

# Lessons Learned: Using Drones in Research and Education

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maitec

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@kejoyce2



Attend the Day 3 Keynote  
Session and Be a Part of

# UNMANNED FOR GOOD

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Speed Motion Films

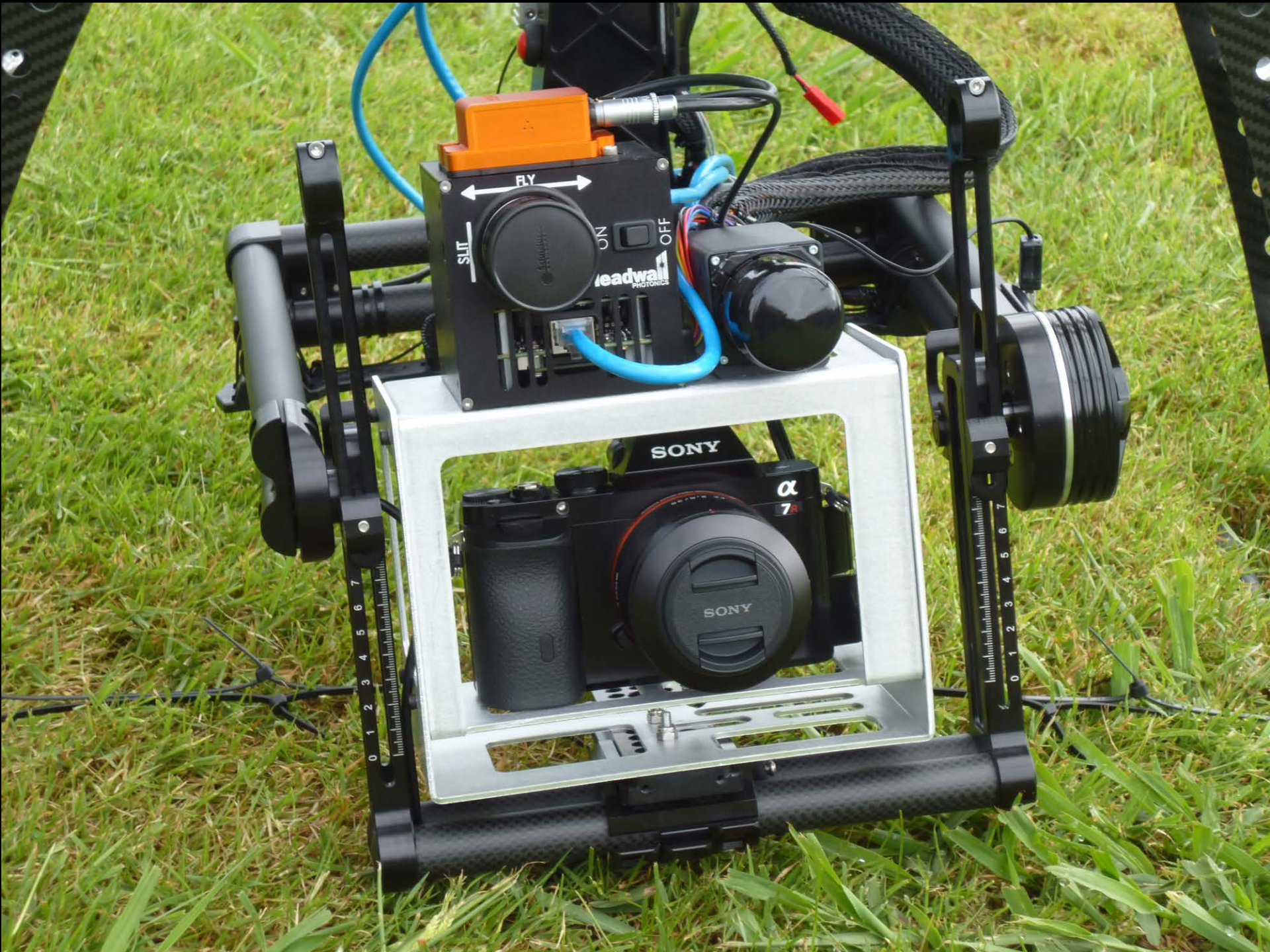
[https://youtu.be/B\\_Kym0e5J7M](https://youtu.be/B_Kym0e5J7M)





