DeepRed

VOLANT

2 Situation

Forest fires are a massive global problem. The loss of lives and resources have been extremely high and continue to grow. An intelligent, efficient and completely comprehensive solutions is necessary to minimize the potential risk of fire occurrence, reduce time to detection and enable more effective mitigation.

3 Solution

DeepRed is an intelligent, 24/7 aerial solution that monitors vast expanses of terrain, detecting forest fires and alerting authorities in real-time. It is comprised of a network of autonomously operating hardware components, including aerostats and towers armed with high-powered RGB and thermal cameras positioned in strategic vantage points. The system also predicts natural disasters and fire paths by incorporating photogrammetric mapping and IoT sensors.

Planning

Photogrammetric Mapping
(Traditional Drones)

- System Component Plan
- Fire Risk Mitigation Plan

Operations

AI Video Detection
(RGB & Thermal)

- Smoke
- People
- Vehicles
- Evidence of Fire Inception
- 24/7

Communication
(Mesh Network)

- Alerts
- Remote Control
- Back-Up System for Fire Personnel
- Remote System for Population

Datastream
(Sensors)

- Weather
- Industrial
- Security
- Miscelaneous
- 24/7

Forecasting

Prediction
(Dynamic Datapoints)

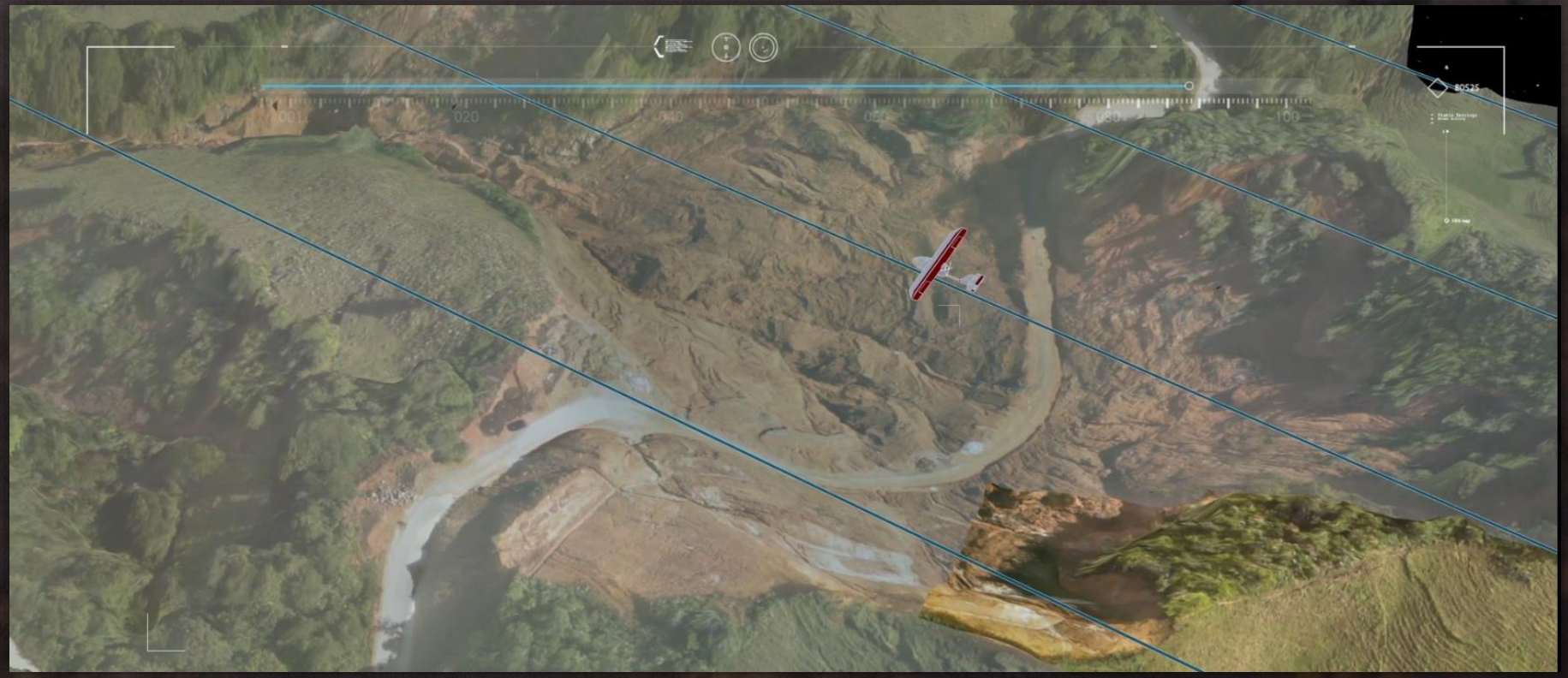
- Natural Disasters
- Fire Path

4

Planning

Photogrammetric Mapping– What is it?

Using manned and/or unmanned aircraft, a detailed map up to 2 inch resolution is created. The map provides the necessary information needed to assess fire corridors, sources of water, plant species, electrical lines, fuel concentrations and more.



