AERIAL RESOURCES for managing wildfire risk and suppression

Presented by:
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Heavylift Firefighting Operator

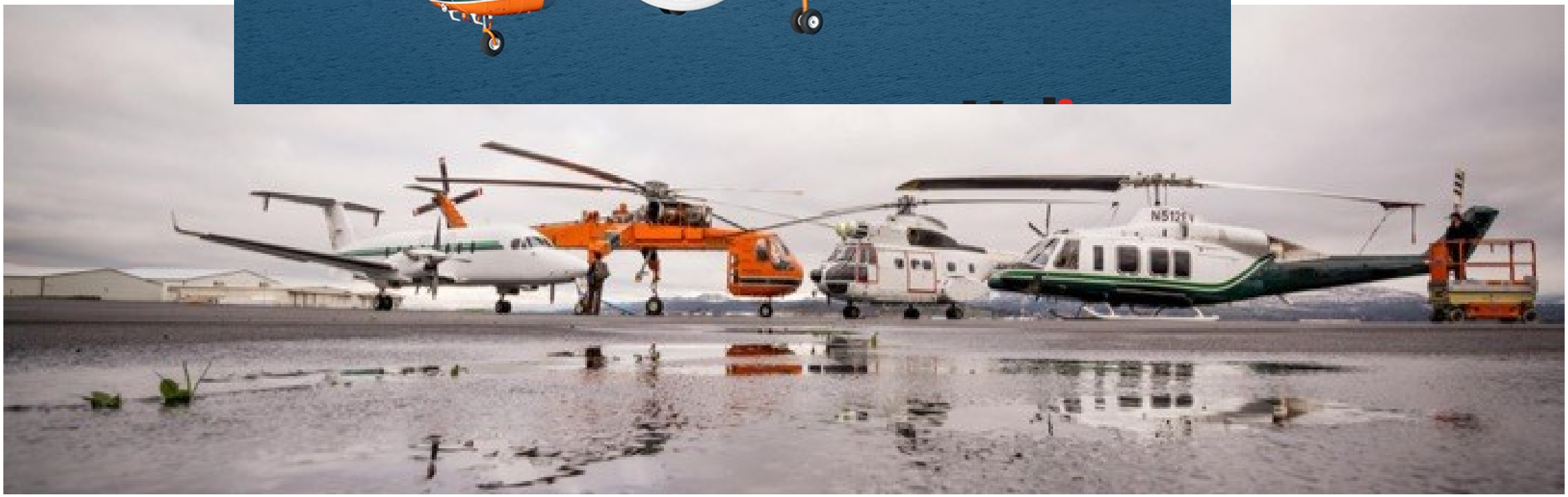
Multiple medium helicopters

Fixed wing airplanes

Firefighting Operations

USA, Canada, Greece, Australia, Chile, Italy, Turkey, France

Multiple California Fire Agencies- Calfire, LA City, LA County, San Diego County, USFS



Aerial Resources

HELICOPTER
‘Rotary-Wing’

Moves vertically and horizontally

AIRPLANE
‘Fixed-Wing’

Capable of forward flight

UNMANNED AERIAL VEHICLE **(UAV)** ‘Drone’

Aircraft that is guided remotely or autonomously and flown without a pilot onboard

