



# PROJECT F.I.R.E.

NASA *Blue Skies* 2024 | Cerritos College

**STUDENTS:**

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**ADVISOR:**

JANET MCLARTY-SCHROEDER

# WHAT ISSUES ARE WE FACING TODAY?



# WILDFIRES ON THE RISE

320%

INCREASE OF  
BURNED LAND  
FROM 1996-2021



# WILDFIRES ON THE RISE

320%

INCREASE OF  
BURNED LAND  
FROM 1996-2021

25%

LAND AT HIGH RISK  
IN CALIFORNIA



# WILDFIRES ON THE RISE

320%

INCREASE OF  
BURNED LAND  
FROM 1996-2021

25%

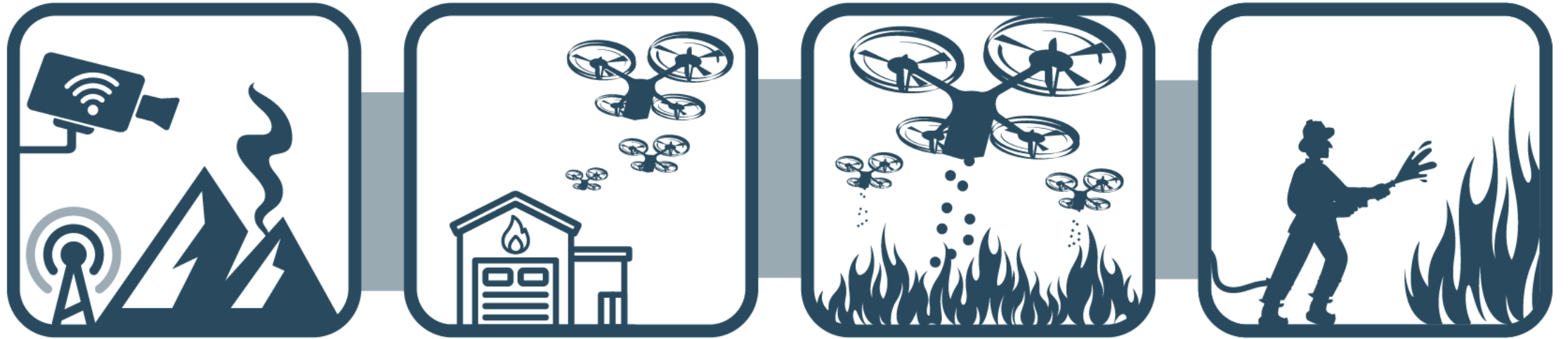
LAND AT HIGH RISK  
IN CALIFORNIA

30%

INCREASE IN  
WILDFIRES BY 2050



# WE HAVE A SOLUTION



# WHAT'S CURRENTLY BEING DONE



# CURRENT PLAN IN PLACE



ALERTCalifornia

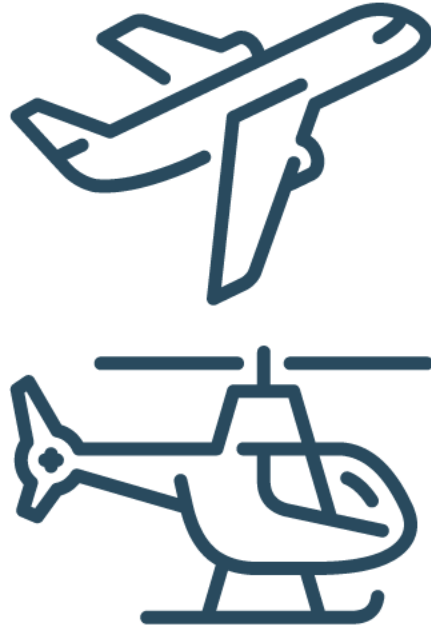




# CURRENT PLAN IN PLACE



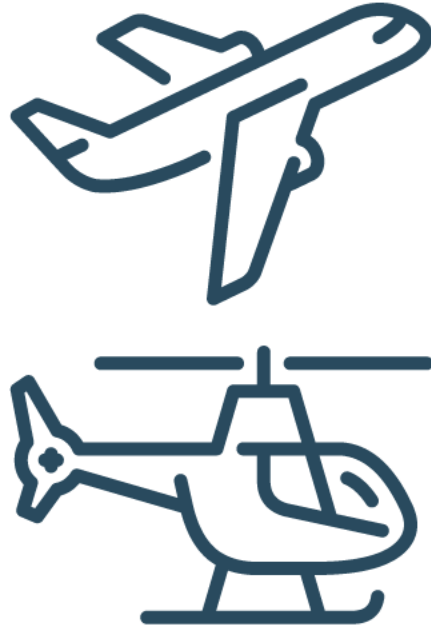
ALERTCalifornia



# CURRENT PLAN IN PLACE



ALERTCalifornia



# OUR SOLUTION TO ADDRESS THESE ISSUES



# PROJECT F.I.R.E



ALERTCalifornia



# PROJECT F.I.R.E



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# PROJECT F.I.R.E



ALERTCalifornia



# LAUNCH PROTOCOL



CAMERAS DETECT FIRE  
AND RELAYS SIGNAL



# LAUNCH PROTOCOL



CAMERAS DETECT FIRE  
AND RELAYS SIGNAL



DRONE FLEET DEPLOYED  
FROM NEAREST FIRE STATION





# LAUNCH PROTOCOL



CAMERAS DETECT FIRE  
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DRONE FLEET DEPLOYED  
FROM NEAREST FIRE STATION



