Wildfire Intelligence

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SKYIMD.

AERIAL IMAGING MAPPING DATA
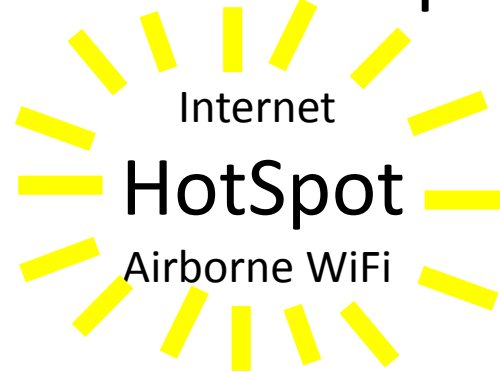
Comparison and Technical descriptions

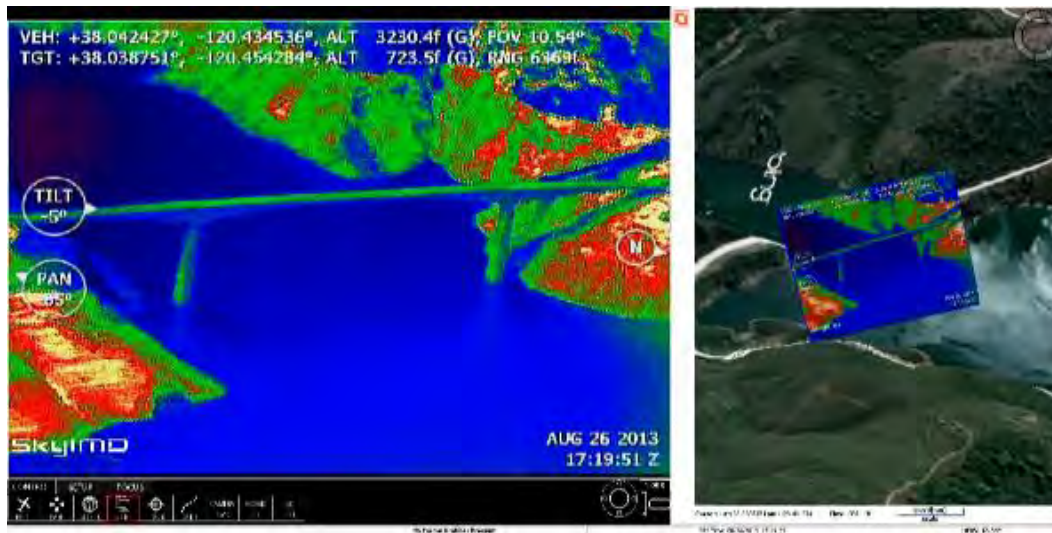| Description	SkyFusion Pak Wildfire 2000	Wildfire 2000+Microwave
Gyro stable 360° gimbal	Tase 200 Operated in the Air	Tase Operated both Air & Ground
Interface	Touch/mouse/keys/joysticks	Interface easier on ground
IR 640x480 10/5° fov	Tau 2 with Wildfire Isotherm	Tau 2 with Wildfire Isotherm
Visible super zoom 56-2° fov	Color NTSC video	Both Air & Ground
Display	Cockpit Split Video-Map	Both Air & Ground (more flexible)
Lock-on auto track	Moving Object, Scene, Map Point	Both Air & ground (easier) control
Auto-track Fire & Dozer line	GIS must be loaded	Air & Ground, easier on ground
Moving Map, base map	Topo, Aerial, Team GIS	Both, Air & Ground has more choices
Air Attack Mode	Instant Situational Awareness	Used mostly in the Air
Live Video	Recorded and 3G Transmitted	Better and more accessible
Photos sent by Satellite	1 button – JPG, or 1 button - Earth	Same, but faster & better on ground
Internet Hotspot	Wi-Fi in cockpit when 3G	Used in the Air
Retardant drop ID	COT or send SnapShot/KMZ	Easier to send to other aircraft
Microwave, ~30 miles to IC		~30 miles from each tower
Upgradeable	Yes, 100%-→	Yes, 100%
Persistent Surveillance optional	*Orthophotos, 3D Models, NDVI*	*Orthophotos, 3D Models, NDVI*

IR, Super Zoom EO, Live Video & photos to ground

Works at 200+ Kts

Internet
HotSpot
Airborne WiFi

360° Stabilized IR (5/10 ° FOV)
28X video continuous zoom (58->2 ° FOV)

