

# Workshop on multicopters for inspection

# How to see the birds eye view





## What is Traditional Remote Visual Inspection?

***“The ability to inspect inaccessible / dangerous environments, whilst minimising the risks to your Personnel and Assets”***





## What is OUR Remote Visual Inspection?

*“The ability to inspect inaccessible / dangerous environments, **visualise emissions and monitor safety**, whilst minimising the risks to your Personnel and Assets”*





# UAV Applications



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# UAV Applications

## Energy Sectors

- Oil & Gas
- Refineries
- Offshore Assets
- Flare Surveys
- OGI Surveys
- Power Utilities
- Power Distribution Network
- Solar Panels
- Wind Power
- Building Inspection

## Agriculture, Forestry and Fisheries

- Environmental monitoring
- Crop dusting
- Optimising use of resources

## Emergency Services

- Fire Fighting
- Fires
- Forest Fires
- Other major incidents
- Emergency Rescue
- Mountain Rescue
- Search & Rescue

## Earth Observation and Remote Sensing

- Climate monitoring
- Aerial photography, mapping and surveying
- Major incident and pollution monitoring

## Government

- Military
- Law enforcement
- Border Security
- Coastguard

## Communications & Broadcasting

- Proxy-satellites
- Short term local communication coverage
- Aerial Imaging



# UAV Applications

## UAV Payloads



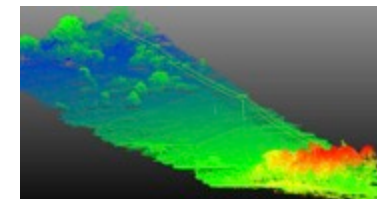
Visual



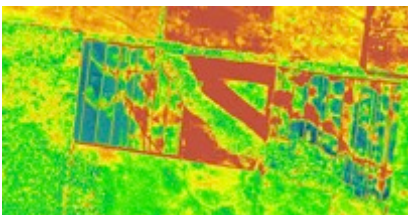
Thermal



Airborne OGI



Lidar



Hyperspectral

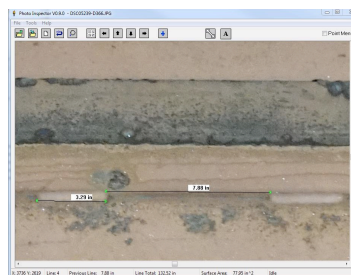


Photo  
Measurement  
Software



Air Monitoring

?

# ... UAV Applications

## Aerial Thermographic Applications



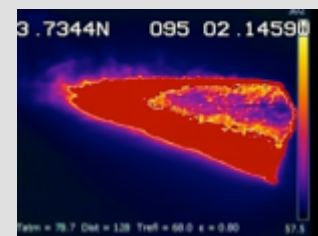
Utility Inspection



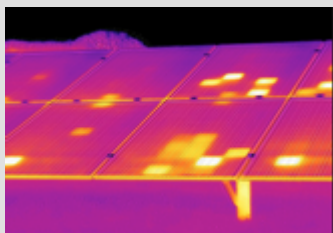
Home Inspection



Building Diag.



Fire



Solar Panels



Airborne OGI



Agriculture



SF-6



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# Inspectahire UAV Capabilities



Inspectahire has a variety of UAVs including the Following:-



Skyeye T-Series



Falcon 8



Mammoth

"Making a Visible Difference"



Flyability Elios





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# UAV Capabilities



- *Photography*
- *Videography*
- *Thermography*
- *Optical Gas Imaging (OGI)*
- *Topography*
- *Hyperspectral*

- 15 – 40 Minute Flight Times
- Longer Duration Flight time with Tethered systems
- Over Pressurised body
- Thermal Sensor on board
- Thermography – Radiometric data
- Optical Gas Imaging (Detection)
- On Board PC to control camera functions
- Parachute Safety System
- Non Spark Safety Battery connectors
- High load capabilities including GF 320 Cameras



# UAV Thermal Inspection



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# See in the Total Darkness



“Making a Visible Difference”



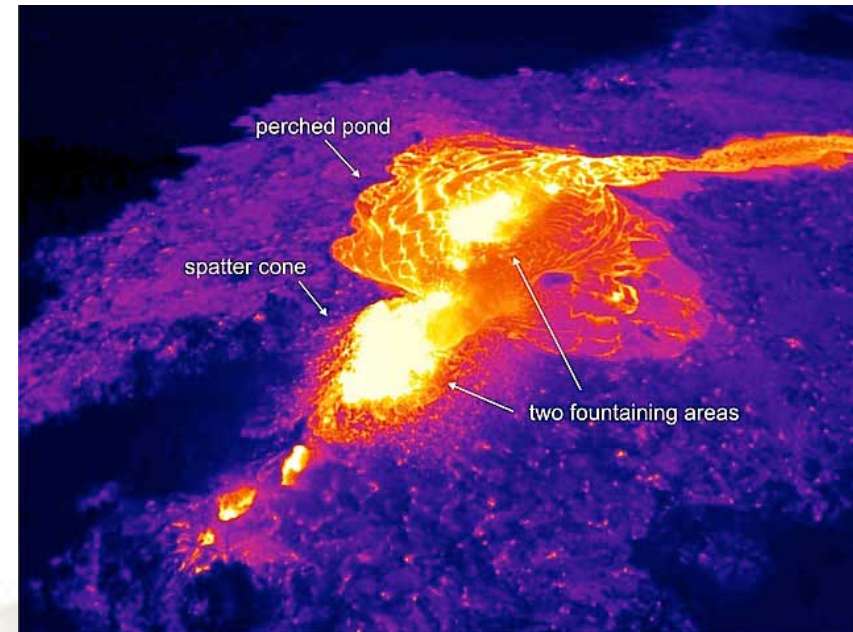
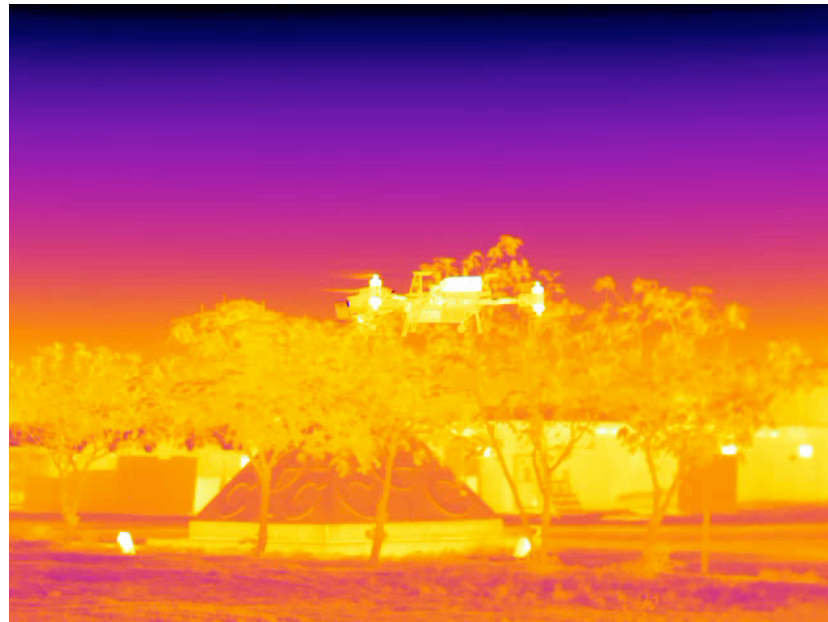


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# UAV Thermal Inspection

The technique is non-invasive designed to pinpoint the exact location of system deficiencies using heat responsive thermal imaging equipment.

Since this method of inspection is non-contact it can be carried out when a system is live, meaning no downtime costs. It also means that when faults are found corrective maintenance strategies can be planned and implemented before system failure occurs.