DRONE FLEET ARRIVES TO  
ELIMINATE OR SUPPRESS FIRE  
TO EXTEND FIRST RESPONDERS'  
REFLEX TIME



# LAUNCH PROTOCOL



CAMERAS DETECT FIRE  
AND RELAYS SIGNAL



DRONE FLEET DEPLOYED  
FROM NEAREST FIRE STATION



DRONE FLEET ARRIVES TO  
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REFLEX TIME



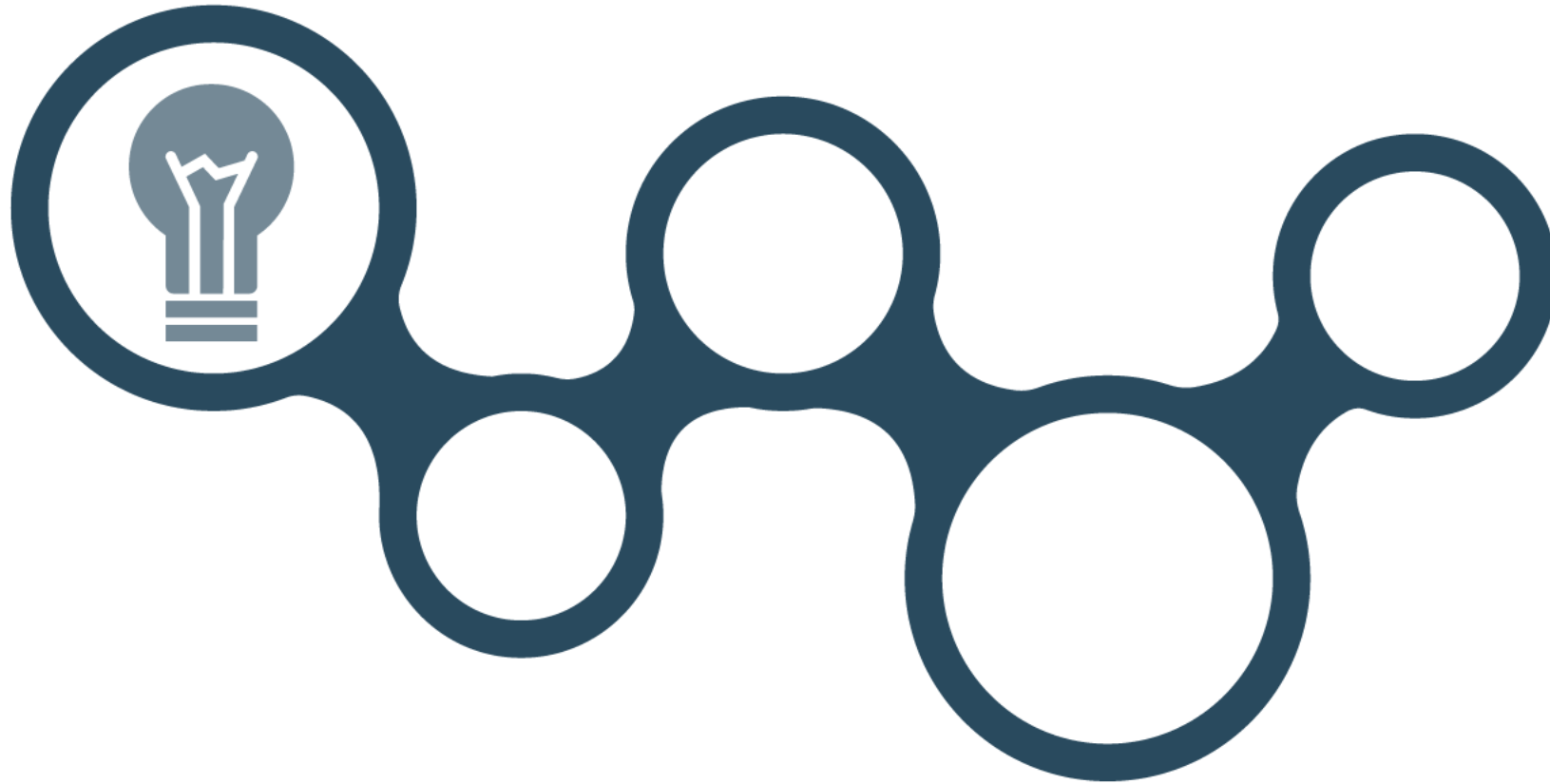
FIRST RESPONDERS ARRIVE  
AT THE SCENE AND  
FINISH THE JOB