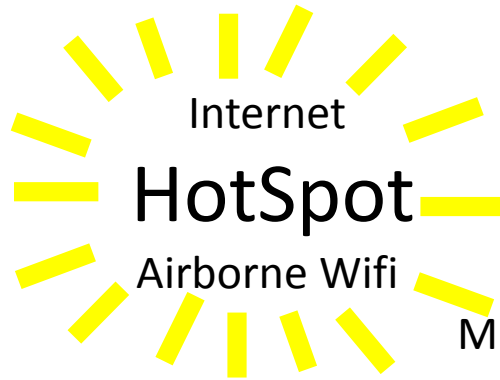Air | Ground

3G or
Satellite

Live Video

SnapShots

Plug'n Play simple for regular workers,
(not elite IR operators)

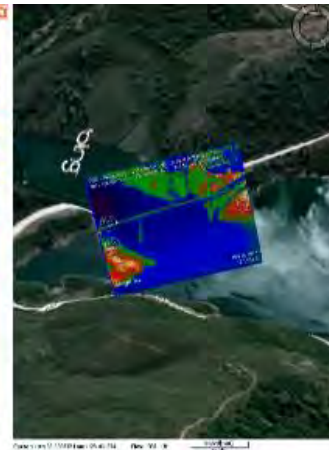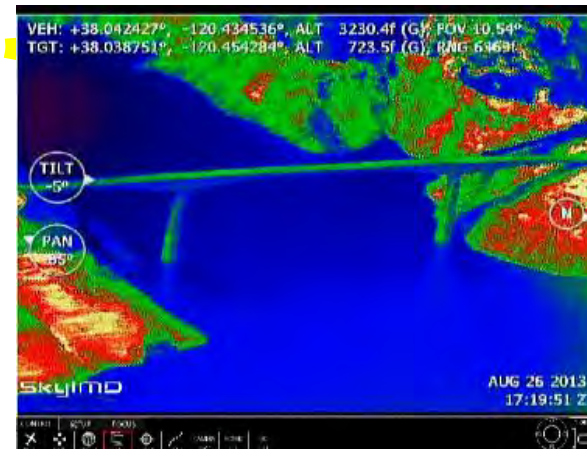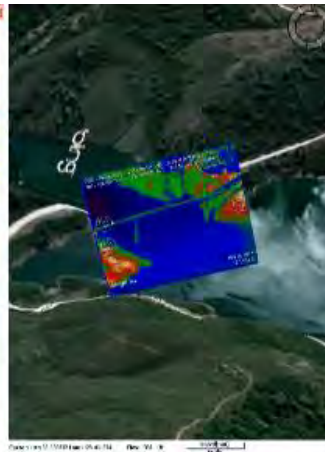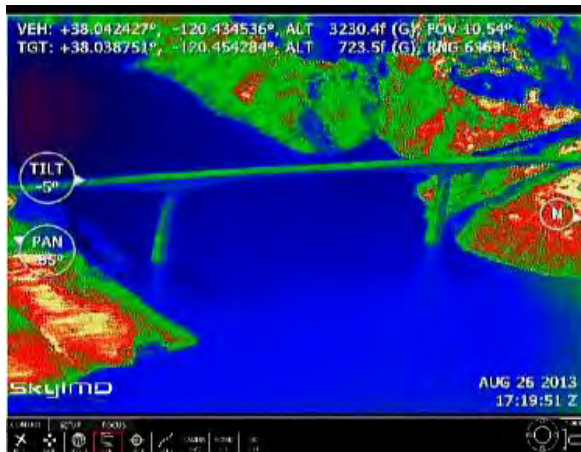# Microwave (unlicensed) duplicates control to the Ground

Internet

HotSpot

Airborne Wifi

Microwave, 3G

Satellite

Air | Ground

Live Video & Snapshots
To firefighters

Operate in the Air

Operate on the Ground

Air the same as the Ground

Operate from either Air or Ground or Both. Continuous video record both ground and air

One Aircraft supports Ground Crews, Incident Command, HQ & Itself

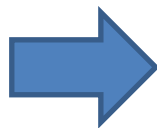
IC OPs

Easy

Operate Gimbal: IR 5/10° & Super Zoom Visible 2-56°
- **Touch** (like an **iPad**)
- Buttons/Joy stick (not needed, matches touch commands)
- Keyboard (not needed, Key-caps are labeled)
- Mouse (same as touch, but more precise than fat fingers)
- Ground: Microwave link upgrade allows for operator anywhere in the world - not in aircraft

