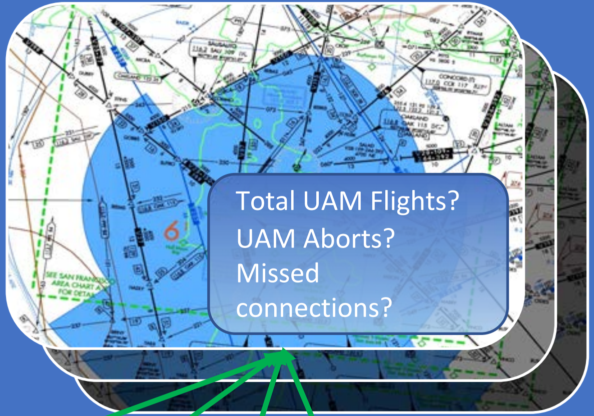
APPLICATION ENGINES

PLANNING

OPERATIONS



PERFORMANCE



CASE-BY-CASE DATA
- DISCOVERY
- AGGREGRATION
- VETTING
- DATA/$ TRANSACTIONS

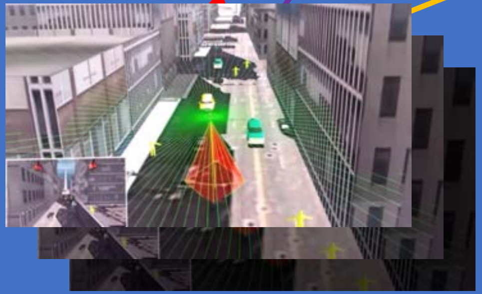
City "A" Planner

Mobility-As-Service Provider "U"

Package-As-Service Provider "A"