# LET'S TALK BENEFITS



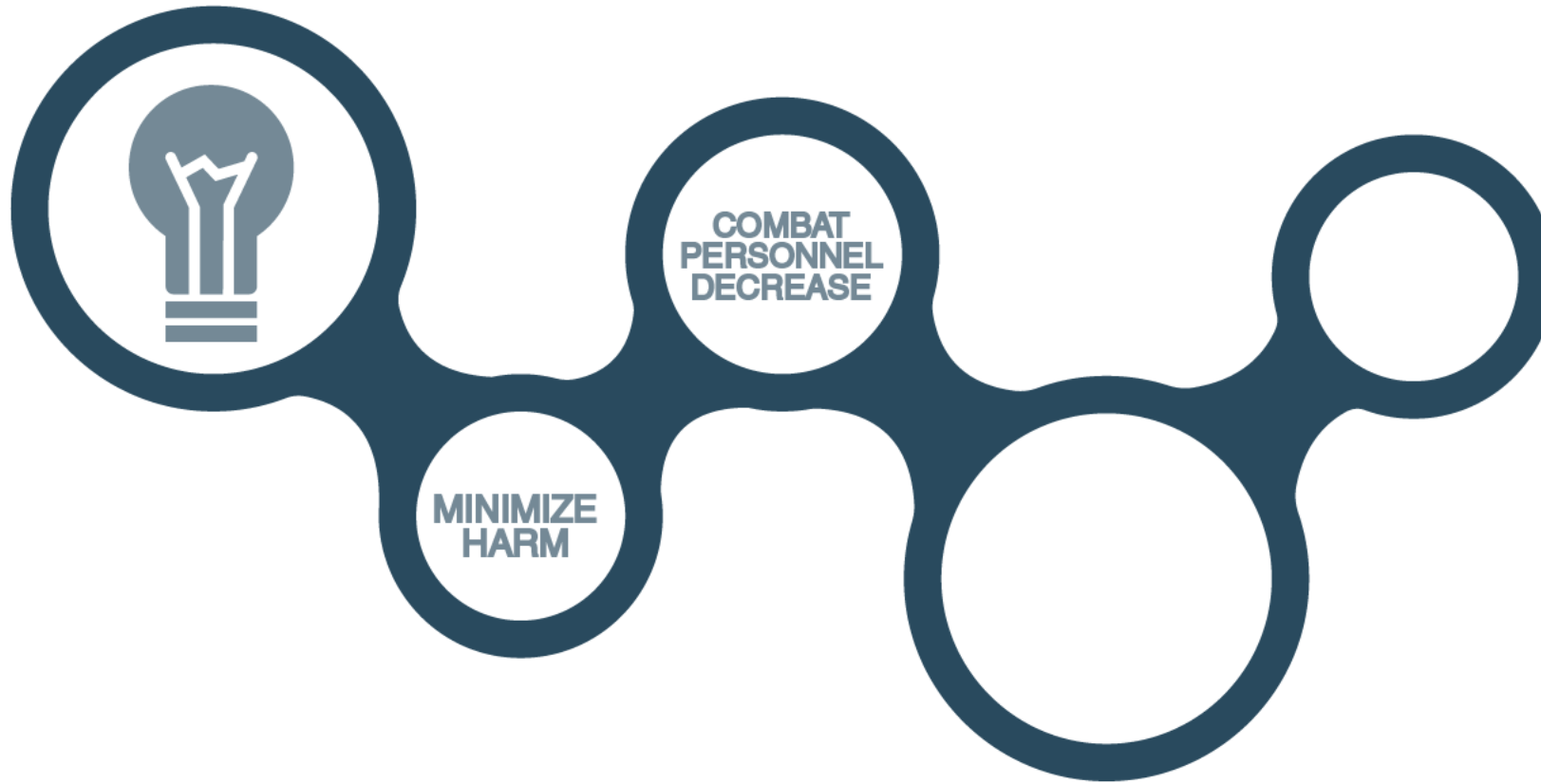
# BENEFITS TO OUR SOLUTION



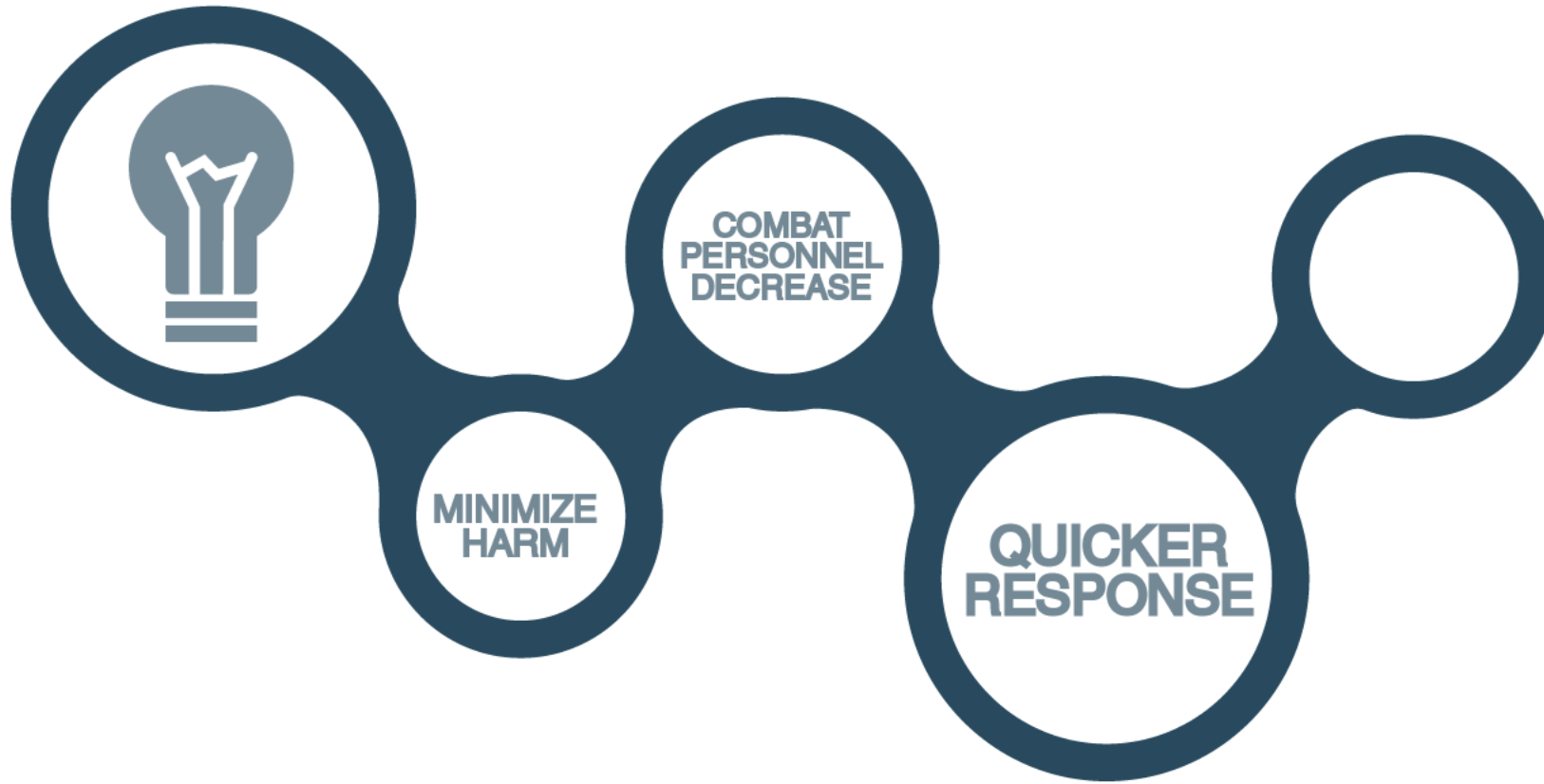
# BENEFITS TO OUR SOLUTION



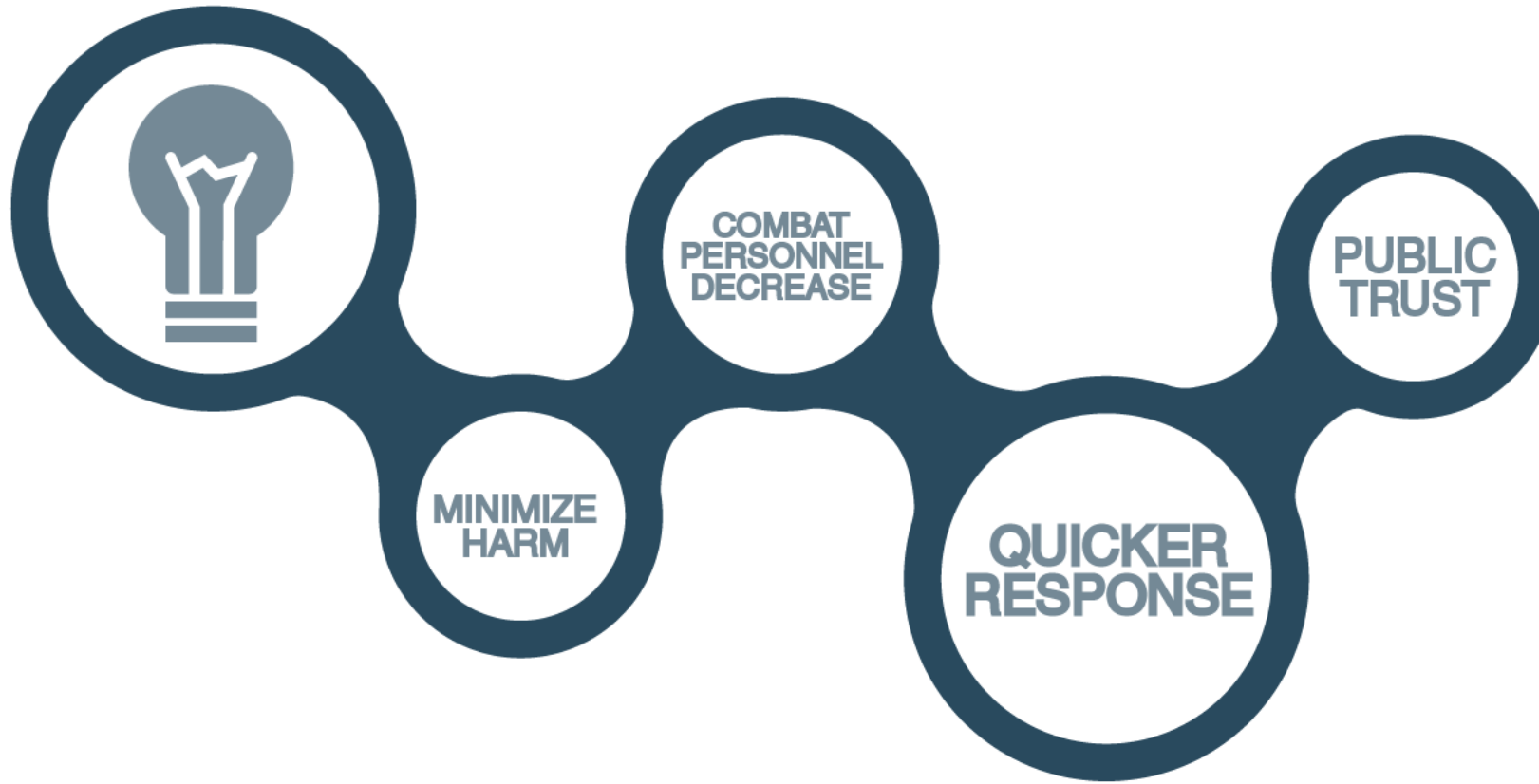
# BENEFITS TO OUR SOLUTION



# BENEFITS TO OUR SOLUTION



# BENEFITS TO OUR SOLUTION





# TECHNOLOGY USED



# MODIFIED DRONE OVERVIEW



# MODIFIED DRONE OVERVIEW



**ALTA X DRONE**

**IGNIS BY DRONEAMPLIFIED**

## **KEY SPECS**

- WORKSWELL WIRIS PRO CAMERA



# MODIFIED DRONE OVERVIEW



**ALTA X DRONE**

IGNIS BY DRONEAMPLIFIED

## KEY SPECS

- WORKSWELL WIRIS PRO CAMERA
- 22-30 MINUTE FLIGHT TIME



# MODIFIED DRONE OVERVIEW



## KEY SPECS

- WORKSWELL WIRIS PRO CAMERA
- 22-30 MINUTE FLIGHT TIME
- 2 PELLETS PER SECOND



# MODIFIED DRONE OVERVIEW



## KEY SPECS

- WORKSWELL WIRIS PRO CAMERA
- 22-30 MINUTE FLIGHT TIME
- 2 PELLETS PER SECOND
- WEIGHT: UNDER 55LBS (WITH 325 SPHERES)



