



United States Department of Agriculture

USDA Forest Service UAS Program Update

Tactical Fire Remote Sensing Advisory Committee (TFRSAC)
NASA Ames Research Center
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FS UAS Program at a Glance...

- Staff
 - Permanent UAS Program Manager hired in July 2018
- Program Focus
 - Develop a comprehensive UAS program in collaboration with DOI
 - Initially support interagency fire operation missions
 - Increase capacity to support resource management missions
- Platforms
 - No official FS fleet aircraft yet
 - Aircraft via IAA with BLM available for FS staff training and fire missions
- Pilots
 - Initial cadre of 30 FS pilots trained in Spring 2019
 - Limited to red carded staff with fire line experience
 - Training for resource management staff planned for FY20





Policy for FS UAS Pilots and Missions

A publication of the
National Wildfire
Coordinating Group



NWCG Standards for
Fire Unmanned
Aircraft Systems
Operations

PMS 515 February 2019



Forest Service
Fire and Aviation Management

**Unmanned Aerial System (UAS)
National Operations Plan**

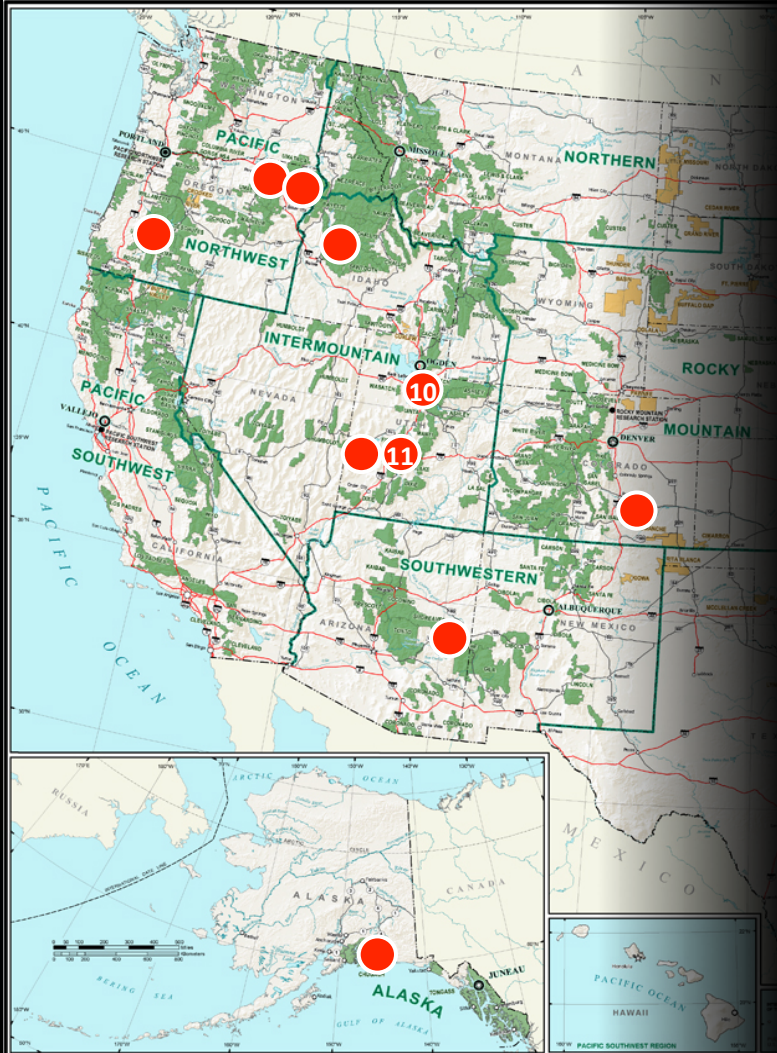
- All Mission Types
 - 14CFR, Part 107 (FAA sUAS Rule)
 - FSM 5700 (FS Aviation Policy) **(Under revision)**
 - USDA and WH directives
- Fire / Incident Support Missions
 - Interagency Fire UAS Operations Guide (PMS 515)
 - Standardized processes and procedures for interagency use of UAS for fire management
 - Staff must meet qualifications for designated positions (UASP, UASD, UASM, UASL)
- Resource Management Missions
 - National FS UAS Operations Guide **(In development)**
 - Supplemental guidance for planning/executing UAS missions

