

Room 9  
11:15 to 11:50  
Wednesday, March 11, 2015

# The Drone Alternative

Multispectral Kite Aerial Photography  
& Photo Processing Workflow

Michele Tobias & Alex Mandel

FOSS4G  
North America

100%  
Open Source



@AIMandel  
@MicheleTobias



# Why Kites?

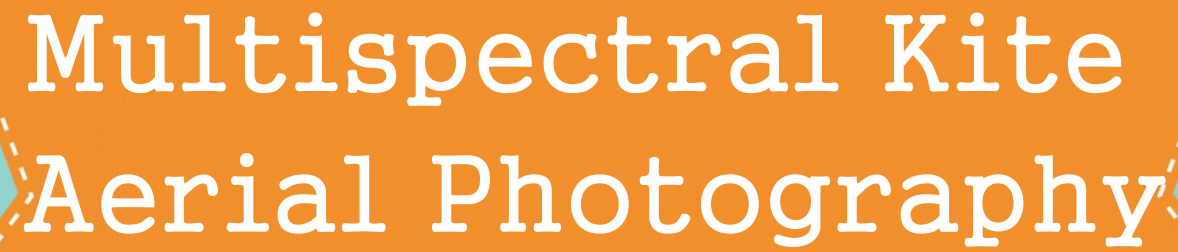
Windy places

Hard to break

Don't scare people

Less expensive





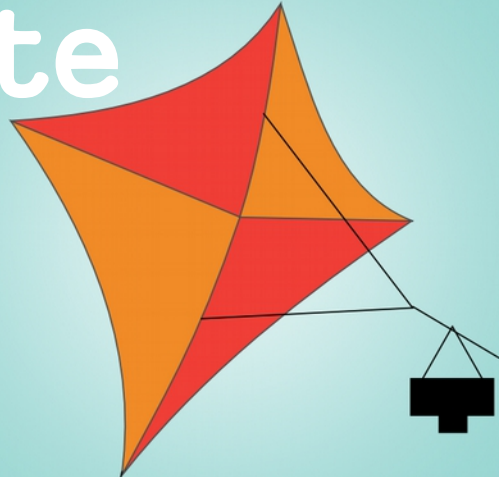