# MODIFIED DRONE OVERVIEW



## KEY SPECS

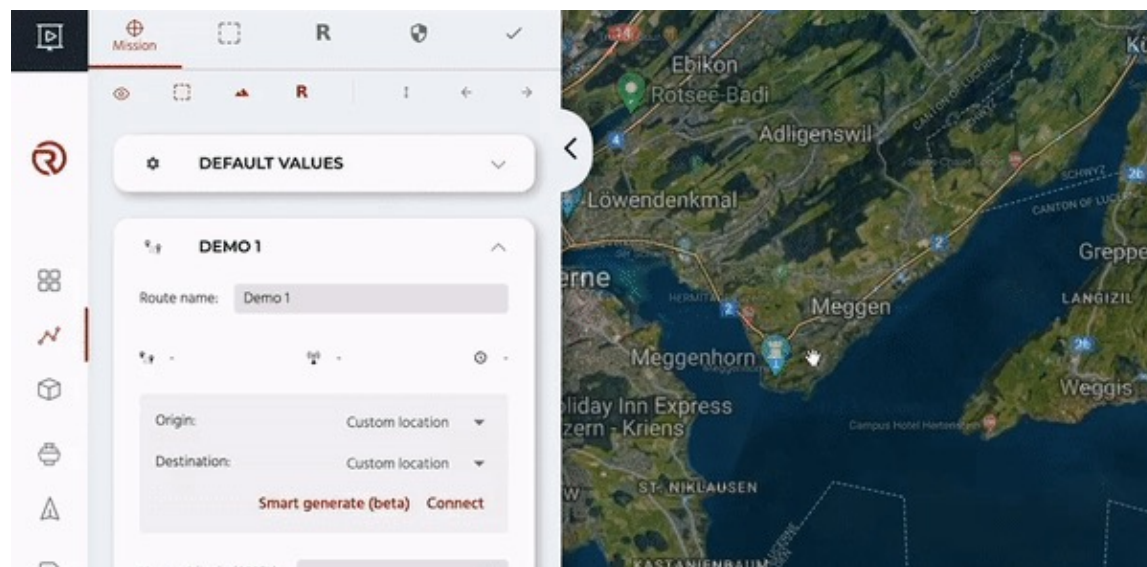
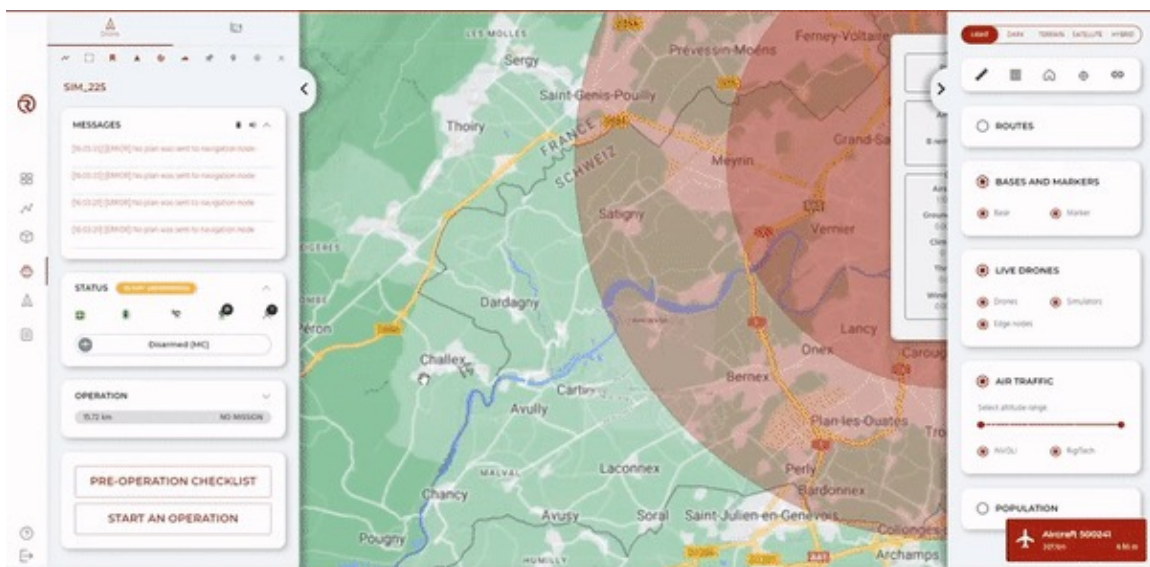
- WORKSWELL WIRIS PRO CAMERA
- 22-30 MINUTE FLIGHT TIME
- 2 PELLETS PER SECOND
- WEIGHT: UNDER 55LBS (WITH 325 SPHERES)

## MEASUREMENTS:

90in. X 90in. X 30in.  
(LENGTH X WIDTH X HEIGHT)



