FEMA
Unmanned Aerial Systems Program

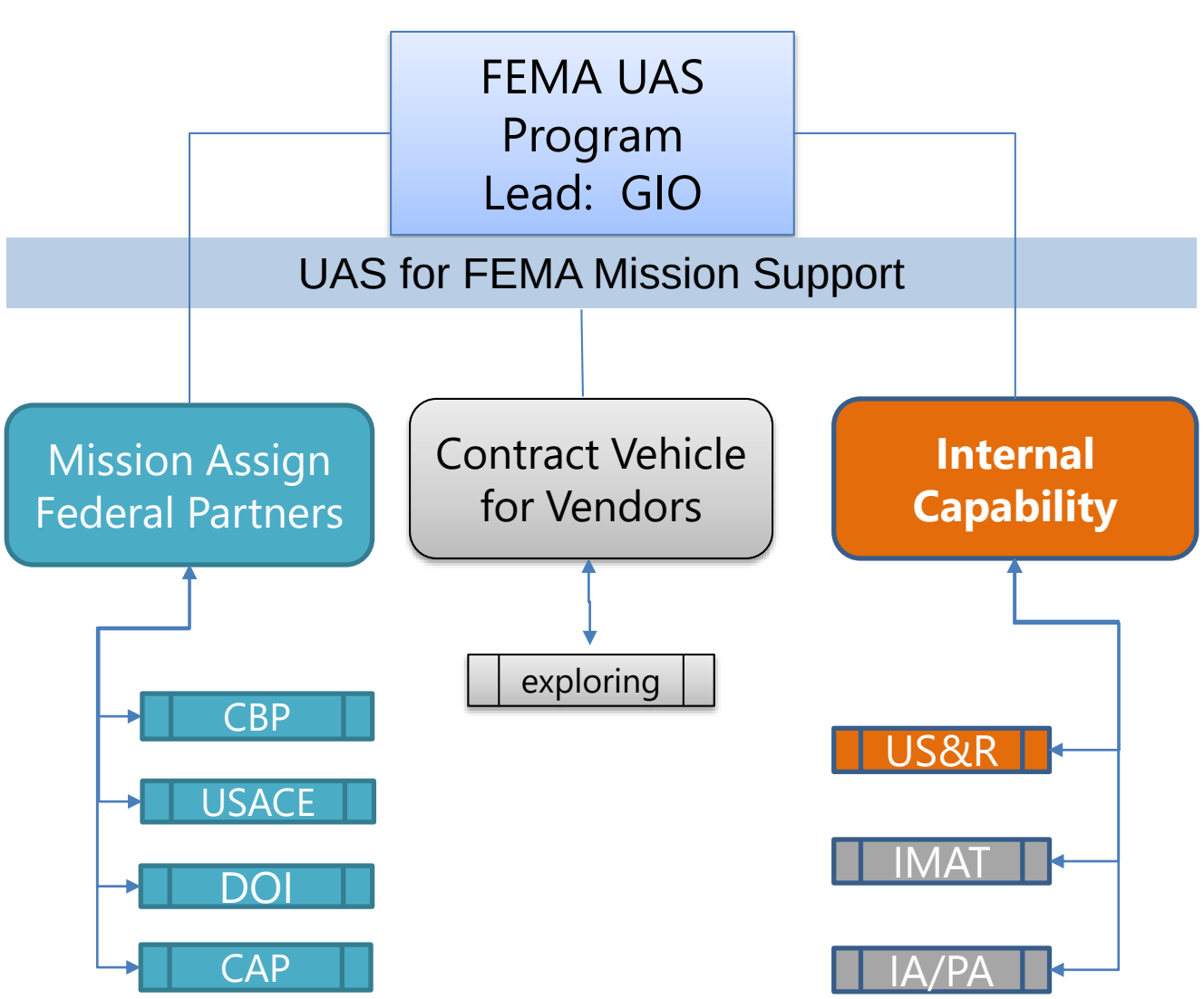
FEMA

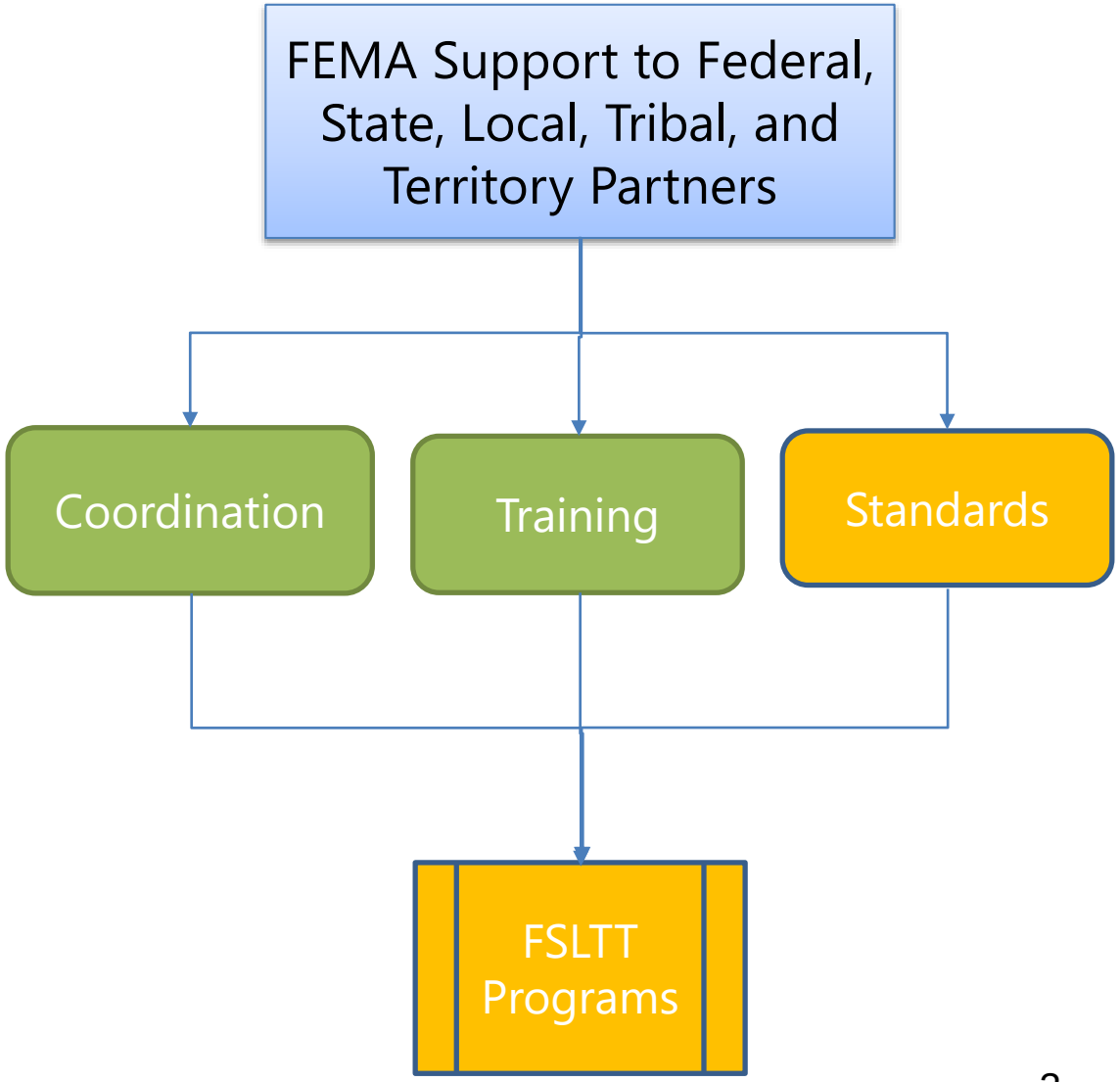
Chad Council, FEMA Region I
Executive Office of The President
Subcommittee on Disaster Reduction
July 12, 2018