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Planning

Photogrammetric Mapping– System Component Plan

DeepRed's hardware includes tethered aerostats, towers and IoT sensors strategically placed to maximize coverage and minimize client expenditures.

AI enabled and automated video detection constantly monitor for plumes of smoke. If identified, real-time alerts are sent to authorities.

The IoT sensors constantly feed the system with strategically relevant datapoints that enable prediction and business decision-making.

6

Planning

System Component Plan

Tethered Aerostat

Ideal for Flatter Terrain
Large Area Coverage
Possible 24/7 Operation

Tethered Drone

Ideal for One-Off / Emergency Use
High Mobility / Fast Deployment

Mast

Ideal for Varied Elevations
Extreme Weather Resistant
24/7 Operation

Ground Sensor

Ideal for Precise Measurements
Landslides/Water Levels/Pressure/Flow/Etc.
24/7 Operation

Existing Infrastructure

Ideal with Elevated Infrastructure
Increased Security
24/7 Operation

Network of Outposts

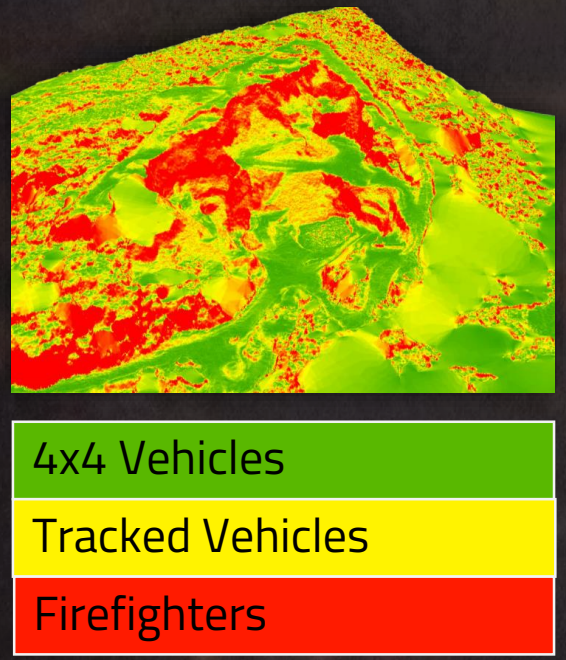
- Fully Automated Operation
- Remote Manual Operation
- Continuous AI Learning
- Wi-Fi Enabled
- Stand-Alone or Integrated Network
- Able to Serve as Communications Network
- AC or Solar Power
- No Pilots Required
- Scalable Network
- Compatible with Existing Systems