Multispectral Kite  
Aerial Photography



Photo Processing  
Workflow



Kite



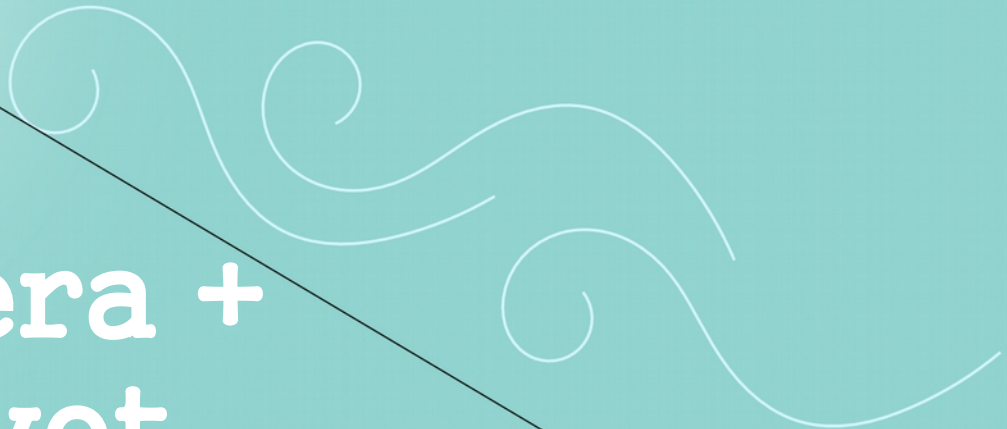
Camera +  
Picavet



Tail



Line







Kites













Delta



Cameras

# Cameras

Light Weight

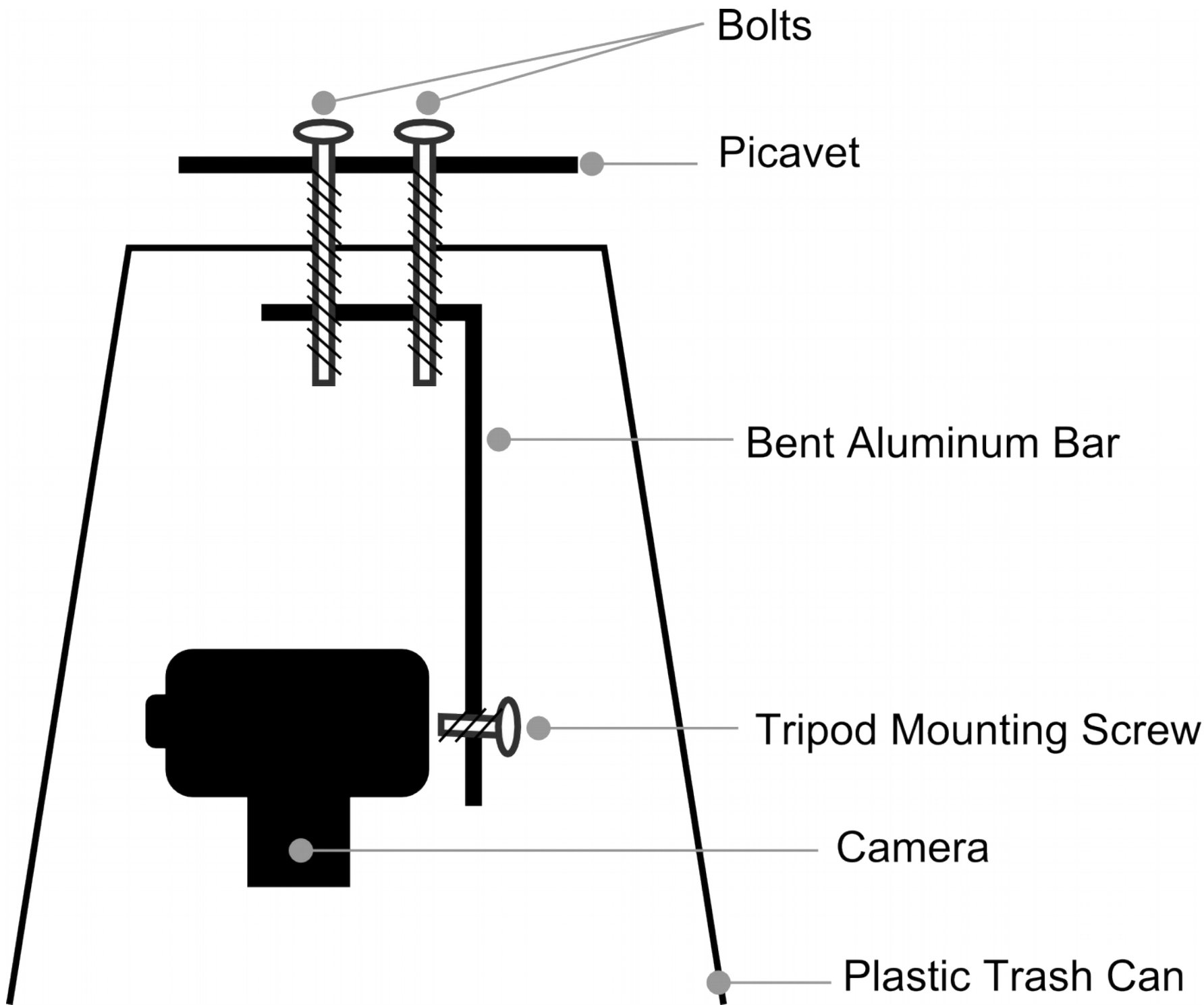
Shutter Timer or Remote  
Communication (CHDK, SDM, etc.)

Inexpensive – in case it crashes

Can be modified to collect different  
wavelengths of light (IR, etc.)



