

Notes for the *Remote Observation over Time (Drone in a Box)* research project kick-off meeting.

October 3, 2024, 8:30-10:00 AM

Invitees:

Vaneza Callejas, Research and Project Associate, MDT

Rebecca Ridenour, Research Program Manager, MDT

Mike Kuni, Project Chair, MDT

Paul Hilchen, Geotechnical Lead, MDT

Curtis Buckley, Technical Panel Member, MDT

Lee Grosch, Technical Panel Member, MDT

Justun Juelfs, Technical Panel Member, MDT

Cameron Klobberdanz, Technical Panel Member, MDT

Patrick McCann, Technical Panel Member, MDT

Ethan Ritzen, Technical Panel Member, MDT

Patrick Dryer, Technical Panel Member, AKDOT

Stephanie Brandenberger, Technical Panel Member, FHWA

Raja Nagisetty, Technical Panel Member, Montana Tech

Jeremy Crowley, Principal Investigator, UM

Bart Bauer, Waiver Specialist, UM

Ian Hellman, GIS Specialist/Pilot, UM

Agenda:

1. Introductions

- a. Panel Chair- Mike Kuni talked briefly about the project, goals, and technical panel role.
- b. Panel Members- Each panel member talked about their position and interest in the research
- c. Research Team- (Jeremy, Bart, Ian) Jeremy briefly described team member's strengths and focus for the project. Jeremy as PI and logistics manager, Bart as the Federal Aviation Administration (FAA) waiver specialist, Ian as the GIS lead and chief project pilot
- d. Research Project Manager- Rebecca briefly talked about project logistics

2. Project Management (Vaneza)- Vaneza described some policy and procedure information to help guide the research

3. Review of Project Scope, Schedule (Jeremy)- Jeremy described where this Phase I work fits into a larger proposed DOT Smart Grant proposal, and went into some detail on the project schedule, project partners, deliverables, and the 5 Tasks to be accomplished under this research: GIS Analysis of Natural Hazards, Market Research on DiaB, FAA BVLOS Waiver, Staged Testing of DiaB Operations, Analysis of Applied Use-case Scenarios

4. Discussion (All)

-Discussion on GIS data available. RAMP, BNSF Avalanche, Earthquake, Landslide, Flood, Fault, cellular coverage

-Discussion on potential project locations criteria:

- Proximity of location to researchers
- Potential to monitor an actual natural hazard (burn-scar induced rockfall?)
- Sparsely populated, Class G Airspace
- With and without cell phone coverage

-Discussion on best strategy to obtain a beyond visual line of sight waiver

- Tiered individual waivers with increasingly complex operations
- Waiver that covers most complex operations
- It was decided that the tiered approach was most likely to be successful
- It is likely a 6-month turn-around time for the FAA waiver

-Discussion on equipment availability

-Is there a way to get NDAA compliant system for the research? Likely not within the project schedule

- We have confirmed access to a DJI Dock 2 through Frontier Precision
- Jeremy would follow up with Collin at Frontier Precision to pin down dates

5. Next Steps (All)

- 1) Paul, Mike, and Justun will follow up with Ian on getting access to RAMP GIS Data. Justun will reach out to BNSF for access to the avalanche data
- 2) Paul/Mike will provide some potential field locations
- 3) Bart/Jeremy will set up an initial meeting with a FAA representative to get their perspective on the waiver submission
- 4) Ian/Bart/Jeremy will start work on the GIS analysis, market research, and waiver strategy and report progress in the first quarterly progress report (due Oct 31)
- 5) Jeremy will work with Collin to pin down dates/logistics for the winter and summer field data collection (likely Feb and June 2025).