City "L" Planner

CONCERNS
- COST
- AGILITY
- SECURITY
- "MONO" ECOSYSTEMS

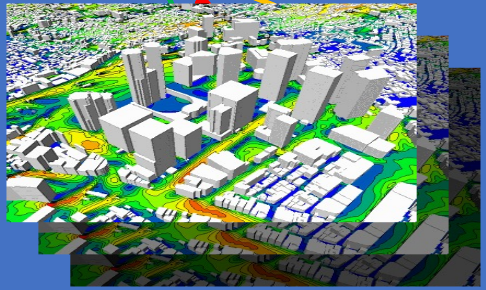


SMART VEHICLES

SMART AIRSPACES

SMART CITIES

REGULATORY



MICRO-WEATHER

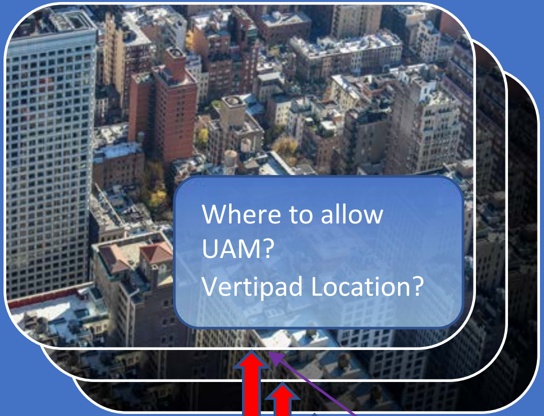
DATA Producers & Consumers

Air Mobility Planning, Operations, and Performance

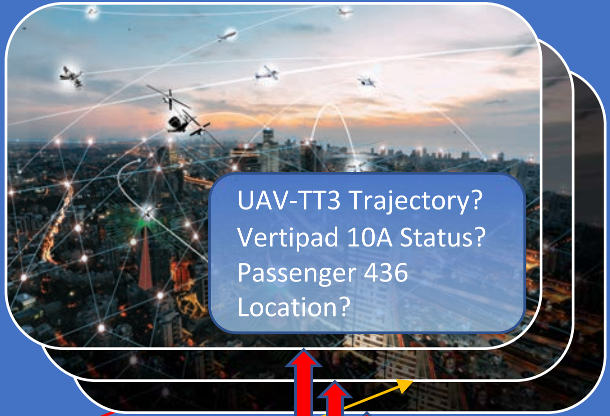
- DRF Trajectory -

APPLICATION ENGINES

PLANNING



OPERATIONS



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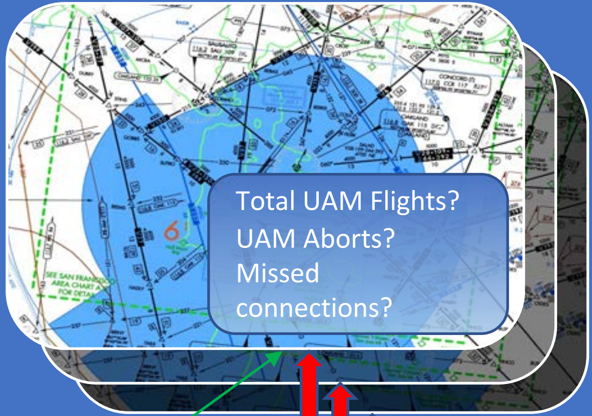
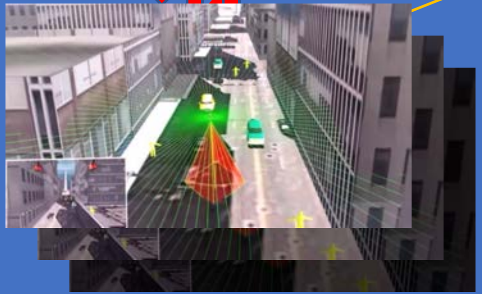


DATA & REASONING FABRIC

A set of secured software infrastructure, tools, protocols, governance and policies to implement, administer, manage and operate data sharing and reasoning services across the entire span of air mobility and other ”smart” edge nodes.

- ENABLE EFFICIENT AND PERVASIVE DATA DISCOVERY, AGGREGRATION, VETTING, AND DATA/$ TRANSCATIONS –



SMART VEHICLES

SMART AIRSPACES

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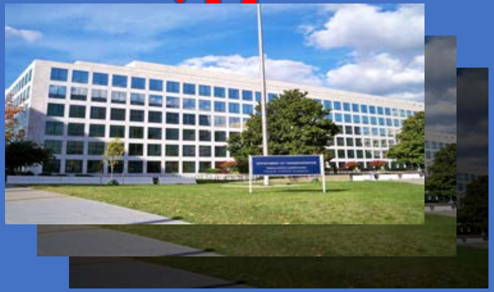
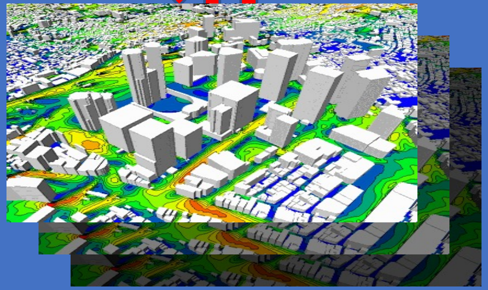


REGULATORY



MICRO-WEATHER

DATA Producers & Consumers

Data & Reasoning Fabric - System-Level Benefits

Provide Clarity

Provide baseline requirements and architecture clarity to all stakeholders, including the private sector

Provide Incentive

Provide core elements of a framework supporting marketplace functions for data, reasoning, operations and policies that provides a clarifying economic incentive to the private sector to bring the relevant innovations, products and services to market

Provide Flexibility

Build in the flexibility and extensibility of the data and reasoning systems supporting the National Airspace System to give all stakeholders confidence in a path to continued innovation and increased capability in the traditional and emerging airspace system

