BAS Sea Ice cruise (Defiant)

Defiant (BAS) – December 2022

Jeremy Wilkinson – Chief Scientist

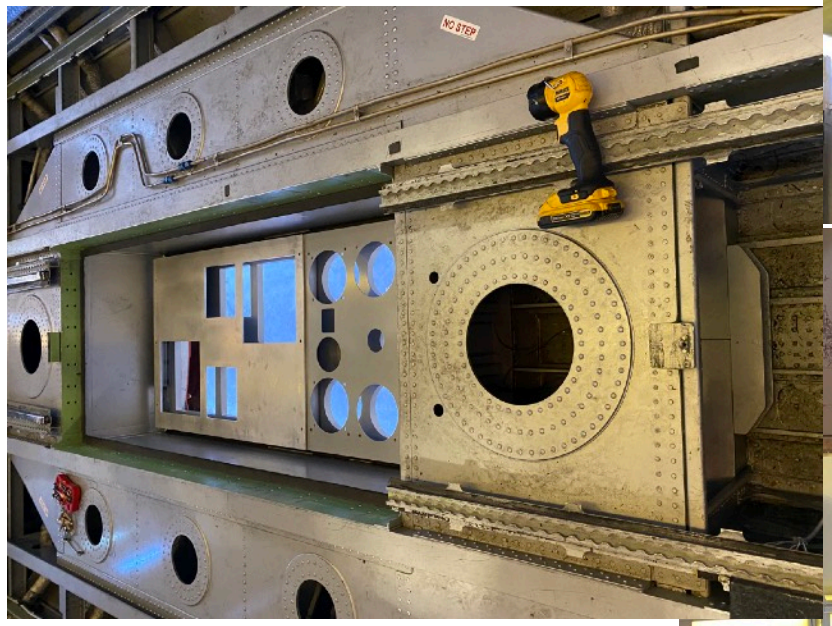
Other Participating Organizations

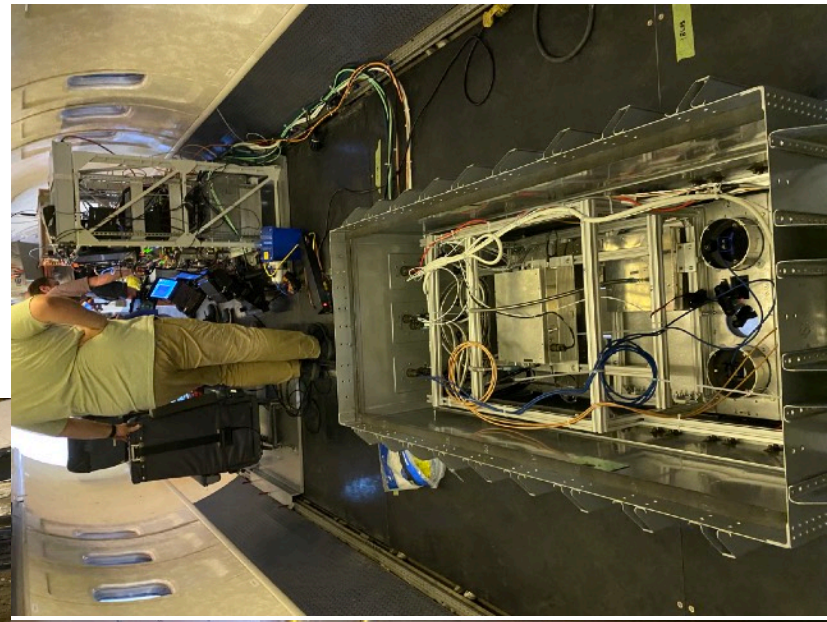
