AAM Crosscutting Working Group:

ISSA/IASMS ConOps Discussion

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Working
Group Lead

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Panelists

- John Koelling
- Dr. Paul Krois
- Dr. Robert Mah
- Dr. Wendy Okolo
- Dr. Steve Young

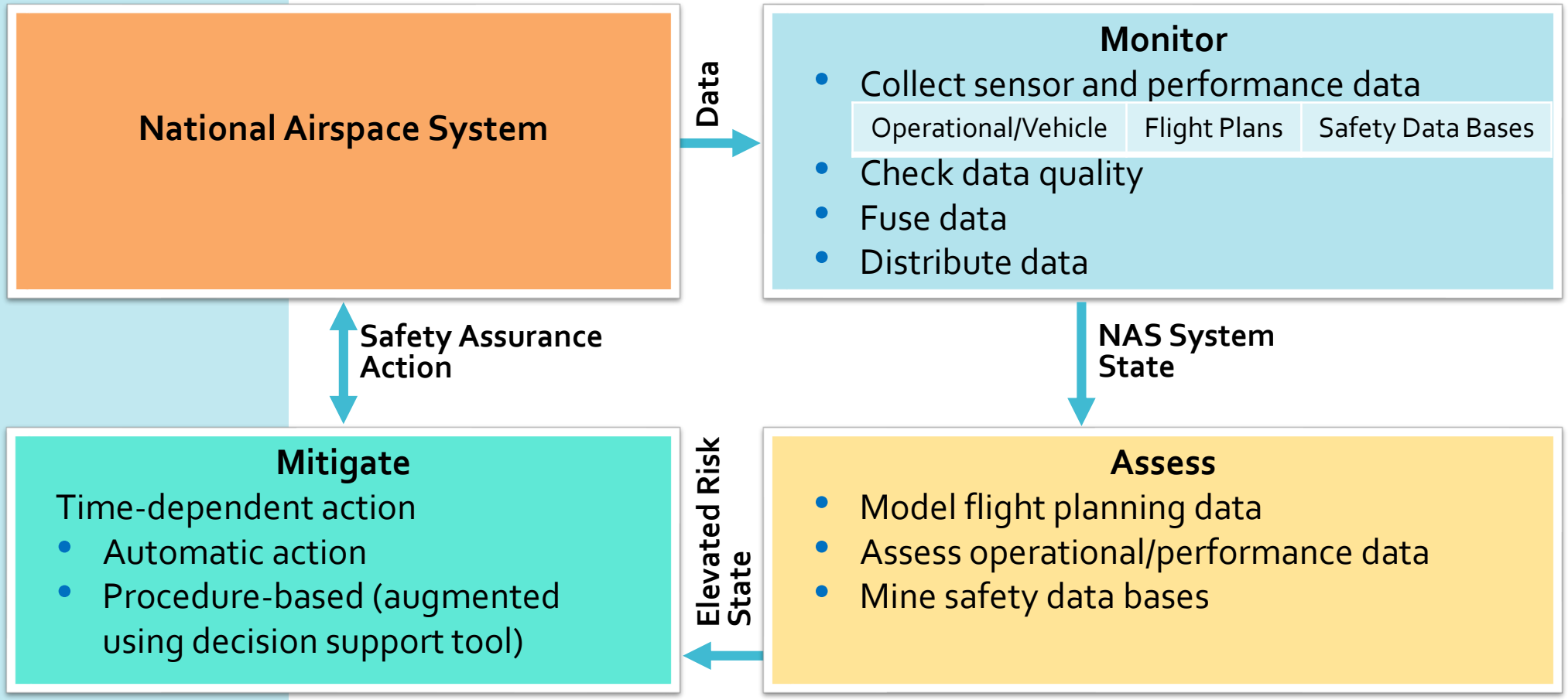
Ground Rules

The goal of these discussions is to receive feedback from all of you in the community. **We will be utilizing the microphone and chat features on the MS Teams platform**. To ensure that we can do this in an organized fashion, we have laid out a few ground rules:

