



Wildland Fire UAS Program

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National Interagency Coordination Center Predictive Services

UAS Systems and Typing

Type	Configuration	Endurance	Data Collection Altitude (agl)	Max Range (miles)	Typical Sensors*
1	Fixed-Wing	6-14 Hours	3,500 - 8,000	50	EO/ Mid or Long Wave IR
2	Fixed-Wing	1-6 Hours	3,500 - 8,000	25	EO/Long Wave IR
3	Rotorcraft	20-60 min.	2,000 and below	5	EO/IR Video and Stills
4	Rotorcraft	Up to 20 min.	1,200 and below	< 2	EO/IR Video and Stills

<https://uas.nifc.gov/>

UAS Type 1

Example

L3Harris HQ-90C

Call When Needed (CWN)

Vendor: Bridger Aerospace



Size – Weight – Power

Length: 8.2'
Wingspan: 15.4'
Gross Weight: 117 lbs.
Payload: Up to 22 lbs.
Engine: 100 cc 2-stroke

Performance

Max Range: 810 nm
Max Datalink Range: 54nm
Max Ceiling: 21,000' Density Altitude
Max Horizontal Speed: 65 kts
Cruise Speed: 45 kts
Endurance: 18 hrs.

ICS TYPE 1 UAS

Payload Options

Sensor: AV CM142/Nadir Mapper
Turret: Steerable, zoomable
Tracking: Target tracking with a daylight or infrared camera.
Video: Video imagery can be viewed in real-time, and/or in subsequent review, on networked displays and Wi-Fi devices, even smartphones.

Data Options

Real Time Video
High resolution photo and video
Infrared (IR) photo and video
Point/Line/Polygon/Orthomosaic (GIS products)

Crew Size

2 Remote Pilots

Portability and Transport Requirements

2 Vendor Service Vehicles

Typical Uses

Large Fire Support (Mapping/IR/Real Time Situational Awareness)
Large Scale mapping projects
Large scale videography
Fireline situational awareness
Fireline hot spot/spot fire detection and geopdf distribution

UAS Type Examples

SILENT FALCON

Call When Needed (CWN)



BYE UAS

SIZE - WEIGHT - POWER

Length: 6.2'
Wingspan: 14.4'
Mean Operating Weight: 32 lbs
Payload: Up to 5.5 lbs

PERFORMANCE

Endurance: 3 hours
Max Range: 25 miles
Max Ceiling: 20,000' MSL
Max Horizontal Speed: 48 knots
Cruise Speed: 25 knots
Power System: Electric (Li-Po Battery) / Solar
(Integrated Thin Film Photovoltaic)

ICS TYPE 2 UAS

PAYLOAD OPTIONS

Four (4) different ISR EO/IR sensors
Midwave Infrared (MWIR) camera
Hyperspectral/Multispectral Imager
FireWatch and CropWatch Payload
Spectrometer
Three (3) different mapping payloads...

DATA OPTIONS

Real Time Video
High resolution photo and video
Infrared (IR) photo and video
Point/Line/Polygon (GIS products)

CREW SIZE

2 Remote Pilots

PORTABILITY/TRANSPORT REQUIREMENTS

1 or 2 Vendor Service Vehicles

TYPICAL USES

Large Fire Support (Mapping/IR/Real Time Situational Awareness)
Large Scale mapping projects (500 acres)
Large scale videography
Fireline situational awareness
Fireline spot fire detection

UAS Type Examples

M600

Agency Owned and Operated



SIZE - WEIGHT - POWER

Dimensions: 65.5" x 60" x 28.5" with propellers, frame arms and GPS mount unfolded (including landing gear); or 17" x 16" x 22" with propellers, frame arms and GPS mount folded (excluding landing gear)

Mean Operating Weight: 22 lbs.

PERFORMANCE

Vertical Takeoff and Landing (VTOL)
Endurance: 35 minutes
Range: Beyond Visual Line of Sight (BVLOS) Capable: 2 Miles
Max Range: 5 miles
Max Ceiling: 14,500' MSL
Max Speed: 40 mph
Motors: Electric (Li-Po 6S Battery)

ICS TYPE 3 UAS

PAYLOAD OPTIONS

Cameras: Ronin MX, Zenmuse Z30, Zenmuse Z3, Zenmuse X3, Zenmuse X5 Series, Zenmuse XT/XT2, Ricoh GR2, Sony RX1R, Sony A7R, MicaSense RedEdge, Yellow Scan LIDAR
Gimbal: Zenmuse Z15 Series HD Gimbal
Ignis PSD

DATA PRODUCTS

Real Time Video
High resolution photo and video
Thermal photo and video
Point/Line/Polygon (GIS products)
Orthomosaic
Stereo Imagery (photogrammetric products)