7

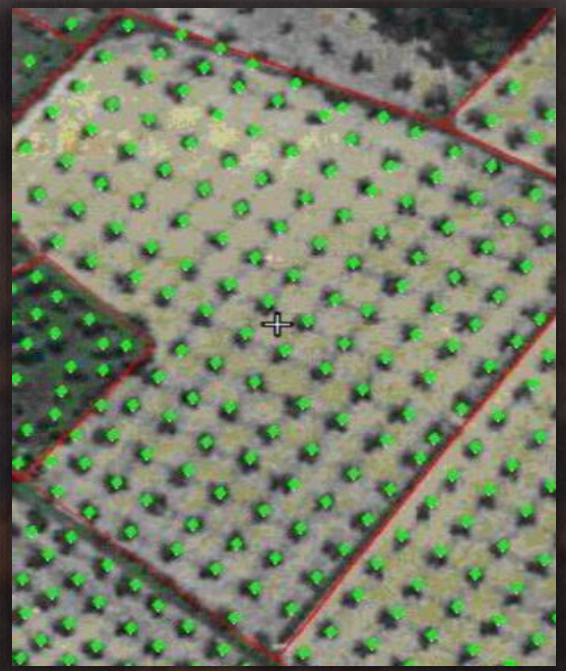
Planning

Photogrammetric Mapping– Fire Risk Mitigation Plan 1

3D Slope Model
Predicting Fires and Defining Equipment Access Routes



2D Tree Inventory
Identifying Tree Species Mortatlity Rates

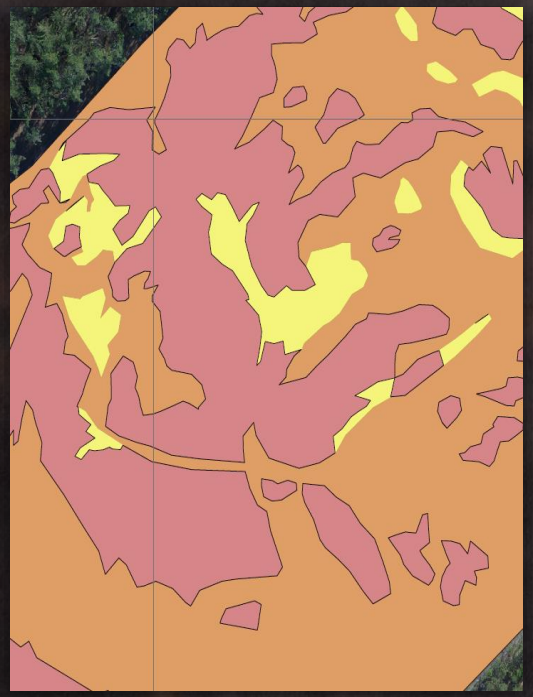


2D Fuel Inventory
Informing Fire Prediction and Mitigation Planning

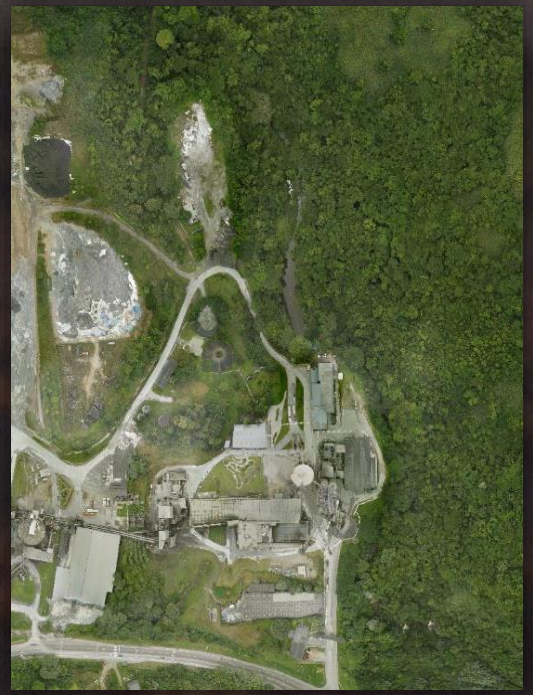
Planning

Photogrammetric Mapping– Fire Risk Mitigation Plan 2

2D Vegetation Inventory
Identifying Vegetation Species



2D Infrastructure Risk
Electrical Networks, Factories, etc.



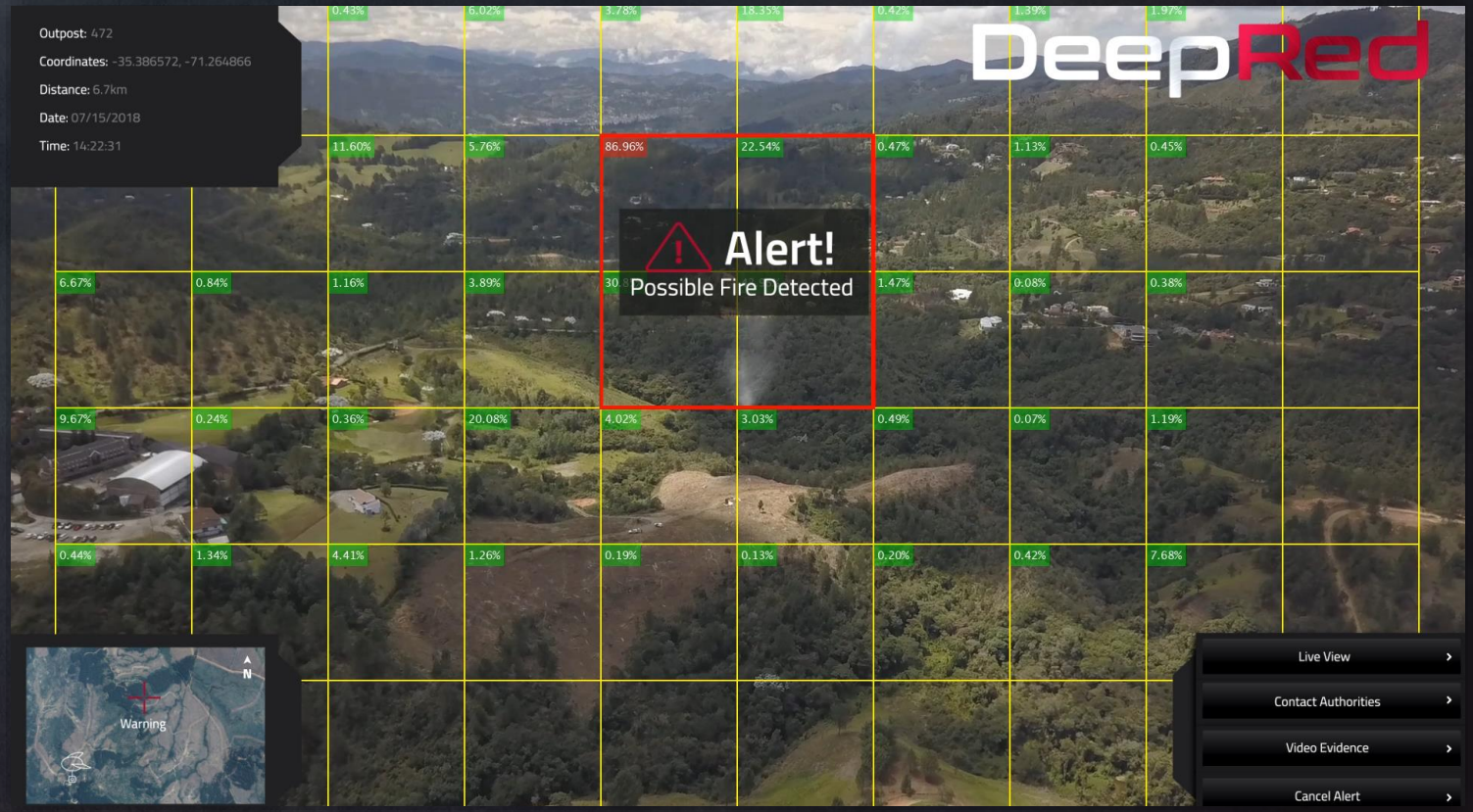
2D Fire Barricades
Informing Fire Prediction and Mitigation Planning