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# UAV Thermal Inspection



Easy, Affordable Thermal Imaging for Commercial sUAS



“Making a Visible Difference”

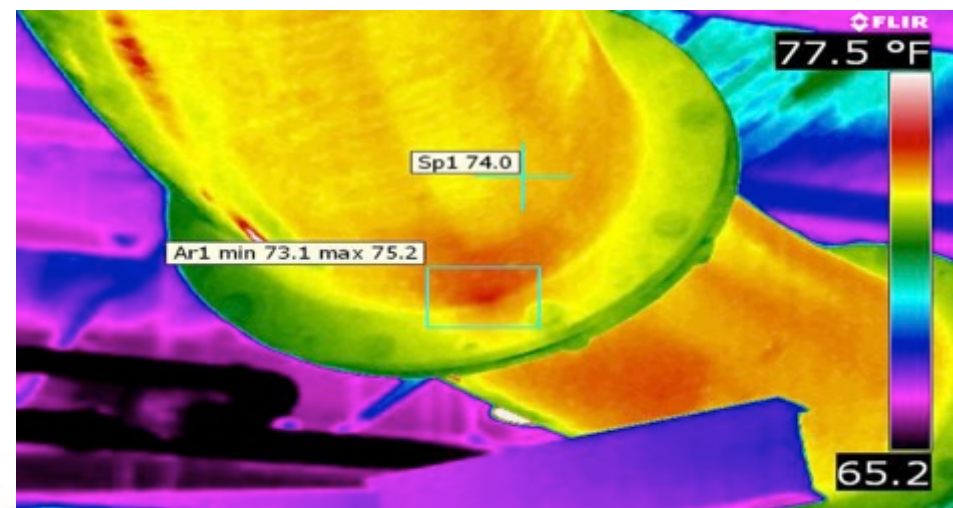




# ... UAV Thermal Inspection



**FLIR T-Series:** The Most Flexible, Innovative and Highest Quality Professional-Grade Handheld Thermal Cameras  
Featuring the New T660 with 640 × 480 Thermal Resolution



“Making a Visible Difference”

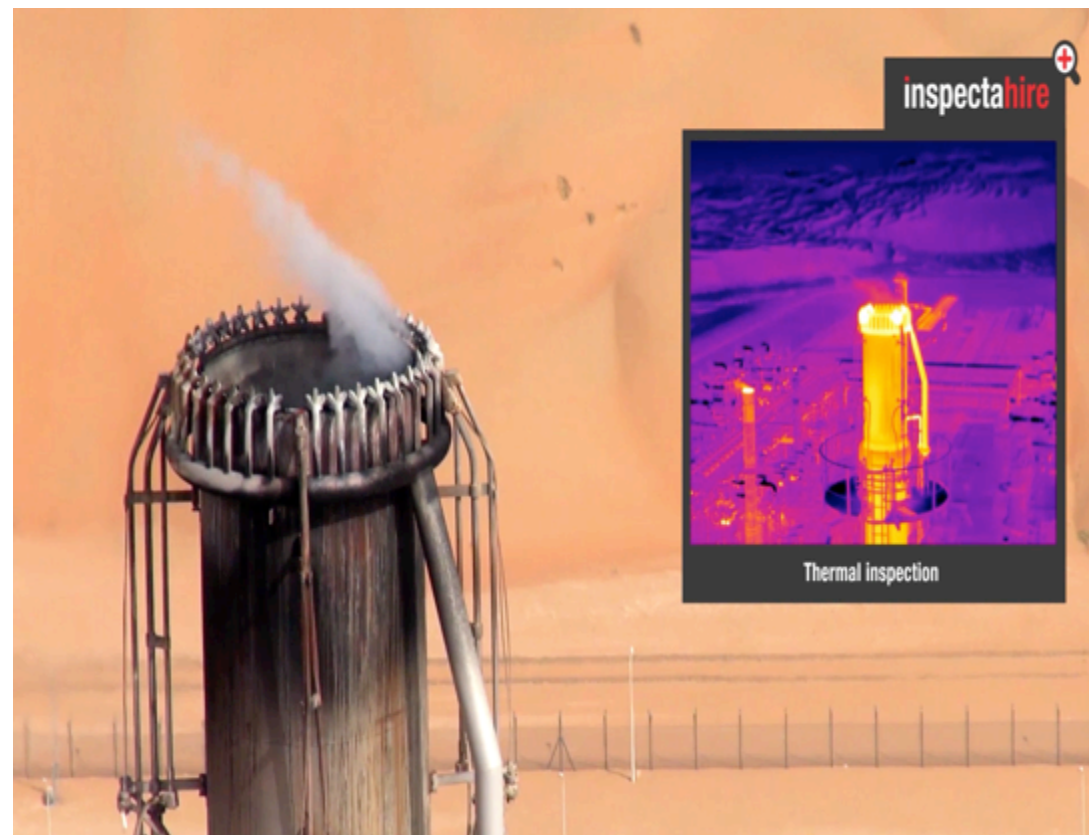
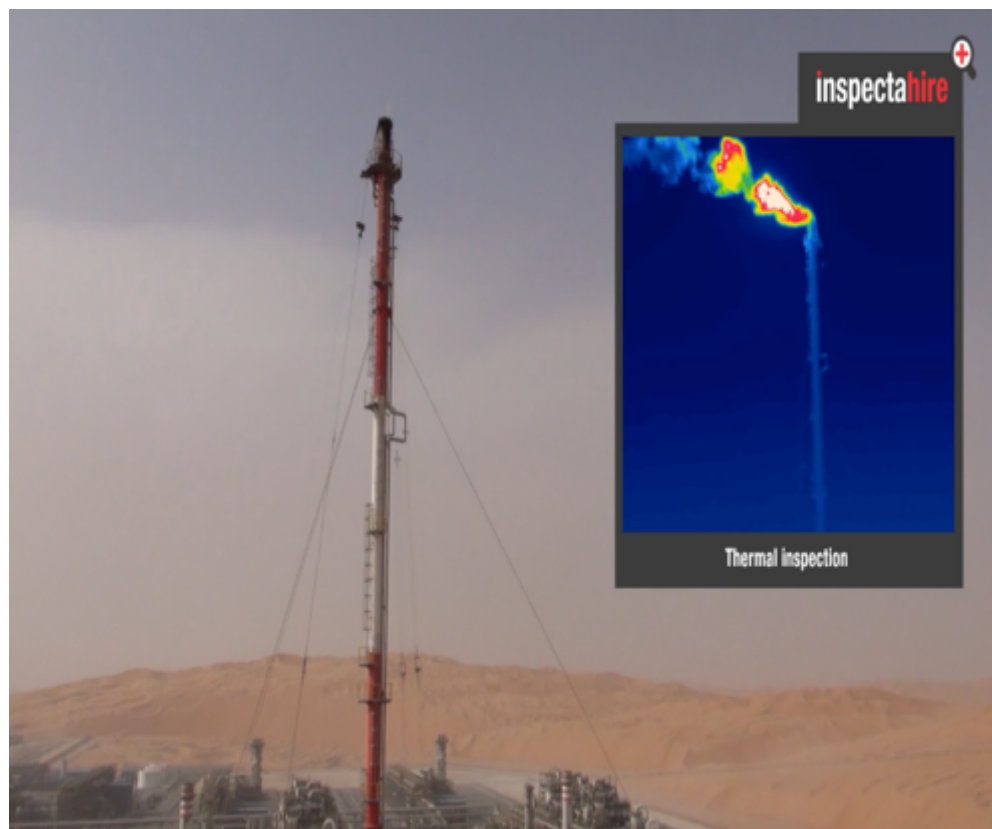
# Energy Sectors