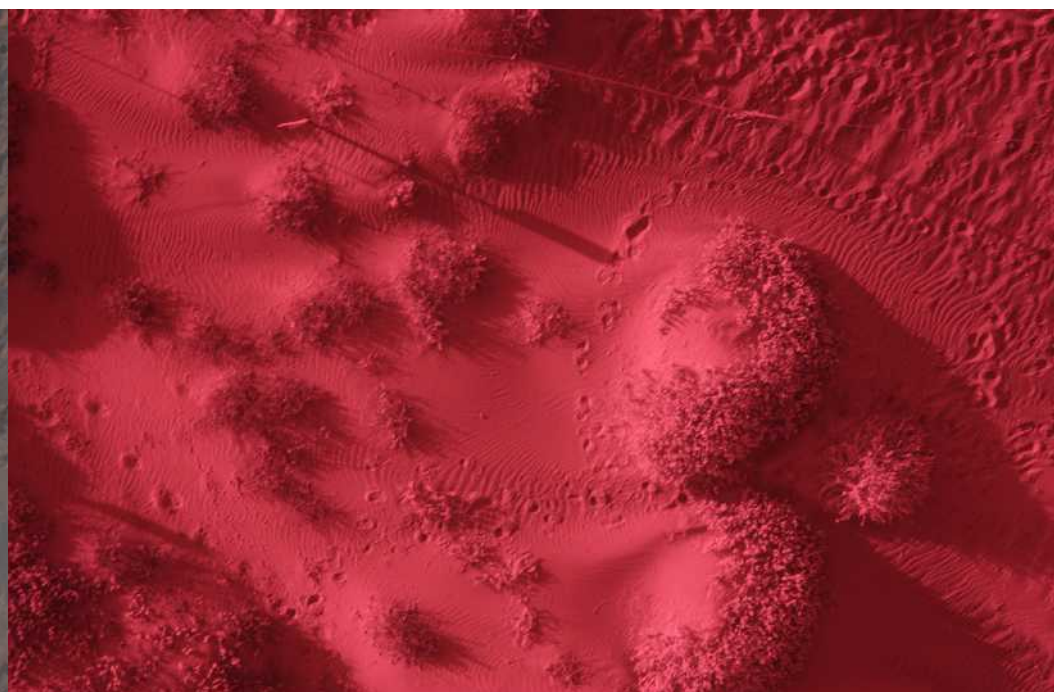








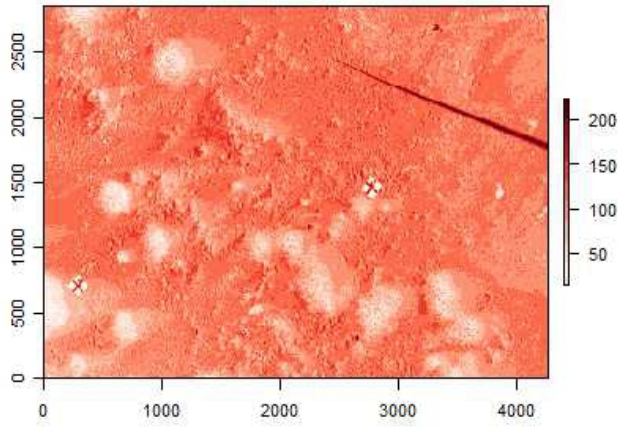
**Color**



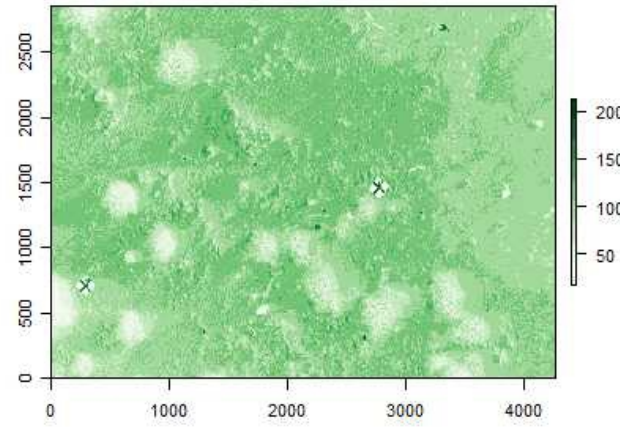
**Infrared**



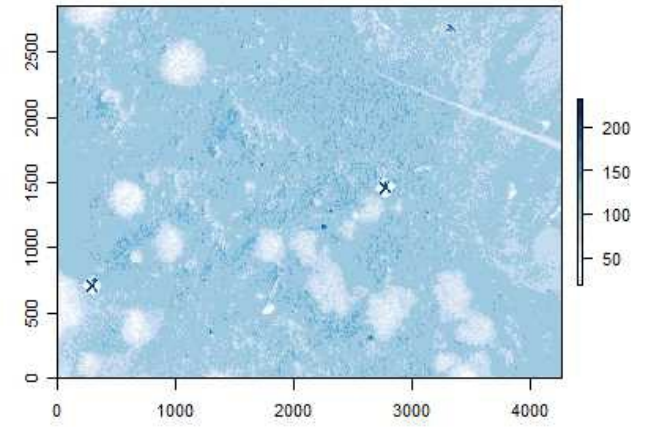
Red Reflectance