Danish Meteorological Institute

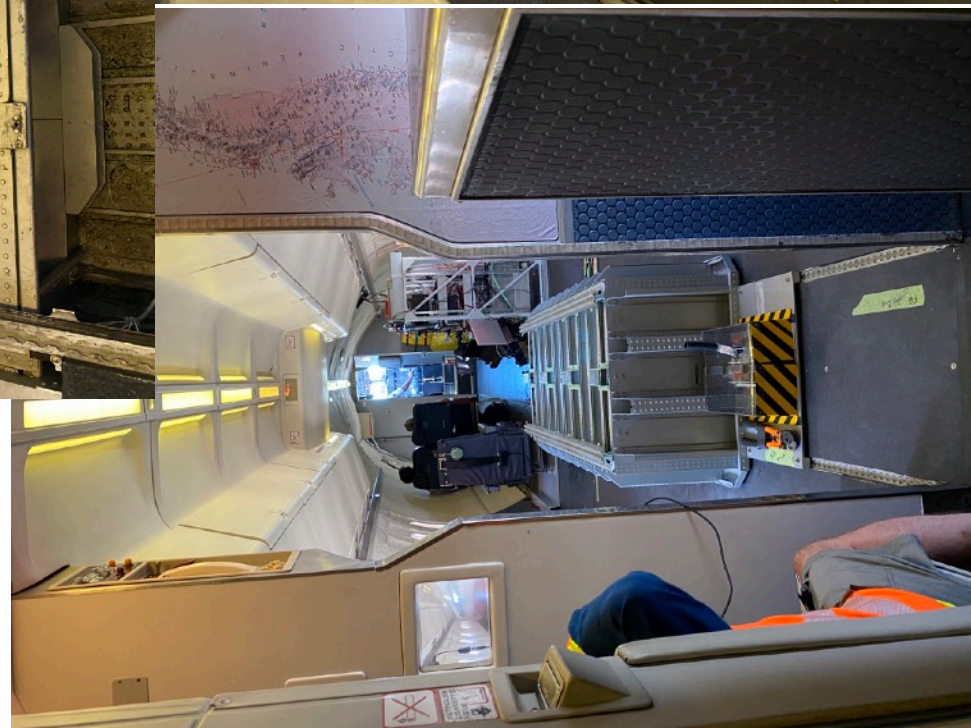
CSIC, Spain

Kansas University

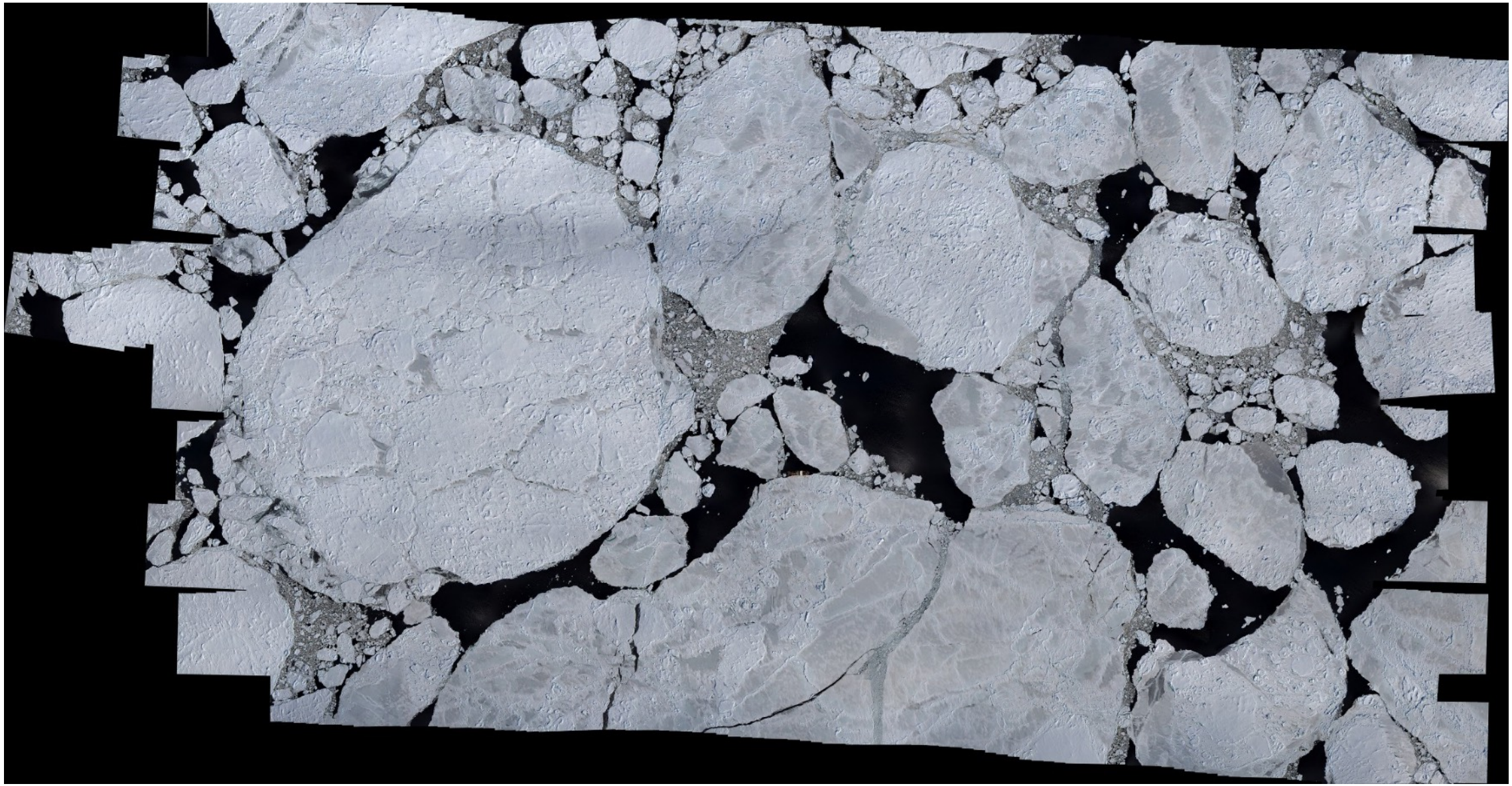
Northeastern University



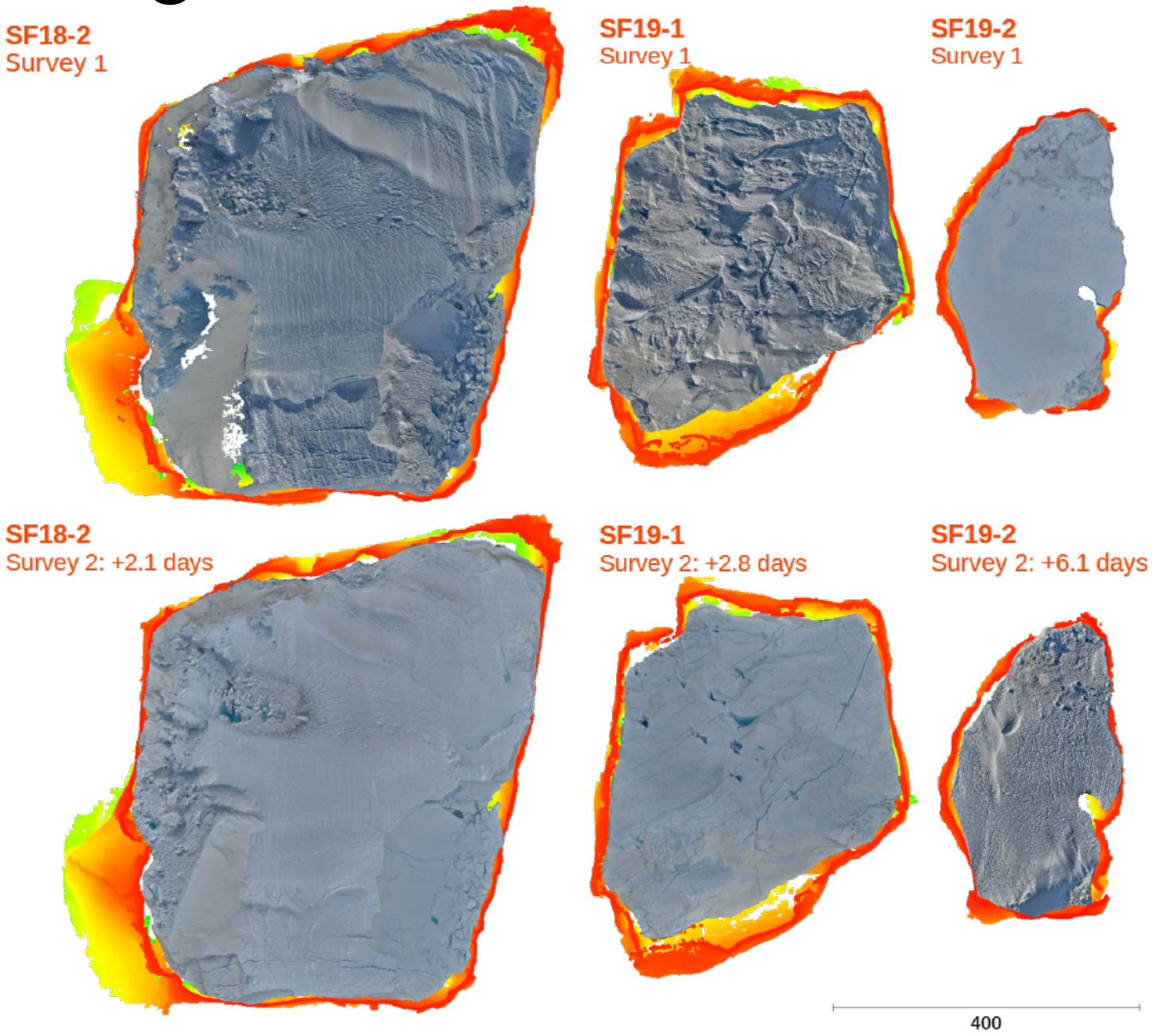