# UAV Inspection

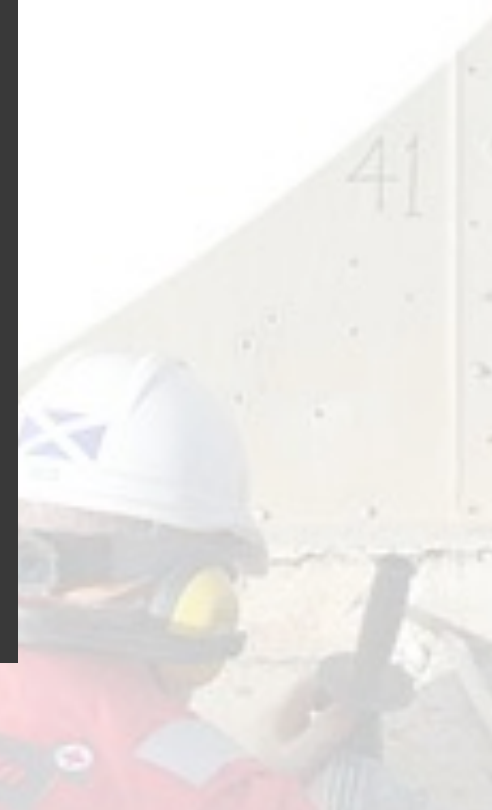
## Flare Visual & Thermal inspection





# UAV Inspection

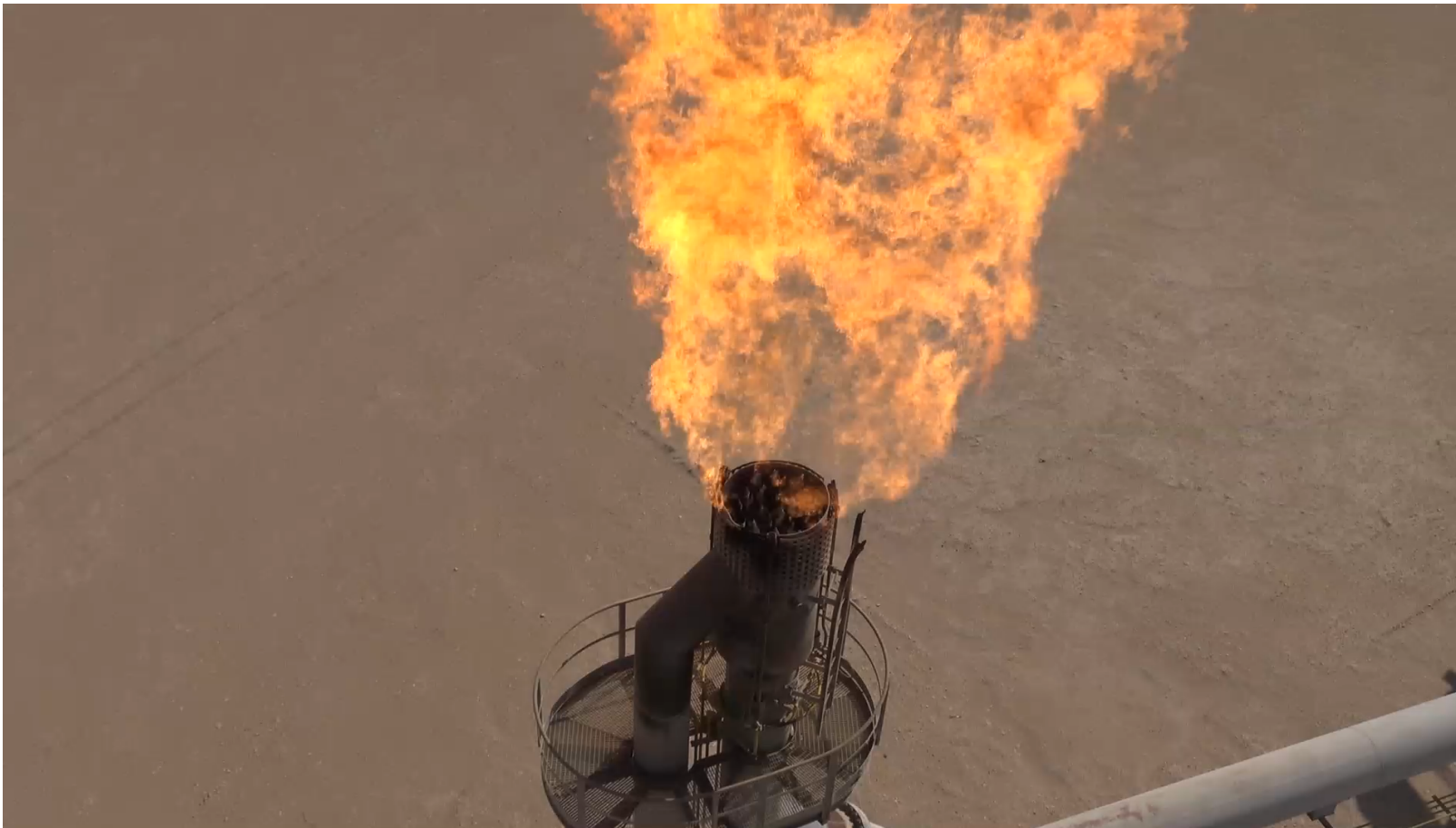
## Flare Visual & Thermal inspection (Video)



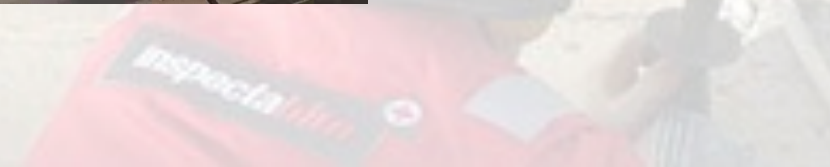


# UAV Inspection

## Flare Visual (Video)

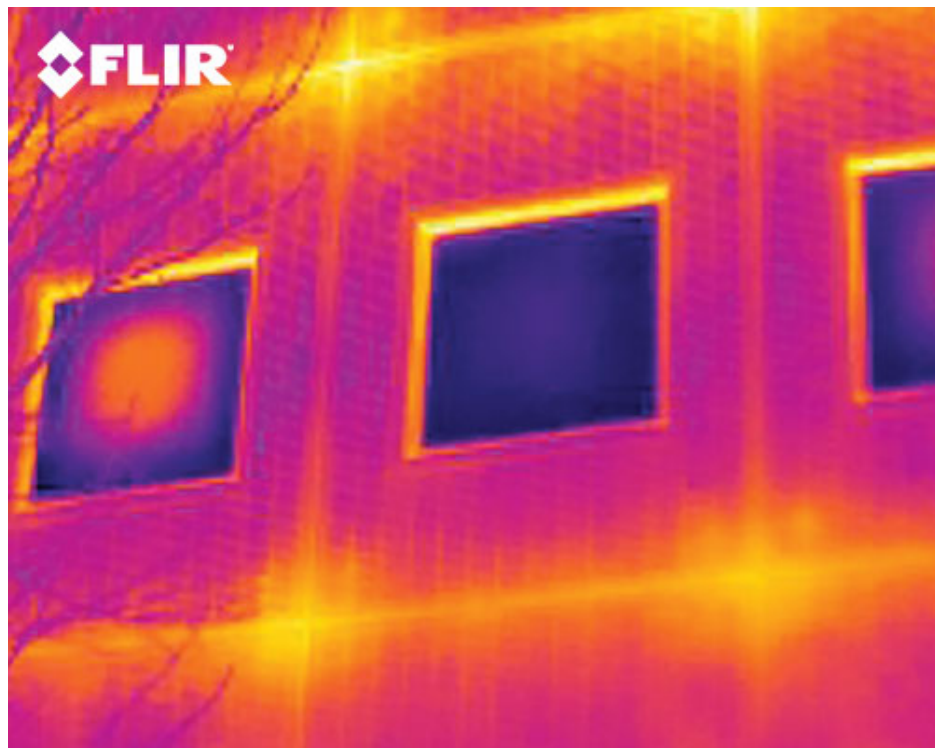


"Making a Visible Difference"