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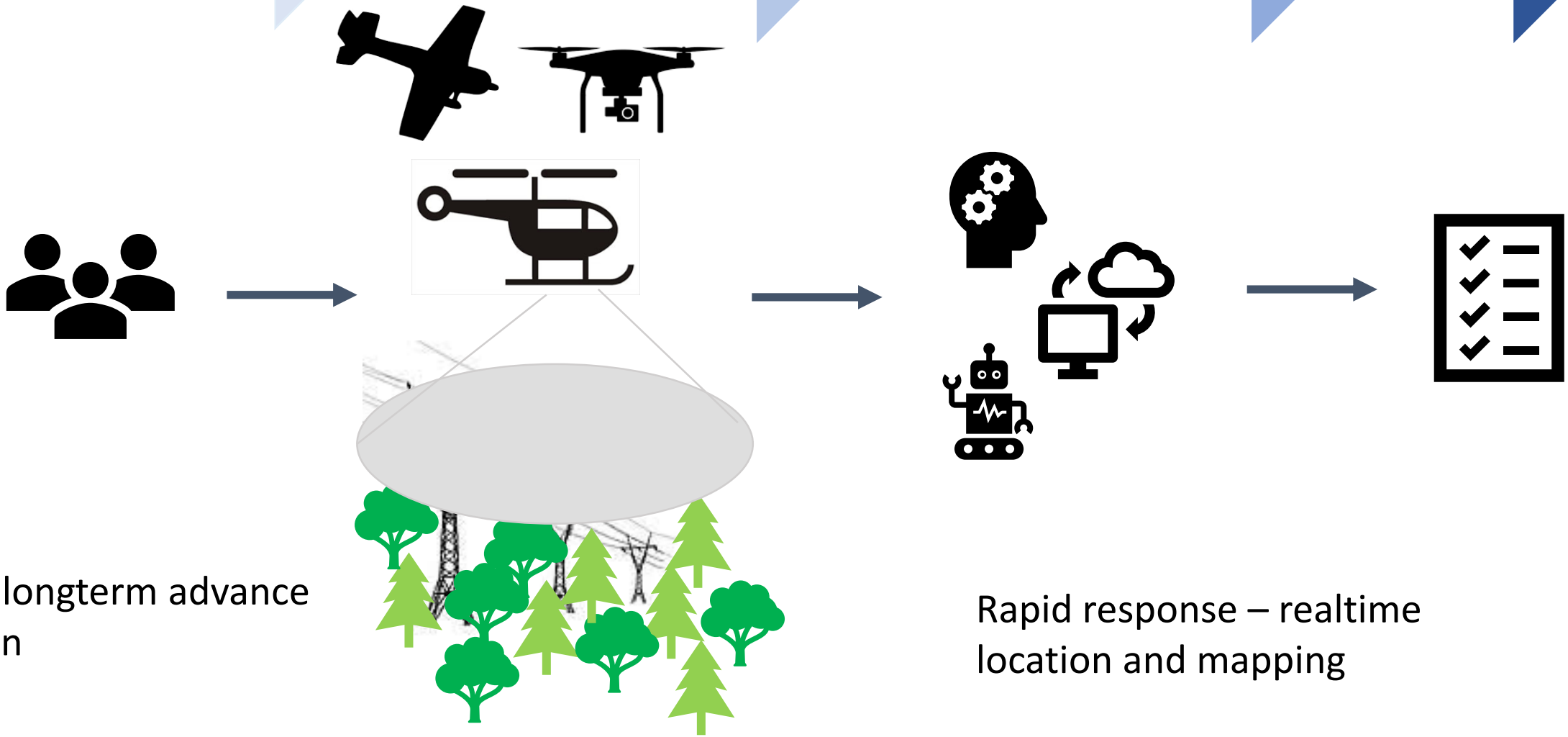
PLANNING

DATA COLLECTION

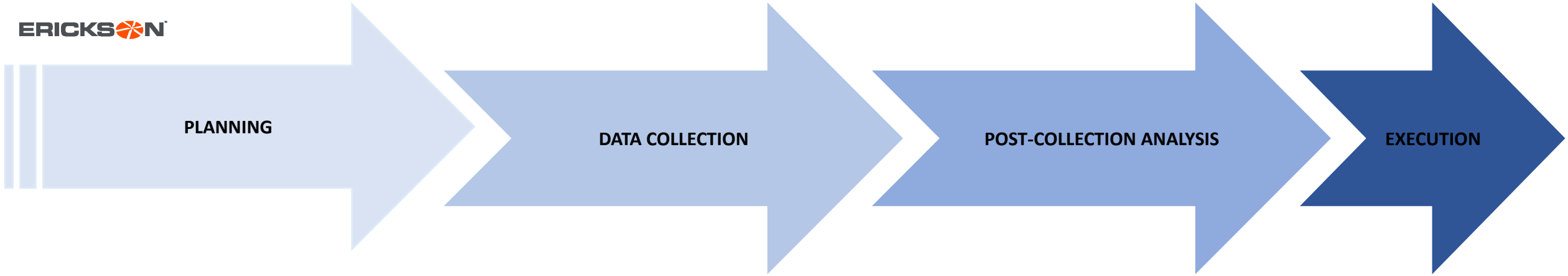
POST-COLLECTION ANALYSIS

EXECUTION



Ongoing longterm advance mitigation

Rapid response – realtime location and mapping



- Identify the target - What data needs to be collected?
- Mitigation vs. Response vs. Suppression

