# NETC 18-3

Integration of Unmanned Aircraft Systems (UAS) into Operations Conducted by New England State Departments of Transportation

wsp

# Welcome and Introductions

| NETC Project TAC Team | Representation |
|---|---|
| Jeffrey DeCarlo, Chair | Massachusetts DOT |
| Amy Stula | Connecticut DOT |
| Matt Philbrick | Maine DOT |
| Carol Niewola | New Hampshire DOT |
| Pamela Cotter | Rhode Island DOT |
| Dave Tillberg | Vermont Agency of Transportation |
| Emily Parkany | NETC Advisory Committee Liaison |
| Maina Tran, CTC & Associates | NETC Coordinator |

| WSP Research Team | Role |
|---|---|
| Jagannath Mallela | Principal Investigator |
| Paul Wheeler | UAS Program, Ops and Technology Expert |
| Darren Hardy | UAS Ops Expert |
| Bhart Sankaran | Lead Technology Research Analyst |
| Chan Choi | UAS Ops Analyst |
| WSP Research Analyst(s) – as needed | Research Support |

# Project overview and objectives

There are plenty of successful examples of using UAS for transportation applications; however, little research has been done to investigate the effective integration of UAS technology into transportation operations.

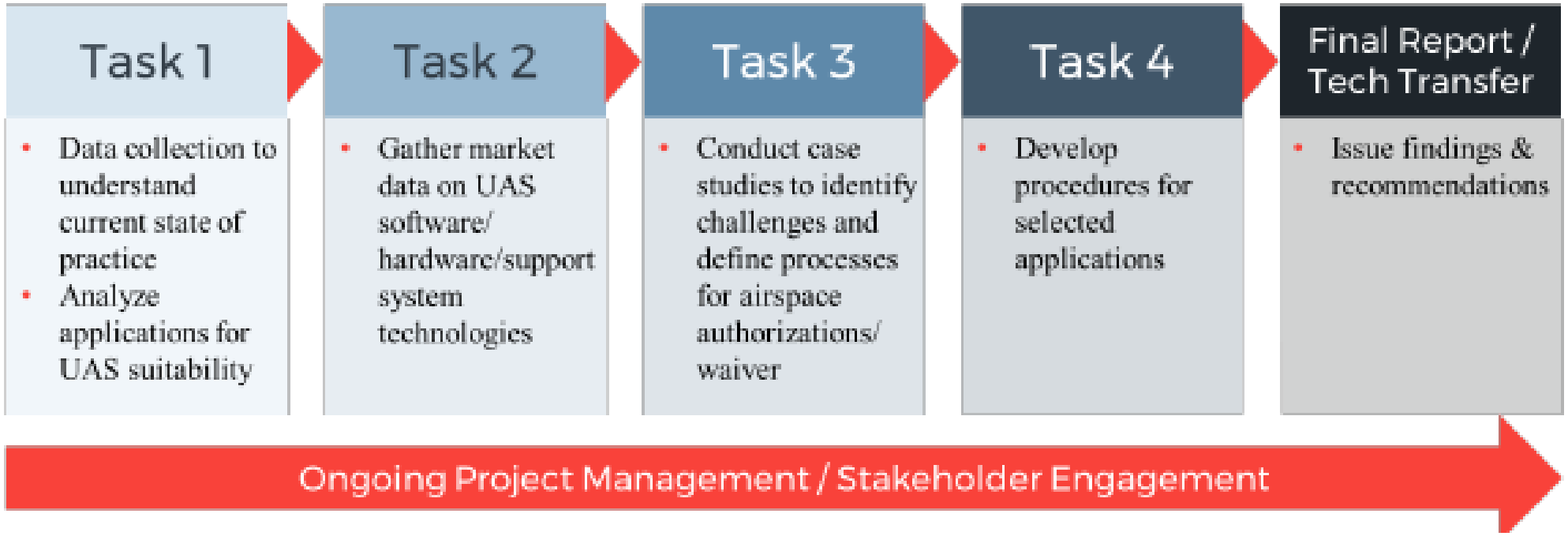
*"The objective of this research is to provide guidance to New England state DOTs regarding best practices when incorporating UAS into daily operations."*