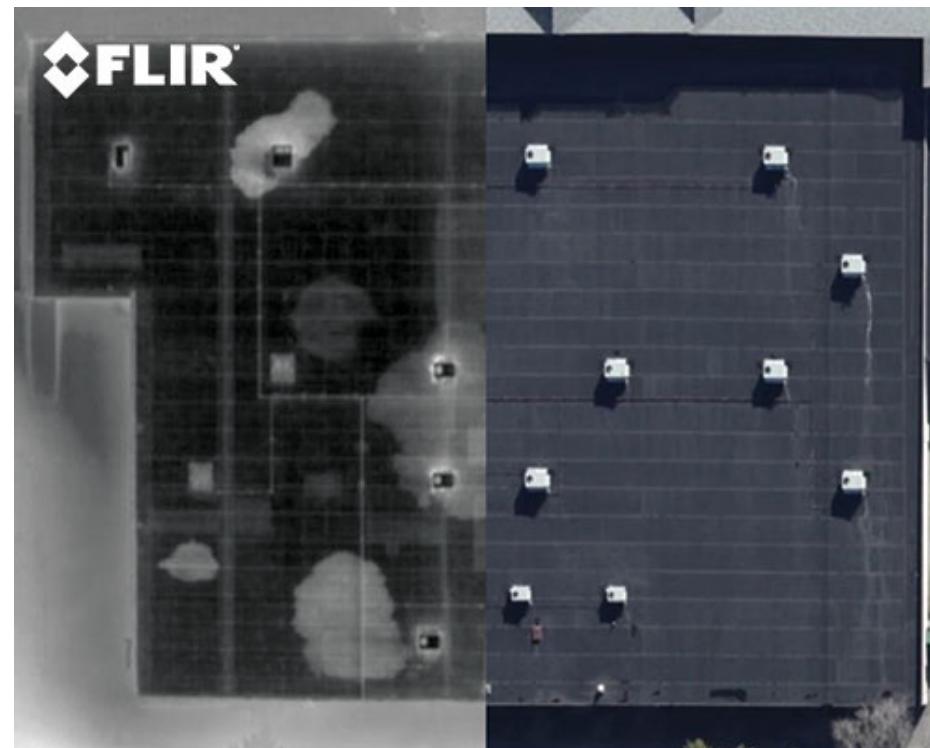




# ... Building Inspection



*Easily located failed argon gas windows on office buildings.*



*Find invisible water damage in seconds.*

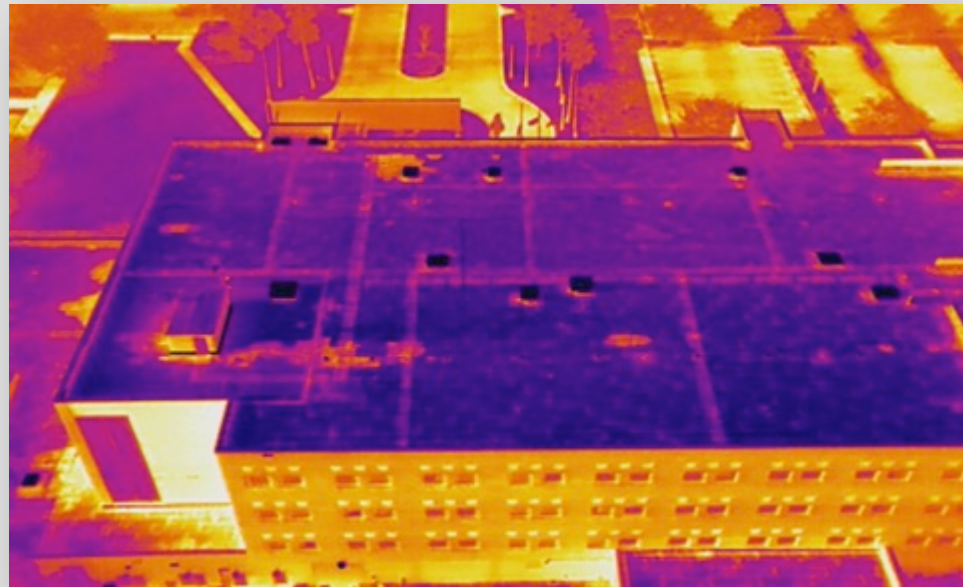


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# Building Inspection

Acquire the Full roof image in one Thermal Image

- Reduce Roof Surveys from hours to minutes.



“Making a Visible Difference”





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# Building Inspection



*Get a wide-angle view of the whole roof while keeping the details you need for accurate analysis.*

**“Making a Visible Difference”**



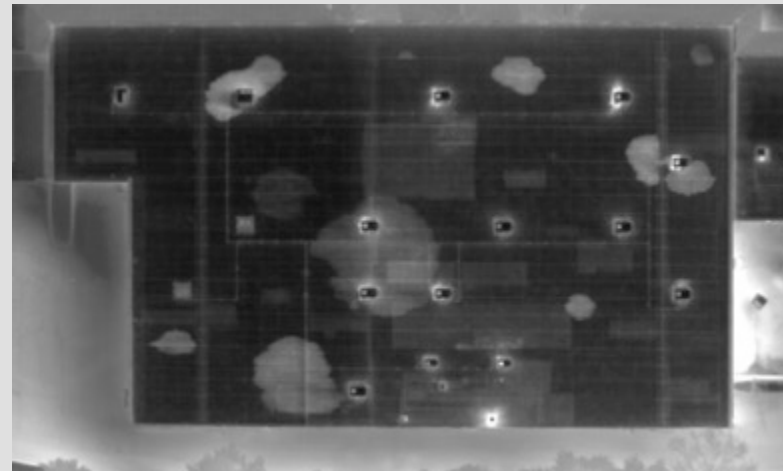
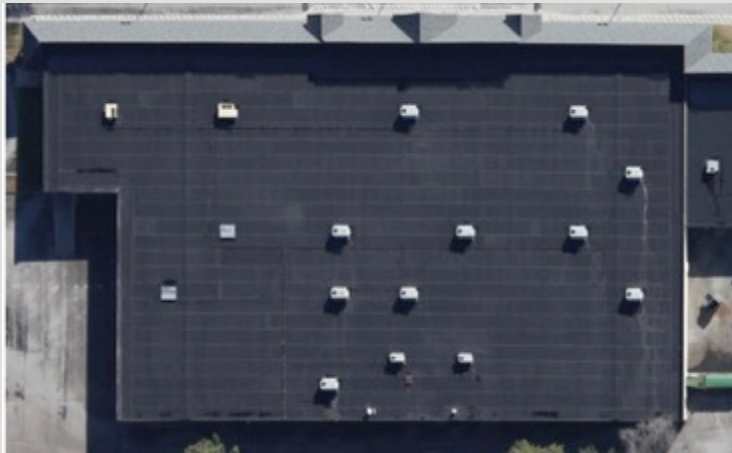