MDT Remote Observation over Time (Drone in a Box) Phase 1 Kickoff Meeting

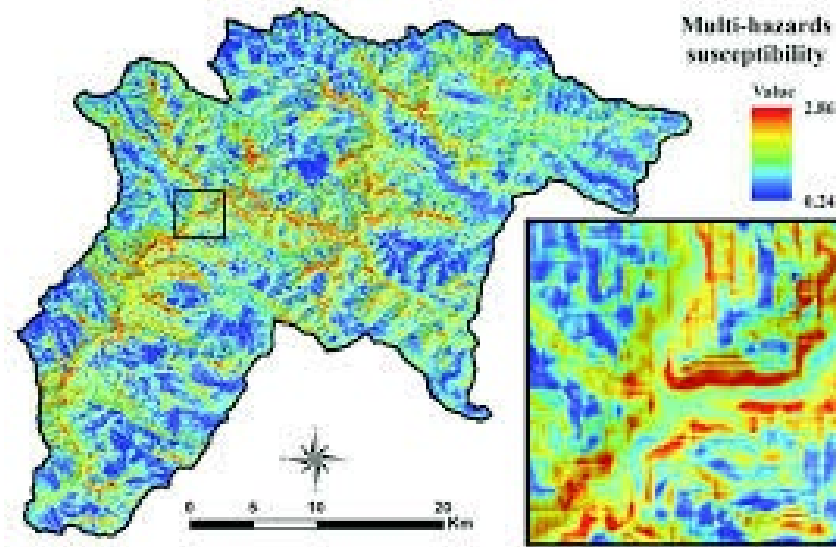
**Autonomous Aerial Systems Office (AASO)
Researchers**

- **Jeremy Crowley, PI**
- **Bart Bauer, FAA Waiver Specialist**
- **Ian Hellman, Pilot and Data Analyst**

Project Overview

- ◆ Phase I- This work made up of 5 tasks
 - ◆ Deployment locations
 - ◆ State of the Tech
 - ◆ BVLOS waiver
 - ◆ Staged DiaB testing
 - ◆ Interface with Maintenance and TMC
- ◆ Phase II- Future work
 - ◆ DiaB mobile trailer
- ◆ Phase III- Future work
 - ◆ Natural hazard to automatically trigger DiaB
- ◆ DOT SMART Grant- parallel effort
 - ◆ Would encompass Phases I-III

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION	
CERTIFICATE OF WAIVER OR AUTHORIZATION	
ISSUED TO	Public Agency – Elizabeth Police Department
Elizabeth Police Department 1 Police Plaza Elizabeth, NJ 07201	
This certificate is issued for the operators specifically described hereinafter. No person shall conduct any operation pursuant to the authority of this certificate except in accordance with the standard and special provisions contained in this certificate, and such other requirements of the Federal Aviation Regulations not specifically waived by this certificate.	
OPERATIONS AUTHORIZED:	Operation of small Unmanned Aircraft System(s) weighing less than 55 lbs., in Class B and G airspace at or below 200 feet Above Ground Level (AGL) in the vicinity of Elizabeth, New Jersey under the jurisdiction of Newark Air Traffic Control Tower (EWR ATCT) and New York Terminal Radar Approach Control Facility (N90 TRACON). See Special Provisions and Attachments.
LIST OF WAIVED REGULATIONS BY SECTION AND TITLE	14 CFR §91.113(b) (BVLOS)



Project Partners

- ♦ MDT
 - ♦ Rebecca Ridenour- Research Program Manager
 - ♦ Vaneza Callejas- Research and Project Associate
 - ♦ Mike Kuni- Technical Panel Chair
 - ♦ Paul Hilchen- UAS/Project Support
- ♦ Frontier Precision
 - ♦ Collin Kemmesat, UAS support, DiaB equipment
- ♦ AASO, University of Montana
 - ♦ Jeremy Crowley, PI
 - ♦ Bart Bauer, Waiver Specialist
 - ♦ Ian Hellman, Pilot and Data Analyst