IR 10/5° fov

Visible 56-2° fov

Touch Video

Touch Map

JPG·KMZ

A Few Intuitive Commands

- **Do Nothing**. Just passively watch
- Send **live video**: Always-on automatic when 3G present (request a COW*)
- **Lock-on:** Touch Screen or Button
- Go to **Point on Map**: double tap map
- **Look Around**: Touch or swipe video, Right Joystick
- **Zoom**: Left Joystick or onscreen slider or keyboard PgUp/PgDn
- **Air Attack Mode**: Touch or Button
- **Photo** to iPhone transmit : Touch Screen or Button
- **Earth Photo of Tanker drop**: Touch Screen or Button
- Change Camera **IR->Visible**: Touch Screen or Button or "C"

* Cellular on Wheels (COW) are available if the ATGS requests it (ATT or Verizon)

AutoTrack Fire/Dozer Lines

- Import NIFC .SHPs: Dozer, Hand-cut, Fire Fronts, Escape Routes
- Path Tracker will Auto-track Hands-off, and Record
- Change Zoom and IR/EO without losing track
- Locking on (stopping the Gimbal) is ok at any time
  - Tracking will restart by touching Track
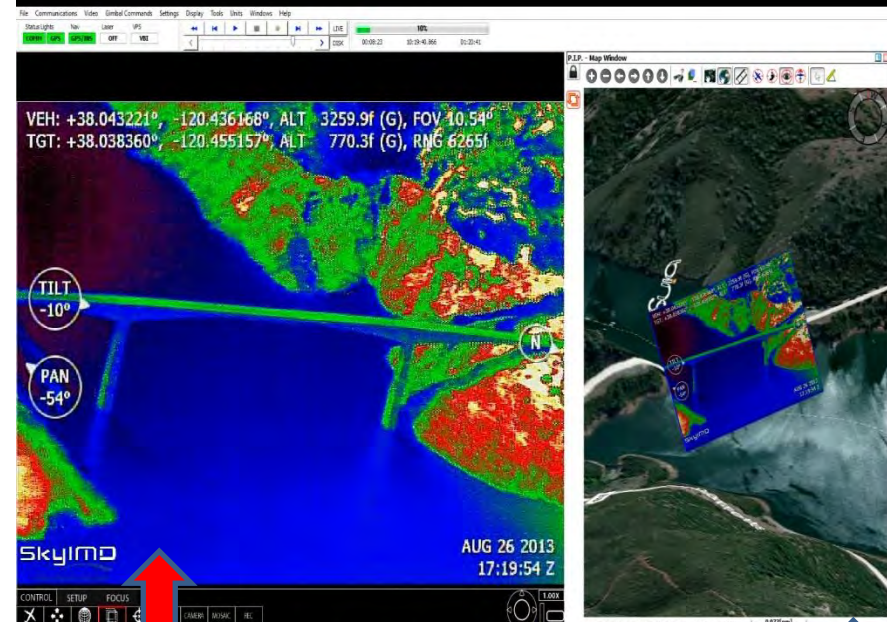- Photos and Video will transmit as normal

Click to see on YouTube

Air Attack Mode
Hands Off, Eyes Outside

As seen Through Windshield (Visible)

Infrared at Same Exact Location

Image Overlaid On Aerial Map Outline on Topos

- Instant Situational Awareness
- Identify Map Names
- Oriented to Intuitive line-of-sight
- At Night and in Smoke
  - See Mountains & Terrain
  - Discover Spot Fires
  - Fire Perimeter & Slop-overs
  - People