CREW SIZE

1 or 2 Remote Pilots
2 (UAS) Aerial Ignition qualified remote pilots required for PSD operations

PORTABILITY/TRANSPORT REQUIREMENTS

Large cargo boxes/Needs UTV or Pickup Truck

TYPICAL USES

Aerial Ignition
Large Scale mapping projects (500 acres)
Large scale videography
Fireline situational awareness
Fireline spot fire detection

UAS Type Examples

MAVIC Pro

Agency Owned and Operated



SIZE - WEIGHT - POWER

Height: 4 inches
Wingspan Diagonal: 13 inches
Mean Operating Weight: 1.62 lbs

PERFORMANCE

Vertical Takeoff and Landing (VTOL)
Endurance: 27 minutes
Range: Beyond Visual Line of Sight Capable (BVLOS): 2 Miles
Max Ceiling: 16,404' MSL
Max Speed: 40 mph
Max Range: 8 miles
Motor: Electric (Li-Po Battery)

ICS TYPE 4 UAS

PAYLOAD OPTIONS

Camera: 4K & 12.5 MP
GPS Data Logger

DATA PRODUCTS

Real Time Video
High resolution photo and video

CREW SIZE

1 or 2 Remote Pilots

PORTABILITY/TRANSPORT REQUIREMENTS

Backpack

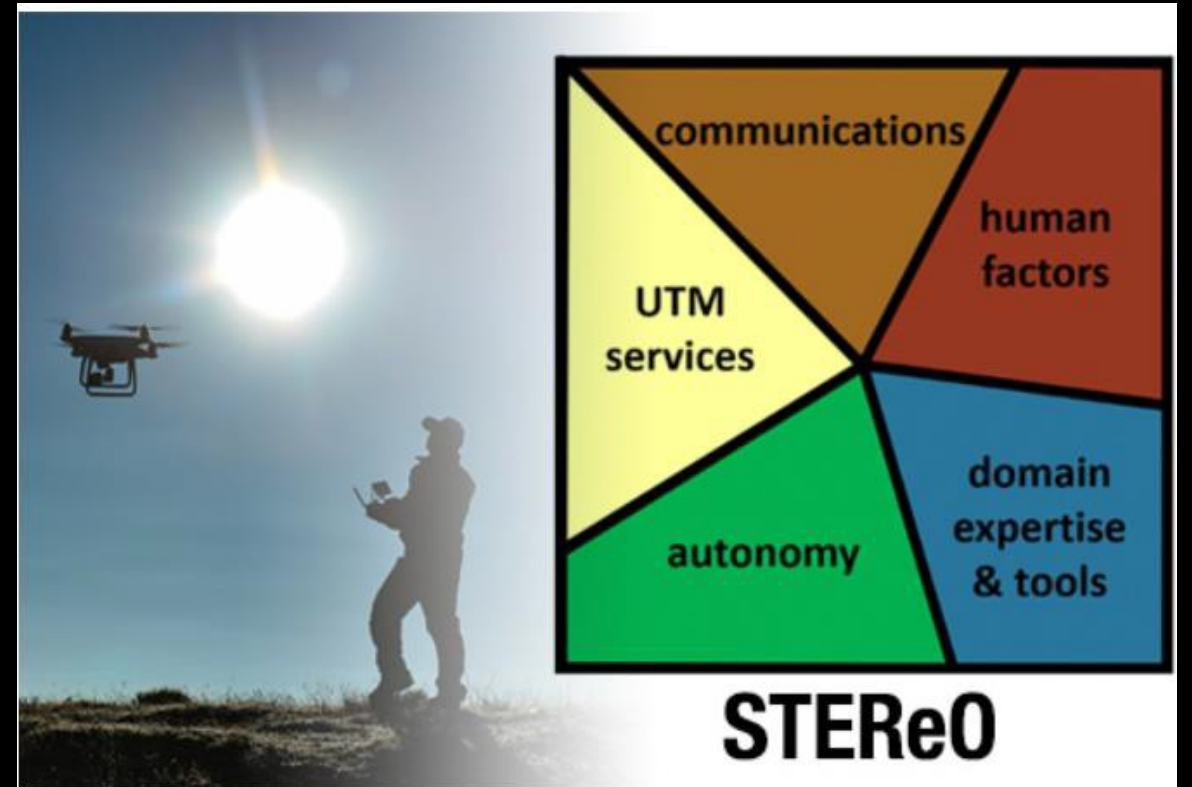
TYPICAL USES

Small scale videography
Fireline situational awareness

UAS Current Project

- Airspace Coordination
- Scalable Traffic Management for Emergency Response Operations
 - Work with NASA

[Airspace Operations Lab @ NASA Ames - Research](#)



STEReO

Scalable Traffic Management for Emergency Response Operations

Combining NASA technologies and partnerships to transform current-day emergency response operations.