# ROUTING SOFTWARE



**RIGICLOUD**  
**BY RIGITECH**

**NASA BLUE SKIES 2024**



# ROUTING SOFTWARE



**CARDINAL**

LINK MODULE BY RAJANT



# ROUTING SOFTWARE



**CARDINAL**

LINK MODULE BY RAJANT

## KEY FEATURES:

- OFFERS MACHINE TO MACHINE COMMUNICATION



# ROUTING SOFTWARE



**CARDINAL**

LINK MODULE BY RAJANT

## KEY FEATURES:

- OFFERS MACHINE TO MACHINE COMMUNICATION
- RADIO FREQUENCY SHIELDING WHICH AVOIDS RECIEVER BLOCKING



# ROUTING SOFTWARE



**CARDINAL**

LINK MODULE BY RAJANT

## KEY FEATURES:

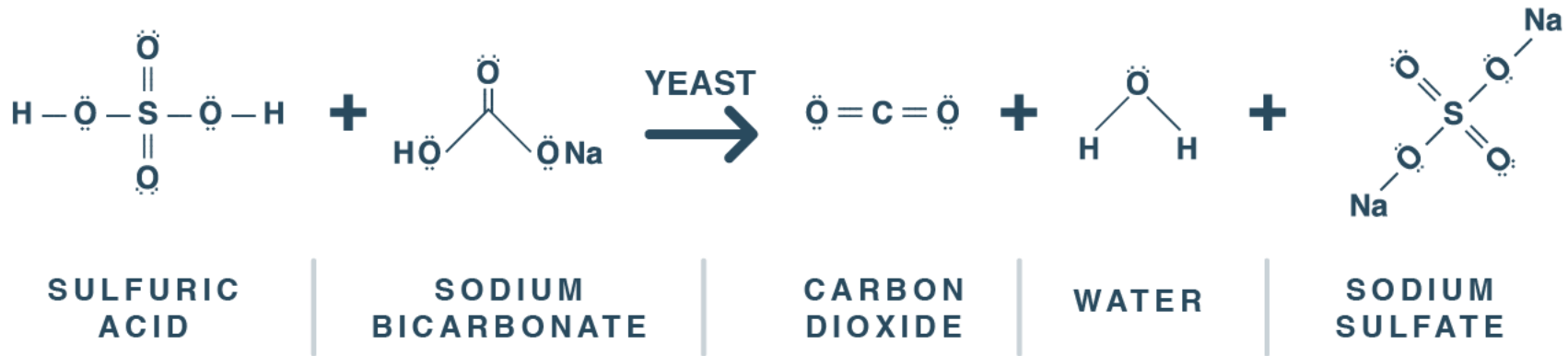
- OFFERS MACHINE TO MACHINE COMMUNICATION
- RADIO FREQUENCY SHIELDING WHICH AVOIDS RECIEVER BLOCKING
- WEIGHT: 90 GRAMS (VERY LIGHTWEIGHT)



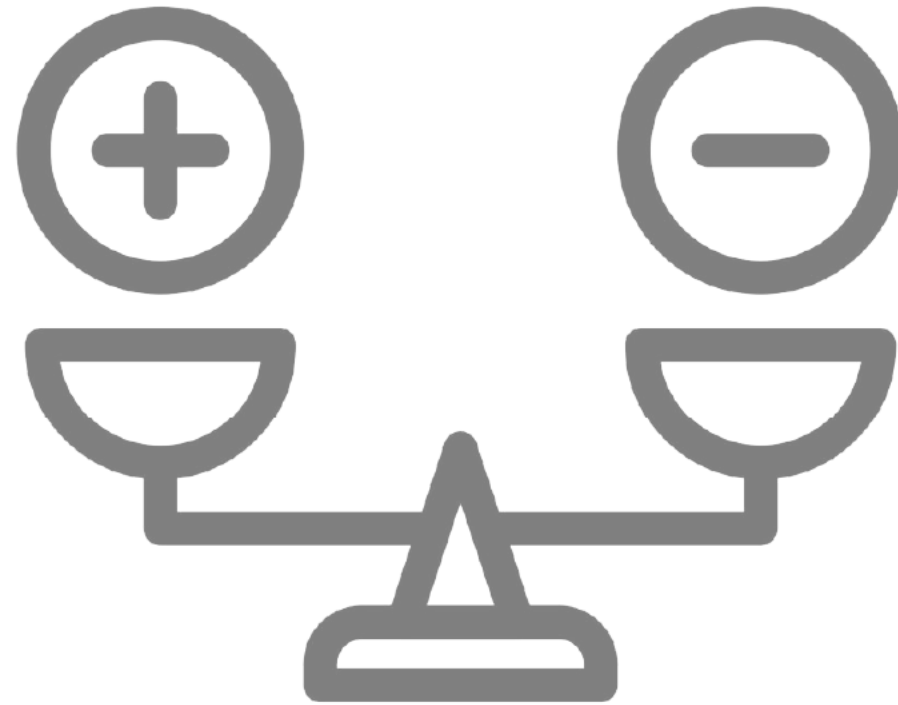
# WHAT WILL WE USE TO TAKE OUT THE FIRE?