Wildfire Isotherm

- Specially developed WildFire sensitivity for IR
- Distinguish sun baked ground from fire
- Makes IR functional on **Hot Afternoons**
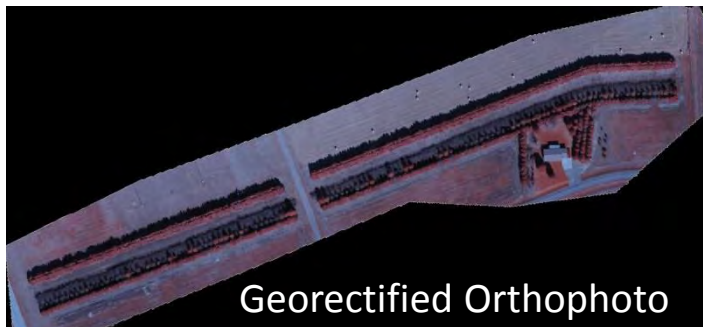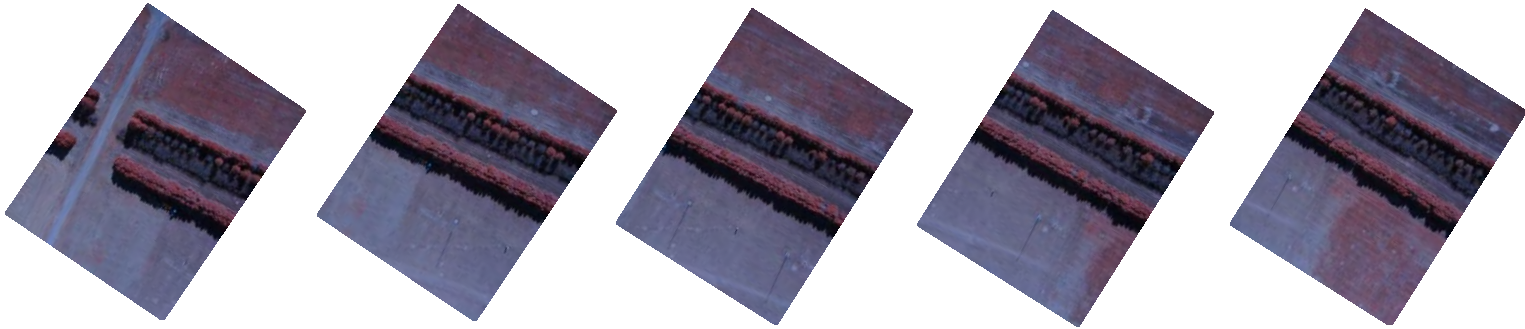- Fix-mounted IR and Gimbal IR are the same

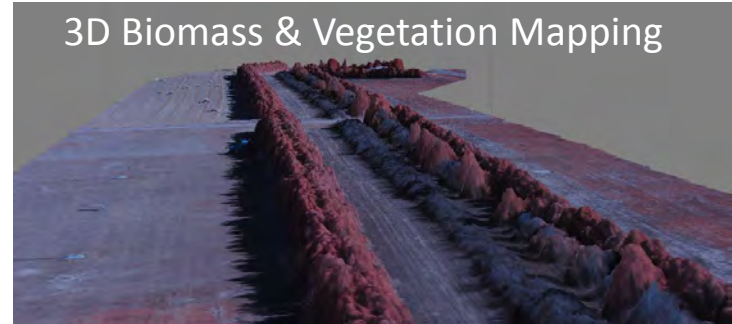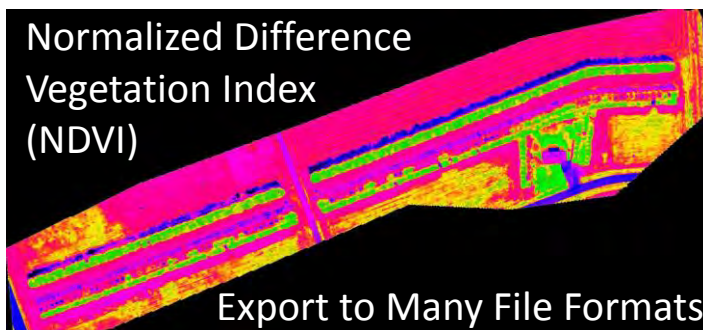

Un-Burned →

Black →

Fire →

Persistent Surveillance
3D Models, Orthomosaic, Vegetation density, NDVI Health

In development: Multispectral Images from Automatic Intervalometer on Belly or Wing

Georectified Orthophoto

3D Biomass & Vegetation Mapping

Normalized Difference Vegetation Index (NDVI)

Export to Many File Formats

- Capture can be Incidental to Normal flight
- Processed Overnight
- Pixel size 1-6 inches
- Relative Biomass Assessment & Vegetation Health
- Allometric measurements
- Automated Tree Classification
- Crown Canopy Coalescence and Density