# Aircraft



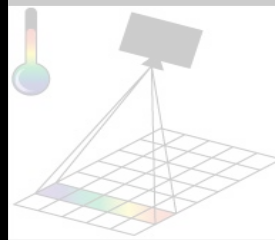




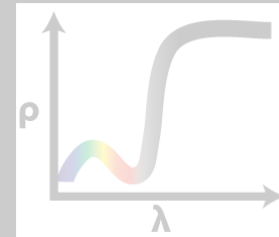
# Cameras



**Sony  $\alpha$ 7R**  
36.8 megapixel  
Full frame  
35 mm

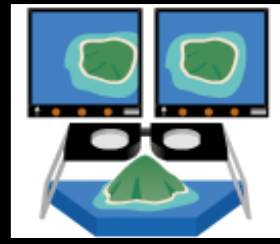


**FLIR A65**  
-25 – 135°C  
640 x 512 pixels  
200 g

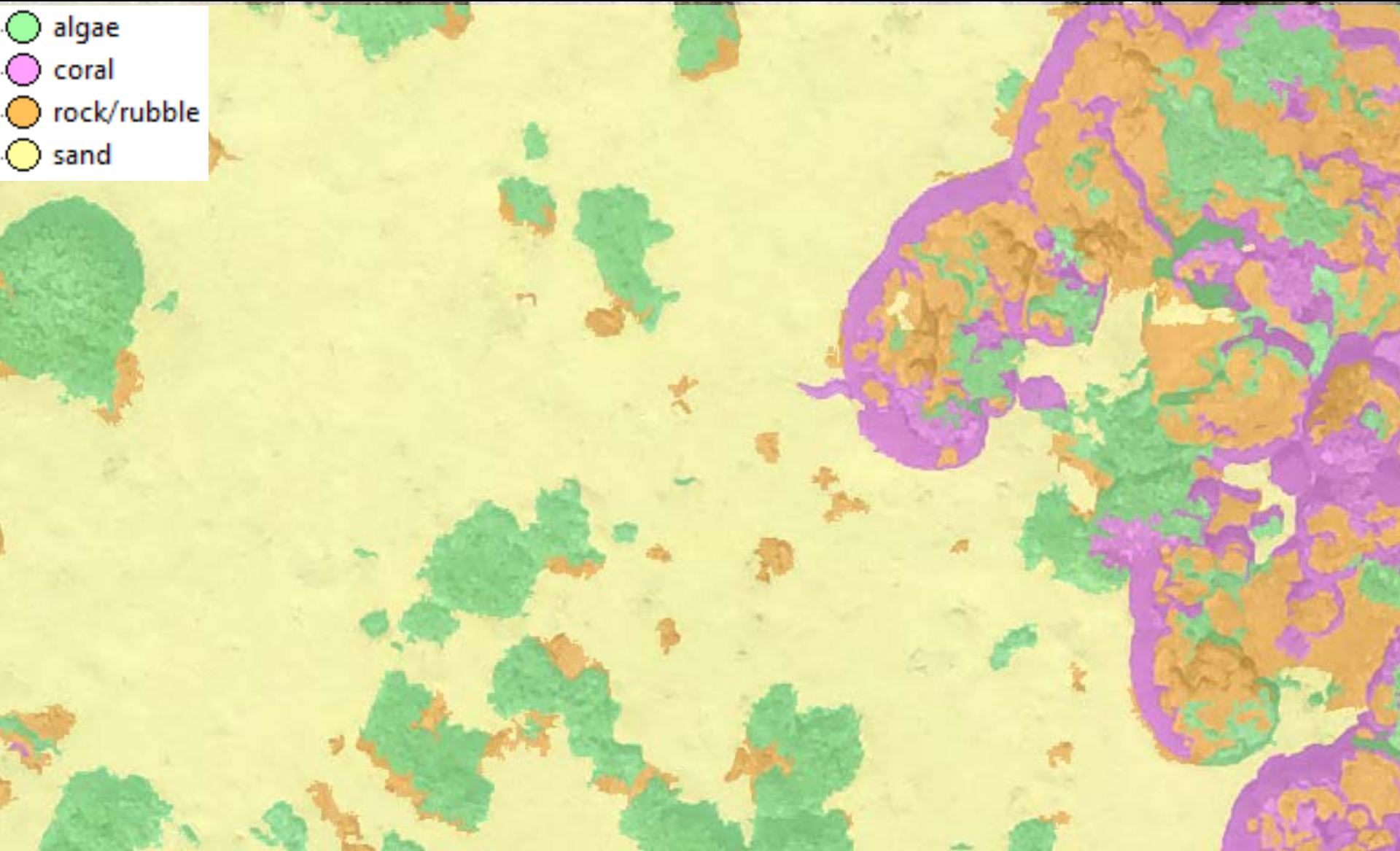


**Headwall  
Nano Hyperspec**  
400 – 1000 nm  
5 nm resolution  
270 bands  
~700 g

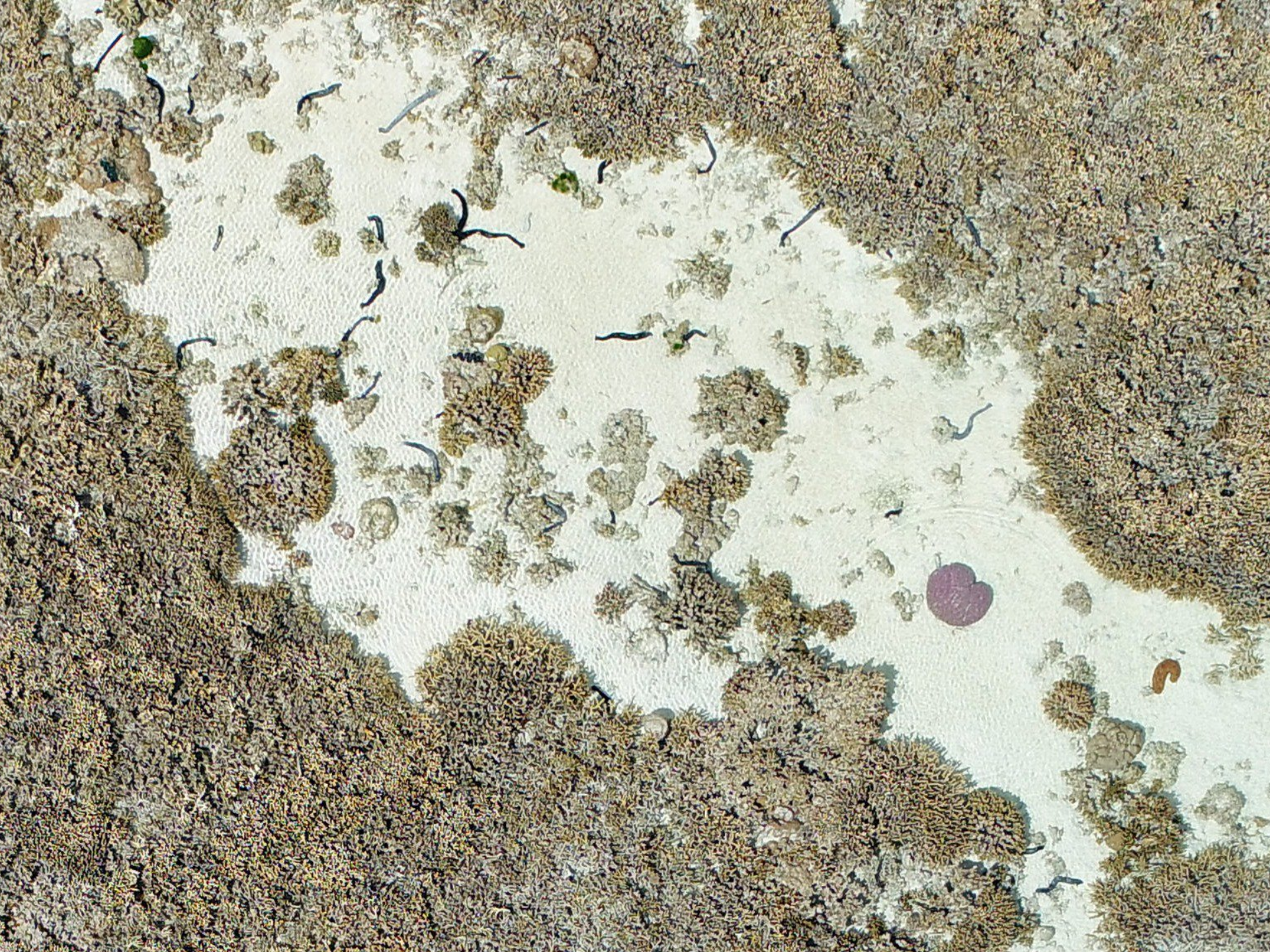
# Why DSLR?