FS UAS Missions Via Agreements and Contracts

- External Cooperators
 - UAS flight services provided by other agencies and academia
 - Interagency agreements required
 - Aircraft and pilots need to be inspected and carded
 - Access to DOI aircraft and pilots is relatively easy
- End Product Contracts
 - Focus is on the data
 - UAS cannot be specified, but can be used to meet contract
- Flight Service Contracts
 - Leverage existing contracting vehicles, including DOI CWN UAS Support Services Contract



Examples of Recent FS sUAS Missions



1. Interagency Wildfire Operations Support in coordination with DOI / Multiple Incidents & Locations (2015 – 2018)
2. Placer River Trail Bridge Inspection / Chugach NF (June 2015)
3. Forest Health/Biomass Aerial Survey / Apache-Sitgreaves NF (September 2016)
4. Eurasian Milfoil Mapping / Fishlake NF (September 2016)
5. Blackjack/Bluebird Mine Aerial Survey / Umatilla NF (October 2016)
6. Riparian/Grass Height Survey / Wallowa-Whitman NF (June 2017)
7. Champion Mine Aerial Survey / Umpqua NF (August 2017)
8. Pioneer Post-Fire Aerial Survey / Boise NF (July 2017)
9. Dinosaur Track Mapping / Comanche NG (November 2017 / March 2018 / December 2018)
10. Invasive Weed Mapping / Uinta-Wasatch-Cache NF (July 2018)
11. Riparian Area Mapping / Fishlake NF (August 2018)



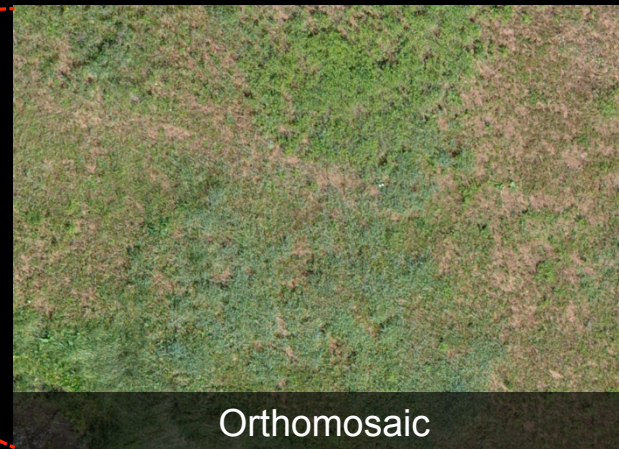
Requested / Planned FS UAS Missions for 2019

Mission Types	Support Resources
<ul style="list-style-type: none"> • Interagency wildfire operational support <ul style="list-style-type: none"> • Spot fire detection • Fire perimeter mapping • Situational awareness • Aerial ignition 	<ul style="list-style-type: none"> • DOI / BLM aircraft & pilots • DOI / BLM aircraft & FS pilots • DOI CWN UAS services contract
<ul style="list-style-type: none"> • Resource management support <ul style="list-style-type: none"> • Riparian surveys • Grass height estimation • Fen / wetland mapping • Forest restoration treatment monitoring • Post-fire damage assessments • Infrastructure inspections 	<ul style="list-style-type: none"> • External cooperator aircraft & pilots <ul style="list-style-type: none"> • BLM • USGS • Academia • End product contracts with vendors • DOI CWN UAS services contract