  - Vegetation growth
  - Vegetation/soil drought index
  - Overgrowth, powerline encroachment
  - Structure threat mapping
  - Powerline sag in high heat events

  - Threat identification – accurate Initial Attack
  - Real time Fire Mapping

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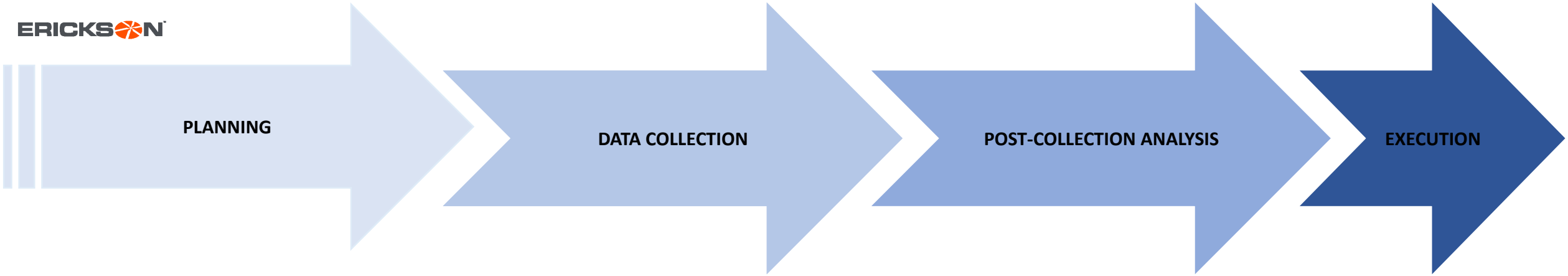

- **LIDAR** -
- **Infrared (IR) Camera**
- **Thermal Imaging**
- **Corona Camera**
- High-Resolution **Photo/Video**
- **Human Spotter**

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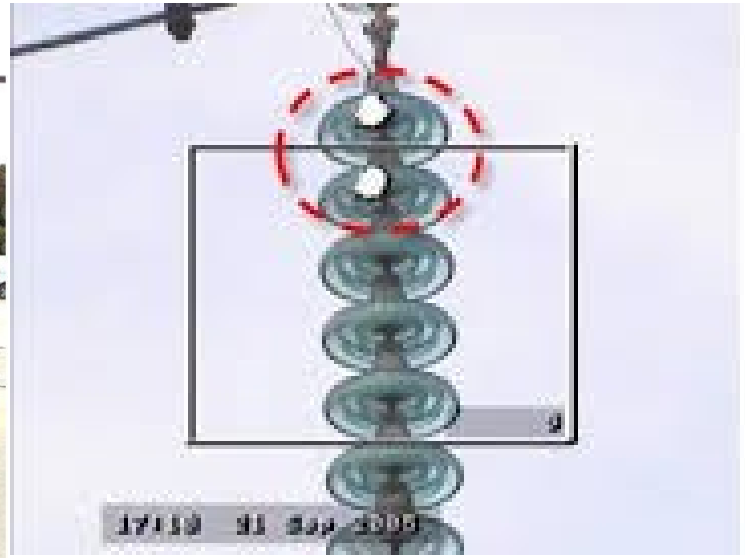
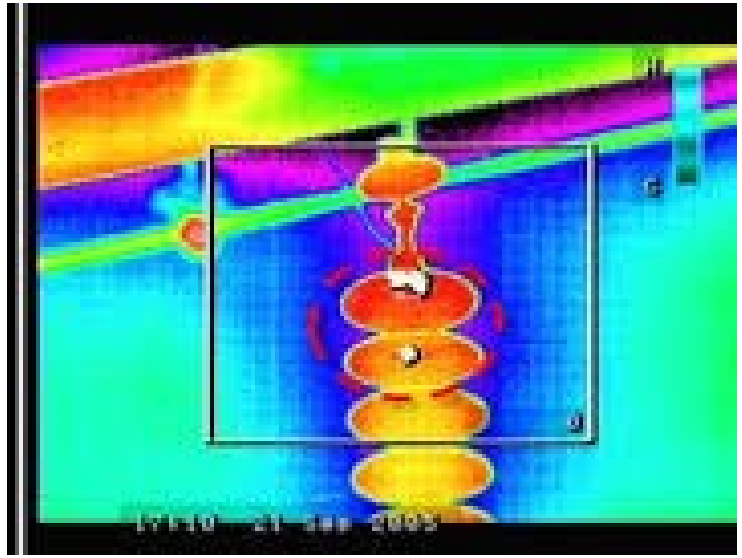
- **Corona Camera** – detects UV emissions locating arcing coronas in high-voltage T&D systems