Live Video to SmartPhones, Pads or PCs Always on when 3G is present

- One time setup on iOS, Android & PCs
- 2 fps, auto, Auto-reconnects. Request a COW*
- Lat-Long on all Images
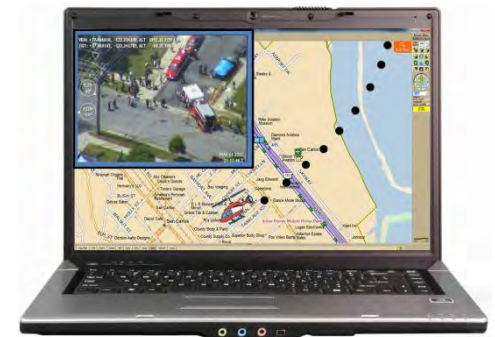- Aircraft's Live GPS Moving-map on a Ground PC

* Cellular on Wheels (COW) are available if the ATGS requests it (ATT or Verizon)

Aircraft's GPS moving-map on the ground

- 2 sec updates real-time when 3G is present (request a COW*)
- Very slick for seeing where the transmitted video is being captured
- Works worldwide. Unlimited clients. Google Earth or DeLorme
- 1st time Setup, and requires additional paid for Apps
- Easiest is to provide pre-installed laptop

Google earth

DeLorme

* Cellular on Wheels (COW) are available if the ATGS requests it (ATT or Verizon)

SnapShots to SmartPhones or PCs Worldwide: Transmits by Email

- Only 1 per ~minute over GlobalStar Satellite

- Unlimited on 3G or Microwave

- Press Button or Tablet

- Email Group: Changed in Air, Ground or Both

Ground Overlaid Photos in Email
Google Earth KMZ SnapShots
1/min Low-cost Satellite, Unlimited by 3G
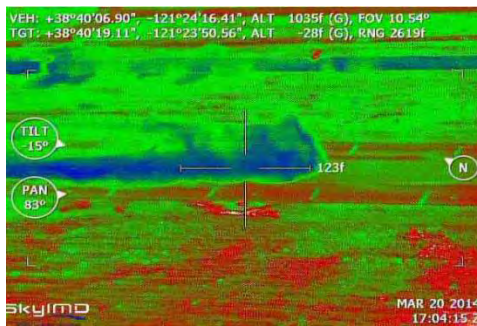

Normal Google Earth

KMZ Auto-transmitted to Email

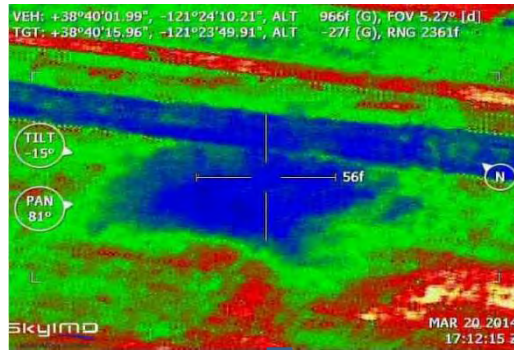Click/Touch Ground Overlay
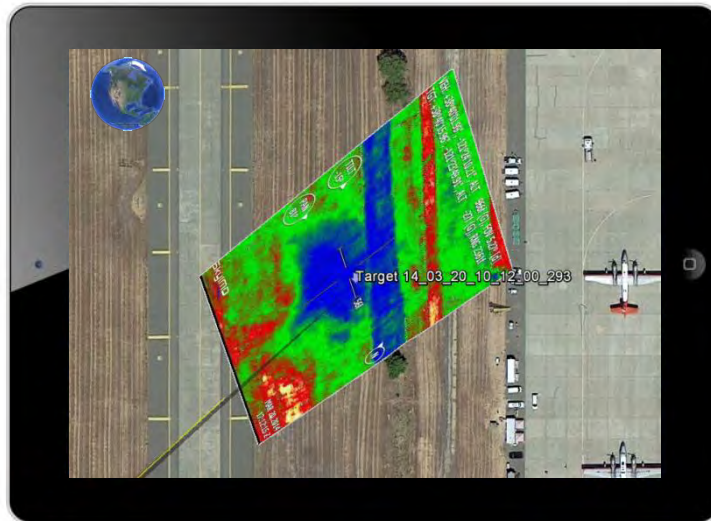Displays Normal Photo