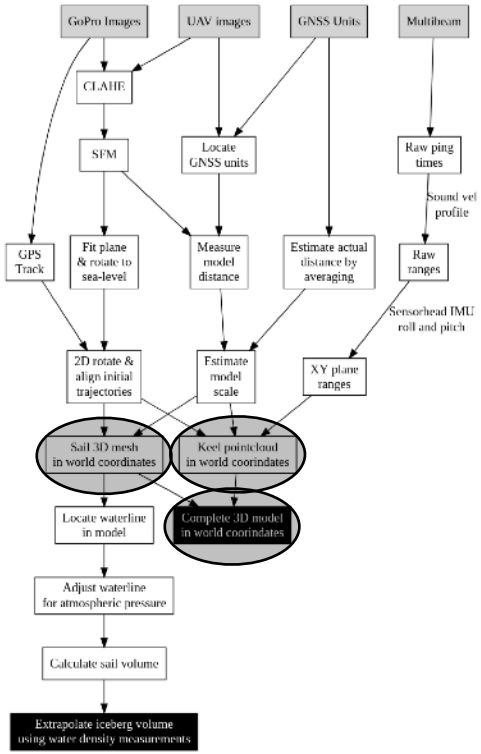


Sea Ice Mosaic



Iceberg Sail Reconstruction from SfM



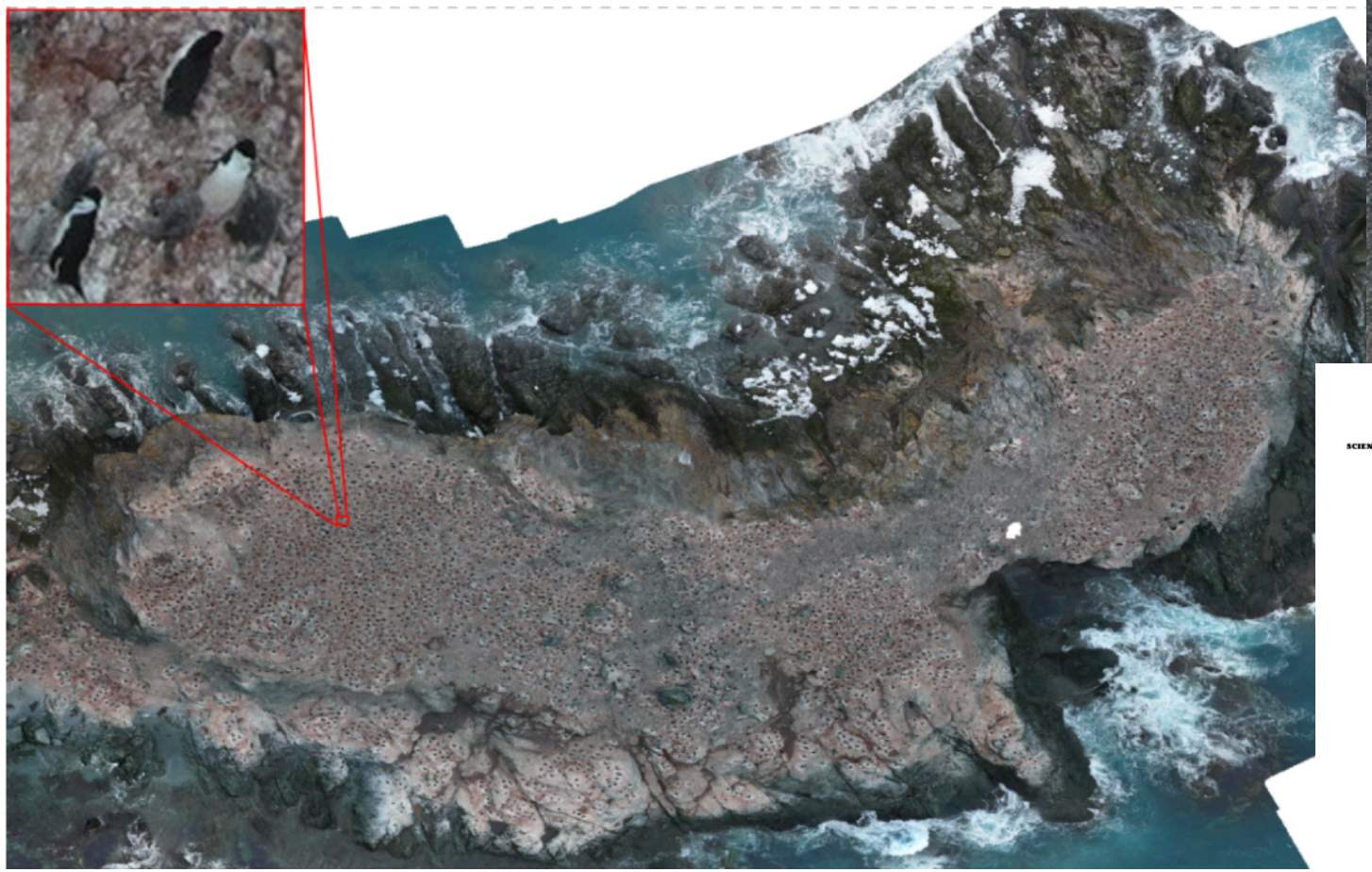


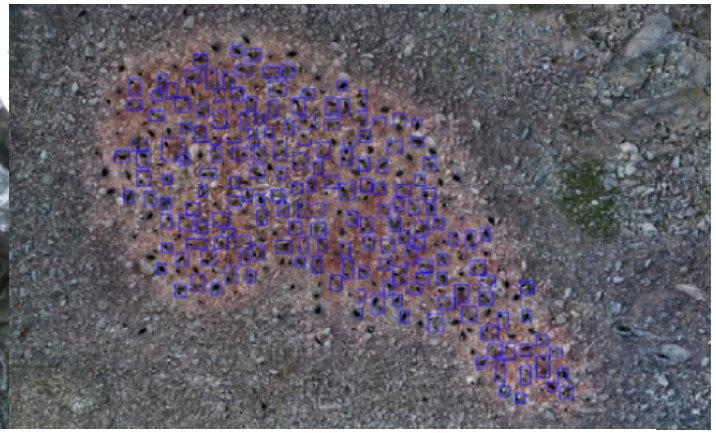
Elephant Island, Smith Island, Low Island Chinstrap Census