# Project Objectives

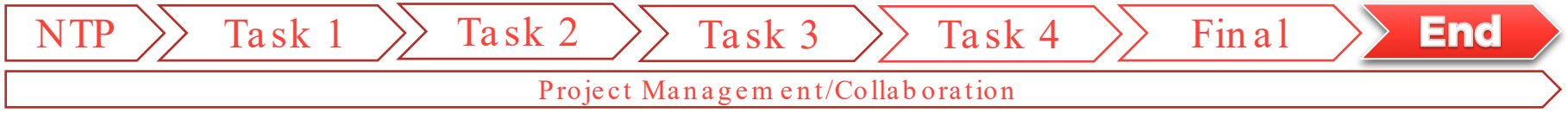


1. UAS Applications & Missions
2. Use Case Technologies and Support Systems
3. Challenges to Integration
4. UAS Processes Development

# Research Approach



# Task 4 Findings –Approach Framework




## Programmatic Guidelines (Agency)

- UAS operation manuals
- UAS policy
- Other guidelines

## Implementation Procedures (Mission)

- Use cases
- Specific projects
- Pilot Applications

## Successful implementation

- Consistency in deployment
- Operational efficiency
- Program Scalability/Sustainability

# Regulations


- Public Aircraft vs Part 107
- Remote ID
- Operations Over People and Moving Vehicles
- Night Flight

PROJECT OBJECTIVES

# Organizational Structure



01.

## Aeronautics

02.

## Functional Departments

03.