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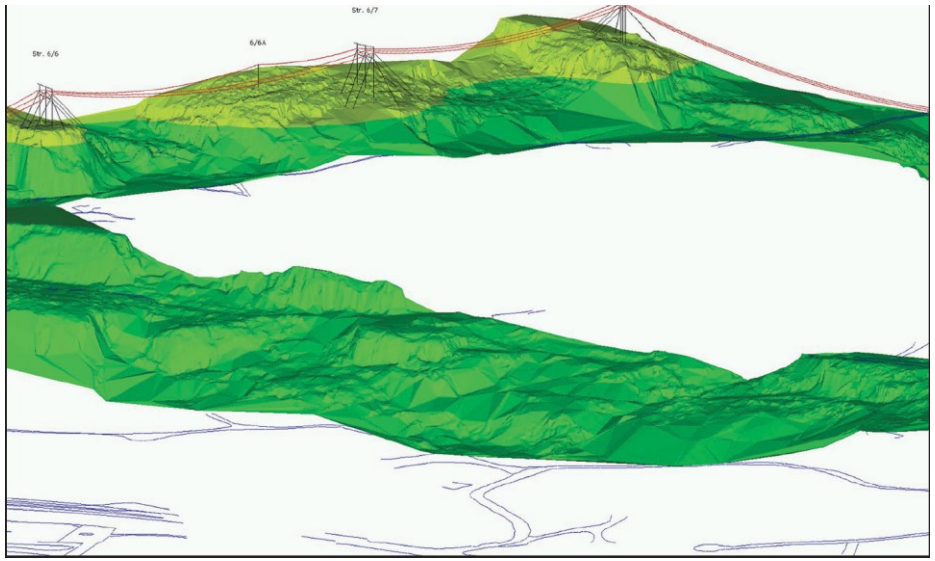
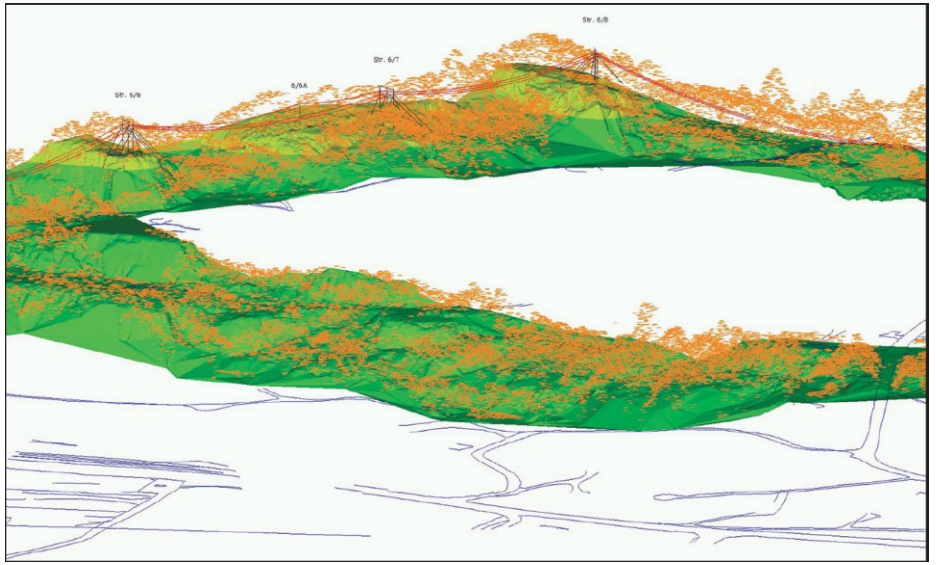
- **LiDAR** – Light Detection and Ranging, is a remote sensing method that uses light in the form of a pulsed laser to measure ranges, producing a 3-d representation.