Vision: Integration of UAS into Emergency Management

- Unique capabilities of UAS integrated into all mission areas, at all levels of government
- Interoperability between partners by establishing standards for remote sensing collection, data storage, and data sharing
- UAS leveraged in accordance with all laws, regulations, and privacy restrictions

Execution of Vision





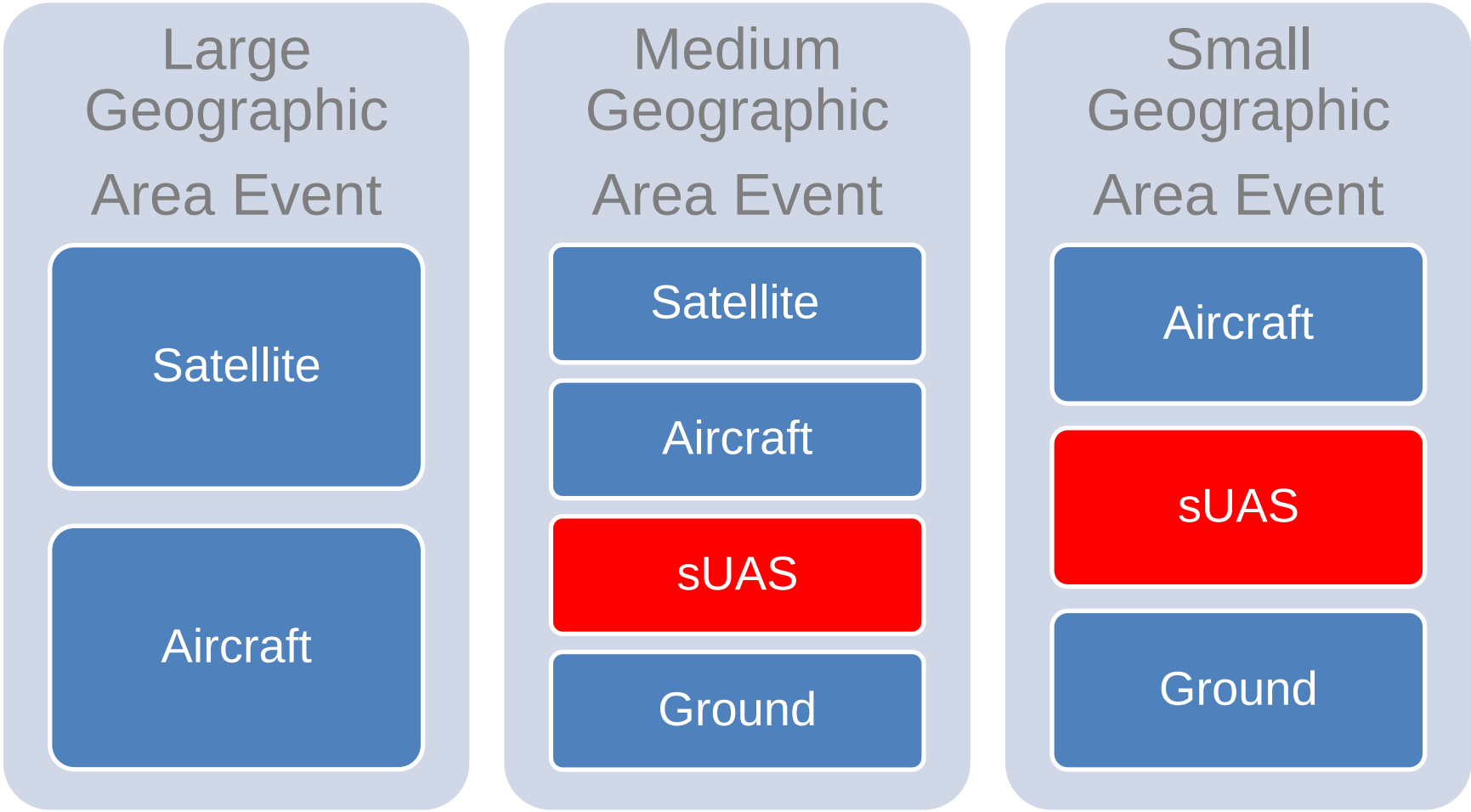
Potential Cross Cutting Integration of Unique Capabilities