## Centralized Model

# Contracting Considerations

Consideration 1

## Experience

Consideration 2

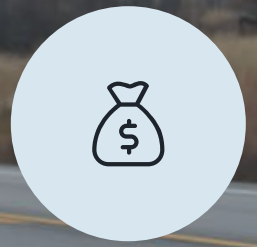
## Procedures

Consideration 3

## Safety Record

Consideration 4

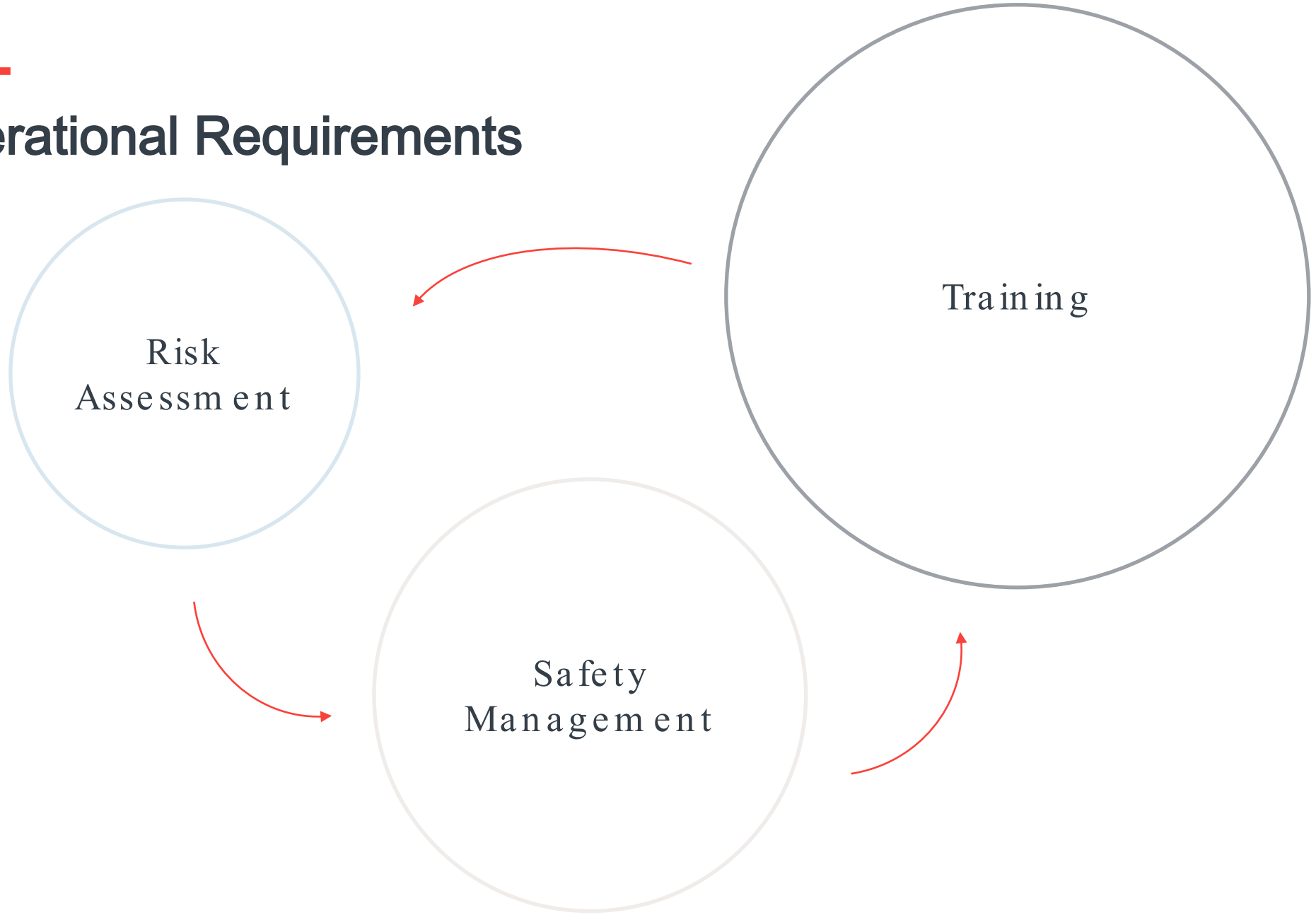
## Insurance



Consideration 5

## Mobilization

# Operational Requirements



# Flight operations

01

## On-Site Pre Flight

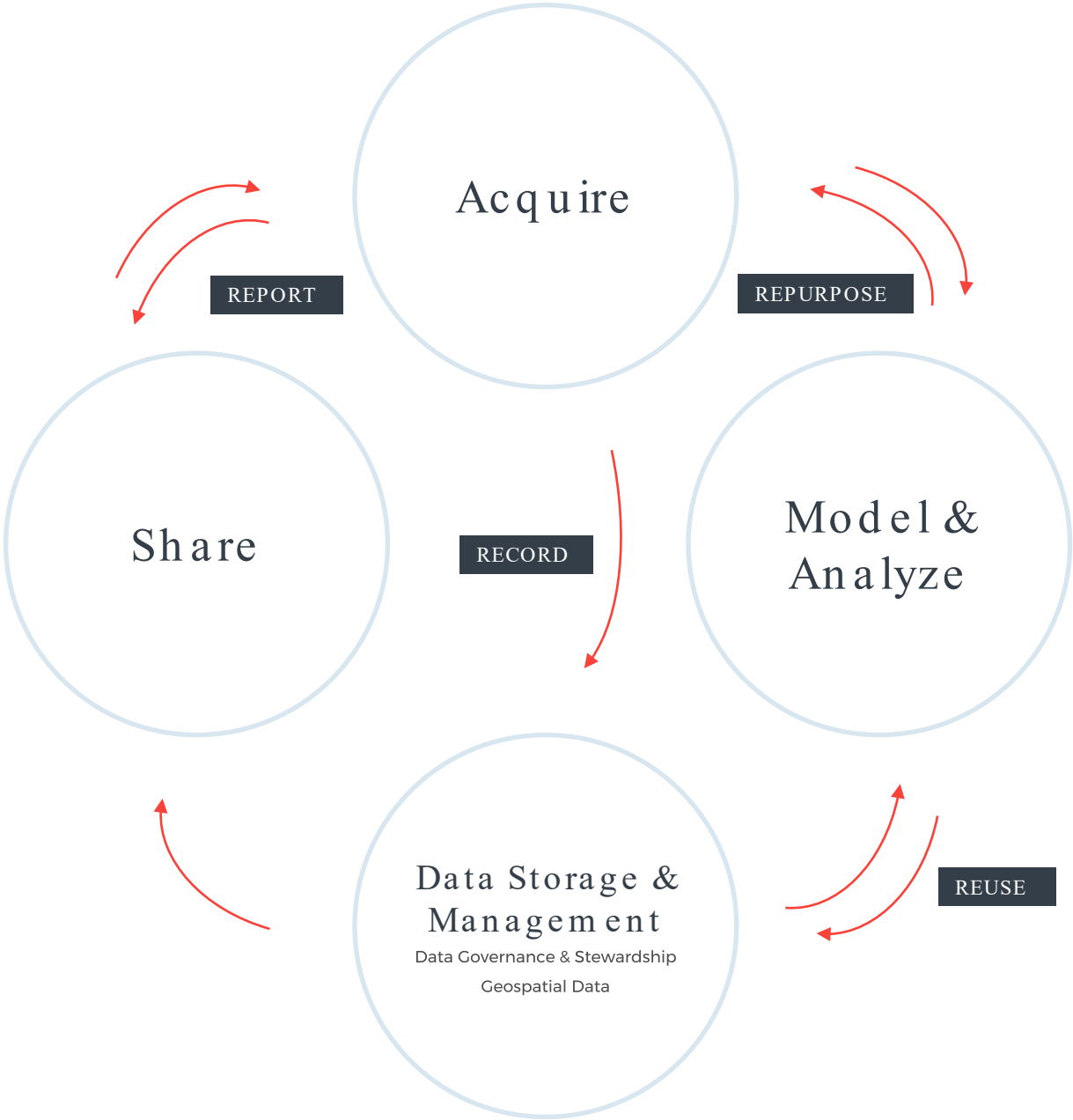
02

## Flight

03

## Post Flight

# Data Management



# Dealing With Emergencies

- Total Loss of Power
- Partial Loss of Power
- Airspace Encroachment
- Loss of Control of the Aircraft
- Erratic Behavior
- Fly Away
- Bird Strikes
- Interference from Outside Sources
- Nearby Emergency when Flying
- Downed Aircraft Recovery Plan
- Accident Reporting
- Waivers

# Use Cases

USE CASES

# Emergency Response



$3.36/hour

UAS Operational Cost

$250 - $600/hour

Manned Aircraft



USE CASES

# Public Outreach and Engagement

UAS can Play a key role in communicating vital information and harnessing public support for projects

- Vital Information
- Acquisition of Project Images and Videos
- Augment other mediums
- Additional Costs outweighed by Savings