- algae
- coral
- rock/rubble
- sand



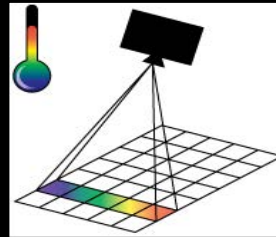




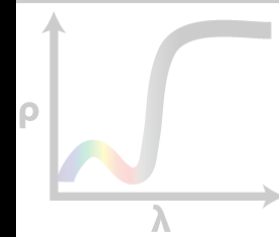
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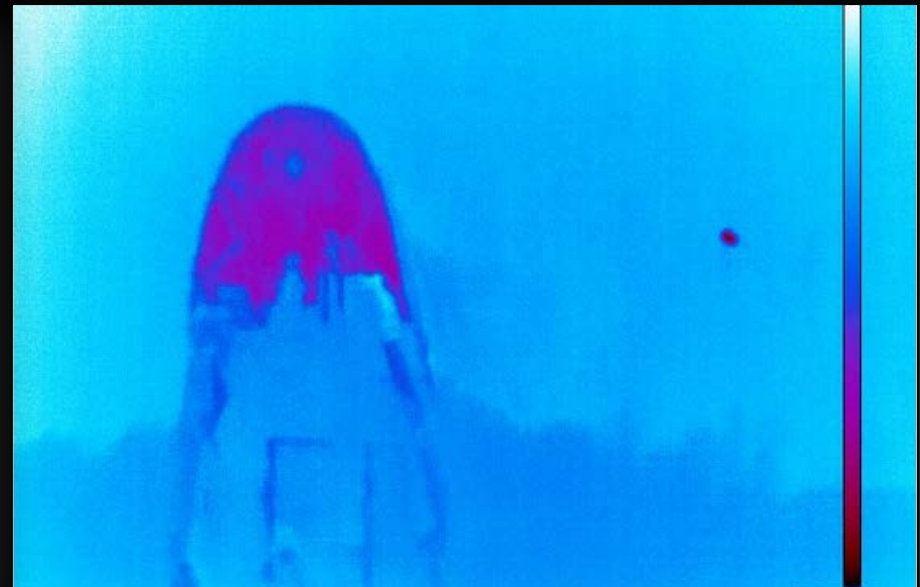
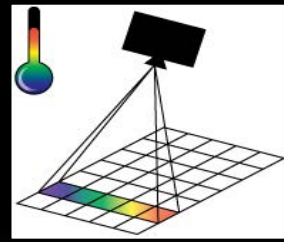


**FLIR A65**  
-25 – 135°C  
640 x 512 pixels  
200 g



**Headwall  
Nano Hyperspec**  
400 – 1000 nm  
5 nm resolution  
270 bands  
~700 g

# Why Thermal?



# Cameras

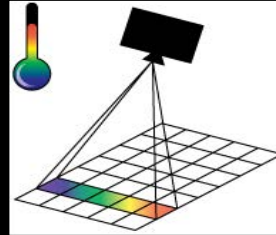


**Sony  $\alpha$ 7R**

36.8 megapixel

Full frame

35 mm

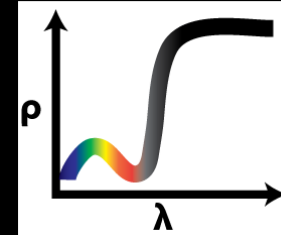


**FLIR A65**

-25 – 135°C

640 x 512 pixels

200 g



**Headwall**

**Nano Hyperspec**

400 – 1000 nm

5 nm resolution

270 bands

~700 g

# Purpose Built



Go Pro Vis or NIR  
Sequoia Multispec  
Single Point Visible Spectrometer  
Thermal camera





**maj  
tec**

HERO4

The image shows a control panel overlay for a drone, specifically the HERO4 model. On the left, there is a digital display showing flight information: a battery level indicator, the text "1080-60", a large timer "00:01", and "1H:45" with a battery icon and a Wi-Fi signal icon. To the right of the display is a large, detailed image of the drone's camera lens. Below the display is a circular button with a power symbol and the word "mode" underneath. The entire control panel is set against a light gray background.