A Convergent Aeronautics Solutions (CAS) execution activity under the Transformative Aeronautics Concepts Program (TACP).

<https://hsi.arc.nasa.gov/groups/AOL/research/stereo.php>

UAS takeoff/landing needs

- Less than 20 kts of wind
- Once 15 m AGL, generally stable
- Systems use GPS to help stabilize the system and account for turbulence
- Weather obtained from:
 - nearby Remote Automated Weather Stations (RAWS)
 - NWS Spot Forecasts
 - Incident Meteorologists (IMETs) at larger incidents

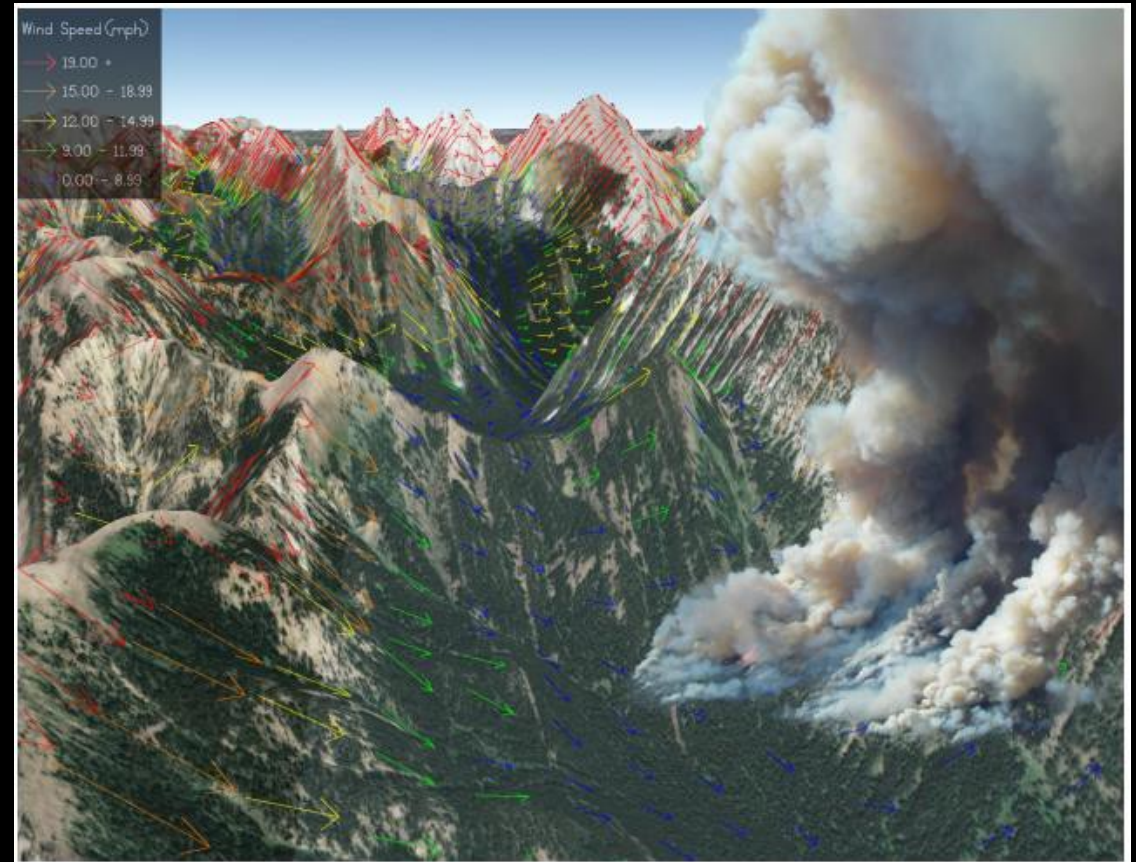


IMET Support

- Larger Type 1 and 2 team incidents – occasionally Type 3
- Daily Forecasts
- Other optional forecasts:
 - Aviation forecasts
 - Spot forecasts for a small location on a fire
 - Updates/Alerts for hazardous weather
 - Can run WindNinja – a laptop wind modeling program

WindNinja

- Input
 - Model (NAM, WRF-ARW, HRRR, etc.)
- Two solvers
 - Mass
 - Mass and momentum
- Output
 - Google Earth
 - Geospatial PDF
- IMETs will run in the field (or can be done in NWS or district offices)
- Resolution is 250 m



<https://weather.firelab.org/windninja/index.html>

Needs

- Higher resolution observational data of the
- High resolution modeling of complex terrain (100-250m or higher)

The logo for the National Interagency Fire Center is a large, faint watermark in the background. It consists of a circular border containing the text "NATIONAL INTERAGENCY FIRE CENTER" at the top and "Boise, Idaho" at the bottom. In the center of the circle is a stylized flame or leaf-like shape.

Questions?

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