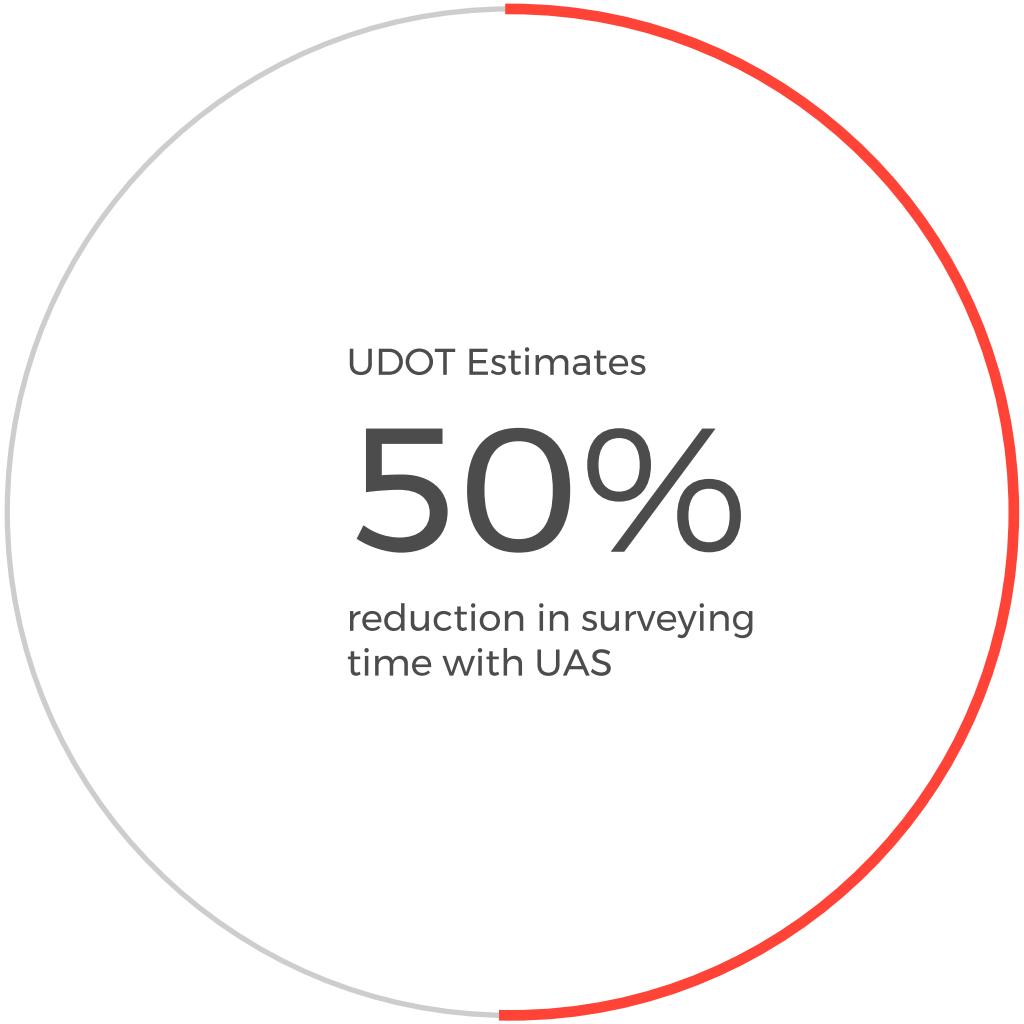
USE CASES

# Bridge Inspection

USE CASES

# Surveying and Mapping

- Can Achieve Design Grade Data
- Sensor
- Ground Control Points
- Quality Control



USE CASES

# Construction Inspection

- Platform
- Frequency
- Repeatability
- Accuracy

USE CASES

# Traffic Analysis

## DOT Integration

- *Tethering Technology*
- *Train Pilots for Traffic Analysis*
- *Sensor/Platform selection for success*

# Summary

✓ Existing guidelines address the issues adequately

■ Guidelines cover this topic but could be supplemented

□ No current guidelines, Report provides recommendations

| SOP TOPIC | VTRANS | CTDOT | MAINE DOT | MASSDOT | RIDOT | NHDOT |
|---|---|---|---|---|---|---|
| Organizational Structure | ✓ | ✓ | ✓ | ✓ | □ | ✓ |
| Personnel Training Requirements | ✓ | ✓ | ✓ | ■ | □ | □ |
| Safety Management and Operational Risk Assessment | ■ | ■ | □ | □ | □ | □ |
| Pre-flight Planning and On-site Risk Assessment | ■ | ■ | ■ | □ | □ | □ |
| Flight Operations – During and Post Flight | ✓ | ✓ | ■ | □ | □ | □ |
| Post-Flight Data Workflow | □ | □ | □ | □ | □ | □ |