# Building Inspection

## ADVANTAGES OF AIRBORNE THERMAL IMAGE ACQUISITION - AC

Acquire the Full roof image in one Thermal Image



Maximize angle of acquisition and target emissivity

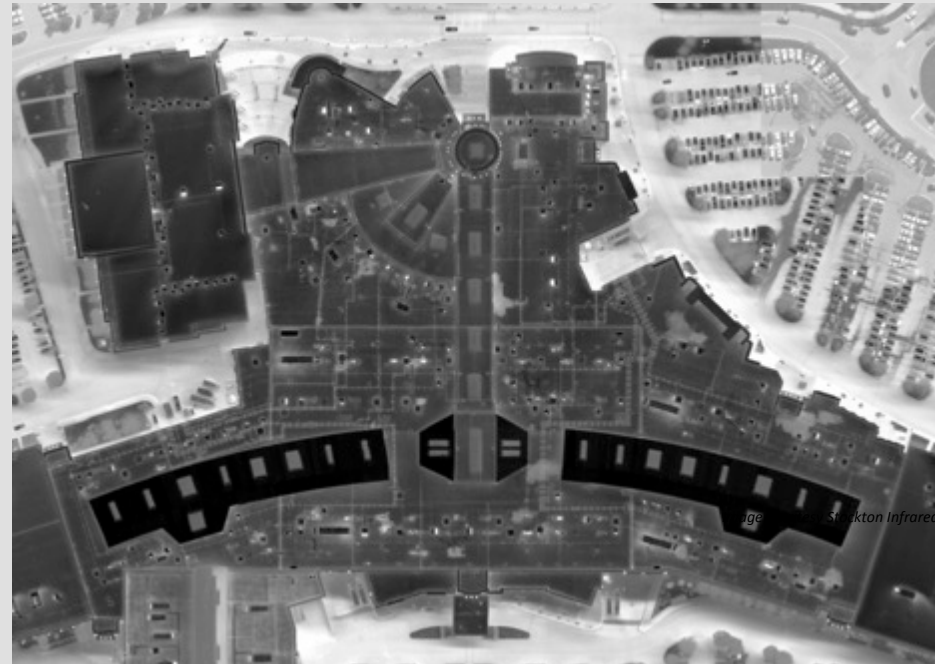


# Building Inspection

## ADVANTAGES OF AIRBORNE THERMAL IMAGE ACQUISITION

Acquire the Full roof image in one Thermal Image

Improve Resolution  
and overlay  
architectural  
drawings

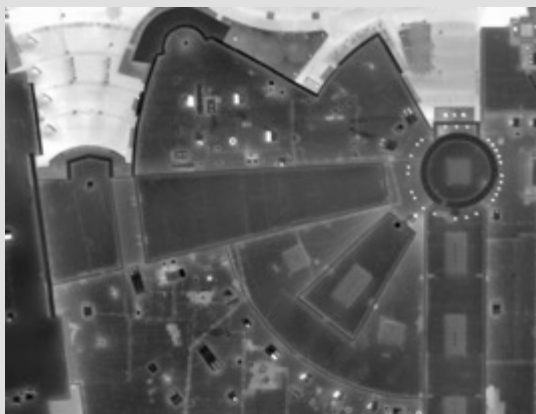




# Building Inspection

## ADVANTAGES OF AIRBORNE THERMAL IMAGE ACQUISITION

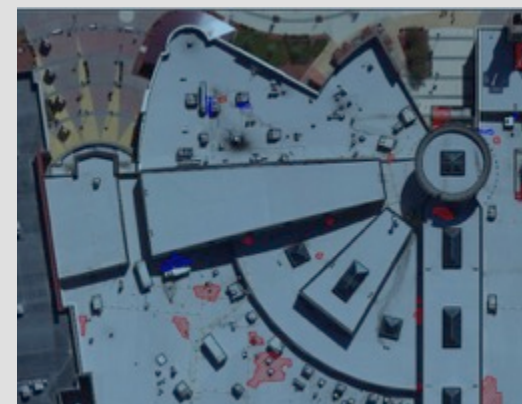
Acquire the Full roof image in one Thermal Image  
Post Processing software will “stitch” multiple Images together



B & W Thermal Image



Architectural Drawing with leaks highlighted



Visual with leaks highlighted

Images Courtesy Stockton Infrared

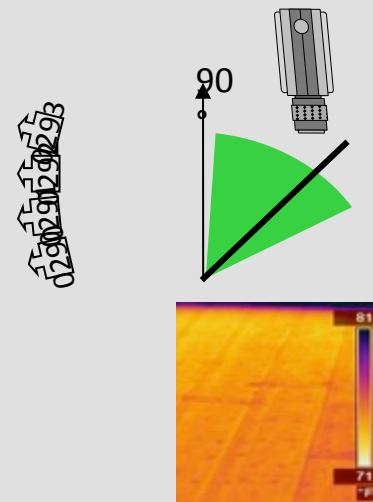


# Building Inspection

## ADVANTAGES OF AIRBORNE THERMAL IMAGE ACQUISITION

The angle of image acquisition impacts the ability to identify temperature variations on a roof surface

- Angle of acquisition optimized
- Time Savings for multiple image acquisition reduces labor costs
- Time Savings makes it easier to justify a baseline survey
- Ease of Multiple Image Collection improves resolution
- Software compatibility reduces “image stitching” effort



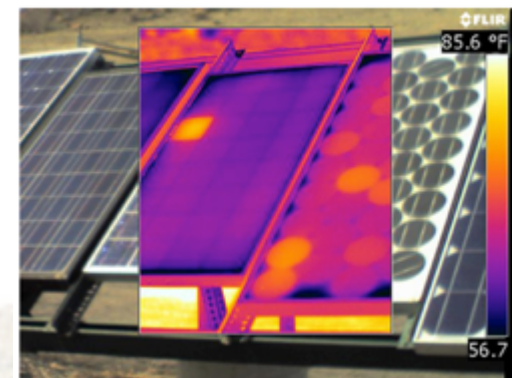
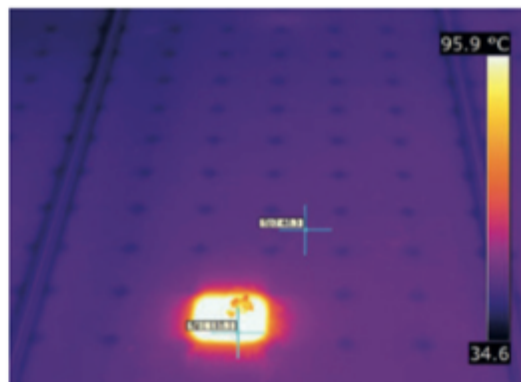
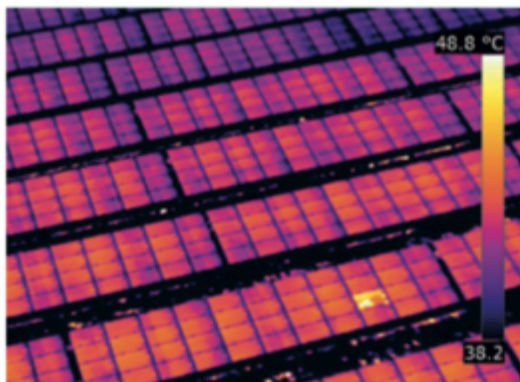
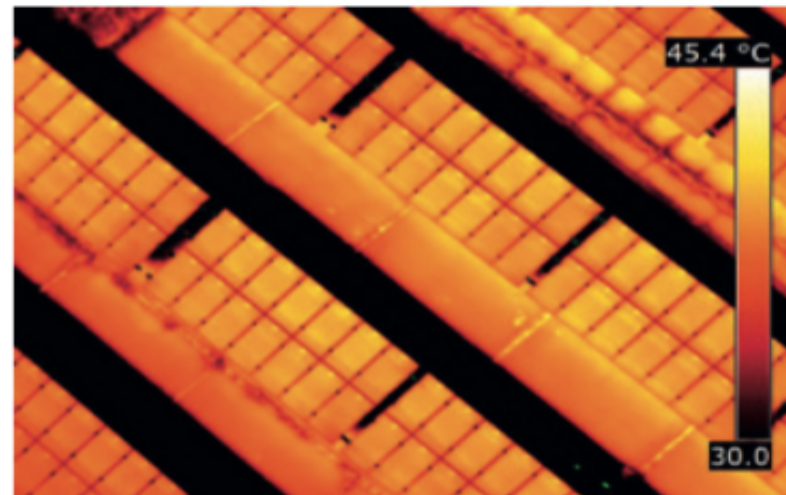