- **Leave your cameras/webcams off to preserve WiFi bandwidth**
- **Enter comments/questions in the chat function on the right side of the screen**
  - The emcee will record and respond to the chat messages as applicable
- **Use your mute/unmute button (i.e., remain on mute unless you have been called on by the emcee to speak)**
- **Type "REQUEST TO SPEAK: [First & Last Name]" in the chat box to notify the emcee that you would like to verbally comment or ask a question**
  - The emcee will (to the best of their ability) call on each of you in the order that your names appear in the chat
- **Say your name and affiliation before you begin speaking**
- **Speak loudly and clearly**
  - You will be given up to 90 seconds (1.5 minutes) to verbally comment/ask a question. Brevity is greatly appreciated
- **Remember this is Social Media, so be professional in all verbal and written comments/questions**
  - If your verbal or written questions are unprofessional or disrespectful in nature, you may be asked to leave and be removed from the virtual meeting room. Once removed, you will not be able to re-enter the meeting
  - Examples of unprofessional or disrespectful behavior include, but are not limited to:
    - Intimidation or bullying
    - Offensive and abusive language
    - Passive aggression
    - Demands for special attention and treatment
    - Uncooperative behavior
    - Excessive criticism
    - Unwillingness to talk through an idea or issue

*Please note, **these sessions may be recorded** and shared on the NARI registration site within a week or so of the event.*

IASMS High-Level Architecture (National Academies)