**maj  
tec**

HERO4

1080-60  
00:01  
1H:45

mode

The overlay features a digital display with flight data, a lens icon, a power button labeled 'mode', and the model name 'HERO4'.



**maj**  
**tec**

1080-60  
00:01  
1H:45

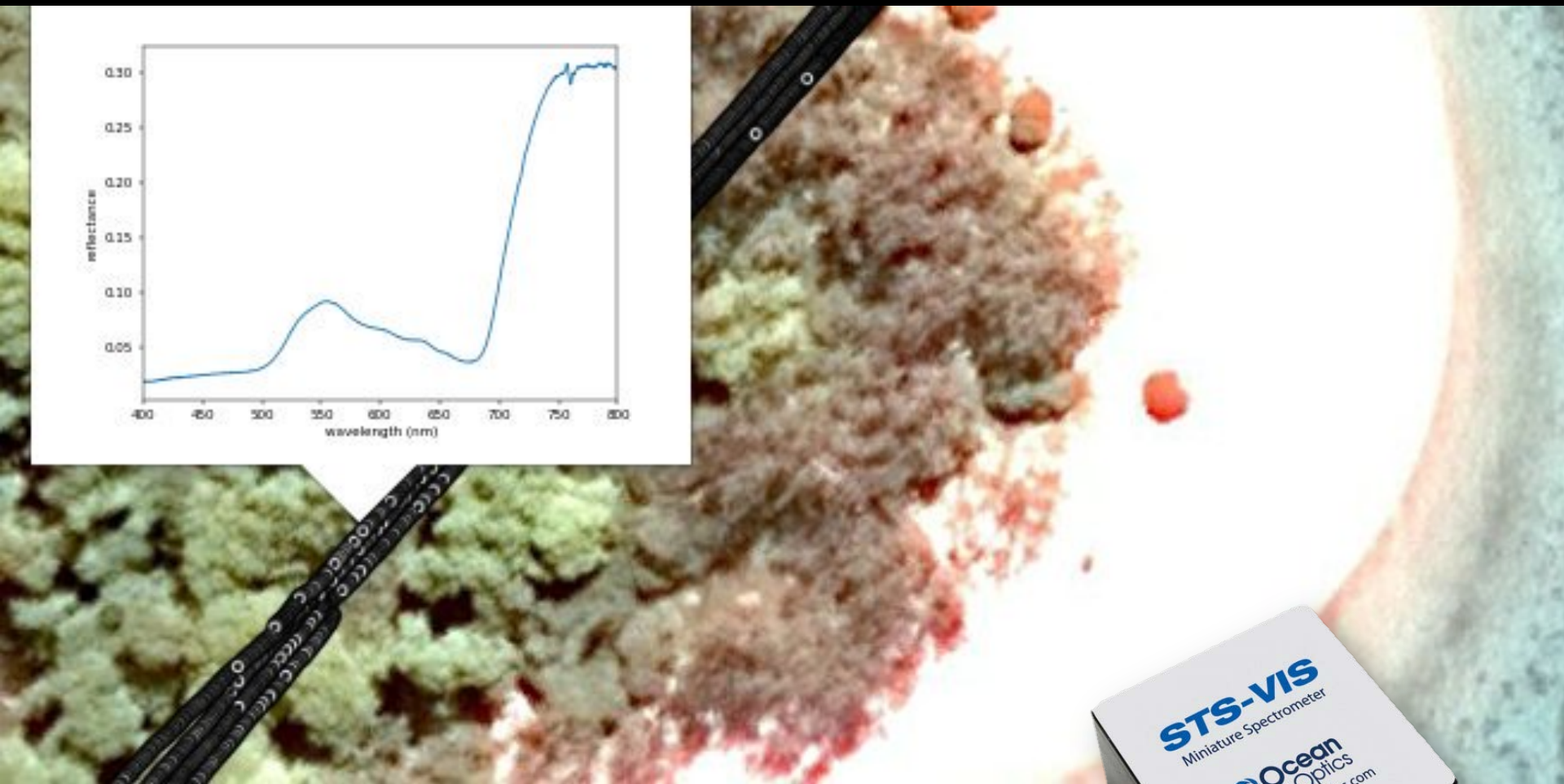
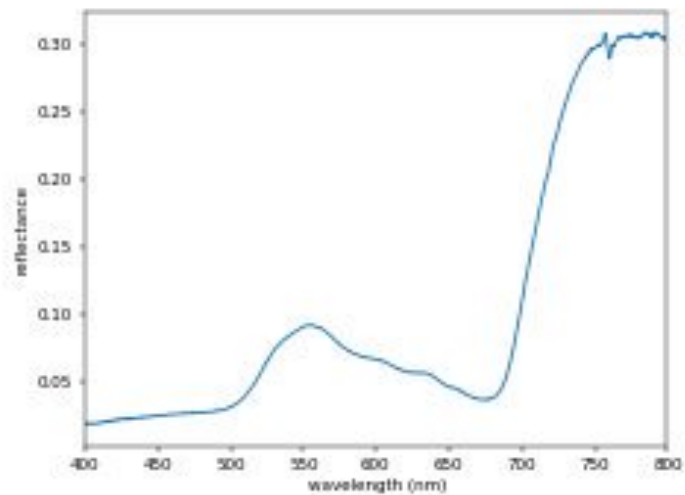
mode