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# UAV Inspection

## Solar Panel inspection





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# UAV Inspection

## Pipeline inspection



“Making a Visible Difference”

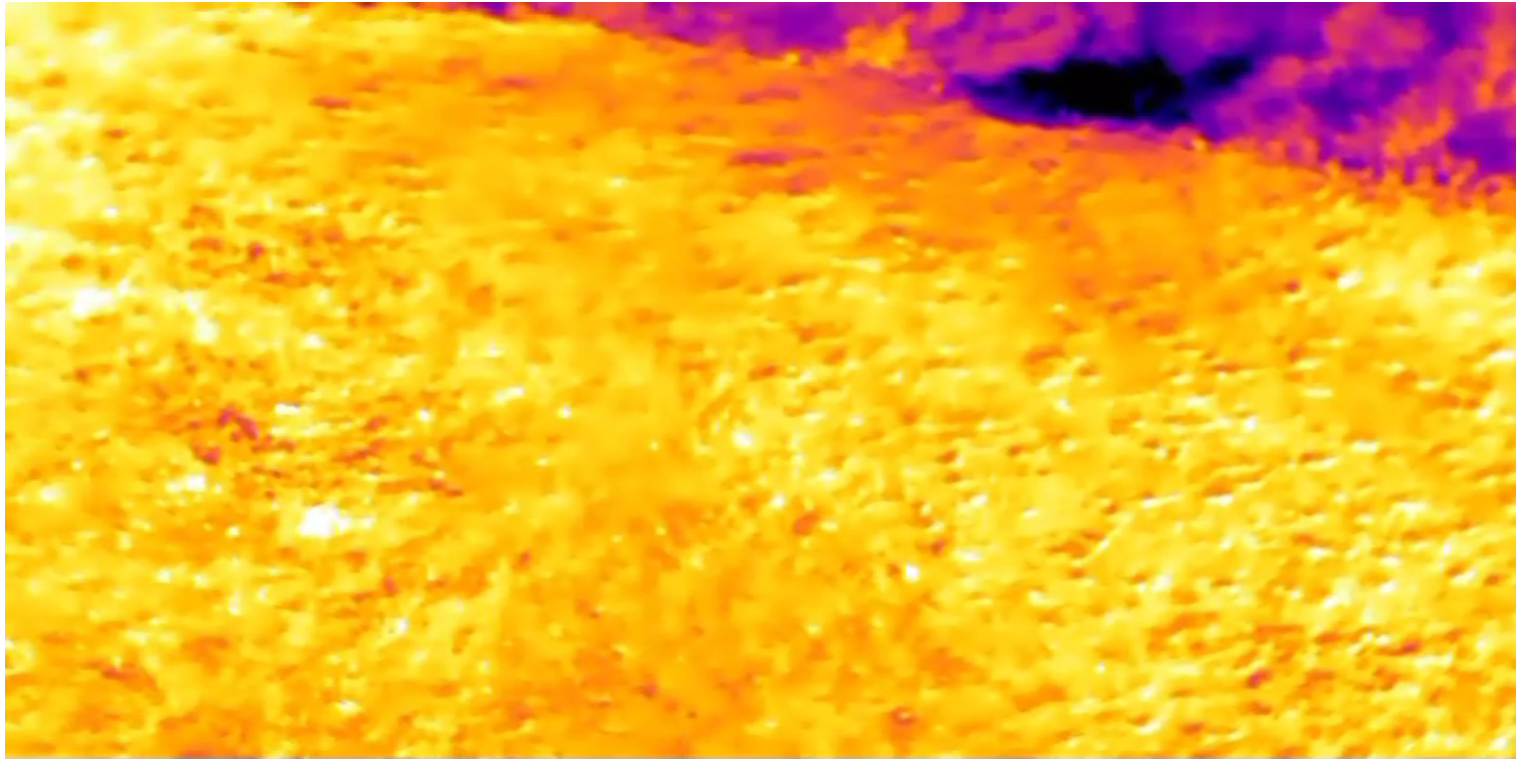






# UAV Inspection

## Pipeline inspection



“Making a Visible Difference”



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# UAV Inspection

## Internal Tank inspection



“Making a Visible Difference”