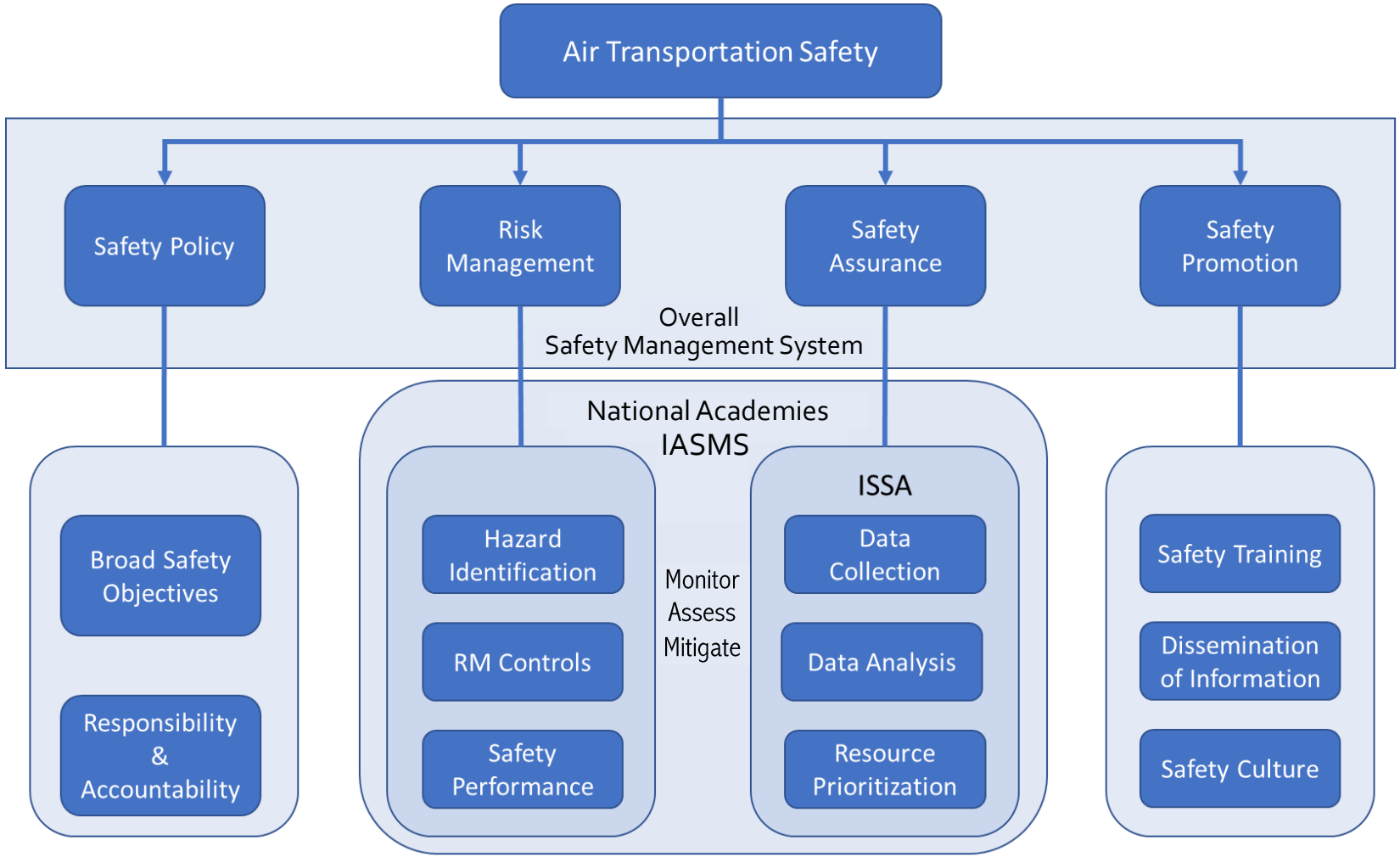


Time Horizon

Pre-Flight	In-Flight	Post-Flight

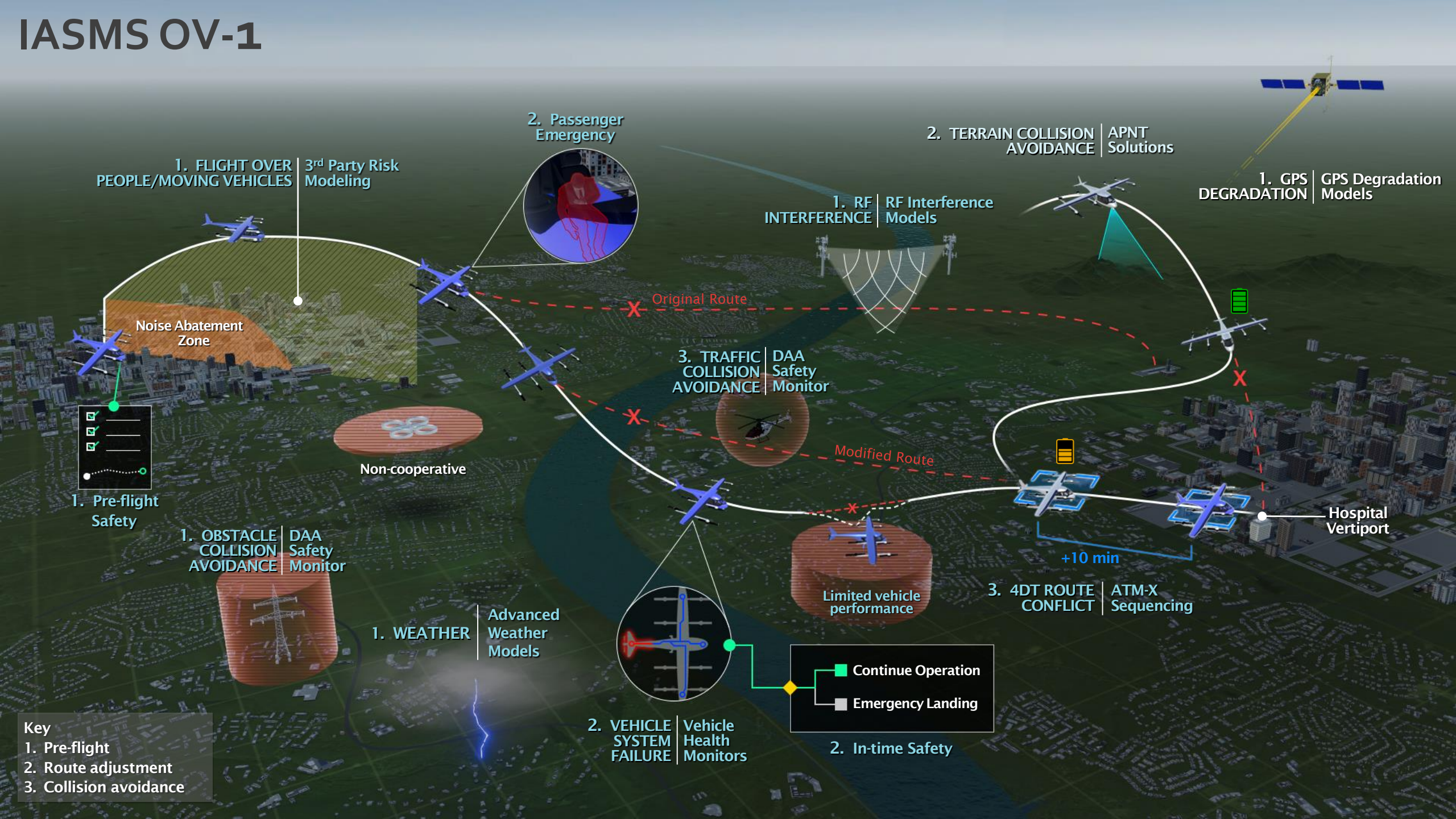
Scopes of the Safety Management System

- Overall Safety Management System
  - In-Time Aviation Safety Management Systems (IASMS)
    - In-Time System-Wide Safety Assurance (ISSA)