The Best & "Proven" AI Fire Detection in the World

AI Video Detection

Test for Univeristy of California – San Diego:
https://vimeo.com/338898266

- Video AI (Artificial Intelligence) Detects Plumes of Smoke
- **Over 99% Precision!**
- **Fire Detection within 2 Minutes!**
- **Less than 2 False Alarms / 24Hr!**
- Functions with Moving Platforms, Ideal for Various Conditions
- Ongoing AI Learning to Improve Accuracy



Operations

AI Video Detection

- 24/7 Camera Operation
- One Aerostat Covers up to 700 Square Miles.
- Geo-Referencing of Fires Detected
- Alerts Sent to Any Connected Internet Device
- Users Can Watch Live Video Feeds and Take Control of System
- Arson Detection
- Video Footage Prior to Detection Saved as Evidence

Operation

Video Detection - Range

The DeepRed Aerostats cover large amounts of terrain from 300ft above.

- Smoke Plume Detection up to 15 Miles
- Human Detection up to 1.5 Miles
- Vehicle Detection up to 4 Miles

(Example: A network of 5 Aerostats monitoring plumes of smoke can cover 2,800 square miles under ideal conditions.)

The DeepRed Towers cover extensive terrain, when positioned at higher elevations.

- Smoke Plume Detection up to 12 Miles
- Human Detection up to 0.8 Miles
- Vehicle Detection up to 1.5 Miles
- Resistant to Winds up to 90 Mph

(Example: A network of 5 Towers monitoring plumes of smoke can cover 1,800 square miles, under ideal conditions.)

Thermal Camera Ranges are Approximately 20% of the RGB Cameras

Operation

Video Detección - Hardware

- 360° Field of View
- 1080*1920 Full HD Video
- Autopilot
- 24/7 Operation
- PTZ Cameras
- 18X, 30X, 36X Optical Zoom
- Gyro-Stabilized Cameras
- Infrared (IR) Thermal Camera
- Low Light Night Mode
- Near Infrared (Night Vision)
- GPS + IMU Triangulation
- IP Video Transmission
- IP 66,68, NEMA 4
- Graphic Based Embedded Computer
- Real-Time AI Performance
- Low Power Consumption 20W to 60W

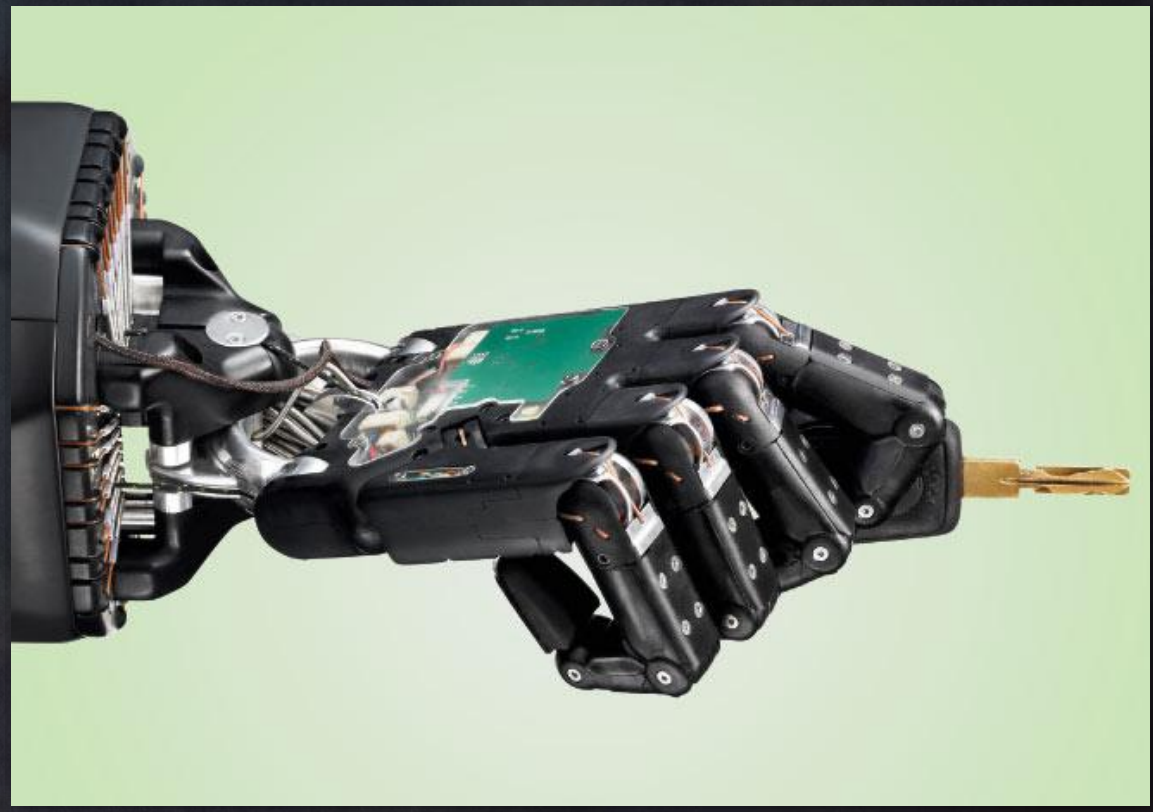
The Aerostats and Towers come Equiped with Cameras Embedded Computers and with the Appropriate Capabiliites and Latest Technologies