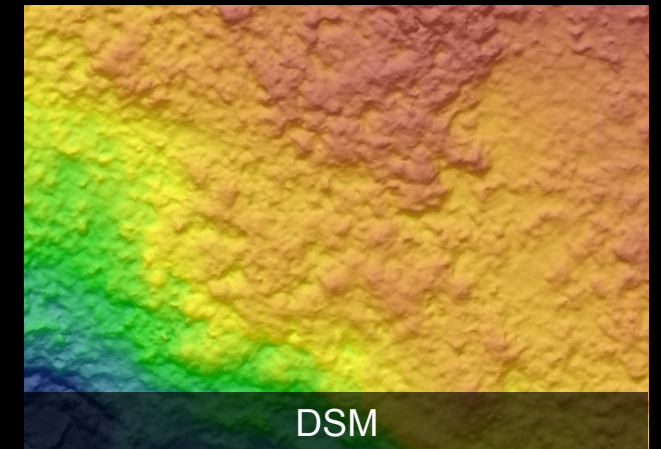


sUAS Riparian Assessment and Grass Height Measurements

- Imagery acquired in coordination with DOI OAS
- 135 acre site on Pine Creek on Wallowa-Whitman NF (Oregon)
- 1.3 cm RGB imagery
- Assess stream bank erosion on Pine Creek, vegetation mapping, measure grass height