Stakeholders vary by domain (e.g., Commercial Ops, sUAS, UAM, GA)

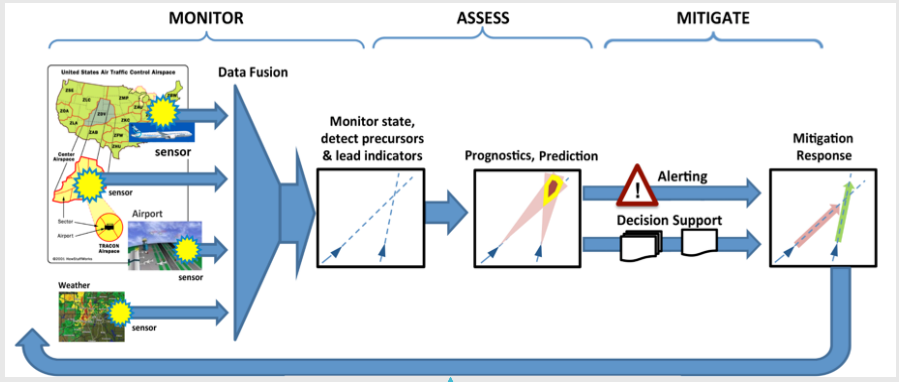
IASMS OV-1


1. FLIGHT OVER PEOPLE/MOVING VEHICLES | 3rd Party Risk Modeling
2. Passenger Emergency
2. TERRAIN COLLISION AVOIDANCE | APNT Solutions
1. GPS DEGRADATION | GPS Degradation Models
1. RF INTERFERENCE | RF Interference Models
Original Route
Noise Abatement Zone
3. TRAFFIC COLLISION AVOIDANCE | DAA Safety Monitor
Modified Route
Non-cooperative
1. Pre-flight Safety
1. OBSTACLE COLLISION AVOIDANCE | DAA Safety Monitor
Hospital Vertiport
+10 min
3. 4DT ROUTE CONFLICT | ATM-X Sequencing
Limited vehicle performance
1. WEATHER | Advanced Weather Models
Continue Operation
Emergency Landing
2. VEHICLE SYSTEM FAILURE | Vehicle Health Monitors
2. In-time Safety
Key
1. Pre-flight
2. Route adjustment
3. Collision avoidance

Operational Safety: In-Time System-Wide Safety Assurance

ISSA Capability = A system that monitors data, assesses data, and performs or informs a mitigating action

IASMS



IASMS = Interconnected ISSA Capabilities That Provide In-Time Risk Management and Safety Assurance

Vehicle ISSA Capabilities

- Communication/ C2
- Remote ID
- Many Others
- Conflict Advisory/Alert
- UAS System Monitoring

Airspace ISSA Capabilities

- USS Network Discovery
- Airspace Authorizations
- Many Others
- Constraint Management
- Conformance Monitoring
- USS System Monitoring

SDSP ISSA Capabilities

- Weather
- Surveillance
- Many Others
- uFOQA
- Operator Messaging
- Third-Party Risk

Vehicle Information Classes

Link Performance, Aircraft State, Monitor Health, Nav Performance, Power Health, Configuration Settings, Aerodynamic Model, Human Performance

Airspace Information Classes

Airspace Conformance, Geo-spatial Constraints, Human Performance, Air Traffic, Flight Plan, Configuration Settings