Alarm over collapse of chinstrap penguin numbers

Global heating suspected to be behind sharp decline in populations across Antarctic islands

Penguin Census – Danger Islands (Jenouvrier et al)





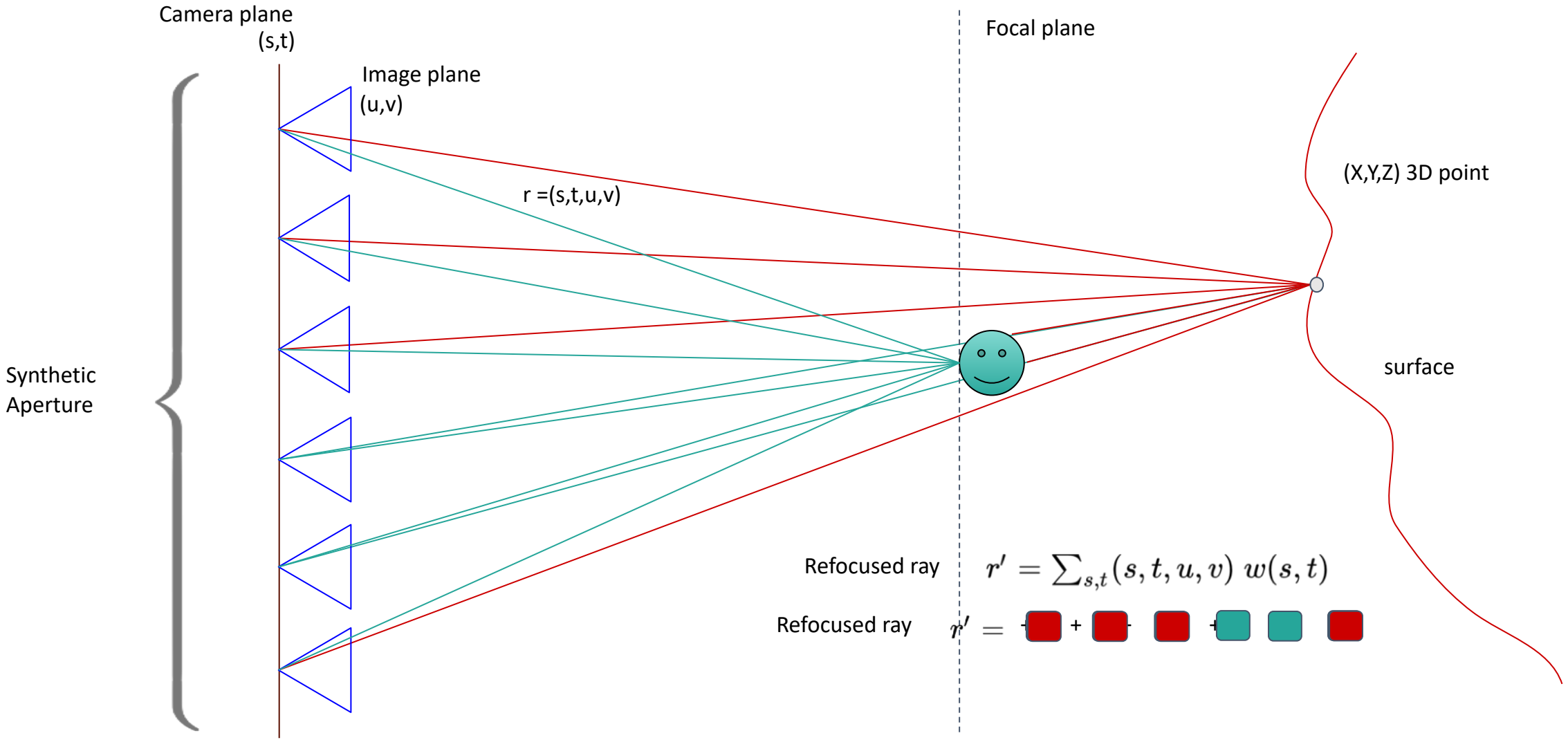
The New York Times

SCIENCE

A Supercolony of Penguins Has Been Found Near Antarctica

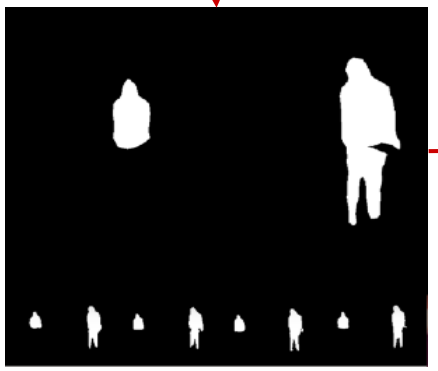
Satellite images and a drone discovered about 1.5 million Adélie penguins living in the Danger Islands, one of two species whose habitats require ice.