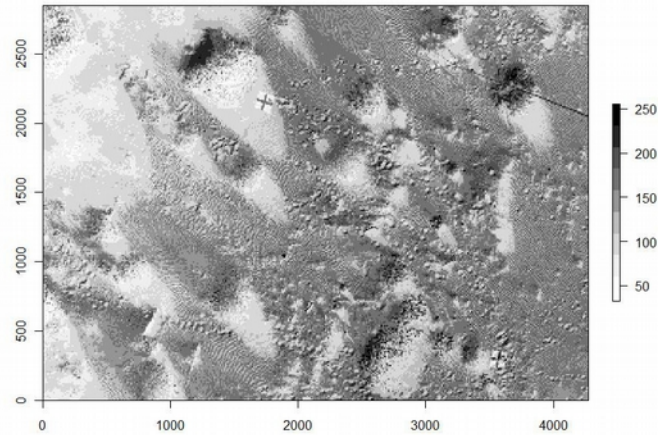
Green Reflectance



Blue Reflectance



IR Reflectance



# Kite Accessories

Camera Housing

Shutter Timer

Picavet

Reel

Gloves

Tail





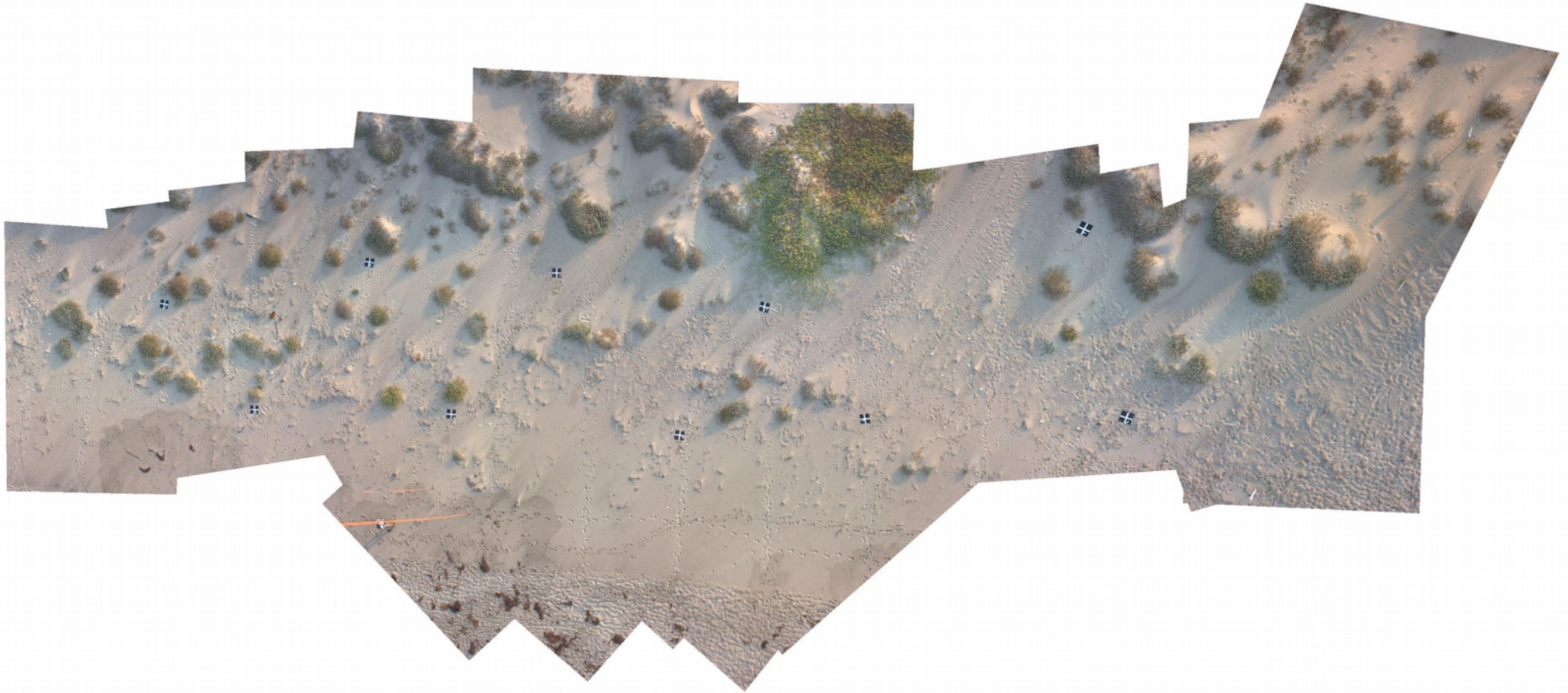