SDSP Information Classes

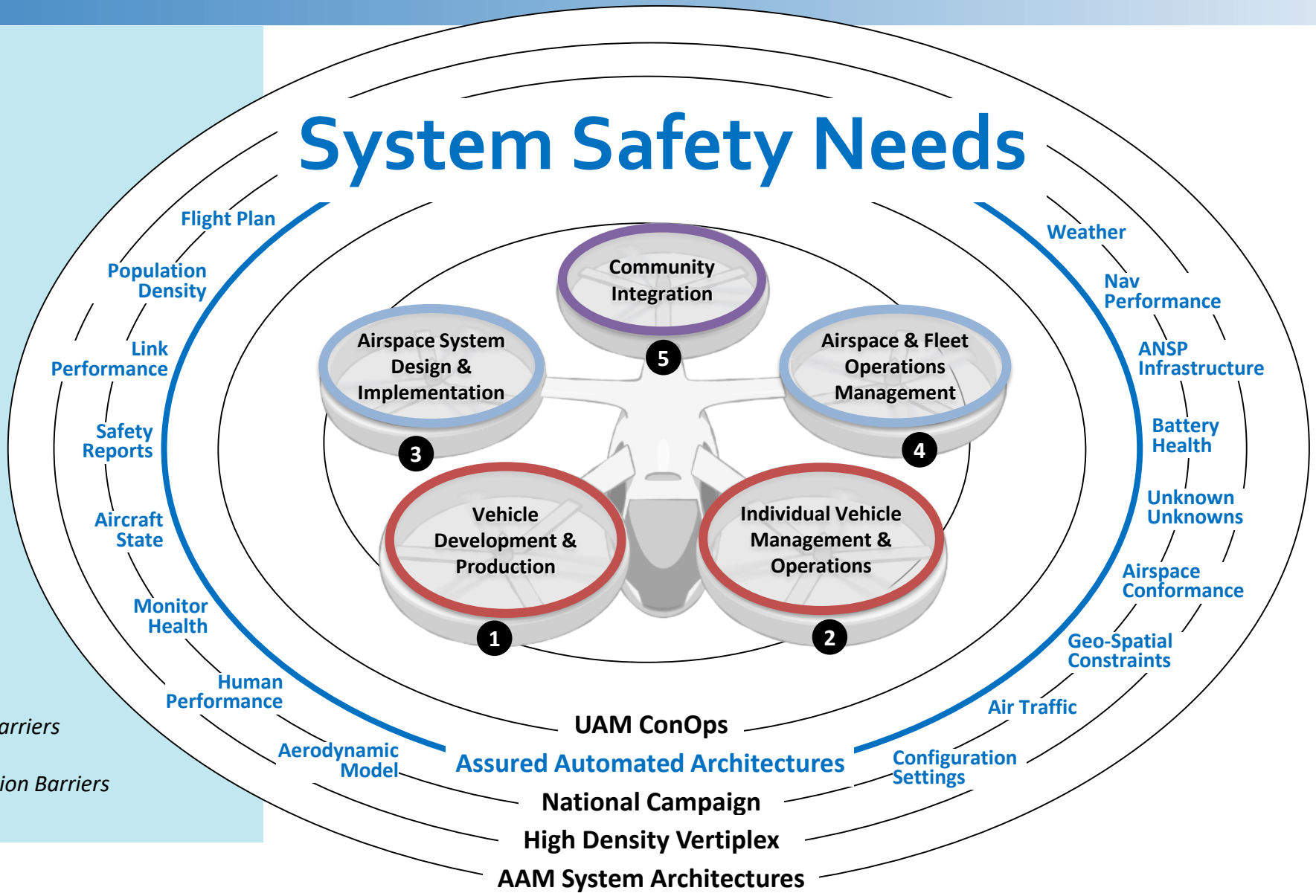
Weather (MET), ANSP Infrastructure, Population Density, Configuration Settings, Safety Reports, Human Performance

Example ConOps Use Case: Non-Participant UAS Operation

Additional Deeper Dive Use Cases:
- Vertiport Emergency and Closure
- Emergent Risk in Mixed Air Space

Other Use Cases:
- Deteriorating Battery Health
- Vehicle Lost Link—NORDO
- Bird Strike—Physical Damage
- USS/U4-SS Service Disruption
- Time-Based Flow Management Issues