- Measurement: Debris estimation, fill volume
- Communications: Cell tower, radio repeater, aerial mesh
- Commodity delivery: Medications, critical equipment
- Tactical support: Urban Search & Rescue
- Remote sensing
  - Situation Awareness
  - Geospatial Damage Assessments

Tactical Use: Urban Search & Rescue

- FEMA Urban Search & Rescue system:
  - Evaluating for tactical use
  - Standards recommendation: National Institute of Standards & Technology sUAS performance
- Extensive Applications
  - Overhead view for mission assignment and tracking
  - Inspection of upper floors of large structural collapse
  - Wide Area Search: Recon of inaccessible areas
  - Interior room searches above debris
- Task Forces across the country also pursuing
  - Some sponsoring agencies have UAS programs
- 2017: Hurricane Harvey
  - FEMA deployed 19 Dept. of the Interior (DOI) pilots in support of US&R

Remote Sensing / Situational Awareness



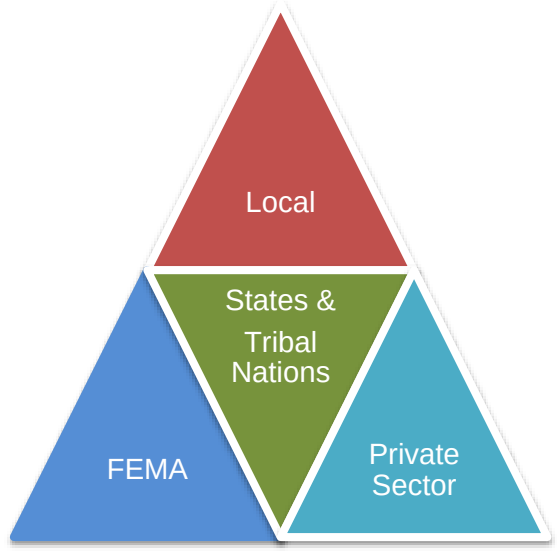
Remote Sensing / Situational Awareness

Satellite

NOAA Aircraft

eBee Sensefly sUAS

How are we supporting partners?



- Training Courses
  - AWR-345 Unmanned Aircraft Systems (NDPTC)
  - Air Operations Course: Recently revised
- National Incident Management System: Typing
  - **Remote Pilot in Command:**
    - Duties, training, certification, experience, currency
  - **Technical Specialist**
    - Communications, data recording, data delivery to AHJ
  - **UAS Team:**
    - Staffing, Ordering Specifications, Aircraft System
- Exploring: Certifications based on task books (similar to Wildland Fire Red Card)

UAS Missions To Date

- FEMA has used large UAS (all via CBP):
  - 2010: During the Nashville floods
  - 2011: Minot, ND for ice jams/flooding on the Red River
  - 2017 Hurricane Irma (Florida)
- FEMA has leveraged sUAS:
  - Oct 2015: Floods in South Carolina via USACE to identify impacts to critical infrastructure (dams)
  - Aug 2017: Deployed 19 DOI pilots in support of US&R ops for Hurricane Harvey

Ice Jam Use Cases

Large UAS / SAR sensor (CBP)

- Detect flooding and ice jams along length of river

Small UAS with Color Imagery

University of Vermont Spatial Analysis Lab

- Derived products can be used for measuring height of ice jam ahead of flooding

Regional Coordination Efforts

- Regions 1, 3, 4 have coordination efforts underway since 2017
- Coordinating with Federal, State, Local, Tribal, and Academic partners in respective regions
- Partners are all trying to solve similar problems
- Combining Emergency Management, GIS/Remote Sensing and Air Operations subject matter experts