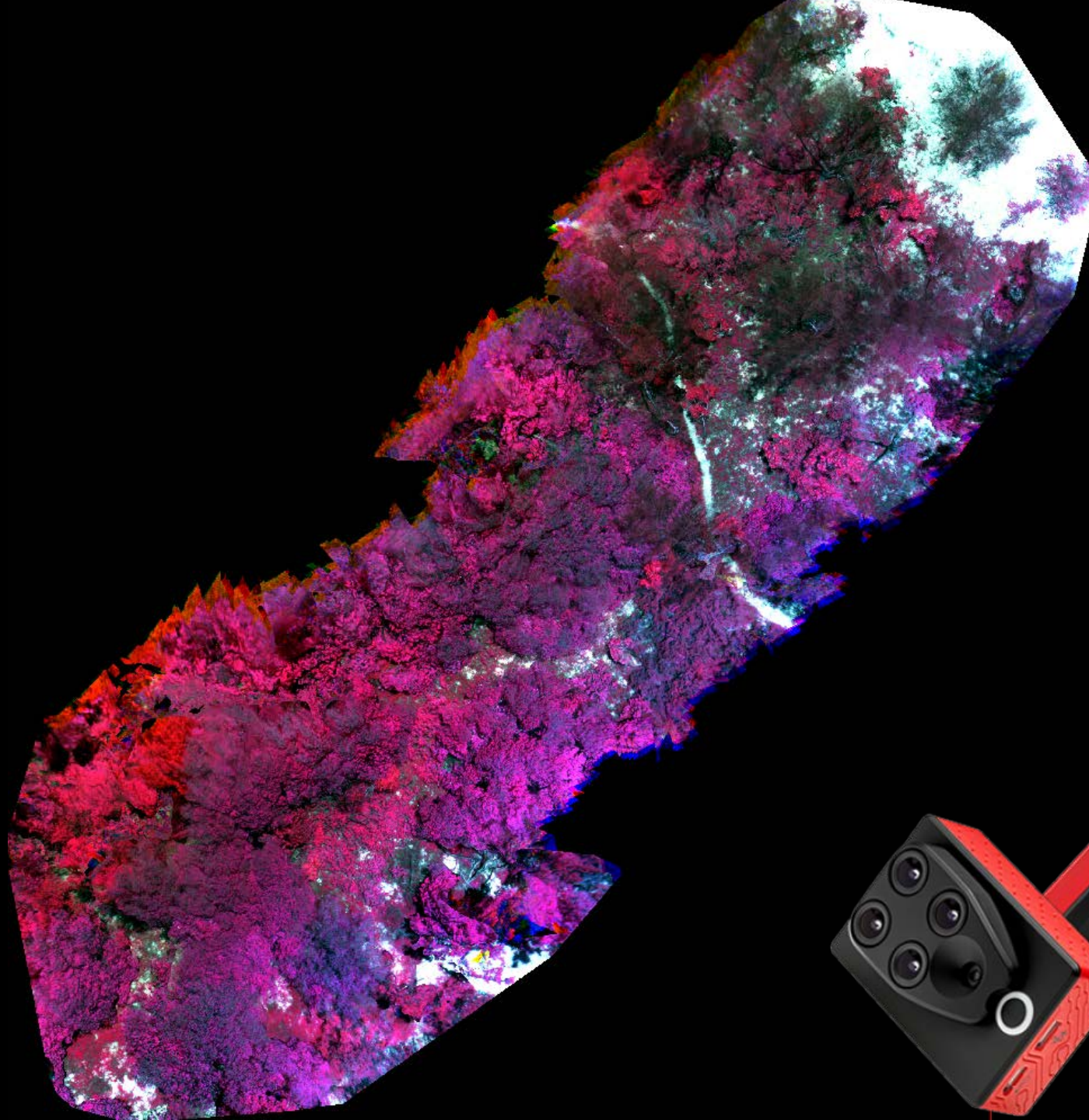
**HERO4**



**STS-VIS**  
Miniature Spectrometer

**Ocean Optics**  
www.oceanoptics.com





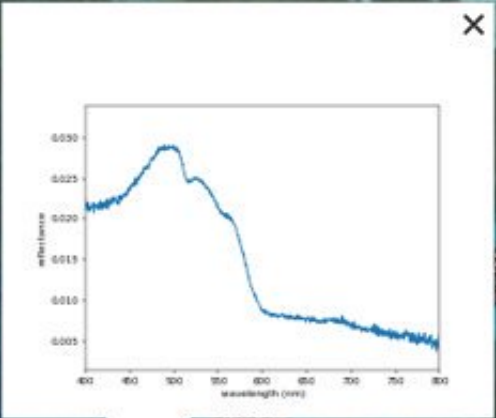