# EXPANDING FOAM FIRE RETARDANT PELLETS



# EVALUATING THE IMPACT



# ENVIRONMENTAL SAFETY





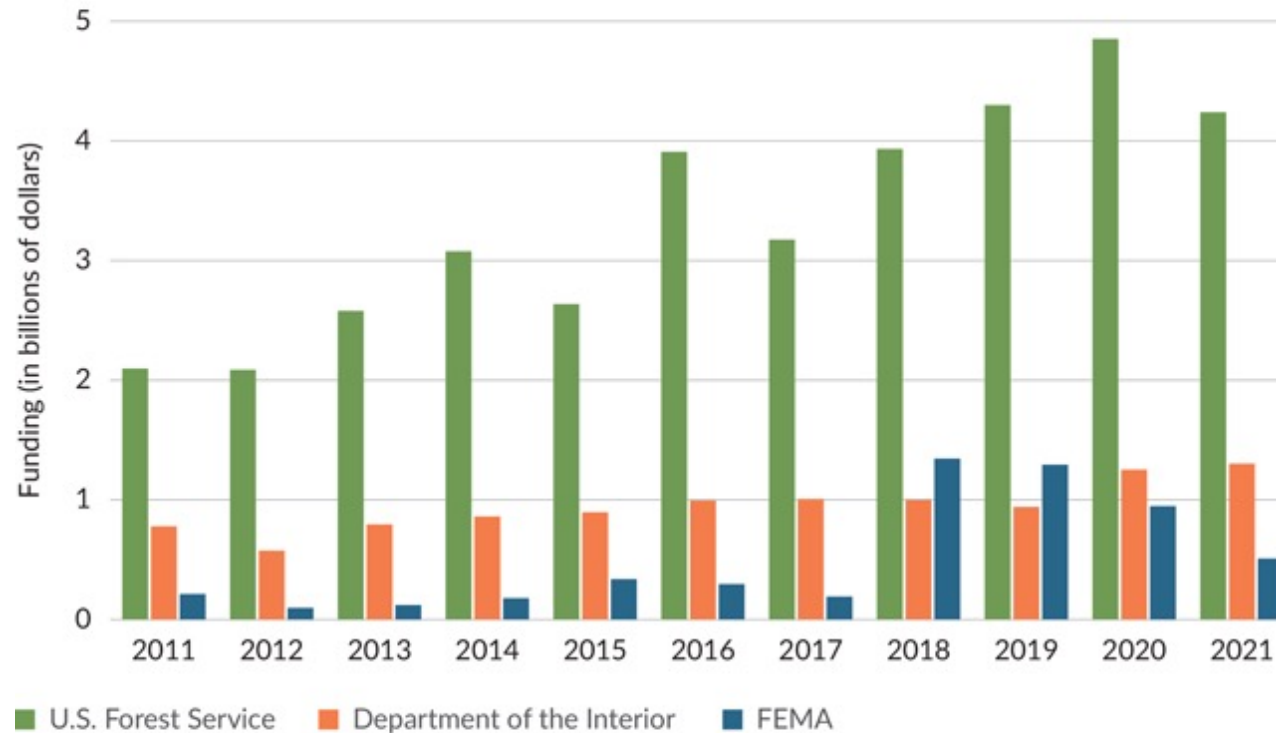
# LET'S TALK COSTS



Figure 3

## Federal Spending on Wildfire Management Has Grown Significantly Since Fiscal Year 2011

Funding over time for wildfire management activities by the U.S. Forest Service, Department of the Interior, and Federal Emergency Management Agency



Notes: Information includes appropriations for total wildfire management funding from the U.S. Department of the Interior and the U.S. Forest Service as calculated by the Congressional Research Service. FEMA figures reflect obligations by the agency for Fire Management Assistance Grants (FMAGs) and Major Disaster Declarations.

Sources: K. Hoover, "Federal Wildfire Management: Ten-Year Funding Trends and Issues (FY2011-FY2020)" (2020); K. Hoover, "Forest Service: FY2022 Appropriations" (2021); Federal Emergency Management Agency, OpenFEMA Dataset: FEMA Web Disaster Summaries - V1, and Disaster Declarations Summaries - V2 (2022)

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# FUNDING ALLOCATIONS



- PREPAREDNESS
- PREVENTION
- MITIGATION



- SUPPRESSION
- OTHER RESPONSES



- RECOVERY
- EFFORTS



**\$45,000 PER DRONE**  
**1/10 OF CURRENT HELICOPTER OPERATING COSTS**



# NETWORKING INITIATIVE

RAJANT



DroneAmplified



RIGITECH



# PROJECT TIMELINE



# PROJECT TIMELINE

## PHASE I

---

- Hardware Modifications & Testing
- Chemical Testing
- Finished conceptual prototype

2025



# PROJECT TIMELINE

## PHASE I

- Hardware Modifications & Testing
- Chemical Testing
- Finished conceptual prototype

## PHASE II

- Full Integration Testing
- Revisions

2025 → 2026





# PROJECT TIMELINE

## PHASE I

- Hardware Modifications & Testing
- Chemical Testing
- Finished conceptual prototype

## PHASE II

- Full Integration Testing
- Revisions

## PHASE III

- First Station Deployment in Southern California
- Multiple station deployment in California hotspots

2025 → 2026 → 2027



# PROJECT TIMELINE

## PHASE I

- Hardware Modifications & Testing
- Chemical Testing
- Finished conceptual prototype

## PHASE II

- Full Integration Testing
- Revisions

## PHASE III

- First Station Deployment in Southern California
- Multiple station deployment in California hotspots

## PHASE IV

- Reach Partnership to extend Alert California coverage
- Expand stations across the United States

2025 → 2026 → 2027 → 2035



# THANK YOU



**Angel Ortega**  
Leading Research Engineer



**Jenny Rodriguez**  
Business Writing Specialist



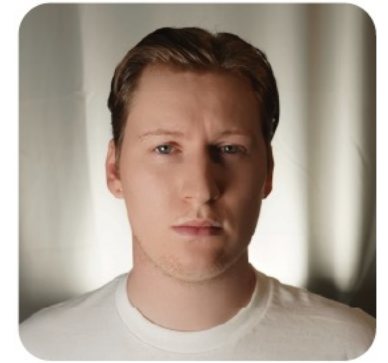
**Juan Villa**  
Fire Technology Researcher



**Bernardo Portillo**  
Aerial Transportation Research Engineer



**Larisa Mayoral**  
Chemical Engineer &  
Hazardous Material Specialist



**Logan Stahl**  
Visual Communications Director