NASA AAM Mission Priorities



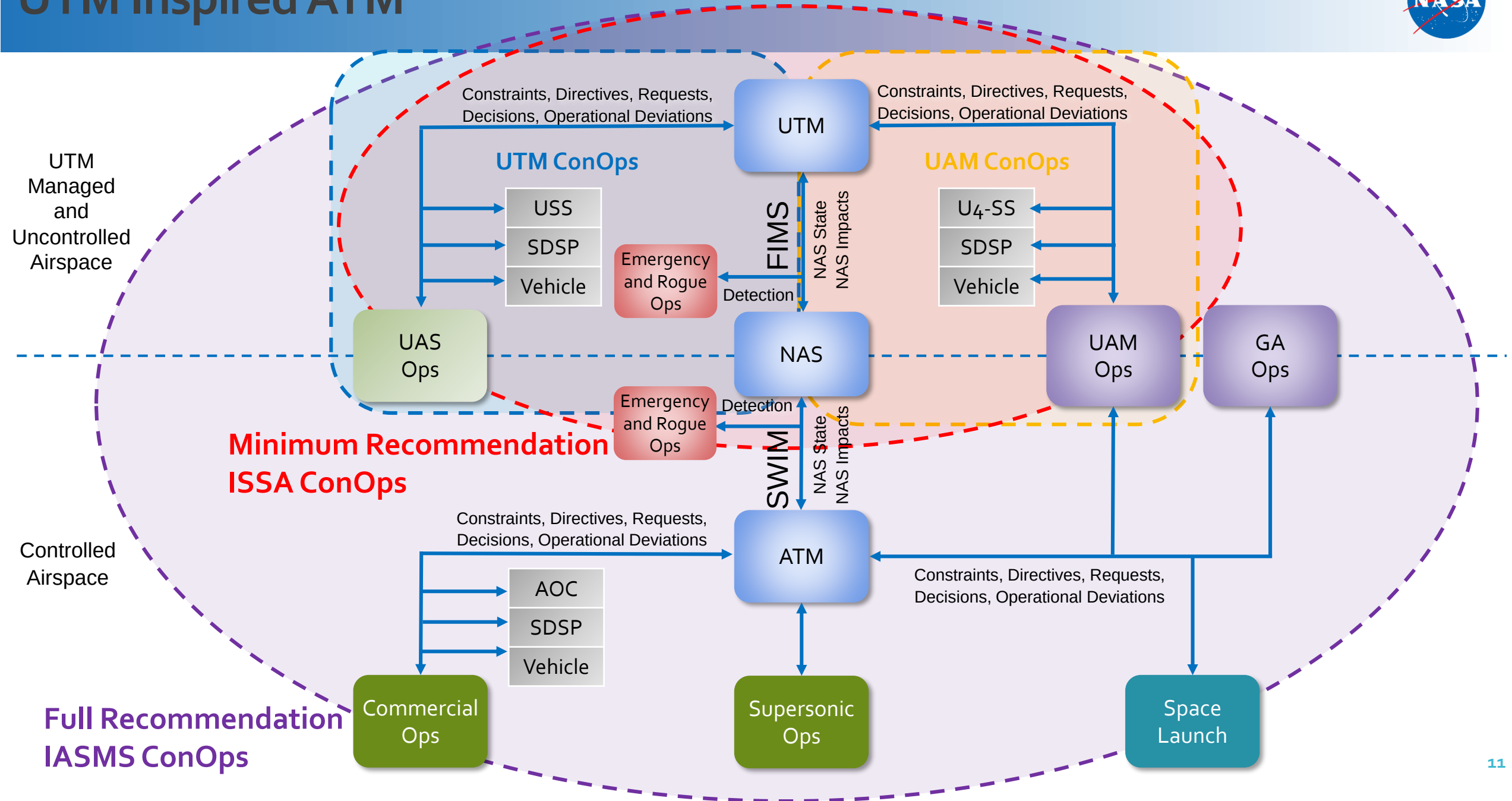
Aircraft & Aircrew Barriers
Airspace Barriers
Community Integration Barriers
 # Pillar number

Graphic Adapted from NASA AAM presentation

Assured Automated Architectures → **IASMS**

Backup

UTM Inspired ATM



Discussion Questions

- **What have we missed in the ISSA ConOps?**
  - Do you disagree with anything in the ConOps?