Orthomosaic

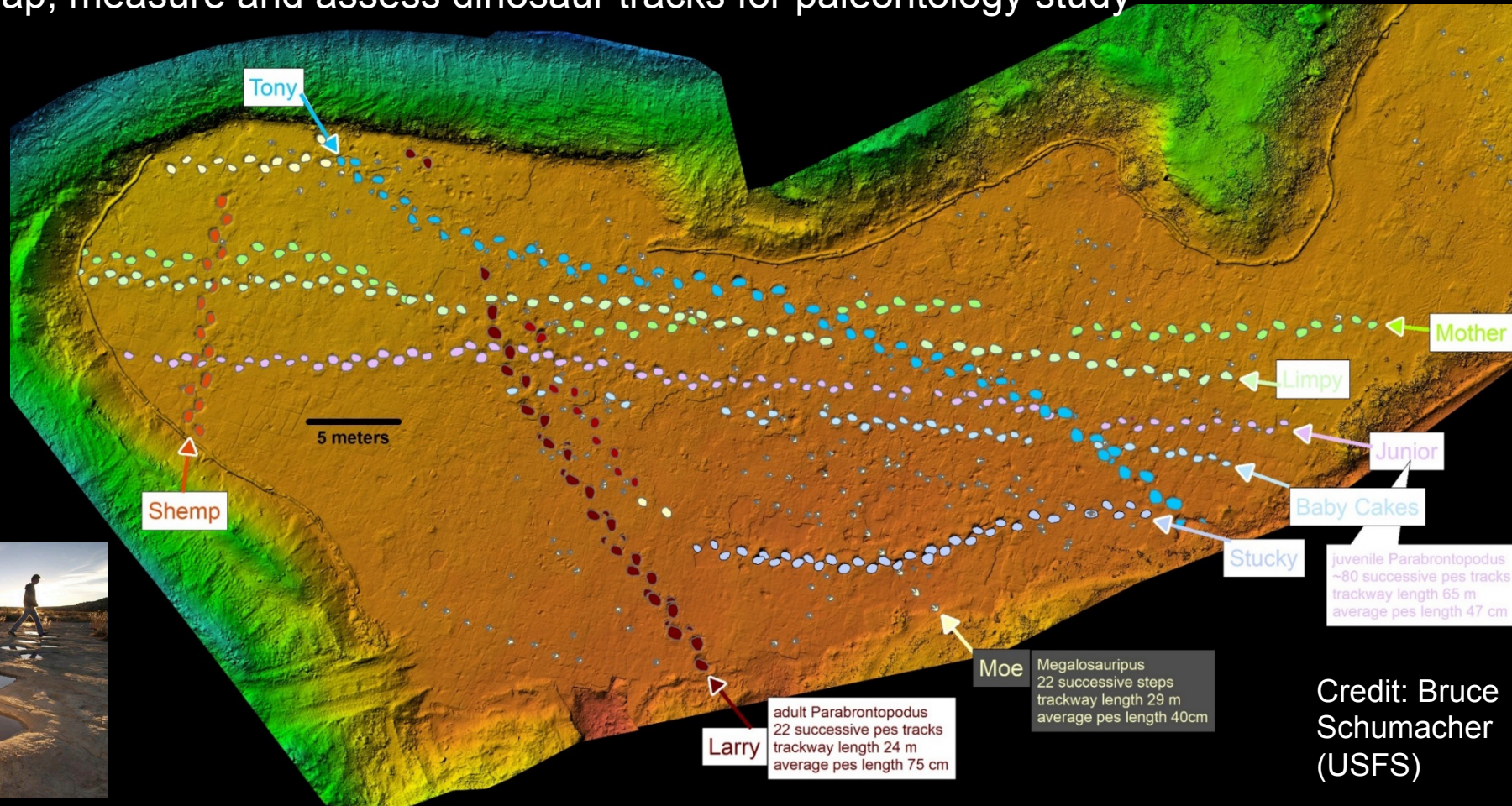


DSM

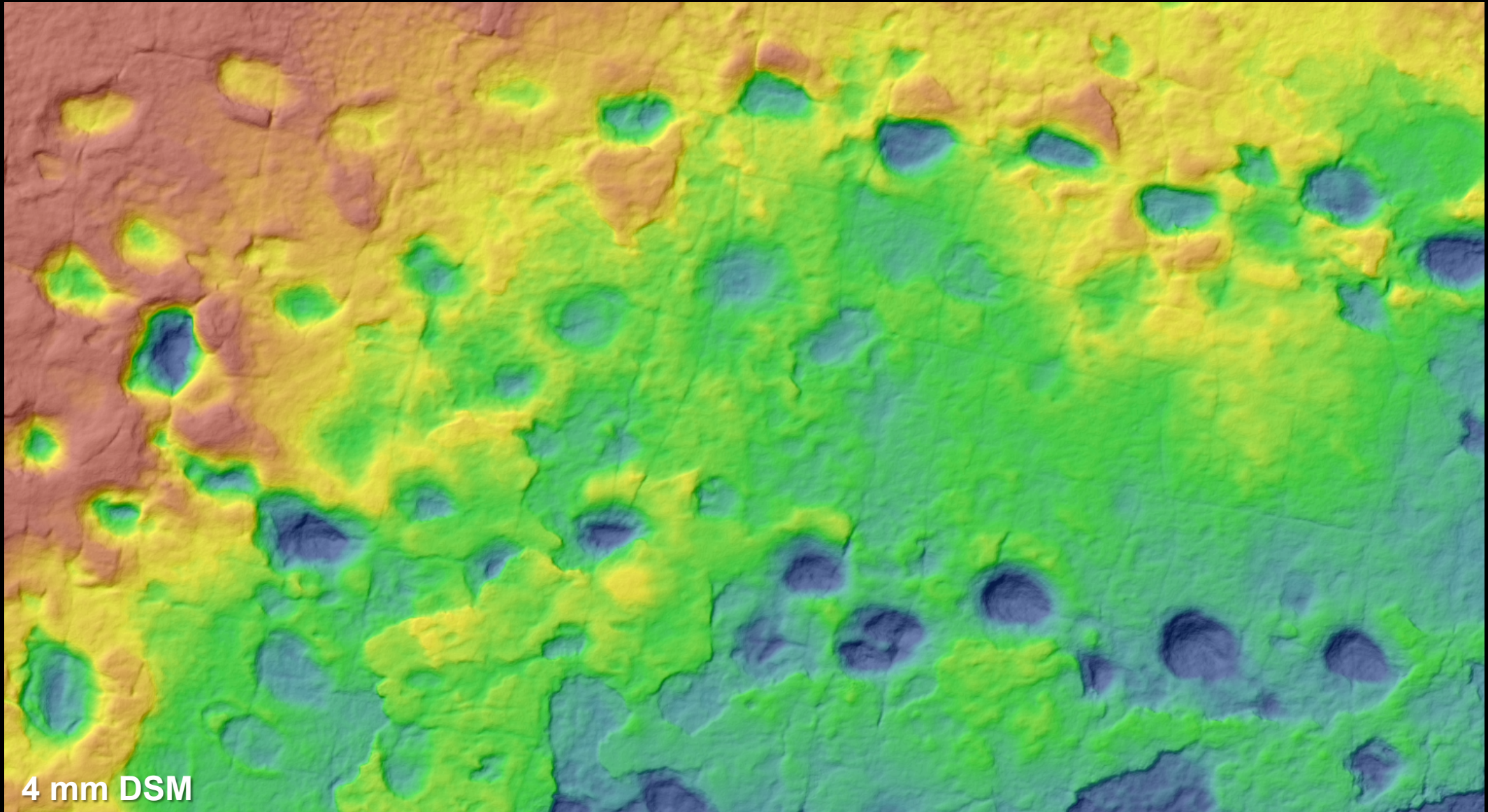


sUAS Dino Track Mapping

- Imagery acquired in coordination with BLM
- ~1 acre site on Purgatoire River in Comanche NG (Colorado)
- 2mm RGB imagery
- Map, measure and assess dinosaur tracks for paleontology study