Light Fields



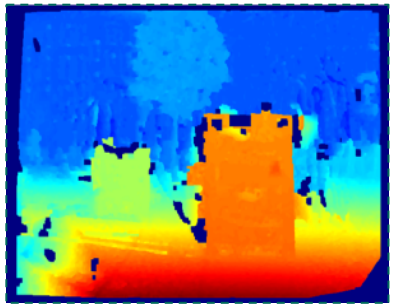
Light Field Reconstruction

frames



Segmentation

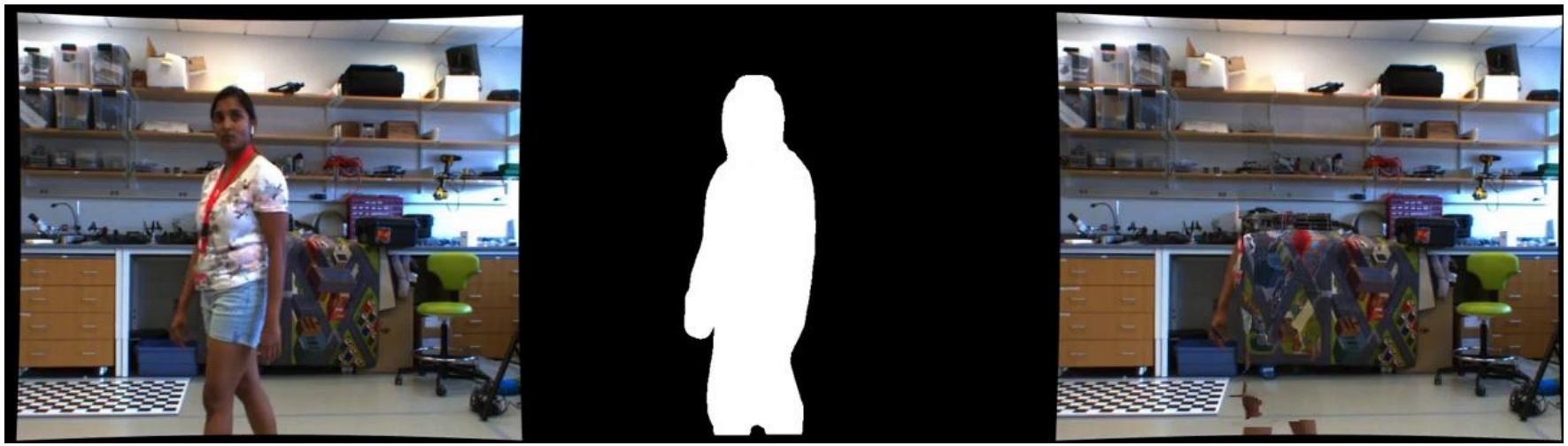
Depth Estimation

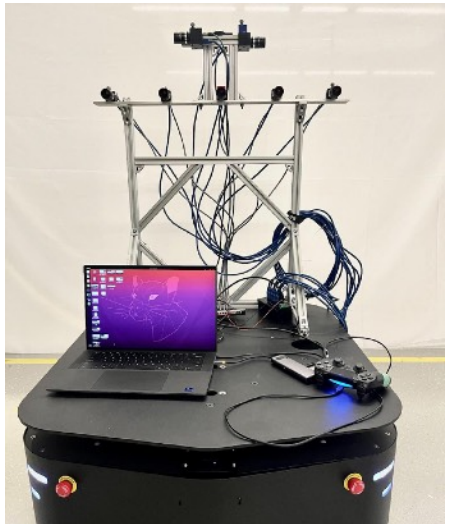


Refocused Image of Static Background

Pose estimates and static map

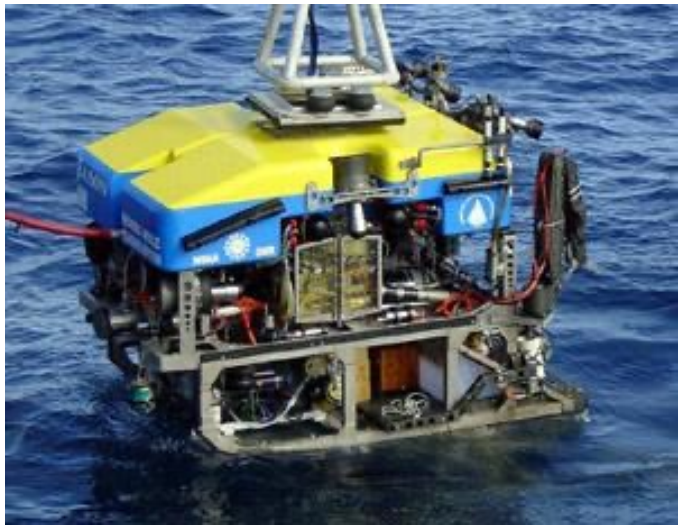
Tracking And Mapping



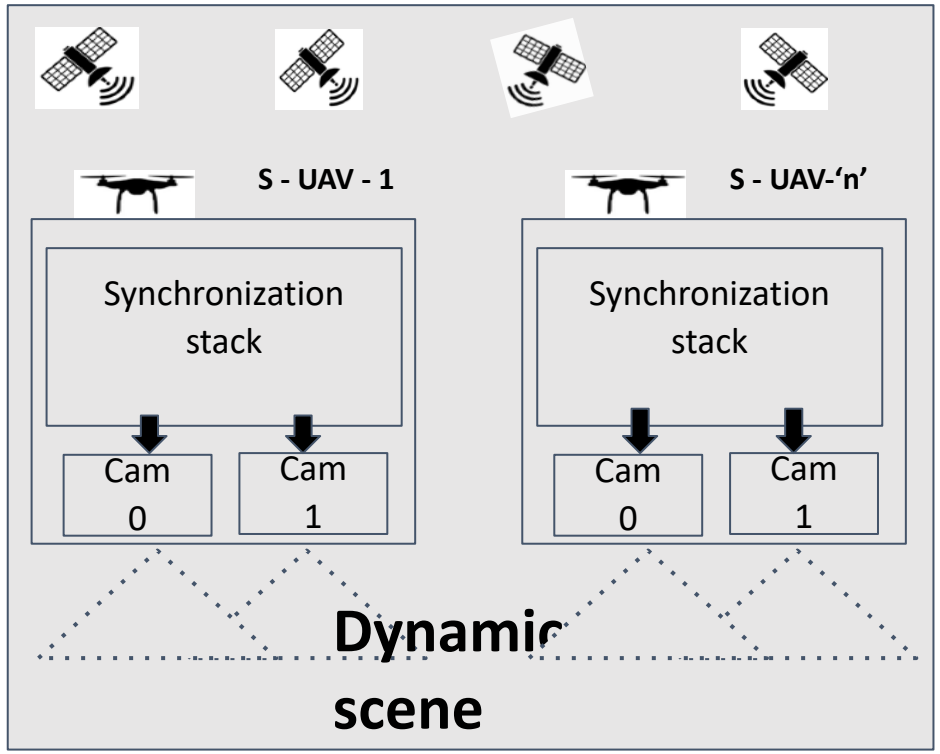


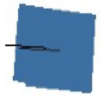
Occlusion Removal