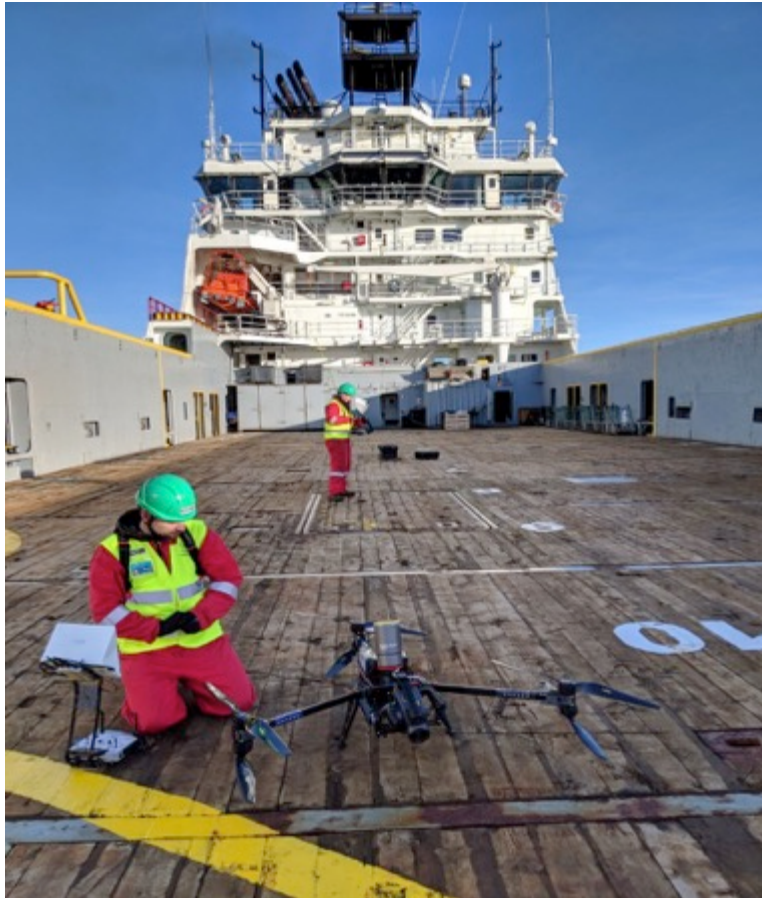




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# UAV Inspection

## Offshore Inspection

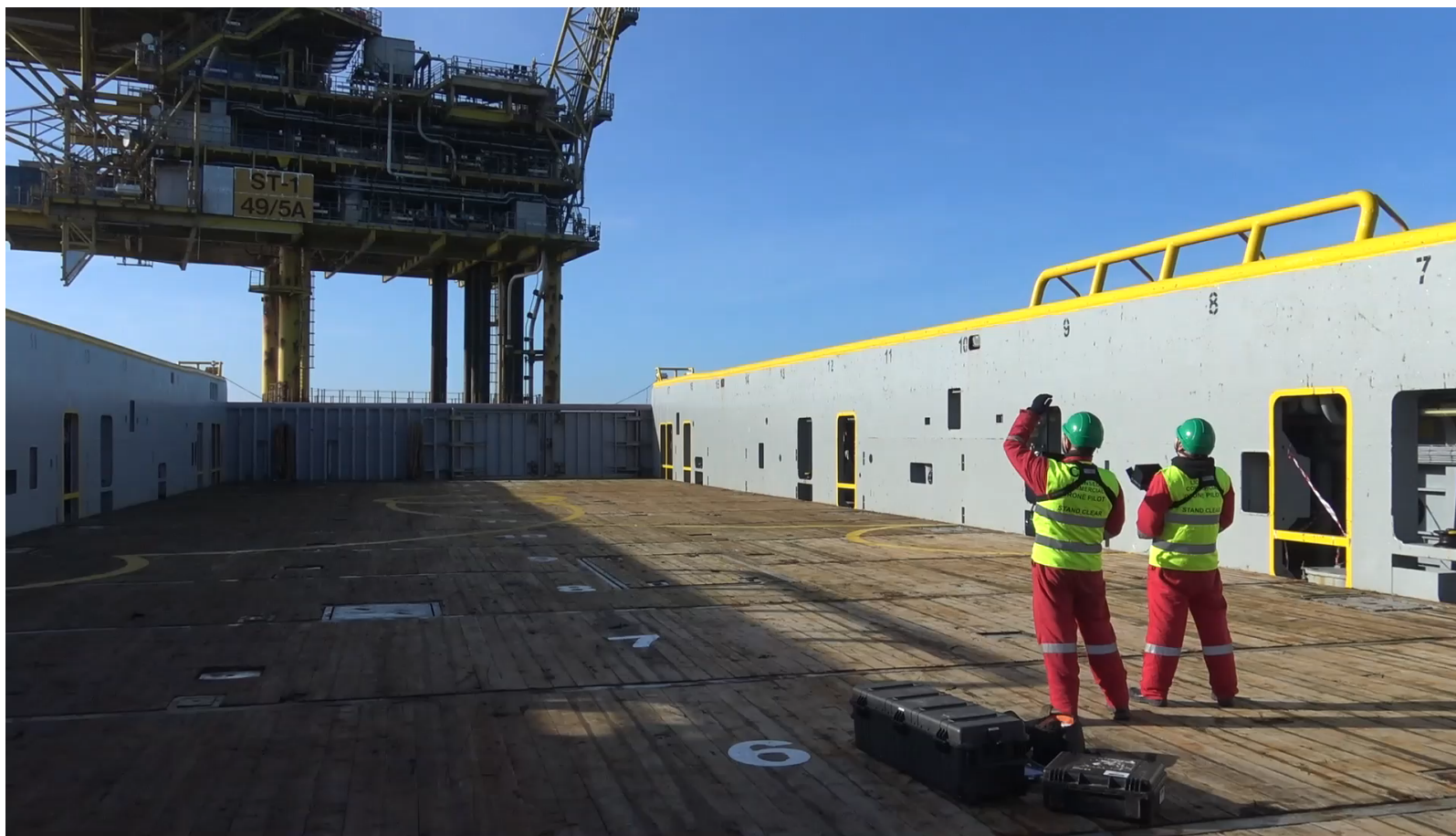


“Making a Visible Difference”



# UAV Inspection

## Offshore Inspection

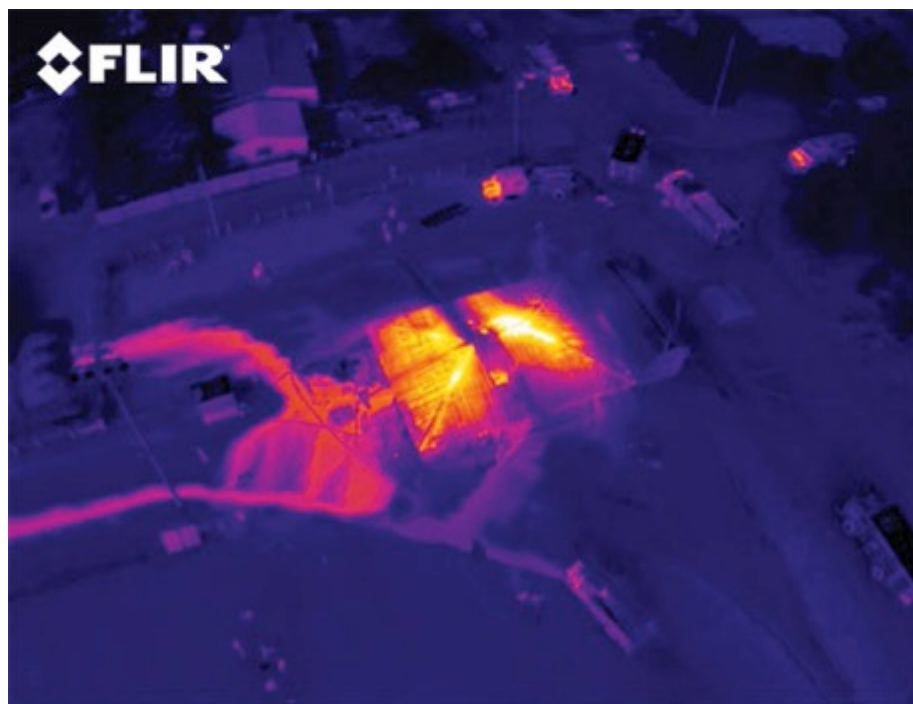


“Making a Visible Difference”