# Photo Stitching

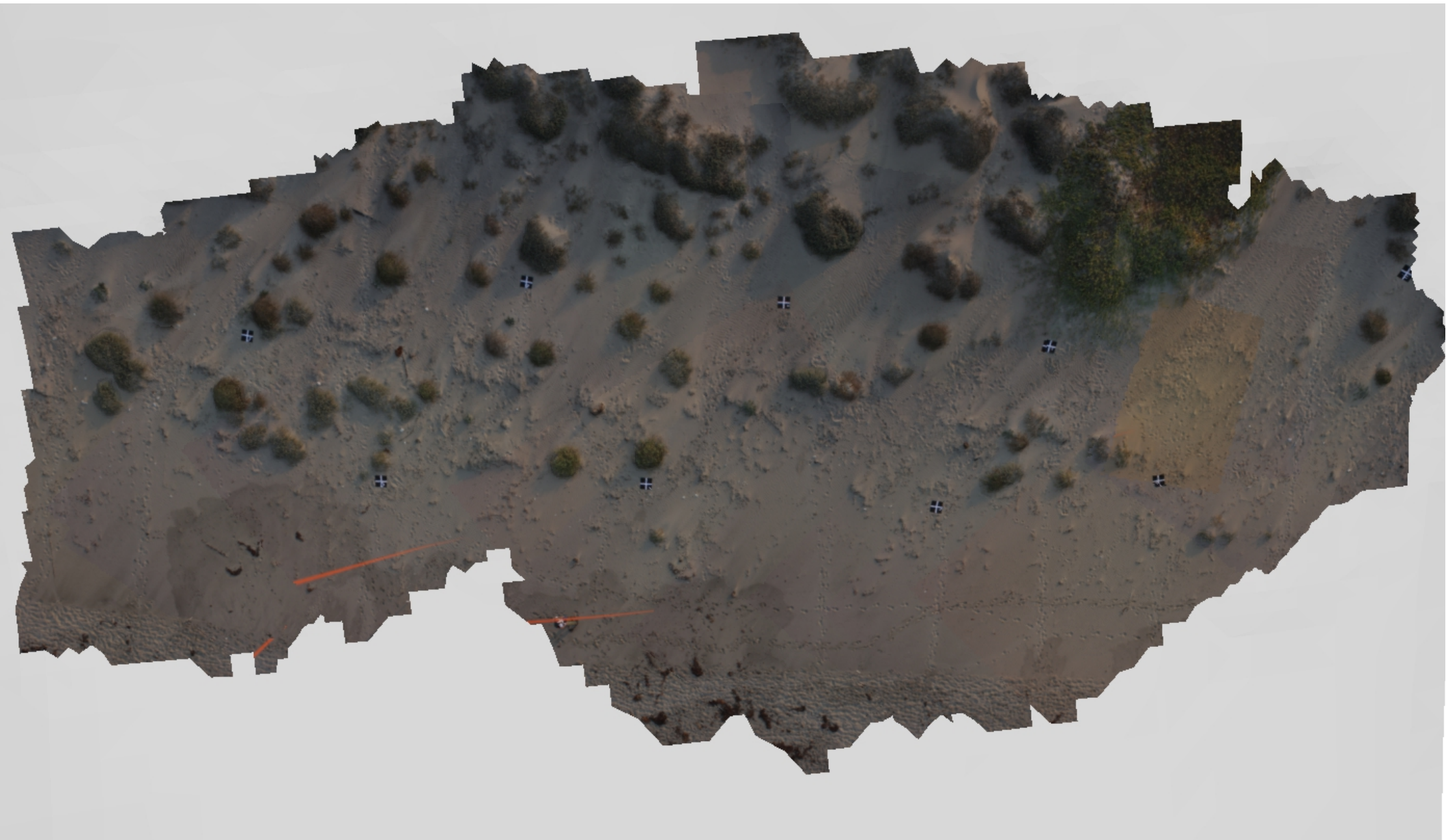
	Stitch Scene	DEM	Georeferenced Output	Automated Control Points	Windows	Mac	Linux
Hugin	X			X	X	X	X
Open Drone Map	X	X	X	X			X
Map Knitter	X		X		X	X	X
QGIS Georeferencer Plugin	X		X		X	X	X
Gimp	X				X	X	X