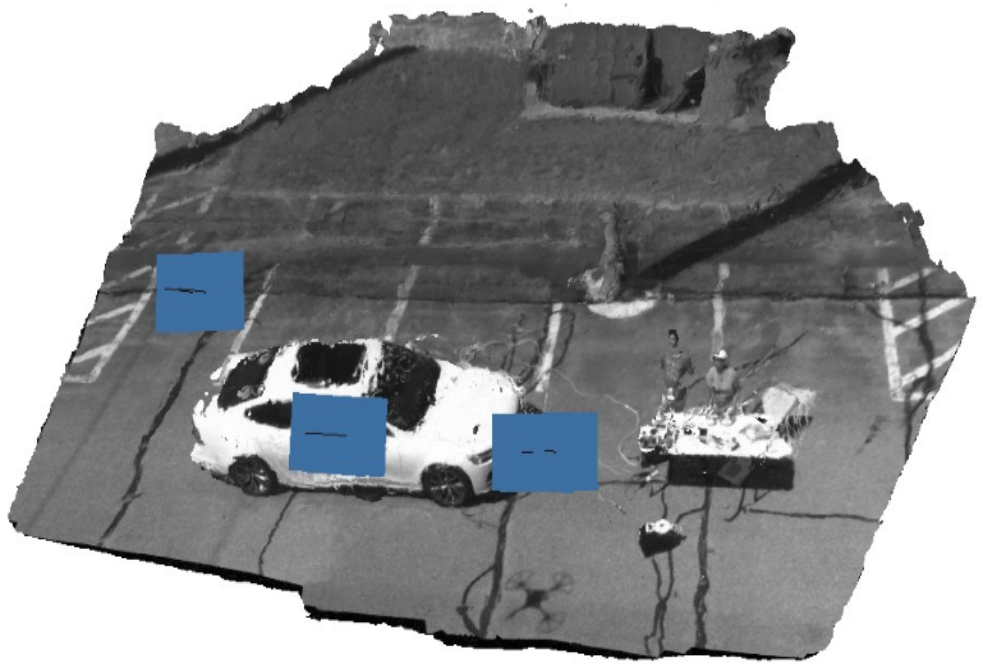
Confetti (slowed down)

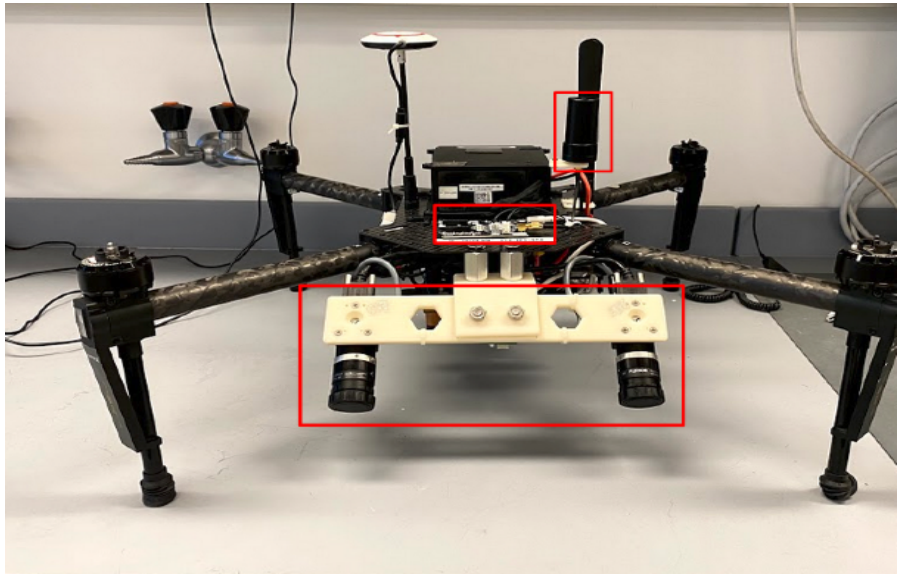


Synchronous and Distributed Image Acquisition

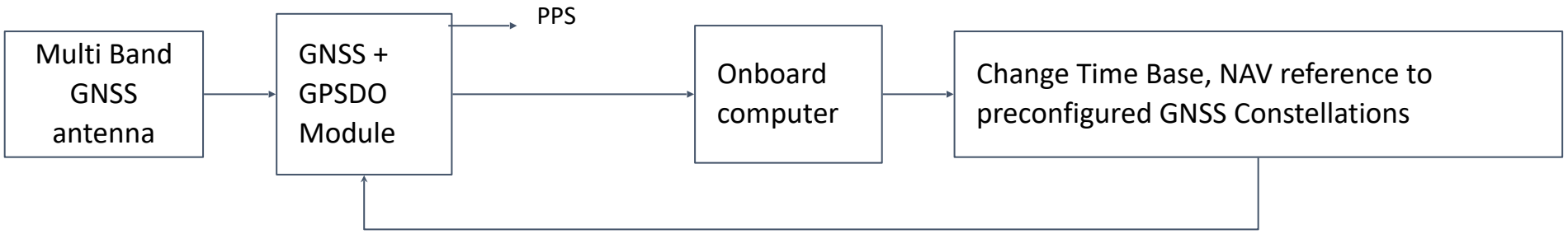








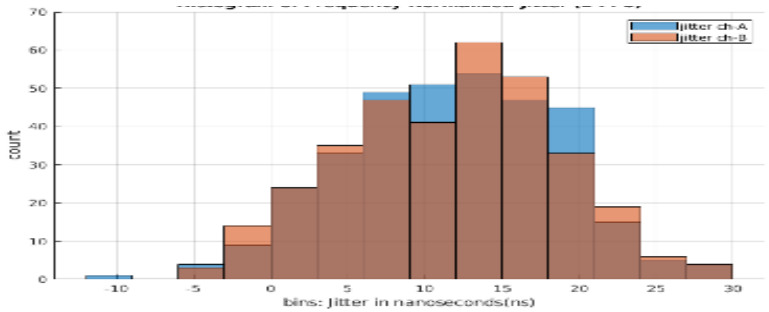
TIE, varying timebase across GNSS constellations

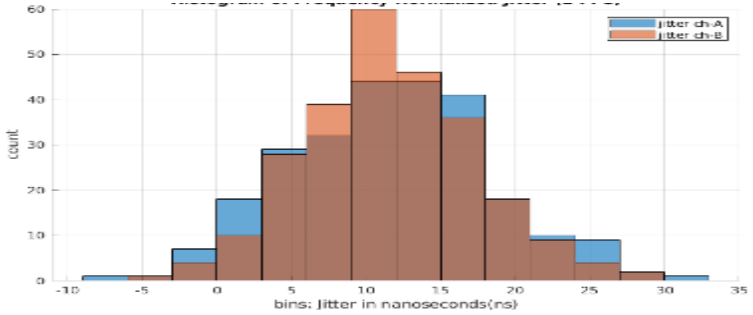


Zed-f9t Baseline,
Timebase: GPS
All constellations, {S}

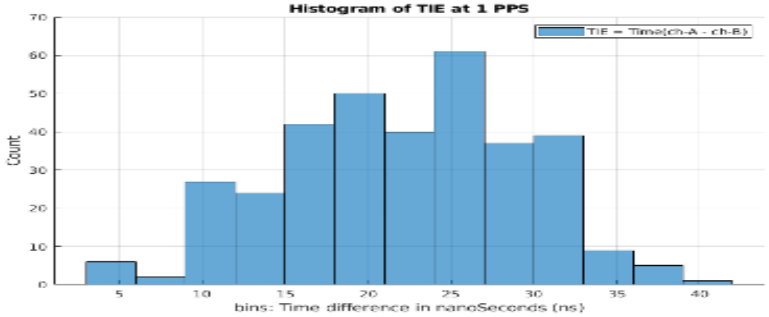
Timebase GLONASS
{S} - {GPS} Constellations