Operation

Autonomous

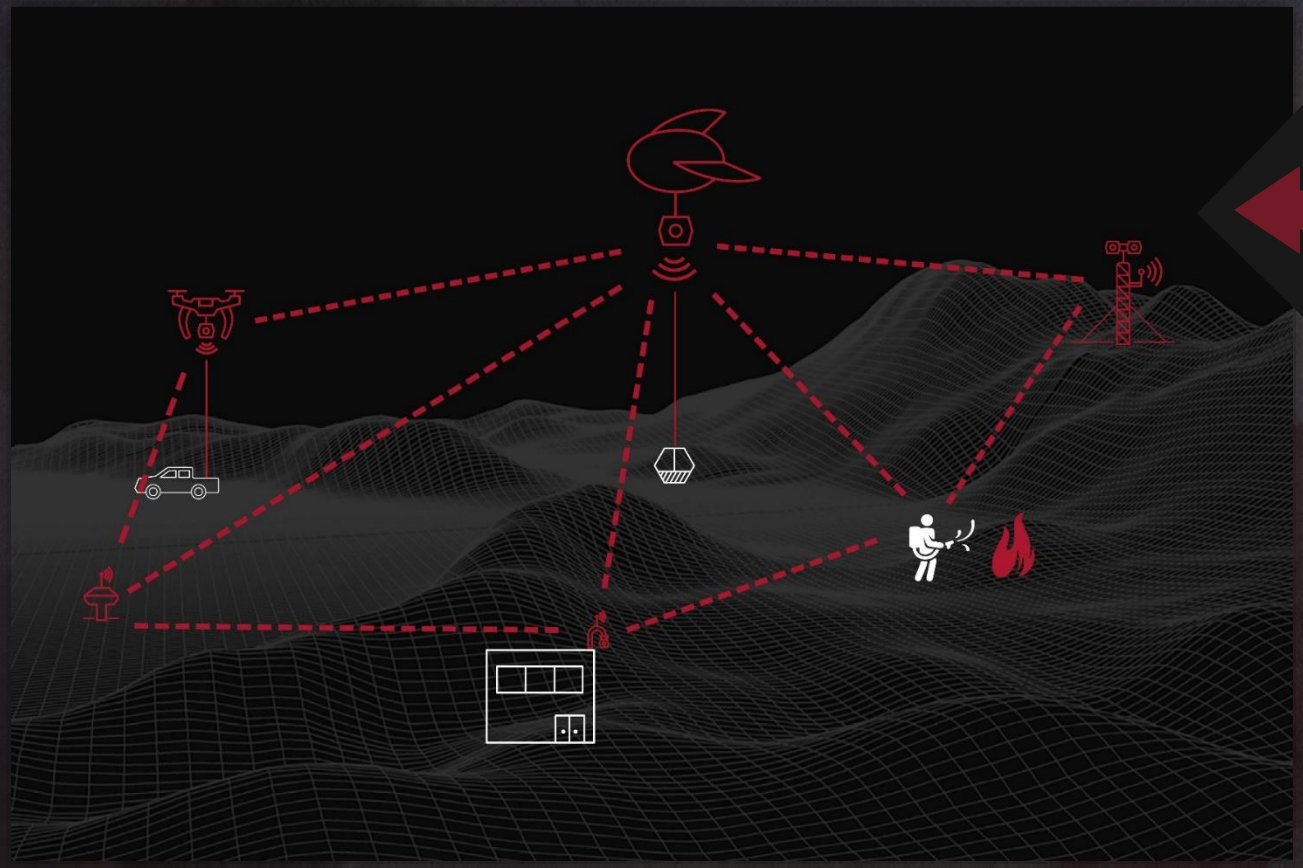
The DeepRed Platform is Fully Autonomous, Reducing Human Intervention and Maintenance