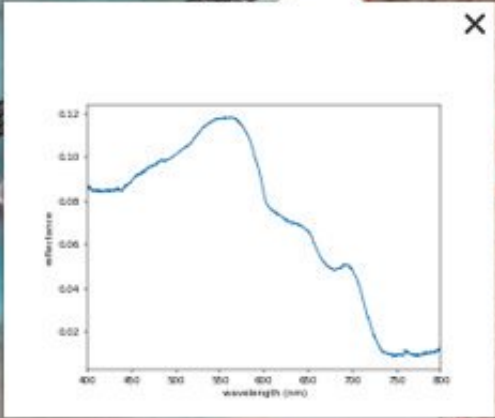
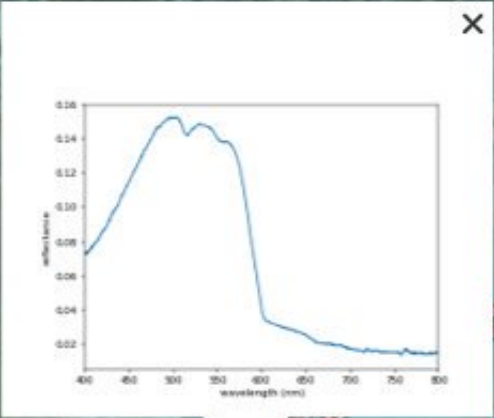
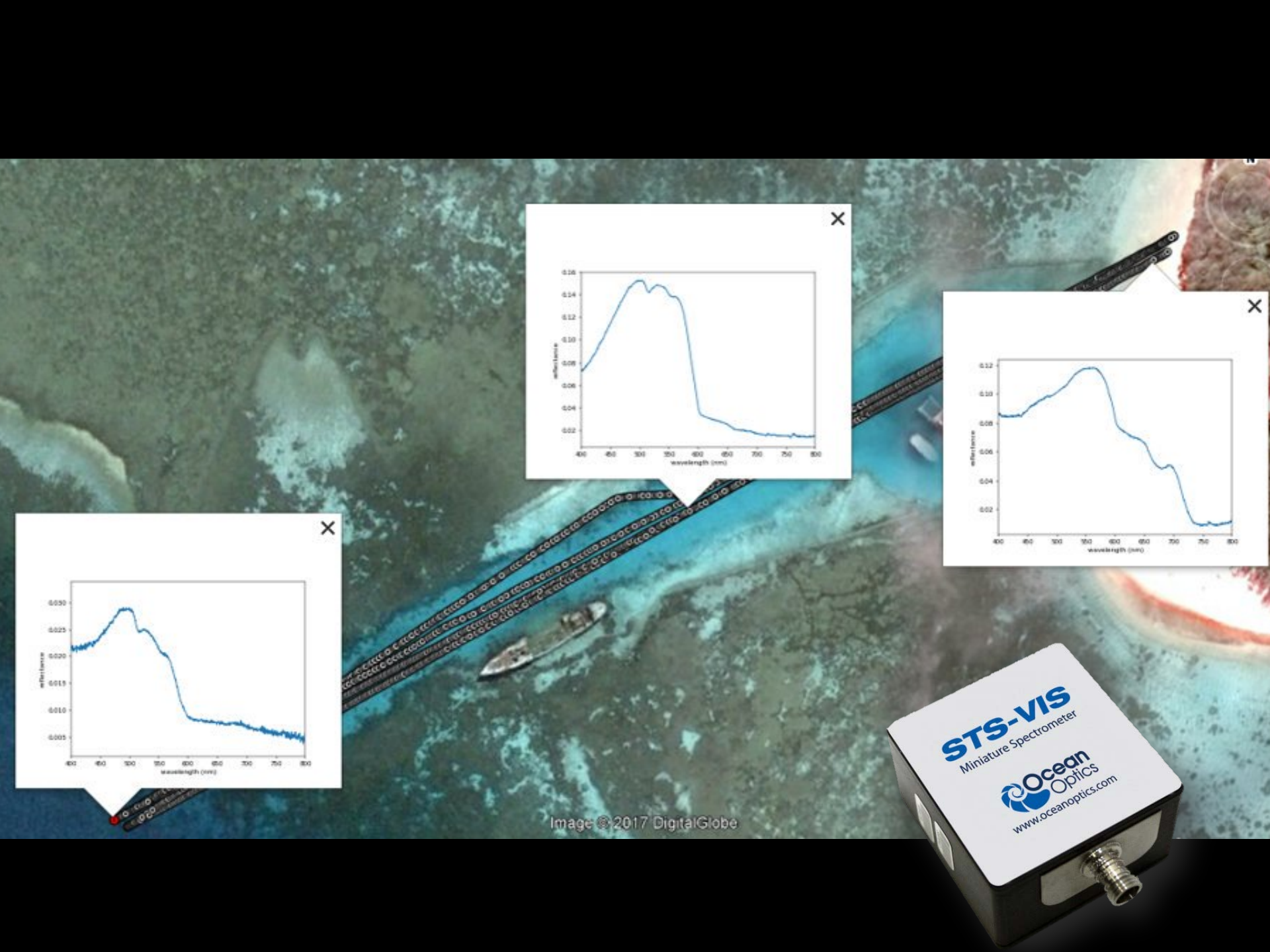
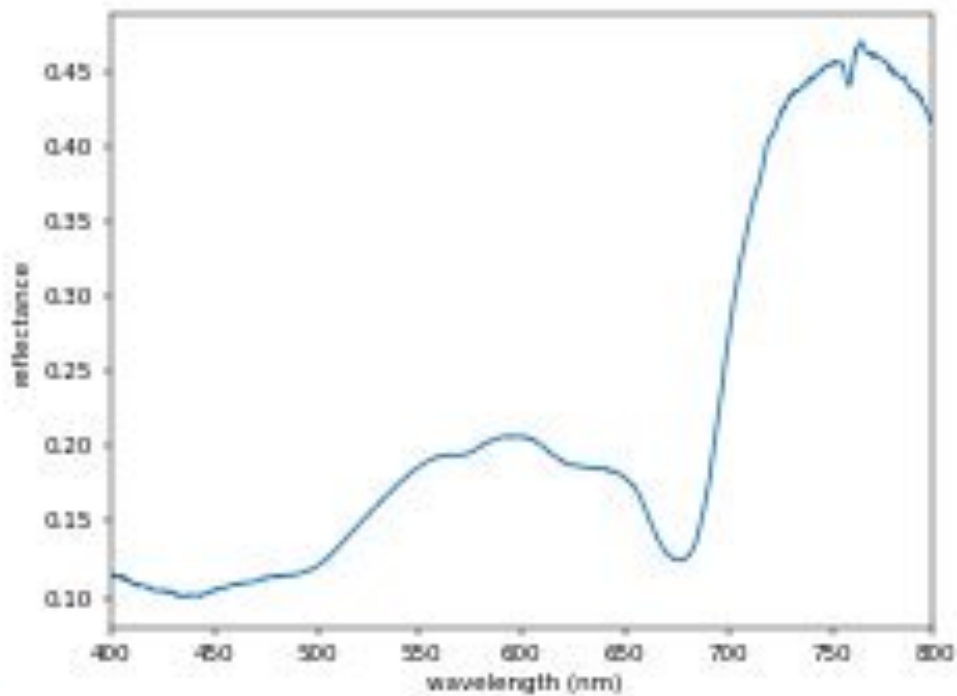