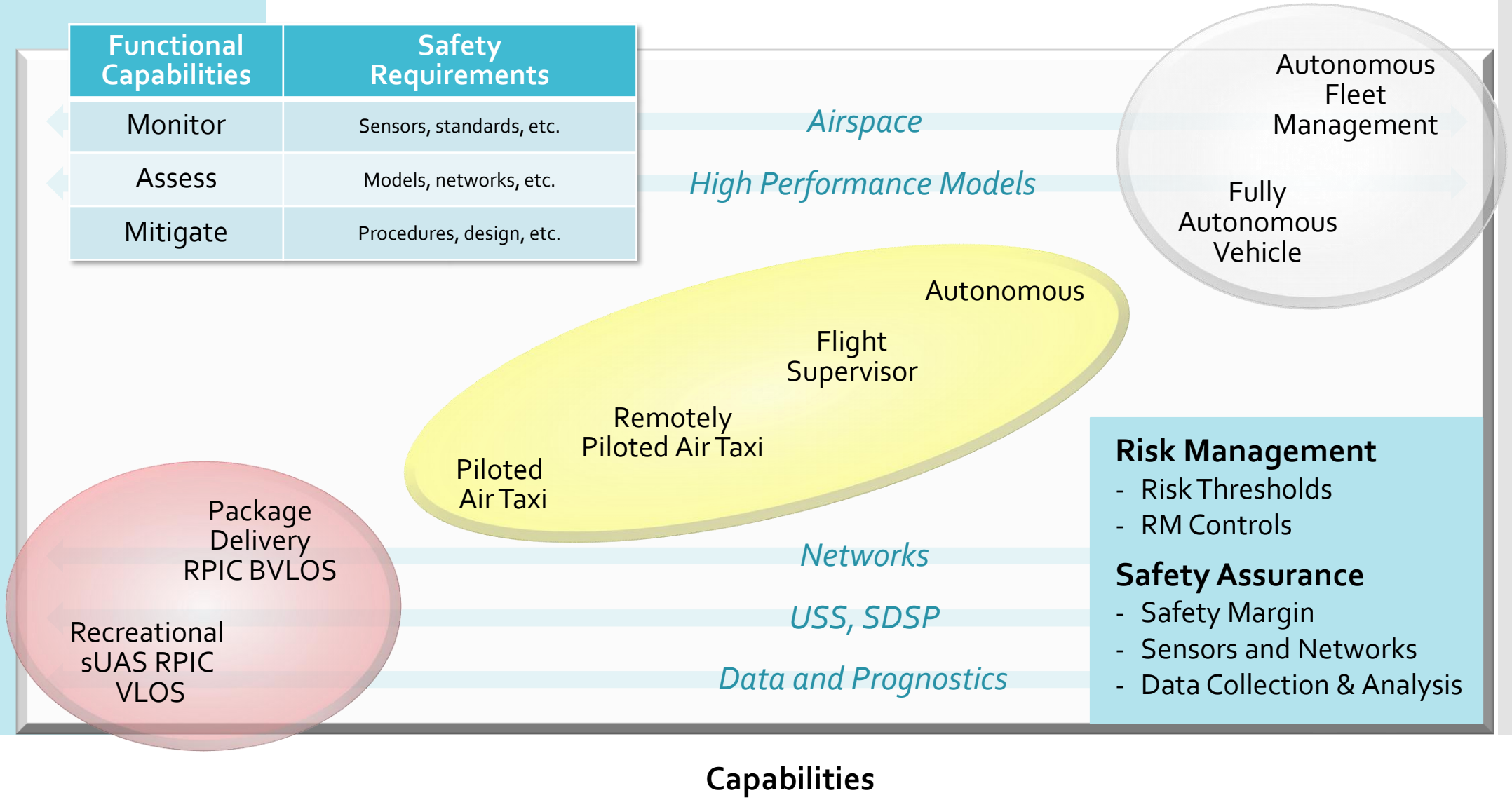
- **What are the gaps in the Use Cases?**
  - What Use Cases should be added?
  - Do the Use Cases touch across all 5 parts of the penta-copter?
  - What do you think about the video and the three detailed Use Cases in the ConOps? Do you disagree with anything? What should be added?

- **How should the Use Cases be tuned for particular domains?**

- **What should be the major parts of a UAM Safety Case?**

Design-Time and Operational-Time Safety Needs

Functional Capabilities	Safety Requirements
Monitor	Sensors, standards, etc.
Assess	Models, networks, etc.
Mitigate	Procedures, design, etc.



Risk Management
- Risk Thresholds
- RM Controls

Safety Assurance
- Safety Margin
- Sensors and Networks
- Data Collection & Analysis