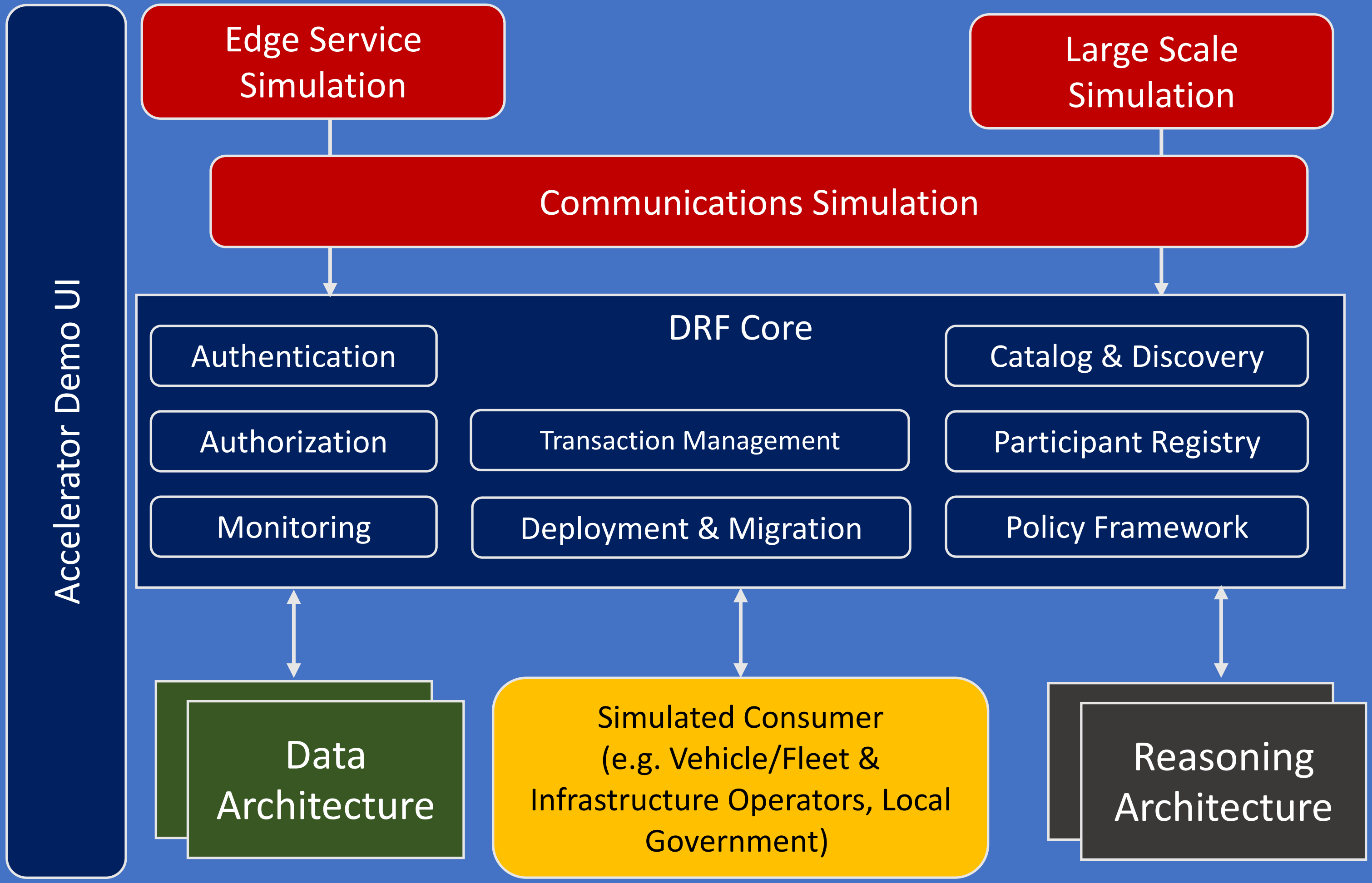
Reduce Complexity

Reduce complexity of system-level engineering challenges for the traditional and emerging airspace system

Factors in Successfully Introducing DRF Capabilities

Involvement from the public sector	• The public sector, as regulator, plays a necessary role in defining requirements from the perspective of safety and other factors that are in the public interest.
The role of the private sector	• Clarity on requirements combined with economic incentive can cause the private sector to deliver the desired innovation and ultimately to push capabilities beyond initially envisioned goals.
Systems engineering – system of smart systems capable of safety-critical operations	• Automation and data for time-critical and safety-related operations across nominal and contingency situations.
Requirements – enabling vs. prescriptive	• The ultimate requirements are complex and cannot be fully known at the outset. Future technologies are sure to bring change. • A foundational layer built around data can reduce complexity while encapsulating core common capabilities and providing inherent flexibility for evolving requirements, future operating policies, and future unanticipated end-applications for the airspace system

DRF Accelerator



DRF Accelerator is an initial prototype implementation showcasing key DRF functionalities

DRF MVP Engagement

- The DRF Project, which is funded by the NASA Aeronautics Mission Directorate, will engage with internal NASA partners and partners external to NASA to support the completion of its objectives.
- The DRF Project team will leverage partnerships with four types of organizations:
    1. Technology providers
    2. Data service providers
    3. Reasoning services providers
    4. End-user organizations.

The engagements will help the DRF Project assess the technical feasibility of the DRF Accelerator, assess the likelihood of adoption and identify what data and services can be shared across DRF