Image © 2017 DigitalGlobe













drones for girls



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drones for girls



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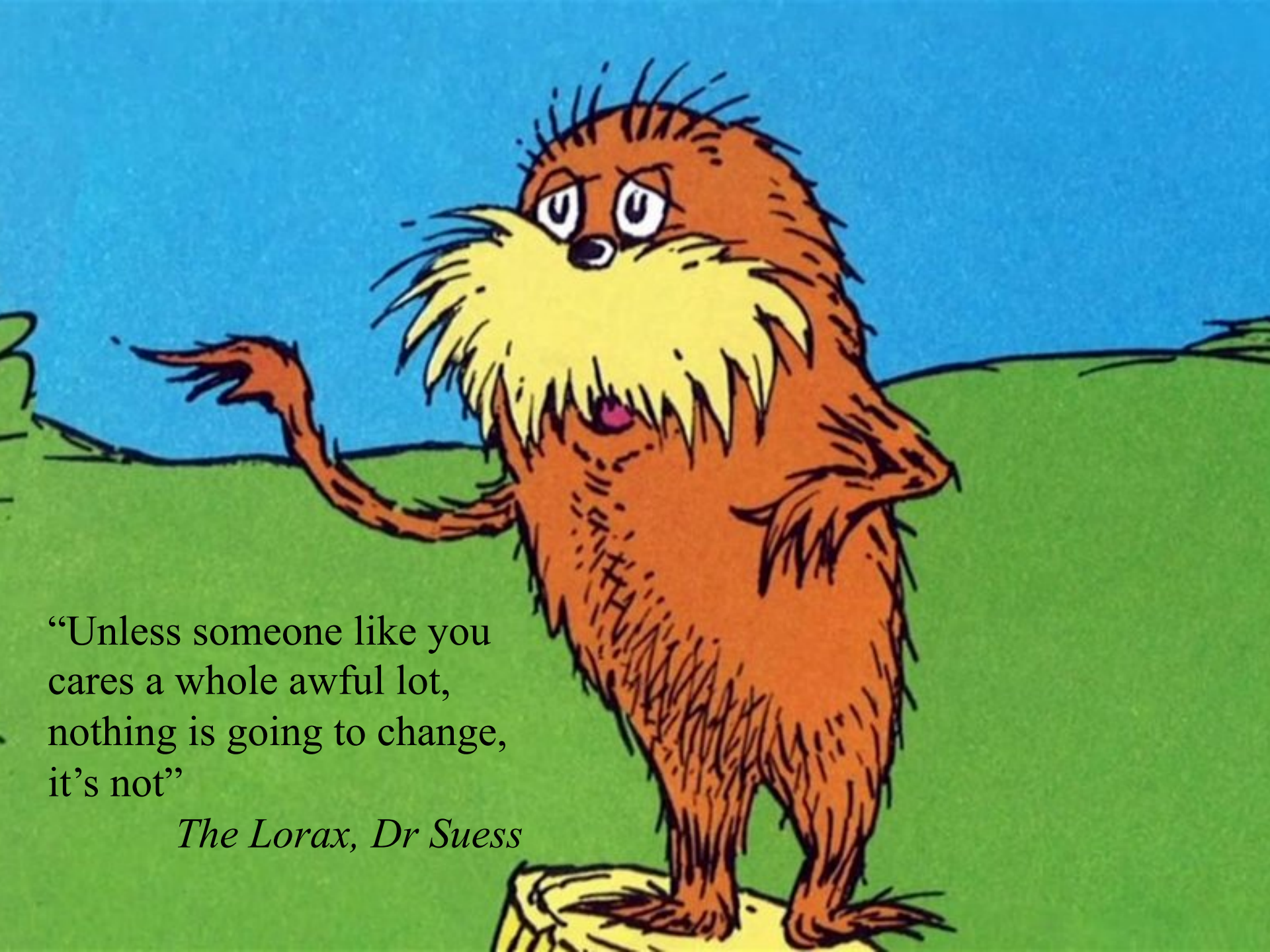
J. Leon



Chris Roelfsema (c) 2017



Chris Roelfsema (c) 2017



“Unless someone like you  
cares a whole awful lot,  
nothing is going to change,  
it’s not”

*The Lorax, Dr Suess*

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**Duke**  
NICHOLAS SCHOOL OF THE  
ENVIRONMENT