# Hugin

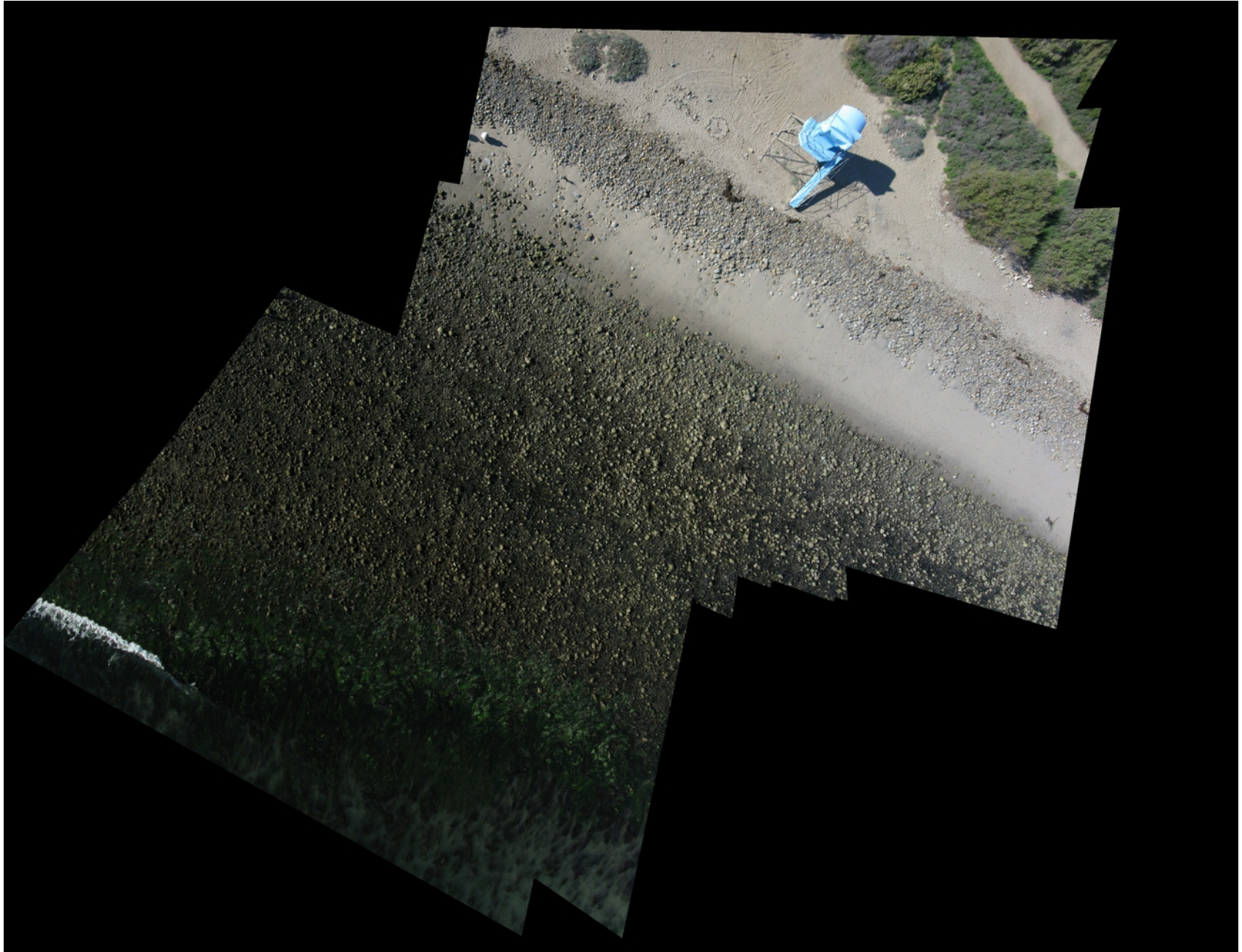


# Open Drone Map

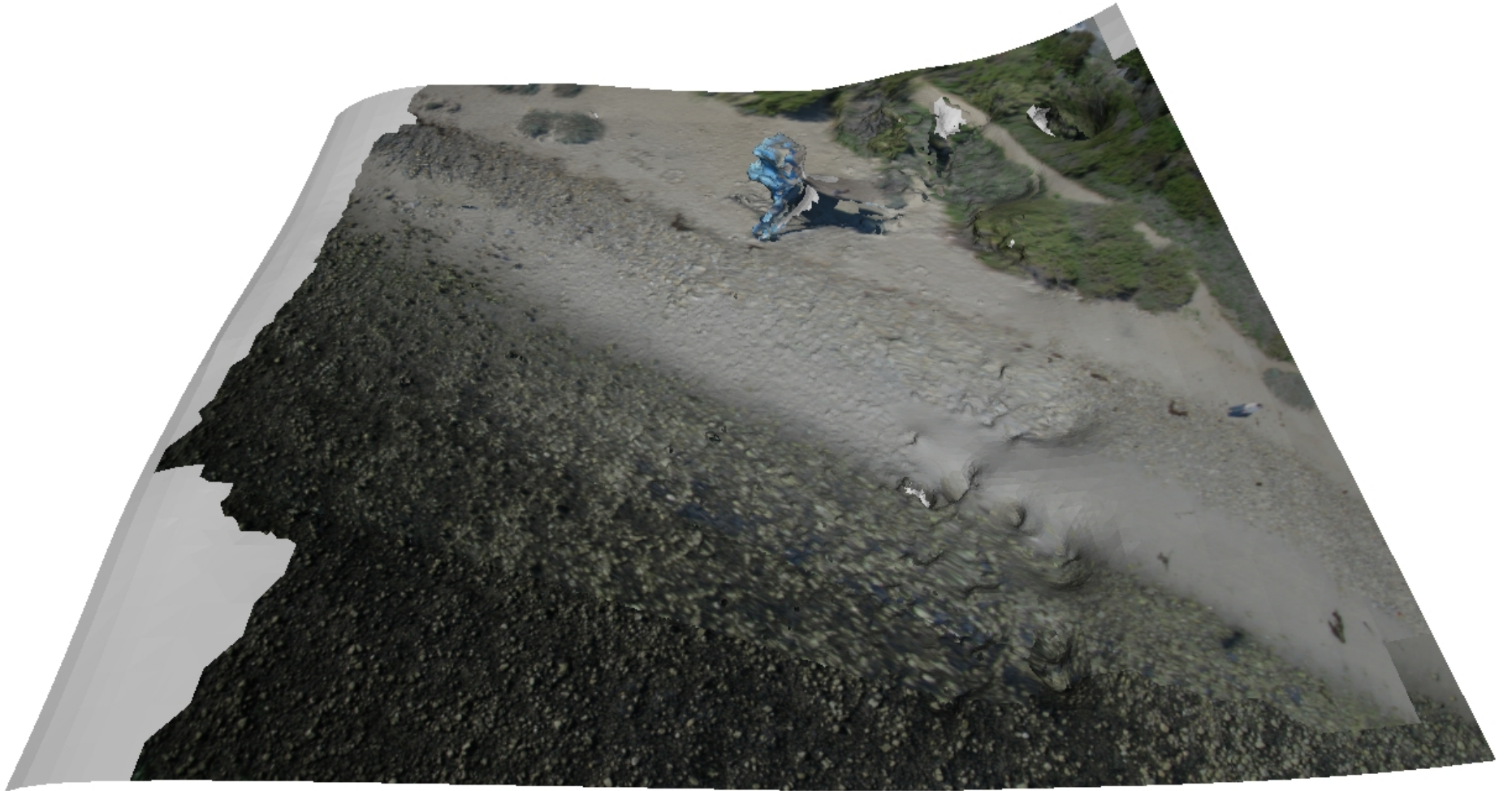




# Hugin

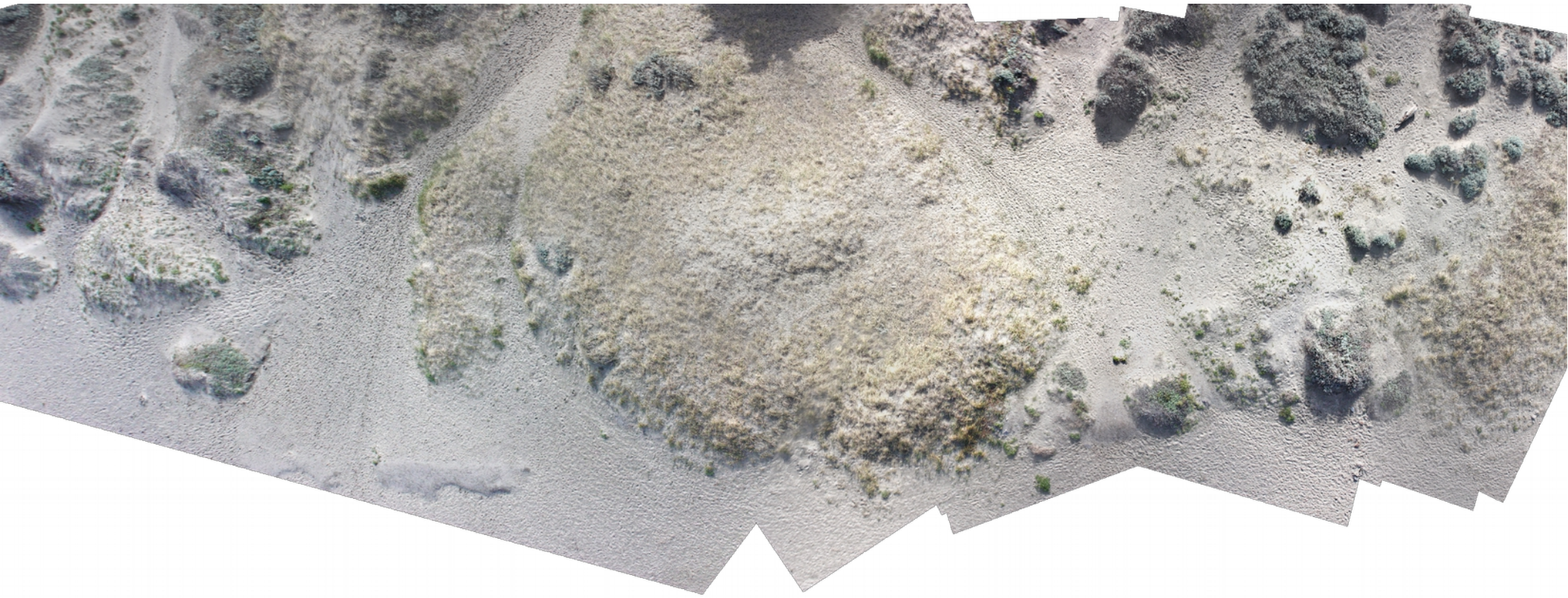


# Open Drone Map





# Hugin





# Hugin





## Kite Aerial Photography

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

[arch.ced.berkeley.edu/kap/](http://arch.ced.berkeley.edu/kap/)

[publiclaboratory.org](http://publiclaboratory.org)

## Kites

Into the Wind: [www.intothewind.com/](http://www.intothewind.com/)

New Tech Kites: [www.newtechkites.com/](http://www.newtechkites.com/)

## IR Cameras

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

## Photo Stitching

Hugin: [hugin.sourceforge.net/](http://hugin.sourceforge.net/)