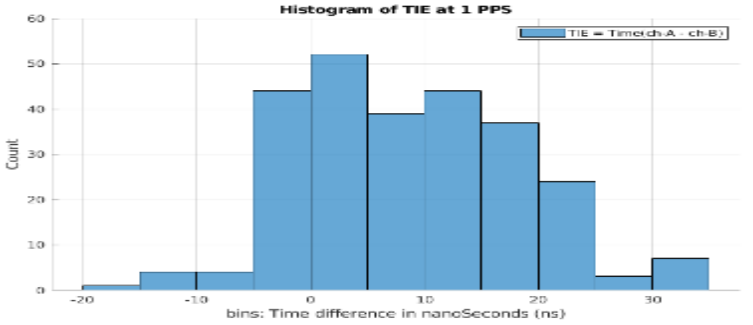
Jitter



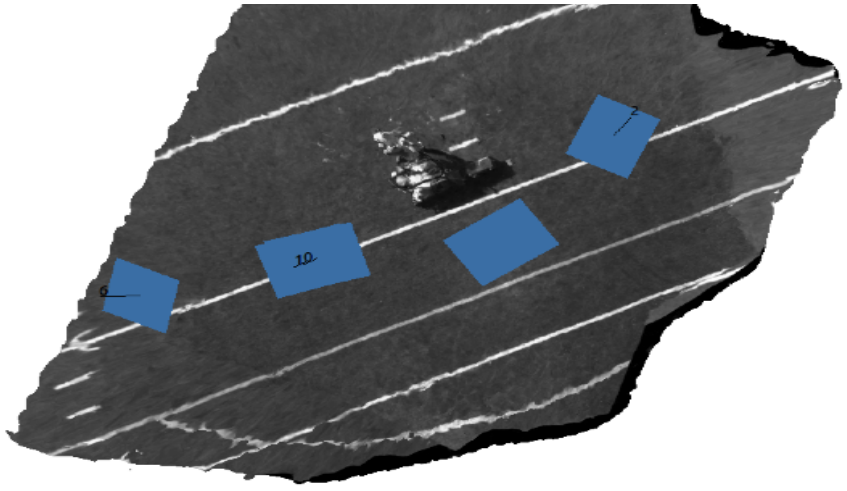


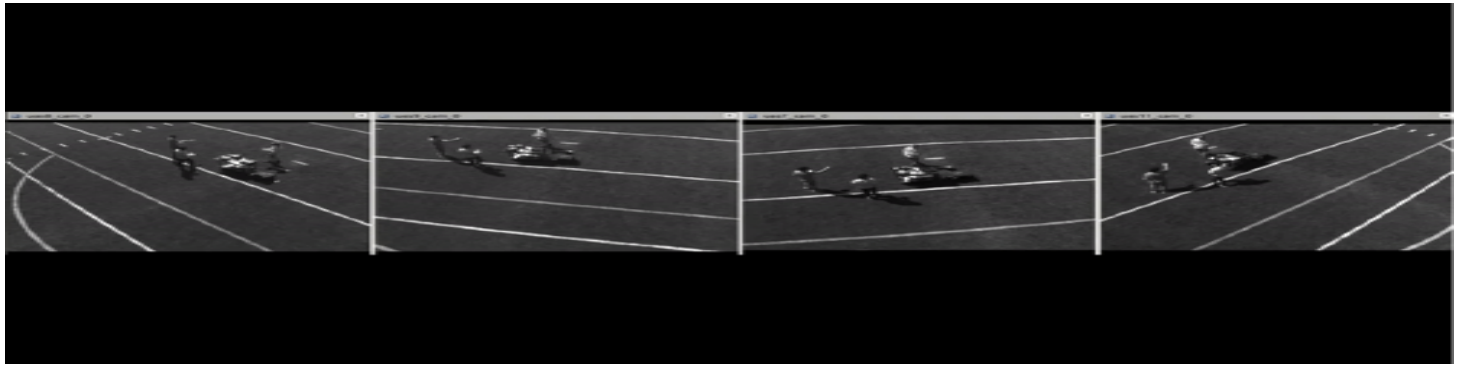
TIE



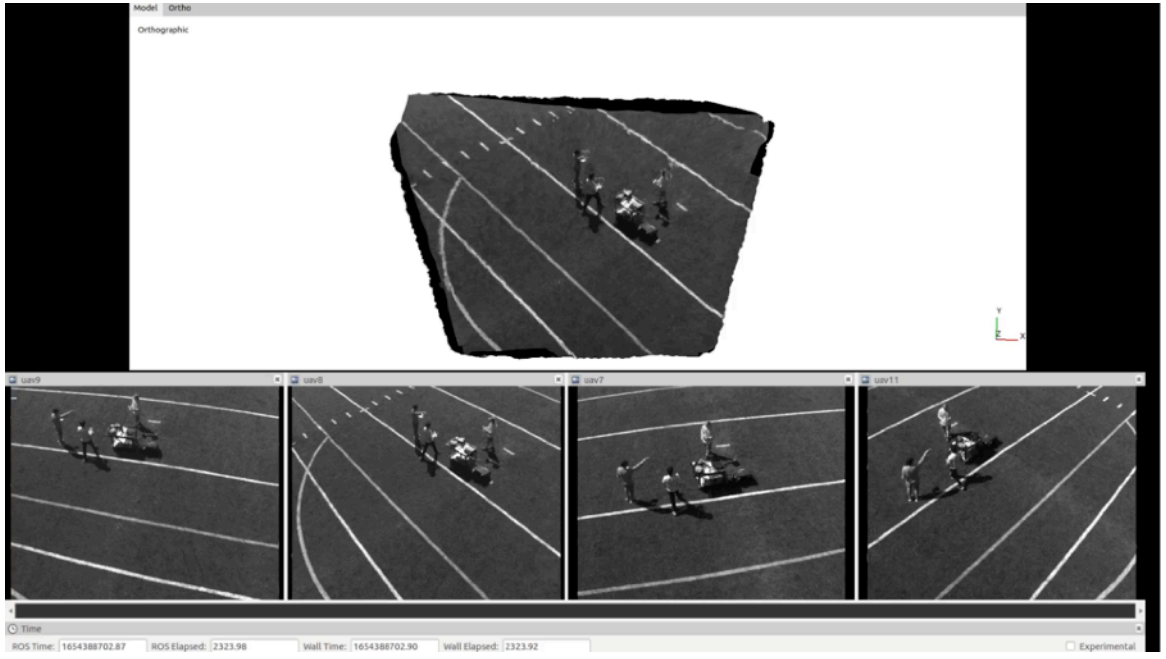


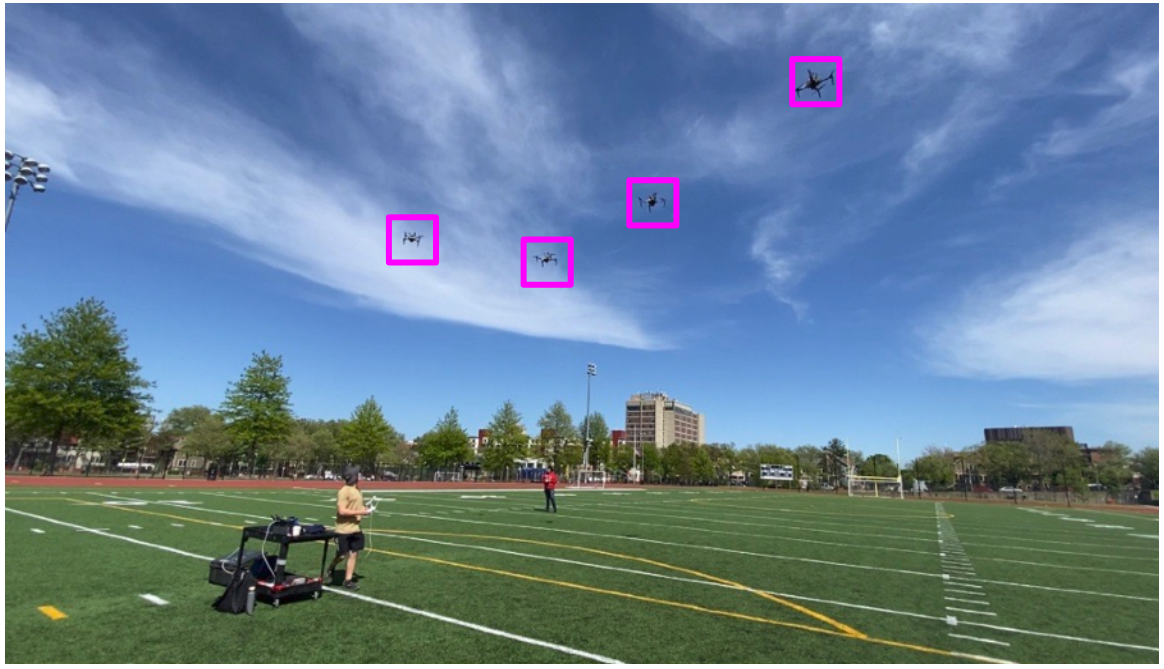
3D Reconstructions from 4 S-UAVs of Dynamic scene with people Walking





Above: Images of people walking across in 1 second duration from 4 S-UAVs captured at 20 Hz, from viewpoints shown in left image.



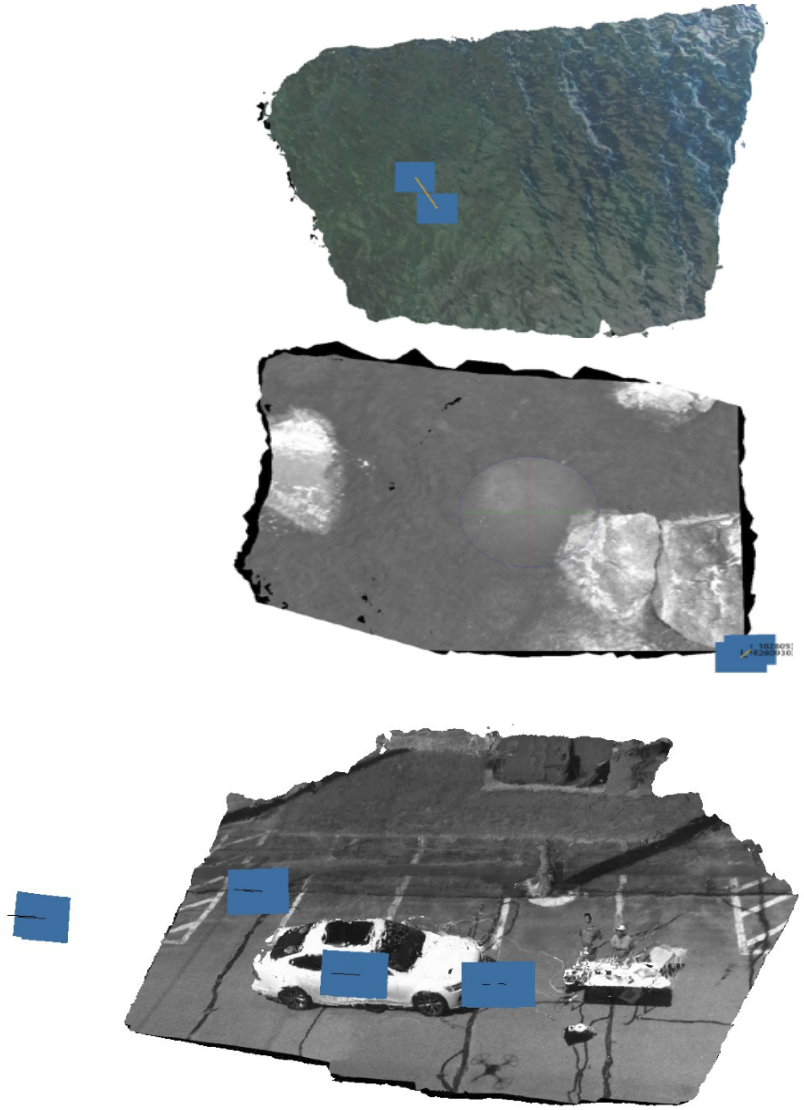


Multiple S-UAVs for Synchronous Wide Baseline Imaging

Using Multiple S-UAV in dynamic environments for:

1. Wide baseline, pseudo camera arrays for configurable depth error or resolution(/ Field of View).

2. Dynamic Baseline: Dynamically vary the Shape of camera arrays with multi UAV Formation

3. Maintain a stationary View points in comparison to ship based stereo.(Eg: Looking at Waves)

4. 3D Mobility: Follow the dynamic objects in scene.