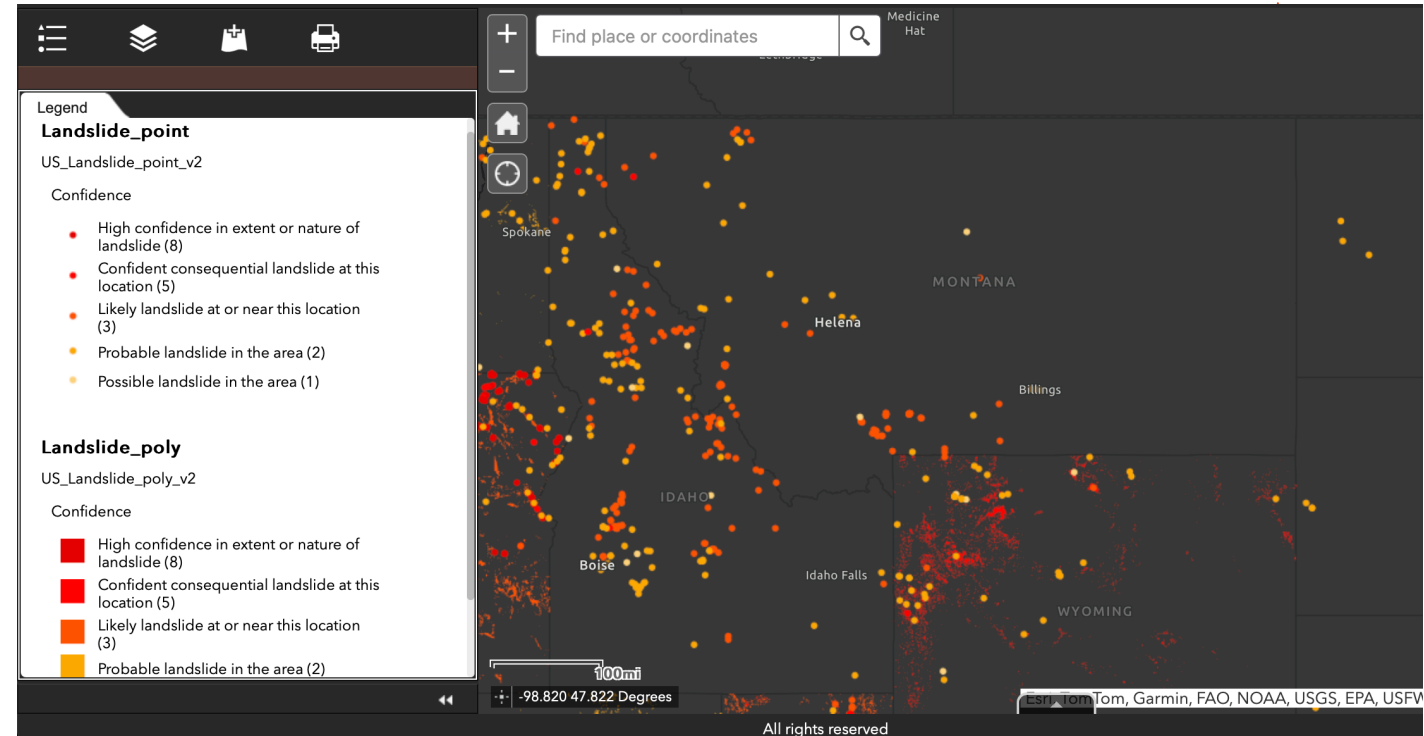
Project Timeline

- ◆ 18-month contract (July 2024- Dec 2025)
- ◆ GIS, Market Research, Waiver (Oct 2024)
- ◆ Staged DiaB testing
 - ◆ Winter- Feb 2025
 - ◆ Summer- June 2025
- ◆ Project Completed- Final Reports and Presentation
 - ◆ December 2025



Task 1- GIS Analysis of Natural Hazards

- ◆ Hazards to transportation networks
 - ◆ Landslides
 - ◆ Earthquakes
 - ◆ Faults
 - ◆ Floods
 - ◆ Rock Slope Conditions
- ◆ Hazard susceptibility map



Task 2- Analysis on the current industry, and technology, and costs for DiaB ⁶



- ◆ Market Research
- ◆ Cost
- ◆ Availability
- ◆ Capabilities
- ◆ Company origin
- ◆ State of the Tech



Task 3- Preparation and submission of FAA waiver for BVLOS operations ⁷

- ◆ Set a meeting date with the FAA Contact
 - ◆ Option 1: Complete waiver to enable complex operations
 - ◆ Option 2: Staged waivers with increasing complexity
- ◆ Develop the Risk Matrix
- ◆ Write and submit waiver