Infrared

Coverage Level

Coverage Levels of Retardant Drops
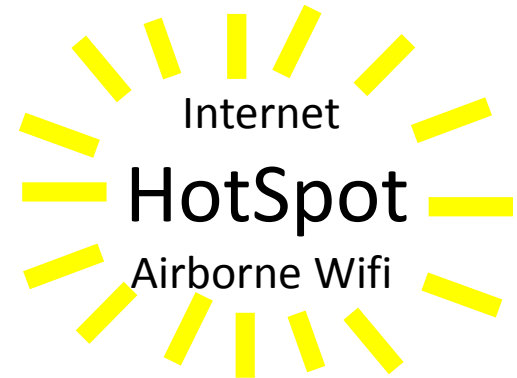## Water or Retardants on the Ground can be Seen in IR

- Confirm Coverage
  - See Gaps and Thin Spots
  - Colorless Retardants
- Email to Ground Crews and IC
- Press button to Map Drops
  - or Post Flight
- Identify New Target Drop Sites
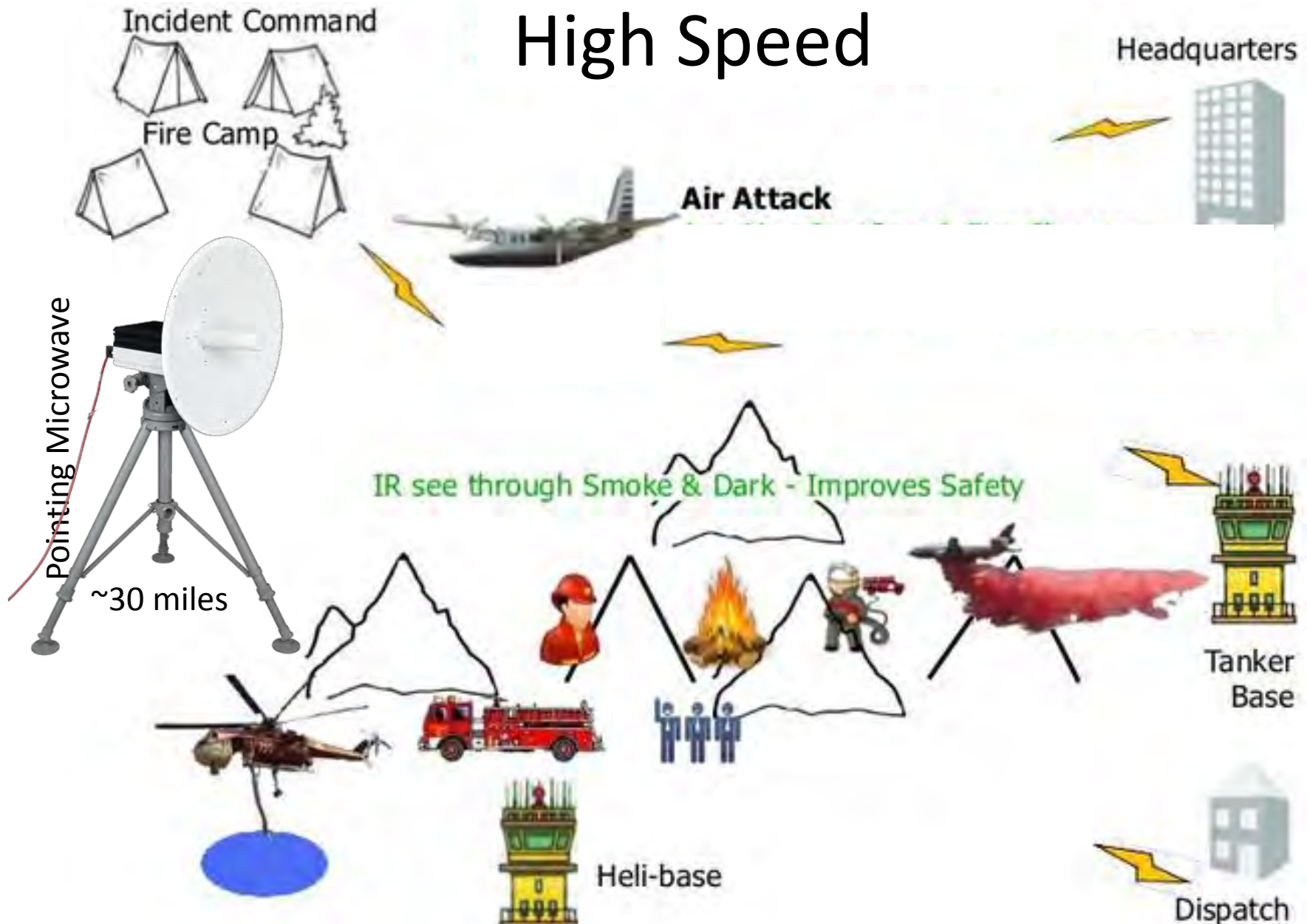- Review Post Fire and BAER