- Auto Rotation of Cameras
- Auto Detection and Alerts of System Failures
- System Redundancies to Bypass Failures
- Auto Detection and Filling of Helium (Aerostat)
- Automated Weather Monitoring
- Automated Lowering and Raising of Aerostat
- Automated Alert System
- Automated Component Monitoring
- Integration with Non-Proprietary Hardware



Operation

Communication



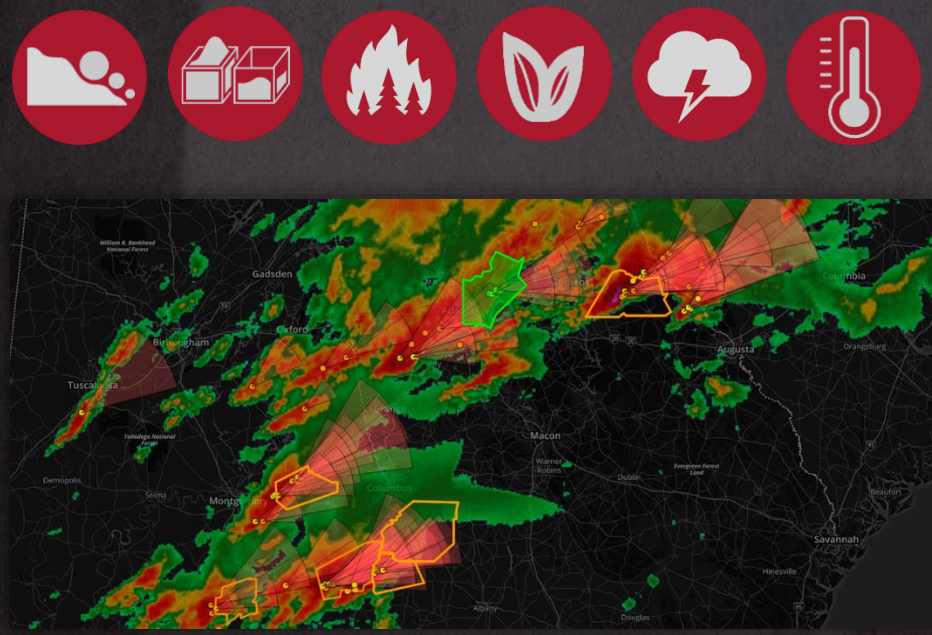
Mesh Network

- Functions as a Remote Communication Network
- Robust 14 Mile Links
- Provides Internet Access to Remote Populations
- Valuable as a Back-Up Communication System for Fire Personnel
- Compatible with Multiple Internet Access Points: Cable, Fiber Optic, Microwave Link Satellite, Long Range Directional Wi-Fi or Cellular Networks
- Redundancy Mechanisms to Ensure 24/7 Connectivity

Operation

Datastream - Sensors

DeepRed includes IoT ground sensors that run on an AC connection or via incorporated solar panels. Using a wireless LoRa communication protocol and line of site between outposts, streams of data are delivered to the system via a Mesh network. Range: 4 Miles



- Climatic Conditions
  - Temperature
  - Ground Temperature
  - Relative Humidity
  - Ground Humidity
  - Atmospheric Pressure
  - Particulate Matter
  - eCO2 - VOC
  - Wind Velocity
    Wind Direction
  - Rain
  - UV-VIS-NIR Radiation
  - Lightning
  - Evaporation
  - Etc.
- Industry
  - Levels
  - Pressure
  - Temperature
  - Flow
  - Etc.
- Security
  - Movement
  - Perimeter Breach
  - Infrared
  - Microwaves
  - Etc.

Operation

Cyber Security

Cybersecurity is More Important Than Ever

- Technology Environment that is Highly-Resilient Against Hacking
- Adjustable to Compliance Needs such as HIPAA, ITAR or GDPR
- Role-Based Access Control: Files, Systems
- Offsite Backup and Cloud Virtualization
- Flexible Data Center Location

Forecasting

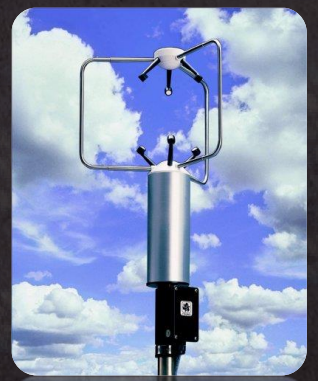
Dynamic Data

The previously executed Planning phase, which leverages Photogrammetric Mapping, provides the foundation for high-precision forecasting. Real-time, dynamic datapoints are continuously incorporated into the forecasting models from the RGB and thermal cameras, along with multiple IoT sensors. The combination enables prediction of natural disasters and fire path.