		A	B	C	D	E
		Negligible	Minor	Moderate	Significant	Severe
E	Very Likely	Low Med	Medium	Med Hi	High	High
D	Likely	Low	Low Med	Medium	Med Hi	High
C	Possible	Low	Low Med	Medium	Med Hi	Med Hi
B	Unlikely	Low	Low Med	Low Med	Medium	Med Hi
A	Very Unlikely	Low	Low	Low Med	Medium	Medium

- ◆ Ideal planned operations: beyond visual line of sight (BVLOS) up to 400', non-geographic based (Montana) in Class G (uncontrolled) in sparsely populated areas

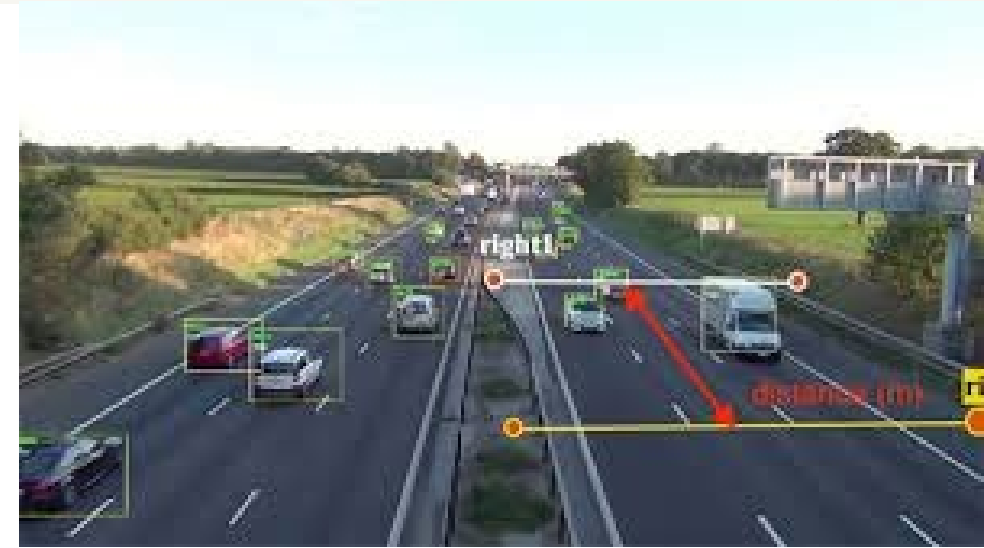
Task 4- Staged testing of DiaB operations

- ♦ Staged/tiered= progressively more complicated operations, i.e.
 - ♦ Simulated BVLOS- Pilot in VLOS
 - ♦ Simulated BVLOS- Pilot on site but not in VLOS
 - ♦ True BVLOS- Pilot not on site
 - ♦ BVLOS in cellular denied environment
- ♦ Weather extremes
 - ♦ DiaB functionality/performance will be evaluated in very cold and hot environments
- ♦ Video documentation
 - ♦ DiaB operations will be filmed for documentation, analysis, and troubleshooting



Task 5- Analysis of potential applied use-case scenarios

- ♦ MDT Maintenance, UAS Program, and the Traffic Management Center (TMC)
 - ♦ For example:
 - ♦ How could a DiaB monitor a construction site?
 - ♦ Could DiaB be used to communicate with or control smart traffic signals?
 - ♦ Are there any communication or data bottlenecks in cellular/outside cellular?
 - ♦ Could a DiaB be used to manage/monitor a multivehicle crash?
 - ♦ Other ideas?



Reporting Schedule

- ◆ Meeting Notes- < 2 weeks post-meeting
- ◆ Quarterly Progress Reports (QPR)
 - ◆ 10/31/24, 1/31/25, 4/30/2025, 7/31/25, 10/31/25
- ◆ Deliverables
 - ◆ Task 1- GIS Report 10/31/24
 - ◆ Task 2- Tech Report 10/31/24
 - ◆ Task 3- Waiver Report 10/31/24
 - ◆ Task 4- DiaB Testing 2/31/25 (winter), 6/15/25 (summer), Report 6/30/25
 - ◆ Task 5- TMC scenarios Report 7/30/25
 - ◆ Final Report and Presentation 12/25



Thank you! Questions?
Discussion?