Click to see on **YouTube**

Internet Hotspot airborne

Internet **HotSpot** Airborne Wifi

- WiFi throughout aircraft

- Internet when 3G available

- DataLink antennas 2-3x better than 3G phones

- Gimbal video is available through out aircraft cabin (iOS, Android, Windows or Mac devices)

Microwave & Mesh Network Option High Speed

Incident Command

Fire Camp

Headquarters

Air Attack

Pointing Microwave

~30 miles

IR see through Smoke & Dark - Improves Safety

Tanker Base

Heli-base

Dispatch

Quick Deploy – 1 hour
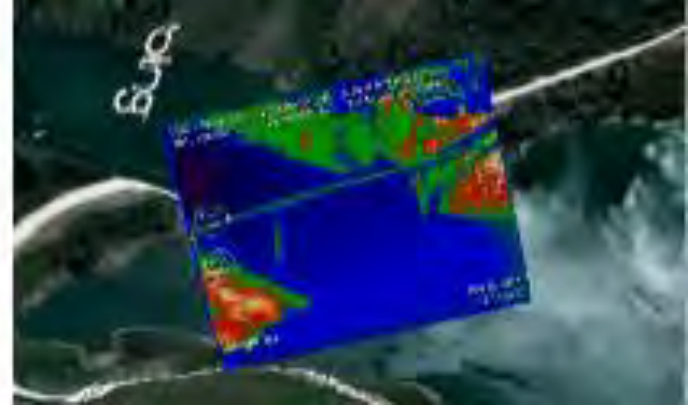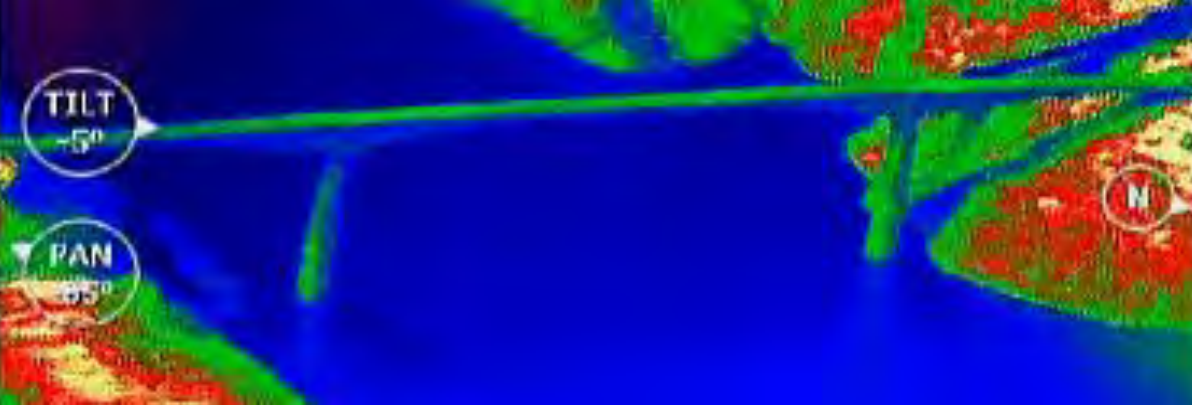## Helicopters, Fixed-wing, Aerostats, Drones

- Quick Deploy for Oils Spills
  - Standard overnight shipping
  - 1 hour after arrival
- STCs (FAA Supplemental Type Certificate), Part 91/135.
  - Belly and Strut: Cessna 152, 172, 182, 206
    - Cessna OEMs-Factory direct
  - Cirrus
- PMA (FAA Parts Material Approval)
- 337s & Public Use – Quick based on STC
- Pilot Serviceable- 20 min on/off, no signoff

Services Before & During Emergencies

- 1-on-1 training
- Group Classes
- Custom Integration
- STC/337 completion
- On-site Airborne Operator
- Ground Implementation
  - Setup user devices: Snaps, live Video, KMZs, Aircraft moving-map
  - Group distribution
  - GIS input
  - inReach ground resource tracking
  - Comm towers setup

Thank-you

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