



ORSOLAR



INNOVATIVE OIL-SPILL IMAGING SOLUTION

THE NEED



How to deal with the harm caused by oil spill ?



- On time detection
- Rapid intelligence
- Fast response
- Detect variety of oil dispersed states
- Monitor large and small scales of spills

SOLUTION

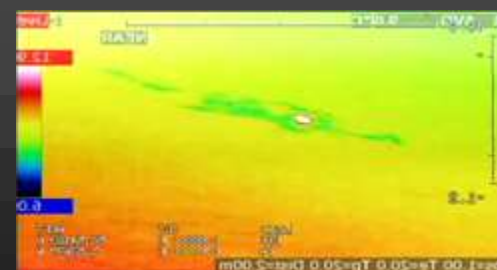




Daytime Oil-Spill Detection Imaging From Air



SOLUTION THAT FITS UAS & SMALL GIMBALS



- An oil spill imaging system
- Mounted on UAS or in small gimbal
- Transmitting visual data of existing oil spill spreads
- Defining clearly borders of oil slicks
- Optional complementary sensing/imaging technologies configurations

imaging



	Option 1	Option 2	Option 3
UV Sensor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IR Sensor		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Visible Sensor			<input checked="" type="checkbox"/>

configurations



UV

- Resolution: **768 x 576**
- FOV: **30°**
- Power consumption up to **4W**
- Polarization: **linear polarization**
- Weight: **450gr**



IR

- Resolution: 640 x 512
- 19mm lens
- Image optimization for UAS
- Power consumption up to 3.9W
- Weight: 110gr



VIDEO

- Resolution: 3.27 M pixels
- X36 zoom (12x3)
- AF & Manual focus
- Power consumption up to 1.2W
- Weight: 83gr

Multi sensors



Combination of UV and IR sensors contribute to getting:



Multi sensors

- ✓ Location of spill spreads
- ✓ Extent of oil contamination
- ✓ Oil slicks movement and their fate, at sea

visible



visible



visible



visible



Clouds shadows resemble patches of oil

Coral reef resemble oil

Sediment plumes resemble patches of emulsified oil

Light reflection can be a problem. UV filters help sharpen visual definition

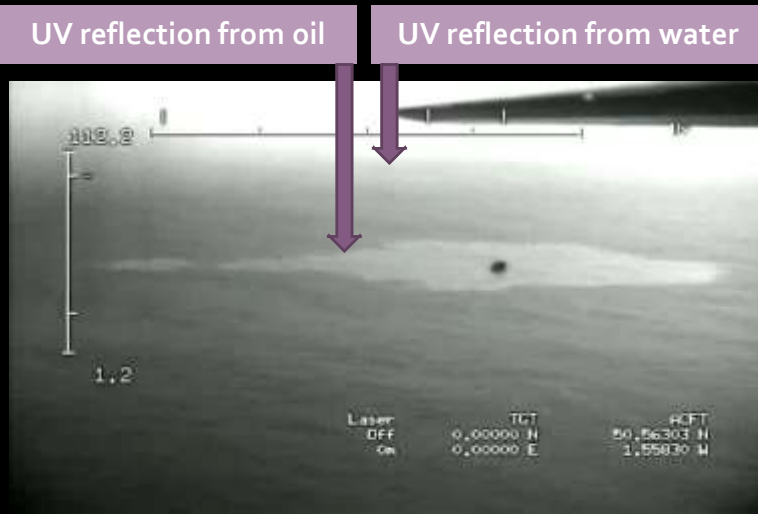


IR imaging – thick layers

UV imaging – thin & thick layers

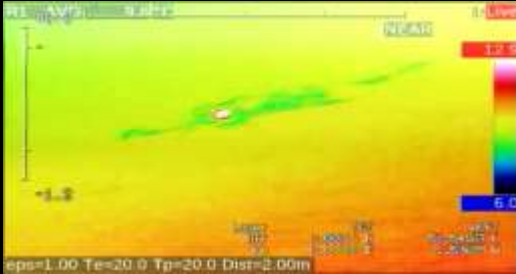
- ✓ Overlapping imaging reduces mistakes
- ✓ Overlapping imaging increases resolution
- ✓ Overlapping imaging complements information

OIL SPILL - BY UV



- The UV sensor ($\lambda = 320-380\text{nm}$) detects sunlight reflection in the UVA range
- Minimum detectable layer thickness: $0.1-10 \mu\text{m}$
- Solar UV rays that hit oil are reflected more than those that hit water
- ORSOLAR enhances the contrast imaging of oil spill over the water surface
- UV sensors can detect emulsions (water-in-oil emulsions)

OIL SPILL - BY IR



- The IR sensor ($\lambda = 8-14 \mu\text{m}$) measures the thermal emission of the sea surface
- Minimum detectable layer thickness: **10-70 μm**
- Oil films differ in their temperature from that of water. Emissivity is temperature dependent. As such, thickness of $10\mu\text{m}-100\mu\text{m}$ seems “colder” than water, due to lower emissivity. Accordingly, results will vary during day and night
- Infrared sensors cannot detect emulsions (water-in-oil emulsions) under most circumstances

BENEFITS





- **ORSOLAR** an excellent imaging solution for oil spill catastrophes. UV imaging enables seeing thin layers of spill in daytime, and in particular contamination in the emulsion phase, which is the bulk
- With **ORSOLAR** it is possible to see various phases of oil spill, various layer thicknesses & borders of spill
- **ORSOLAR** is fit for both UAS and bigger aircrafts
- UAS are optimal platforms for ad hoc oil spill surveillance and investigation missions

benefits



- With **ORSOLAR** detection becomes available **ON TIME, IN PLACE, READY** to be deployed
- **ORSOLAR** transmits **LIVE INFORMATION** directly from the spill arena, valuable for directing crews that are involved with rescue and cleaning operations
- **ORSOLAR** transmits on-time info necessary for **FAST RESPONSE**

benefits





- **ORSOLAR's** multiple sensors provide information that is required for **MODELING THE SPREAD** of the oil spill layers
- **ORSOLAR's** multiple sensors enable seeing various layer **THICKNESSES** for assessments
- **ORSOLAR** has **LOW** maintenance and operational **COSTS**
- **ORSOLAR** enables **ACCESS** to dangerous and hard to get areas

benefits