FEMA Region 1 UAS Working Group

Monthly topic-specific meetings

- FEMA Region 1
  - Air Operations
  - GIS/Remote Sensing
  - Operations Integration
  - Incident Support
  - Situation Awareness
  - US&R
- Federal
  - Civil Air Patrol
  - DHS Infrastructure Protection
  - DHS TSA Boston
  - FBI Boston
  - OSHA – New England
  - USACE Region 1
- CT
  - DEMHS GIS
- MA
  - MEMA GIS
  - Mass DOT
  - MWRA
- ME
  - Maine GIS
  - MEMA GIS
  - Critical Infrastructure
- NH
  - NH HSEM
  - NH DOT
- RI
  - Plans Ops Integration
  - RIEMA GIS
- VT
  - VEM GIS
- Higher Education
  - Harvard Humanitarian Initiative
  - University of Maine, Augusta
  - University of Vermont

FEMA Region 3 UAS Working Group

- Established a FEMA RIII UAV working group Fall 2017 – quarterly call to discuss UAV related matters with state and local partners within Region III. Membership has steadily grown over the past 6 months.
- Drafting MOU for data exchange with State partners that currently have UAV Programs
- Currently working on a UAV/UAS SOP for Disaster Response and Recovery Operations – Scheduled for completion December 2018
- Developing in house remote sensing imagery analysis capabilities within Response GIS

FEMA Region 4 UAS Working Groups

- Since the Fall of 2017, five statewide UAS working groups have formed.
- Each state working group consists of members from the public, private and academic sectors.
- The State EMA is typically the lead agency with support from the Regional UAS Coordinator.
- Kickoff meetings are held to place law enforcement, fire, transportation, utility, academic and federal partner subject matter experts in the same room for the common goal of UAS integration.
- Members participate in bi-weekly working group calls along with monthly common operating picture calls leading up to state TTX and practical UAS exercises.
- Regional UAS exercises are being planned for long track tornados, hurricane response and Shake & Fury.
- Pre-scripted regional remote sensing mission sets and triggers are being developed that include UAS integration.
- GIS products based on program area requirements and shared areas of interest are being developed.
- State training facilities have been identified to host meetings and exercises.
- An annual exercise that includes UAS and manned aircraft is being planned for 2019.