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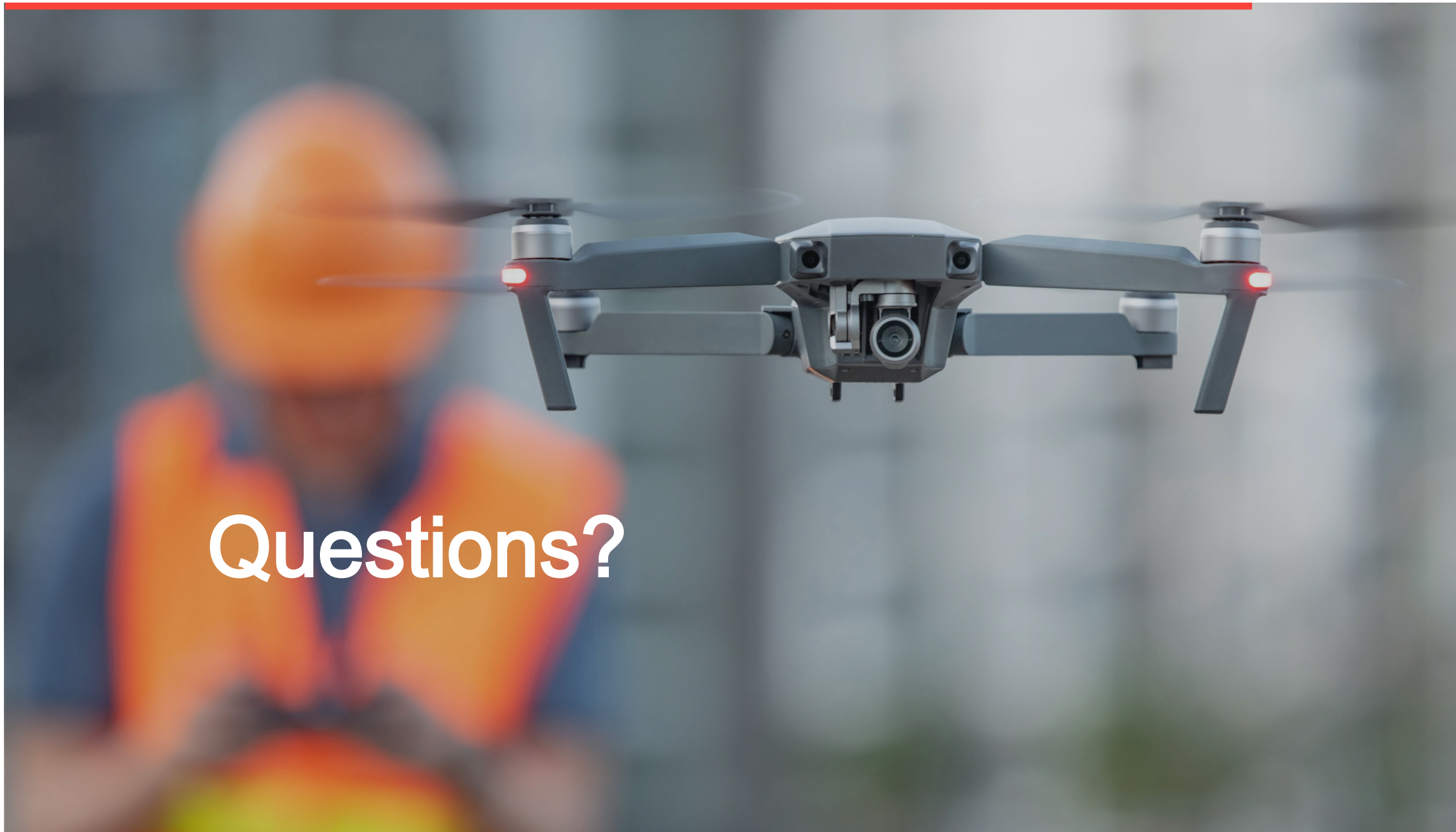
| SOP TOPIC | VTRANS | CTDOT | MAINE DOT | MASSDOT | RIDOT | NHDOT |
|---|---|---|---|---|---|---|
| Data transmittal, retention, and privacy | ✓ | ■ | ■ | ☐ | ☐ | ☐ |
| UAS Emergency Procedures | ✓ | ✓ | ☐ | ☐ | ☐ | ☐ |
| Downed Aircraft Recovery Plan | ✓ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Accident Reporting | ✓ | ✓ | ☐ | ☐ | ☐ | ☐ |
| Guidelines for Obtaining Waivers | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Use Case Indicators | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |


Questions?

# Thank you!

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