sUAS Dino Track Mapping

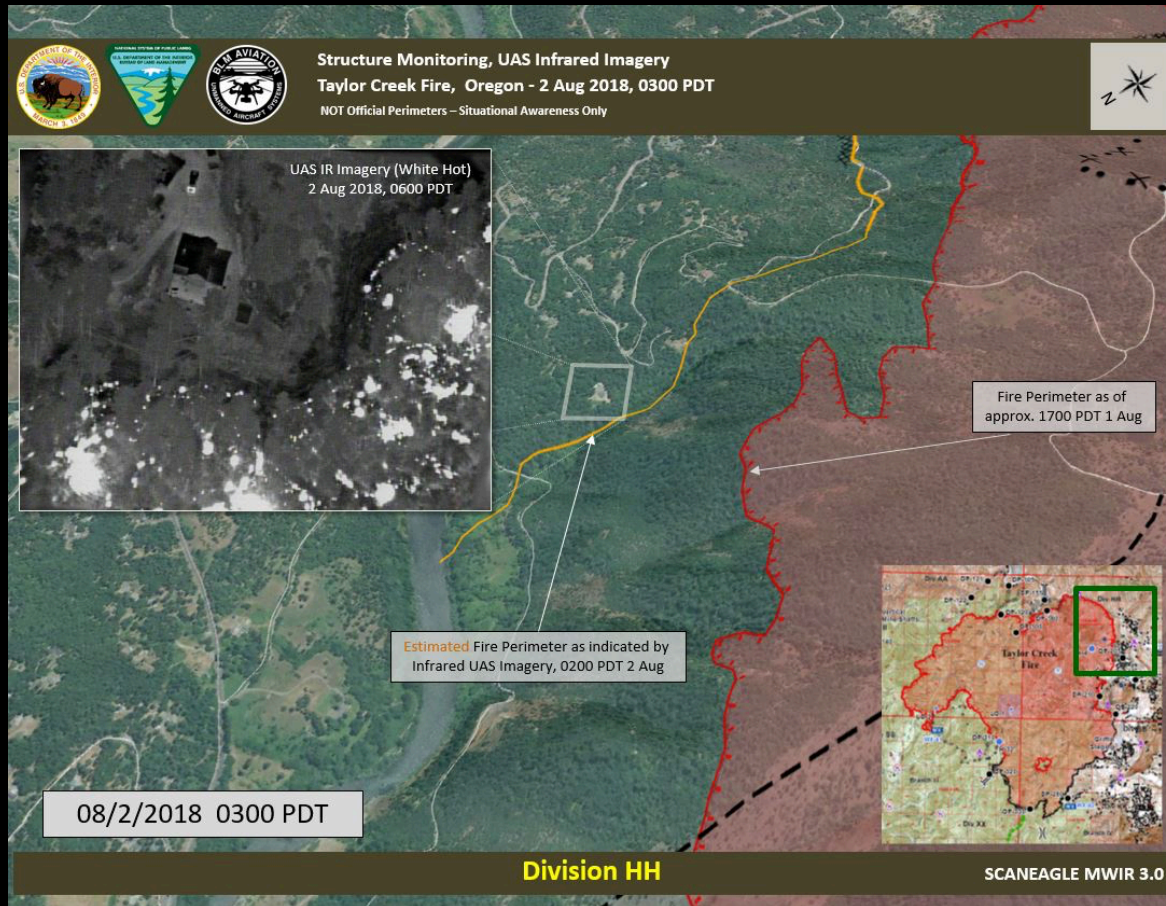


Interagency Fire Operations sUAS Platforms

- DOI Aircraft Utilized by FS in 2019
 - 3DR Solo
 - Parrot Anafi
 - Autel EVO
- DOI Call When Needed (CWN) UAS Contract Aircraft
 - Insitu - ScanEagle
 - Bridger Aerospace - Silent Falcon
 - Precision Integrated – Stalker XE
 - Pathways2Solutions – Bramor
 - Additional vendors / platforms in 2019

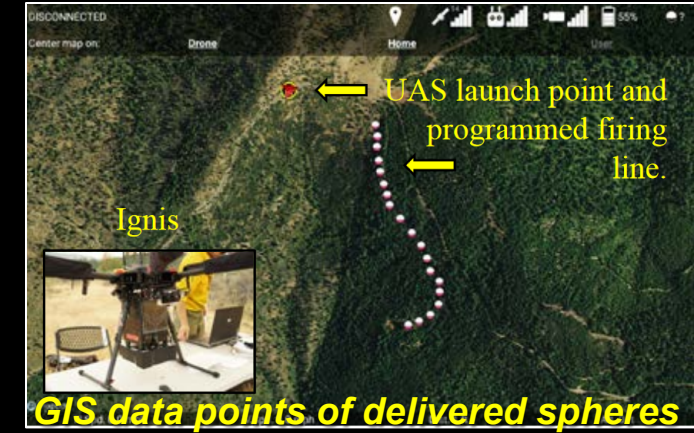


sUAS Infrared Fire Mapping & RT Situational Awareness



- Mapping and real-time IR video display with ScanEagle UAS on the Taylor fire
- ~8 inch fire can be identified by ScanEagle at 5,000 to 10,000 AGL
- 80% of the 382 DOI CWN contract flight hours in 2018 were conducted on FS-managed fires

sUAS Aerial Ignition Delivery



- DOI and FS NTDP are evaluating sUAS platforms with PSD payloads for aerial ignitions
- 110-125 spheres per load, ignite 50-75 acres per load
- Objectives are to Increase safety/efficiency of aerial ignition operations, reduce personnel exposure

Current FS UAS Program Challenges

- Program Staffing
 - FS is proposing an organizational structure to address this issue
- Policy/Guidance Development
 - FSM 5700
 - FS National UAS Operations Guide
 - Programmatic Risk Assessment
- Platform Acquisitions
 - “Blanket” aviation business case development
- Pilot Availability
 - UAS support is primarily a collateral duty



Additional Information

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