Marine Robotics  
& Remote Sensing

# Application Specific





PGW 4502e  
Max 4500g d= 0.01g

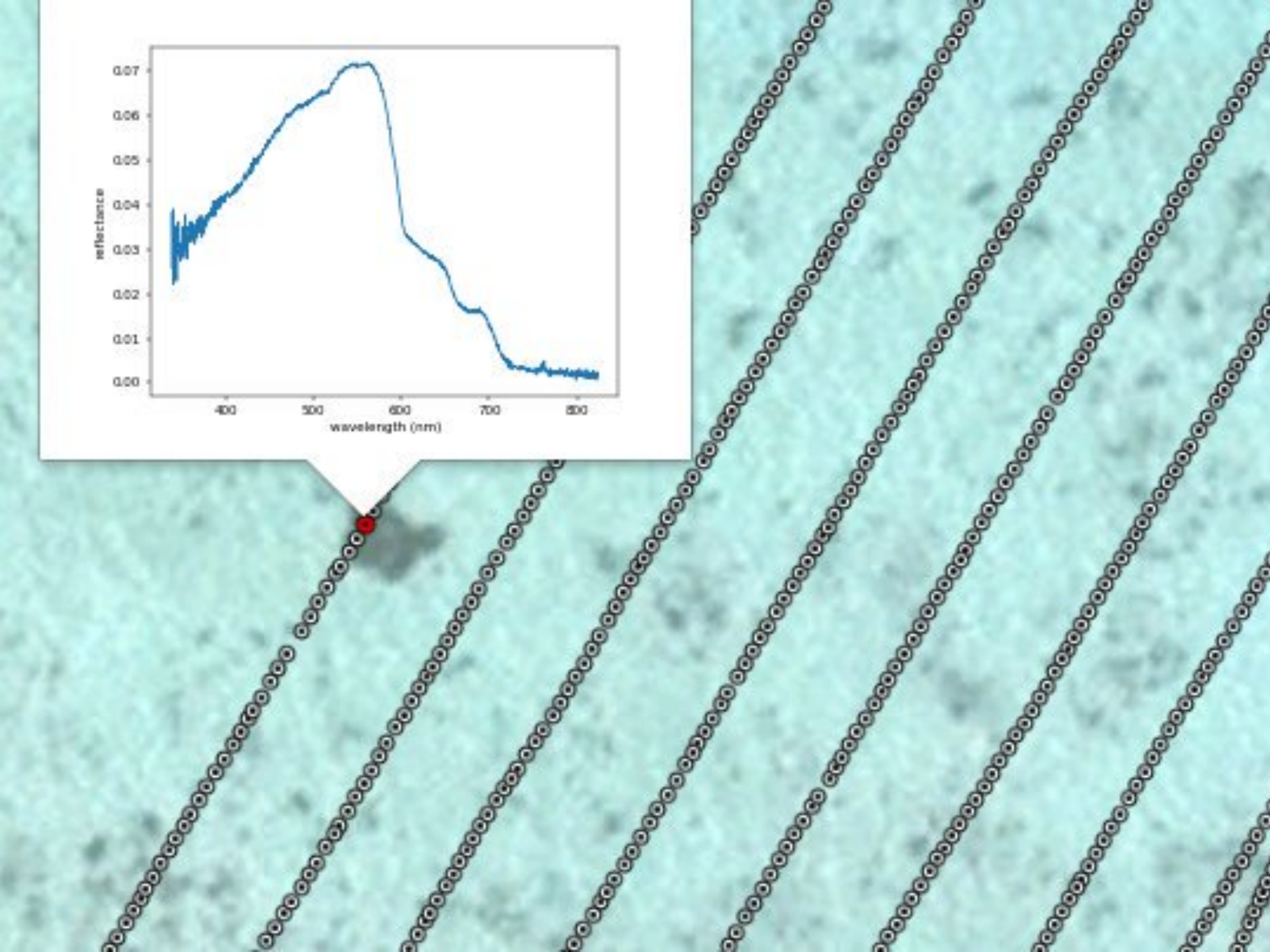
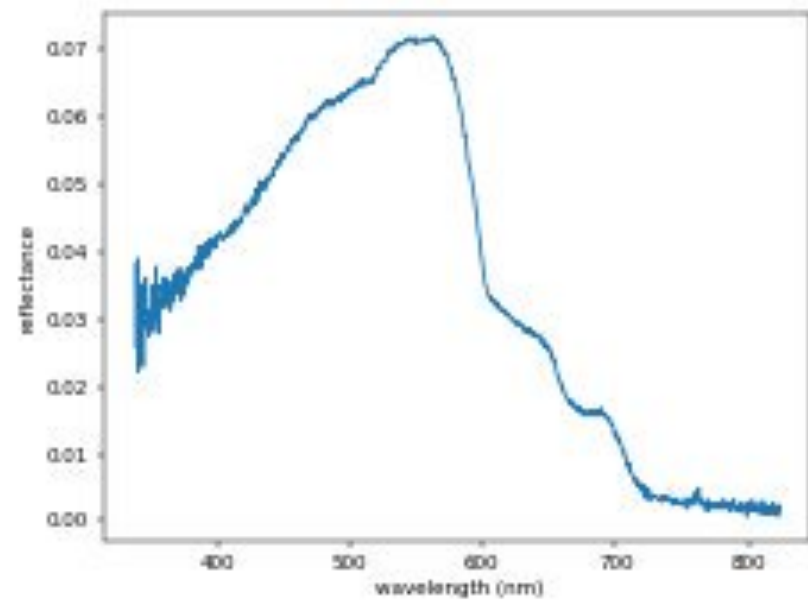
1844.98 g

⏻

Cal

METTLER ADAM



















# Why DSLR?