Planning

Video Detection

Sensors



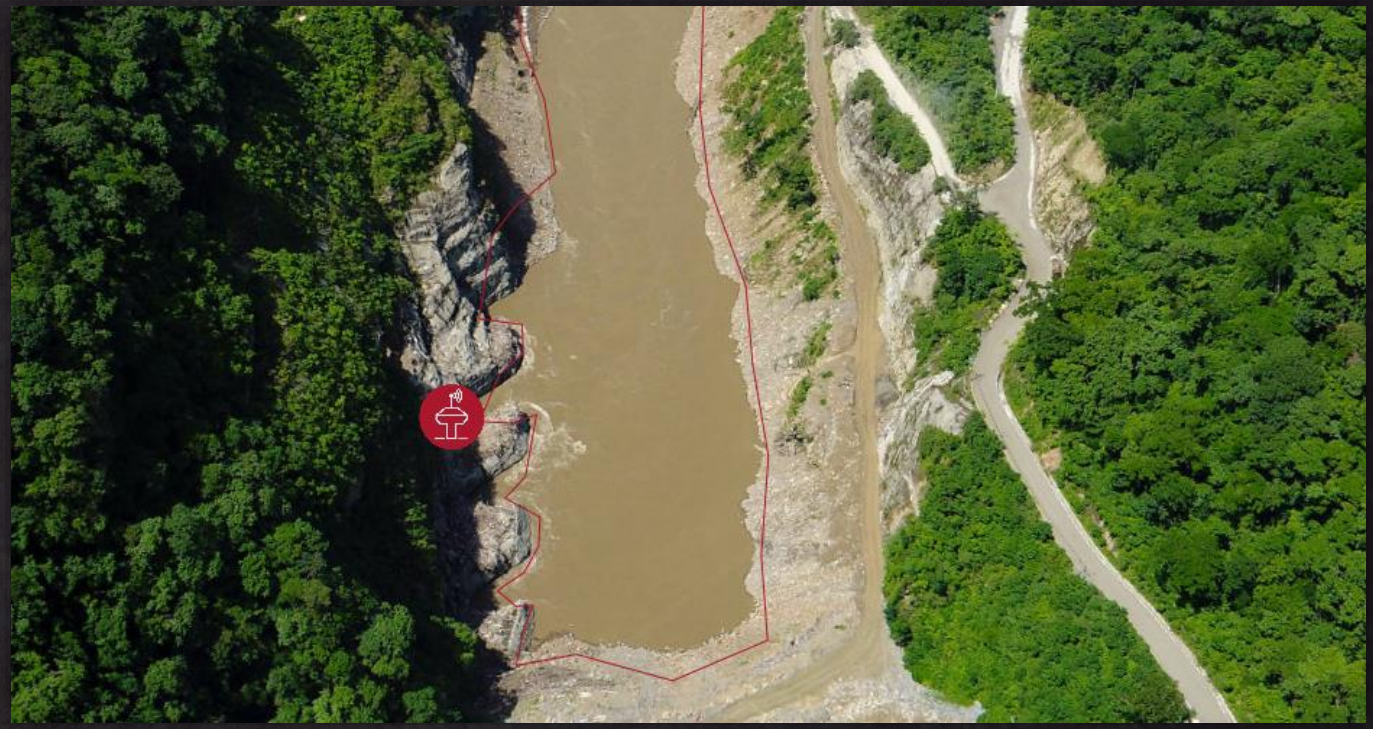
Real-Time, High-Precision Forecasting

Forecasting

Climatic Events

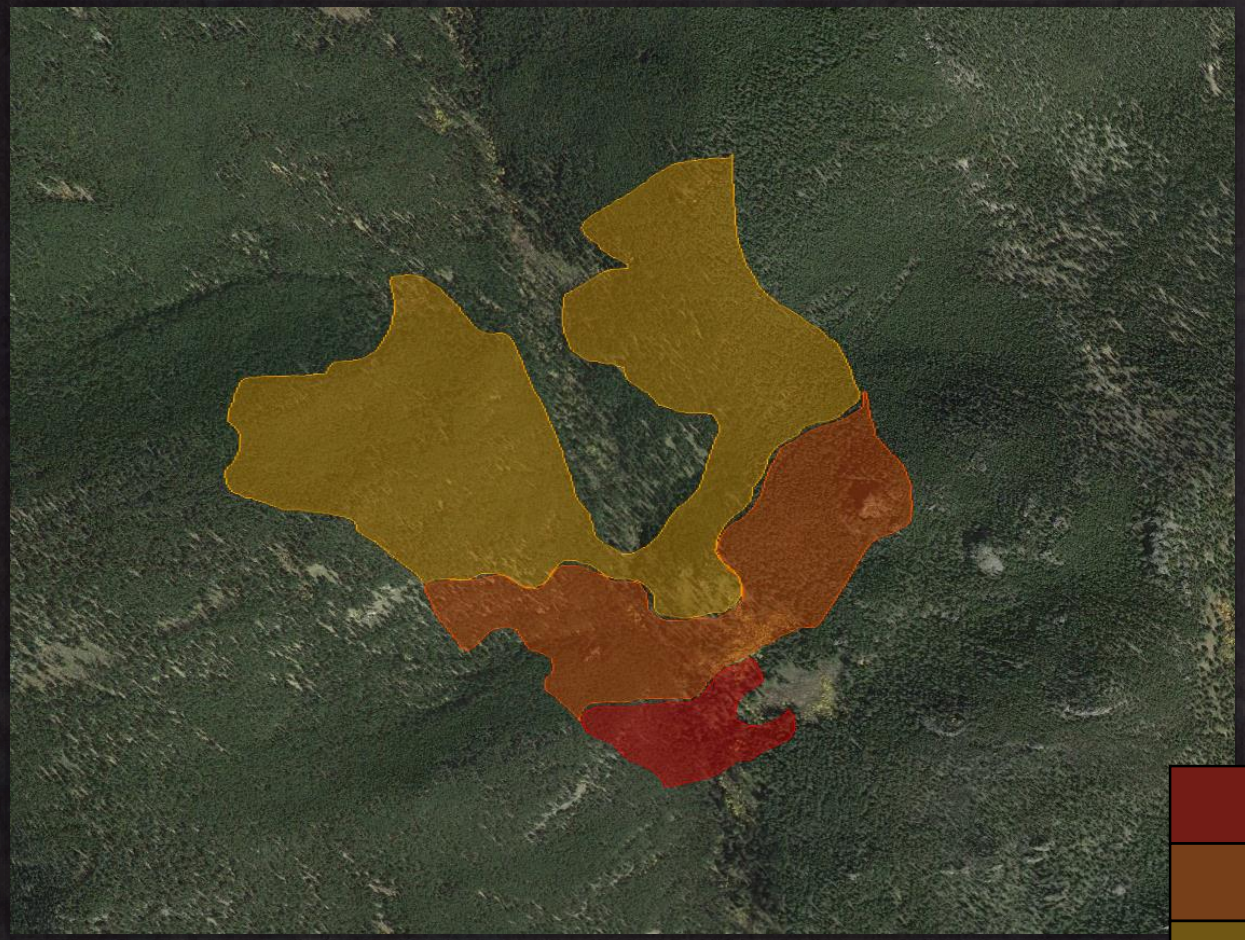
Strategically placed sensors enable 24/7 monitoring of key datapoints. This flow of data enables real-time forecasting of climatic events of importance to clients:

- Water Flow Conditions
- Water Level Conditions
- Earth Movement
- Ideal Conditions for Fire
- Ideal Conditions for Lightening
- High-Wind Conditions



Forecasting

Fire Path



Combining the mapping of terrain and combustible materials with real-time data provided, DeepRed automatically predicts a probable fire path in time intervals to inform fire mitigation personnel. It also aids in evacuation planning.

AI Upgrades

Artificial Intelligence Modules

DeepRed is a "modular" system that was developed to seamlessy integrate additional AI modules. The same system can serve Law Enforcement, Wildlife Management Services and more!

- Traffic
  - Vehicles - Bicycles - Pedestrians Identification and Flow
  - Speed Monitoring and Ticket Automation
  - Road Condition Monitoring and Alerts
- Security
  - Facial Recognition
  - License Plate Identification
  - Unauthorized Access Alerts
- Wildlife
  - Animal Detection
  - Species Identification and Counting
  - Illegal Poaching Monitoring

Compatability with Legacy Systems

No Loss of Investment – Just More Precision with More Capabilities