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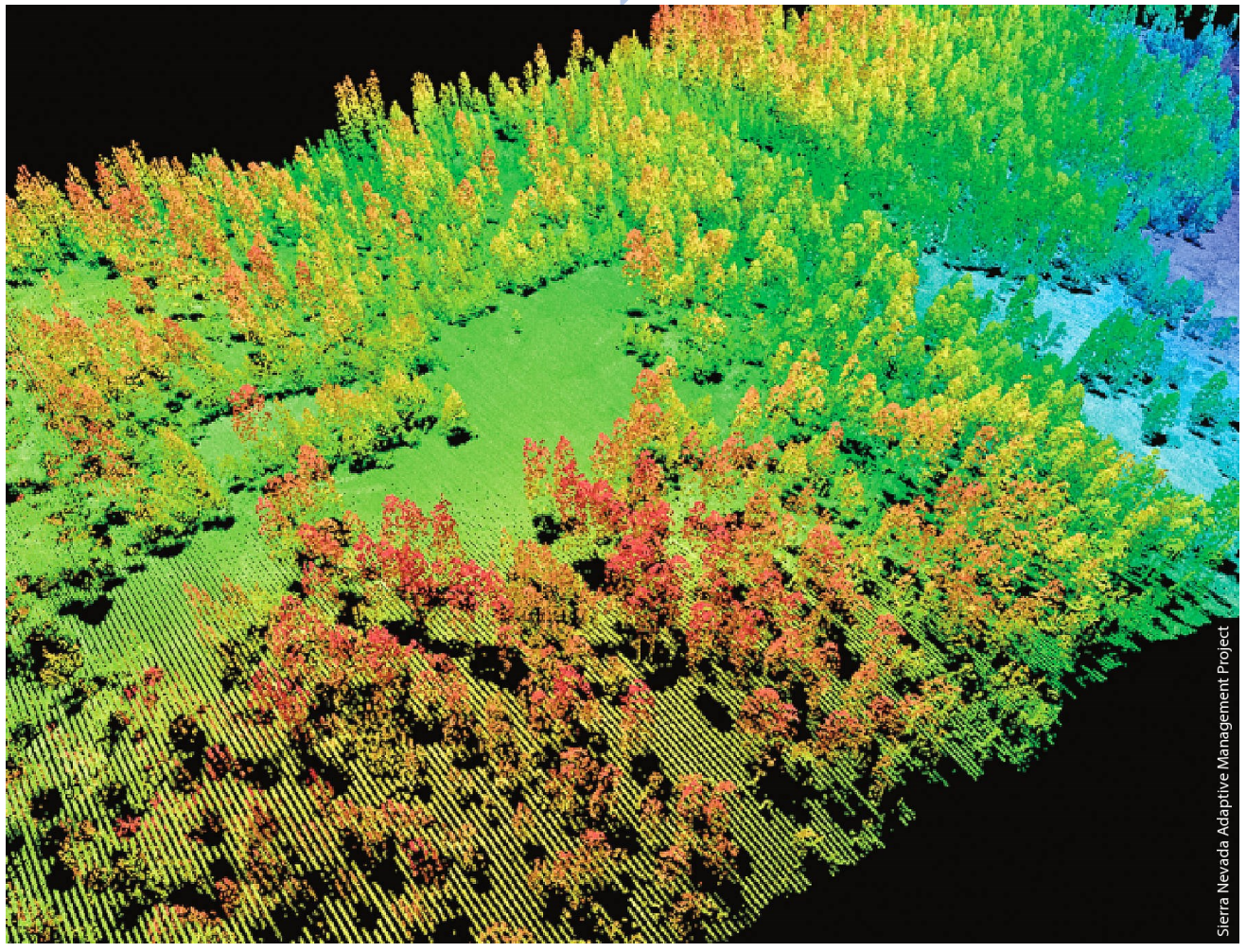