# Emergency Services



# ... First Responder



*See through smoke and guide water application for efficient attacks.*

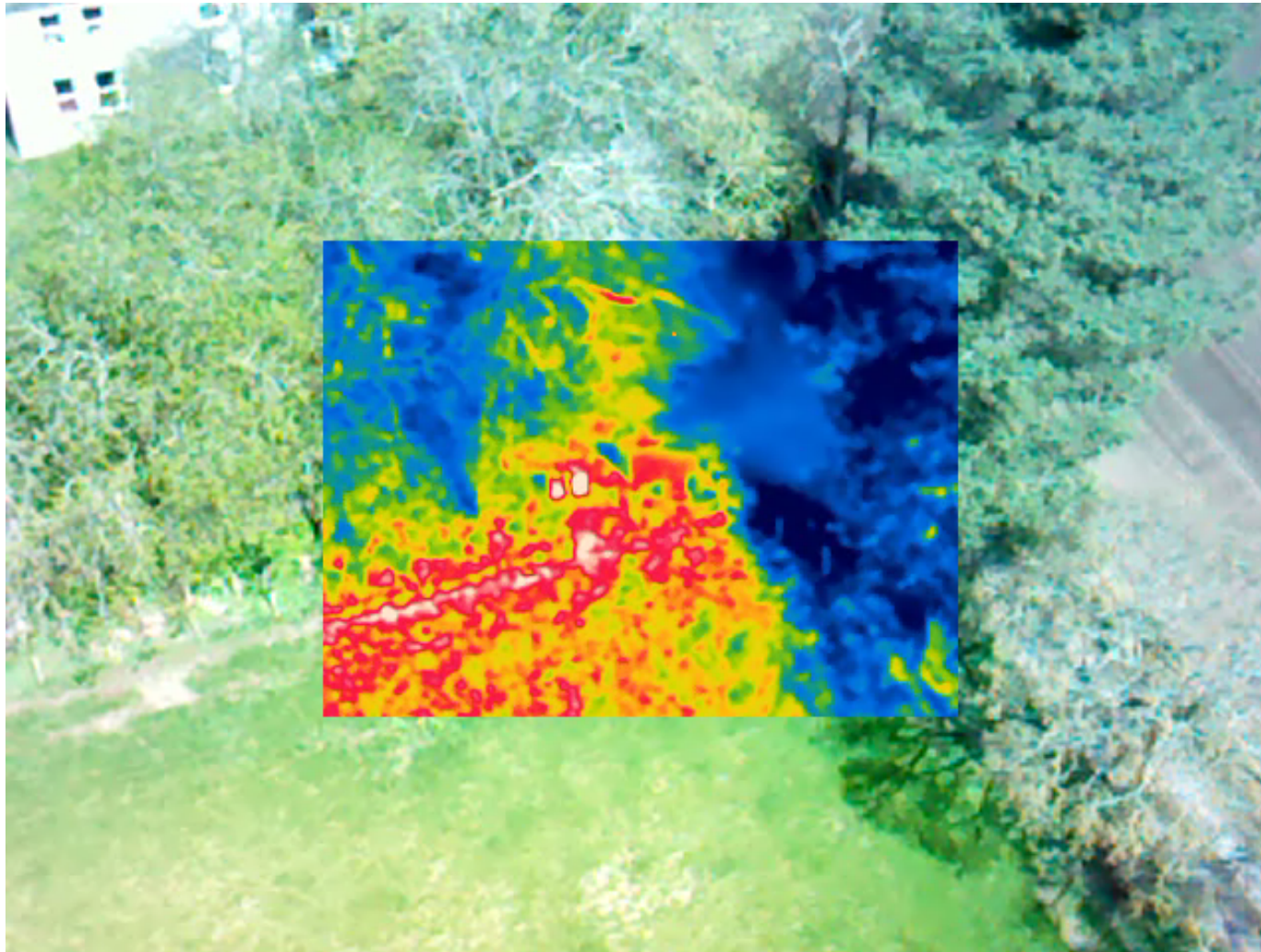


*Find lost hikers or accident victims night and day.*

# Agriculture, Forestry and Fisheries



# Thermal / Multispectral



“Making a Visible Difference”



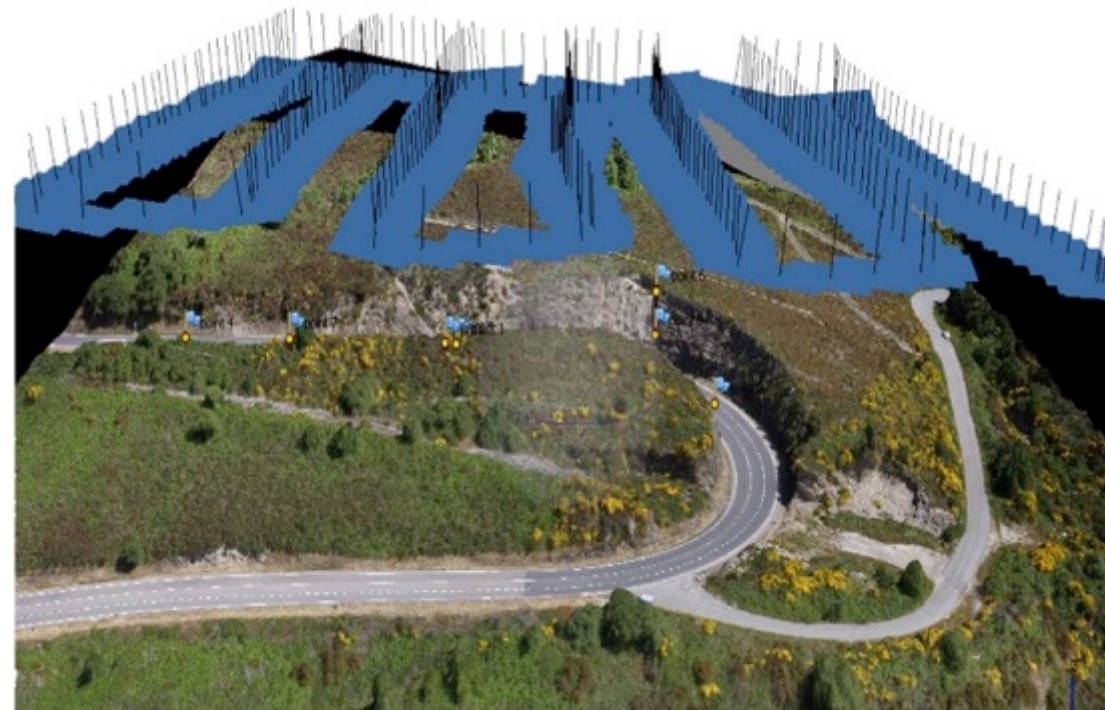
# Earth Observation and Remote Sensing



# ... Aerial Photography



# ... Surveying and Mapping



“Making a Visible Difference”

# FLIR OPTICAL GAS IMAGING CAMERAS





# OPTICAL GAS IMAGING



GF320

- Gas imaging of VOC gas (Methane, Propane, butane etc)
- Upstream & Downstream Oil, Natural Gas Industry, Petrochemical & Chemical Industry
- IR Spectra 3.2 – 3.4  $\mu\text{m}$



GF304

- Gas imaging of Refrigerants (R134a, R404A, R407C, R410A)
- Food industry, Air conditioning systems, District heating system (heat pumps)
- IR Spectra 8.0– 8.6  $\mu\text{m}$



GF306

- Gas imaging of SF6, Ammonia, Propylene & Ethylene
- Power Utility Industry & Petrochemical Industry
- IR Spectra 10.3– 10.7  $\mu\text{m}$



GF343

- Gas imaging of Carbon Dioxide
- By product of a production process, a trace gas used to detect leaks from power generators, or as part of an Enhanced Oil Recovery program
- IR Spectra 4.52– 4.67  $\mu\text{m}$



GF346

- Gas imaging of Carbon Monoxide
- Steel Industry
- IR Spectra 4.52– 4.67  $\mu\text{m}$





# G300 / GF320

## FLIR GF Cameras



With thermal imaging cameras like the G300 you can mount onto an airborne platform to monitor your vital gas pipelines or installations 24/7.

You will immediately **see** if a dangerous and costly **gas** leak appears.

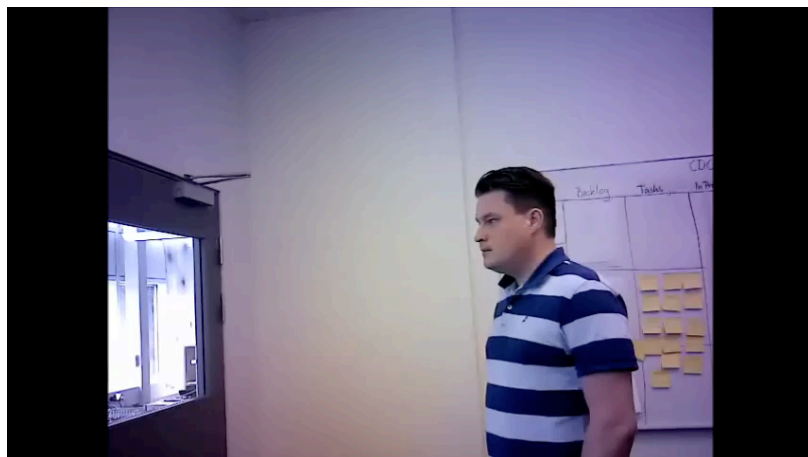
No more relying on periodic inspections.

Monitoring is done from a safe distance without the need to send technicians into a potentially dangerous areas.



# GF 343

## FLIR CO2 Cameras



The GF343 you can mount onto an airborne platform to monitor for CO2!

One of a range of leading edge optical gas imaging cameras

Assist monitoring for Environmental Compliance.

Monitoring is done from a safe distance without the need to send technicians into a potentially dangerous areas.





# Contact

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Fax: +44 (0) 1224 789462

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[www.Inspectahire.com](http://www.Inspectahire.com)

## **WE HAVE OFFICES & AGENTS WORLDWIDE:**

-  **United Kingdom**
-  **Australia**
-  **Iraq**
-  **Qatar**
-  **United Arab Emirates**