Policy Considerations

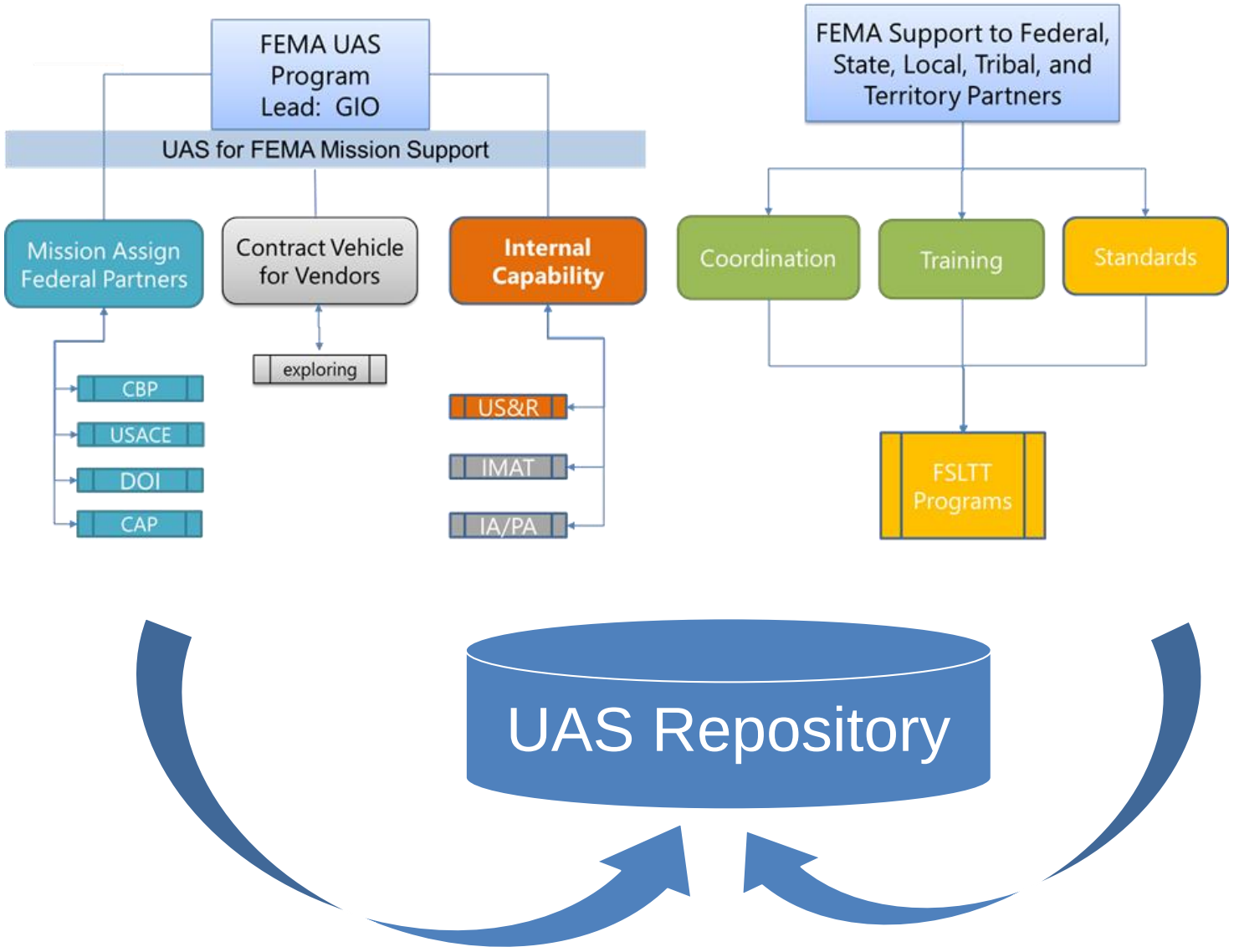
- Authorities: Internal policy memo by Asst. Admin. for Response
  - Naming GIO lead for program
  - Approving mission assignment and/or contract courses of action and exploration of others
- Privacy Act:
  - Must conduct study to ensure image collection, storage and handling meets with privacy requirements
- Liability for Agency
- Agency own/operate course of action options:
  - Type 107 vs. Blanket COA / self-certifying
  - Section 333
- Availability and access to interagency and private sector sources to meet Federal operational requirements

Technology Considerations

- Data storage, retrieval and sharing
  - Still imagery:
    - Massive quantity
    - No standards for resolution, focal length, angle, altitude, etc.
  - Video:
    - Storage volume
    - Lack of Motion Imagery Standards Board Compliant Full Motion Video in lower cost UAS
  - Derived product storage
    - 3D Model storage formats

Opportunities

- Data integration across all levels of government
- Enhancement of FEMA Image Uploader System
- Crowd sourced image analysis and assessment
- Augmentation of Hazards Data Distribution System?



Conclusion

- UAS present a new set of capabilities and improvements that improve disaster response and recovery
  - Provides existing services such as imagery in a faster, more readily available, and tactically advantageous way under specific conditions
  - Provides new services that could change aspects of emergency management
- Proper integration will make it “one more tool in the toolbox”
- Next Steps
  - Expand coordination efforts in FEMA Regions
  - UAS Workshop in August

FEMA

Helping people before, during, and after disasters.