Migrating to the best-in-class solution doesn't imply a loss of a previous investment. Most existing infrastructure and assets can be leveraged with zero or only slight adaptations. Progressively upgrade where and when it is right for you.

- Towers
- Cameras
- Monitoring Stations
- Connectivity

Comparison to Competition

Smarter, Better, More Comprehensive…

- DeepRed AI (Artificial Intelligence) vs. Mathematical Models is Significantly More Precise
- Contantly Learning AI Ensures the Platform Gets Better, vs. Technology that Becomes Obsolete
- Combining Both Near Infrared (Night Vision) and Thermal (IR) Imaging Provides More Precision at Night
- Modular Infrastructure Allows for Insertion of Best-in-Class AI Modules at Any Time
- Full Integration of Proprietary and 3rd Party IoT Sensors Deliver More Data and Redundancy
- Incorporation of a Fully Autonomous Aerostat Covers Many Miles More when Terrain is Flatter
- Planning & Mapping Enures Efficient/Better Coverage & More Accurate Predictions
- Doubling as a Mesh Communications Network Supports Fire Personnel and Local Communities
- Integrated Fire Path Prediction Informs Fire Mitigation Activitities and Evacuation Plans
- Mixing Propietary Hardware with Non-Proprietary Ensures Best-in-Class, Flexibility and Lower Pricing
- Monthly Usage Pricing Models Reduces CapEx and Excessive Payments for Lower Usage
- Headquartered in Boulder, Colorado: An Extreme Testing Environment & an Epicenter of AI & Robotics