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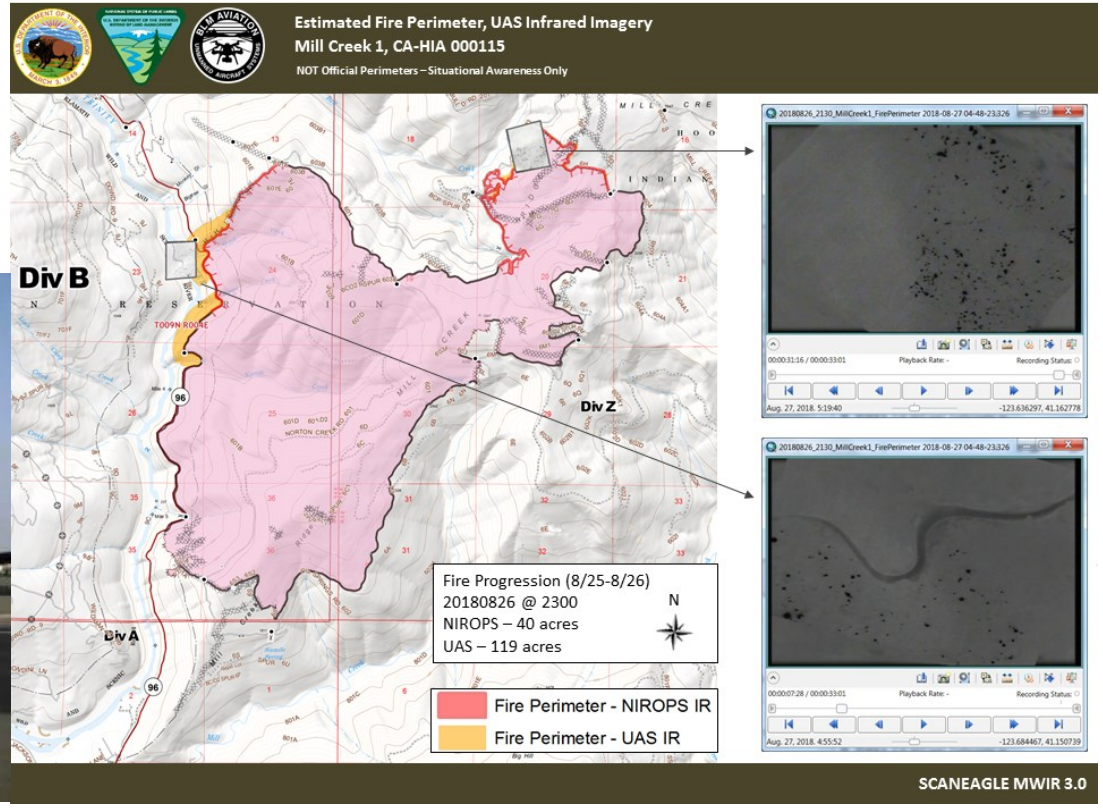
- **Infrared (IR) Camera** – detects heat zones