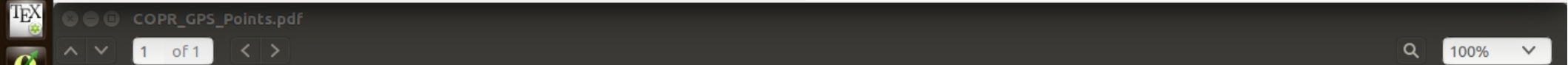
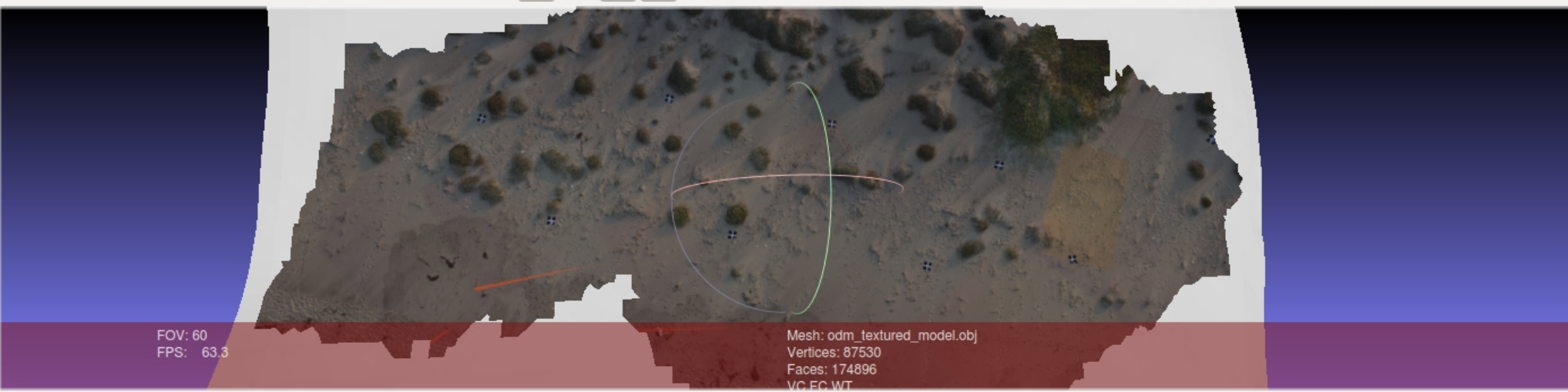
Open Drone Map: <http://opendronemap.github.io/odm/>



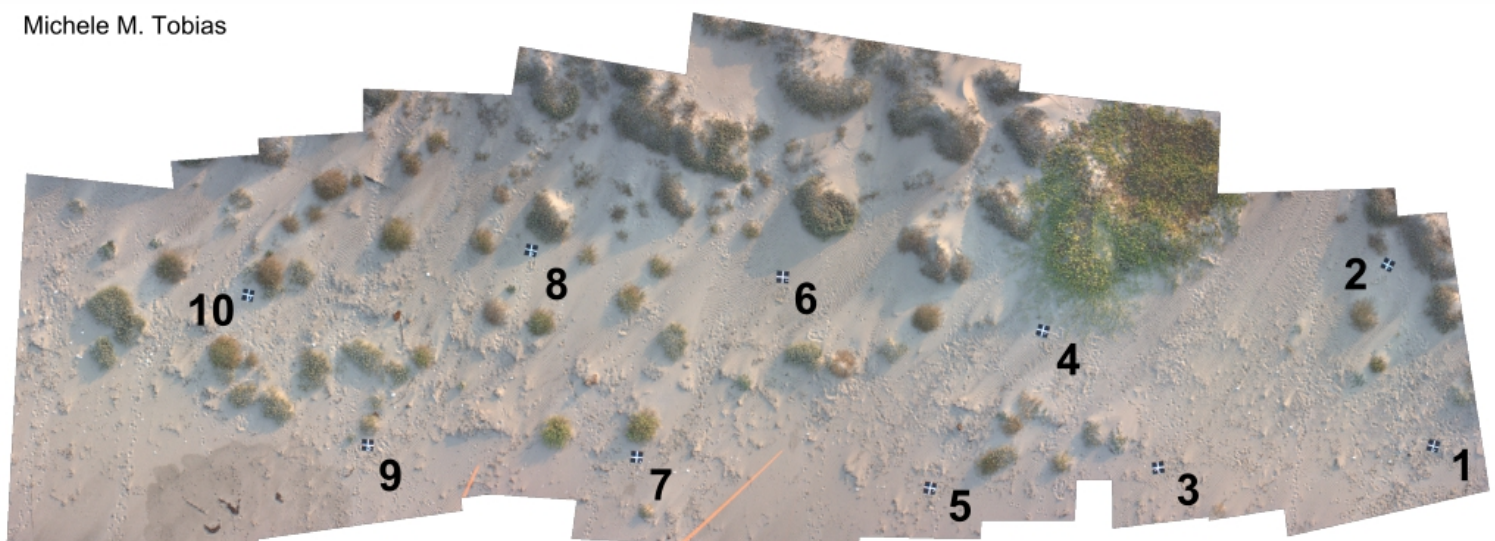


**Questions?**





Michele M. Tobias





# Evaluate the sessions

Sign in: [2015.foss4g-na.org/](http://2015.foss4g-na.org/)

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