Cessna Citation II

King Air 200



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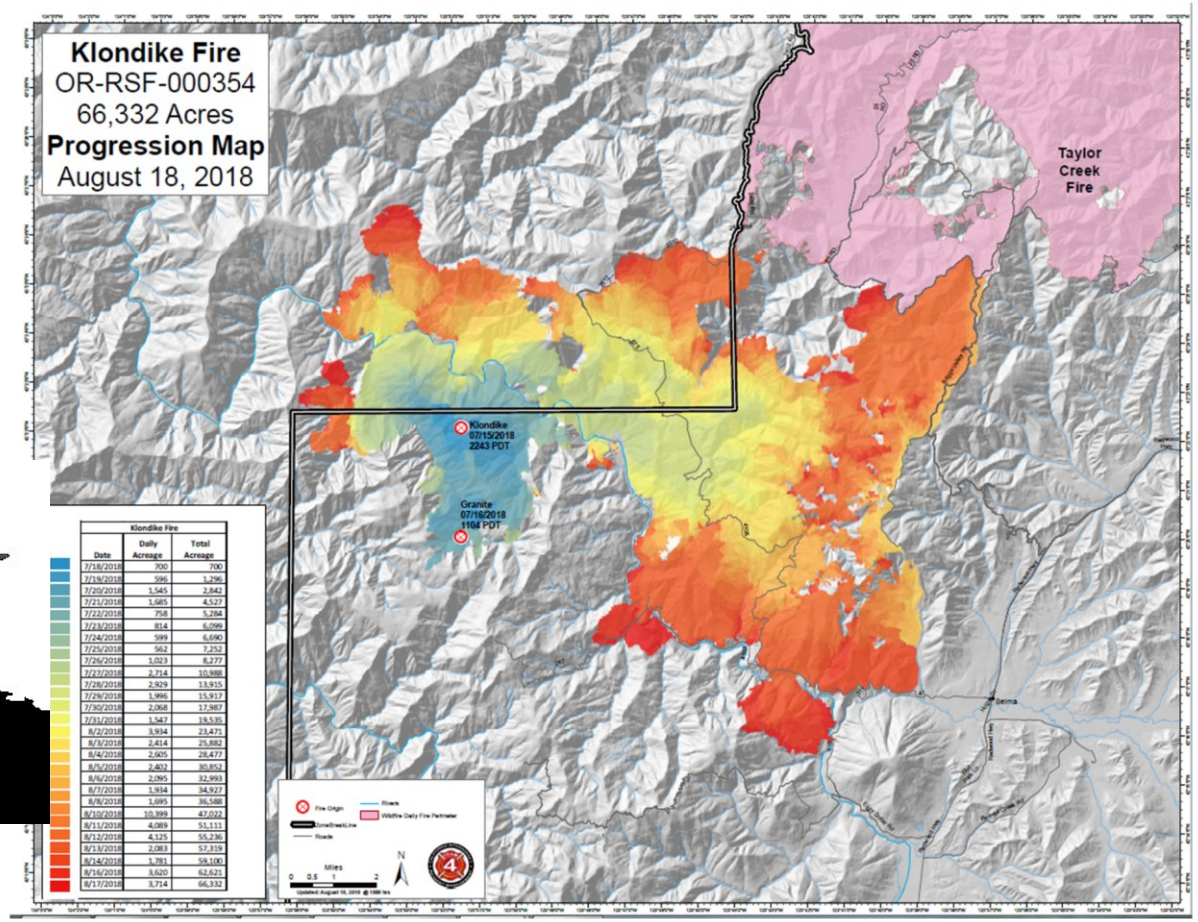
USFS NIROPS

Fire Progression Mapping

Fixed Wing and UAS



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- High-Resolution **Photo / Video**

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- **Spotter** – subject matter experts who visually collect data from an aerial resource (i.e. Lineman spotter or Air Attack Supervisor)

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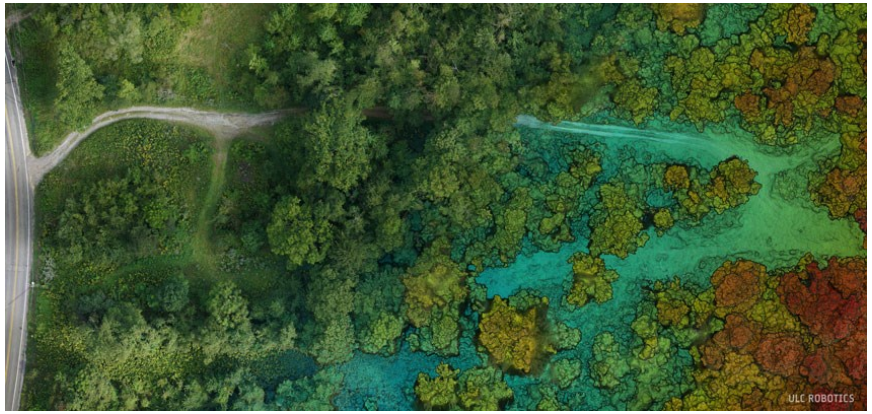
- Post-collection analysis performed with the assistance of specialized software and/or real-time tracking
  - <u>Option 1</u>: Used for mitigation and preventative maintenance (planned)
    - Where are the closest response sites from each structure?
    - Where are the priority locations for vegetation removal? Is there a pattern of continued encroachment?
    - What location is the highest risk depending on drought conditions?



Option 2: Initial Attack Response

- Accurate fire location, Mapped water resources
- Appropriate combination of aircraft for threat – Type 1,2,3

- Integrated response with air and ground assets
- What lives or structures are in immediate danger?
- How do we safely support ground firefighters?

Napa fire, CA 2017

Active, fast suppression in the WUI (Wildland Urban Interface) requires input from both advance and real time aerial mapping and monitoring for a truly effective integrated response.

Woolsey Fire, Los Angeles 2018