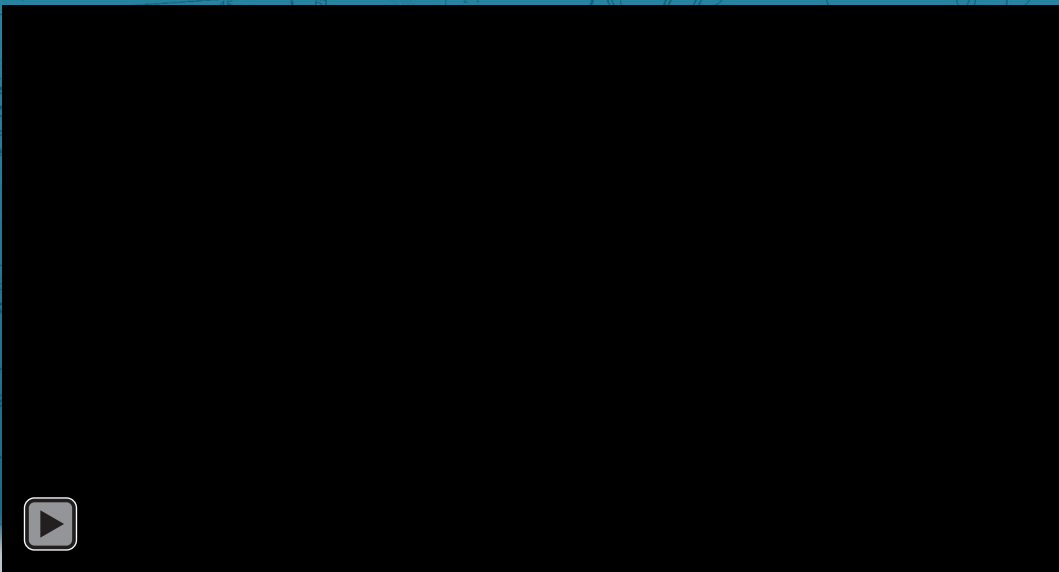


Thoughts on the Efficiency of Uncrewed Surface Vessels



ASV Global CW-4
Bathymetric Explorer and Navigator - BEN



Seafloor Systems Echoboat



Saildrone Surveyor

Teledyne Oceansciences Z-Boat



Hydronalix EMILY Boat



As replacement for crewed launches - OCS - OMAO

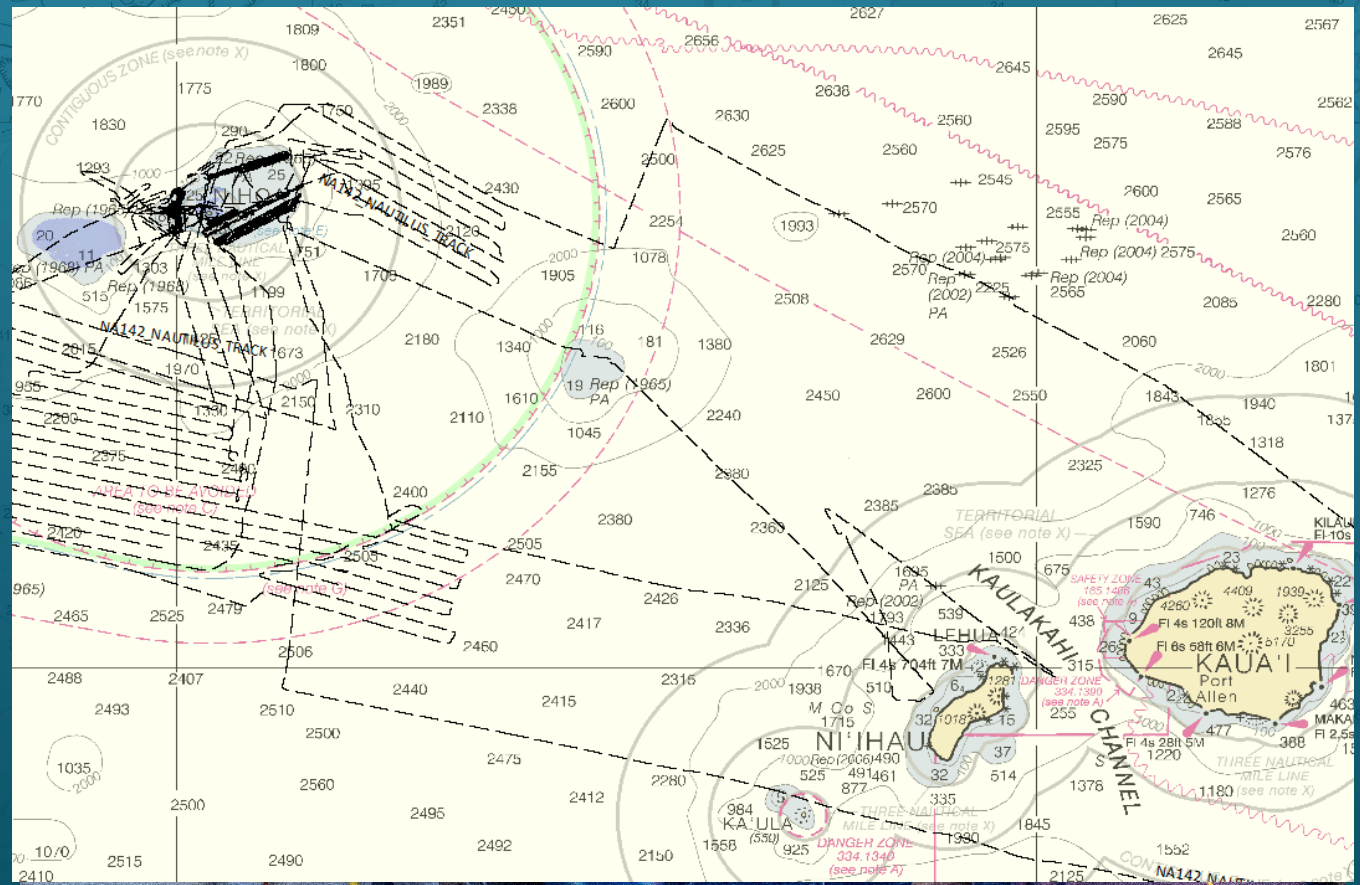


As replacement for crewed launches - OCS - OMAO

OECI DUAL MAPPING TECHNOLOGIES

NA-142 16 July – 8 August Honolulu - Honolulu

- DriX launch and recovery on NAUTILUS (single-point pick w/crane) limited by weather and sea-state – likely similar to limits for crewed launches on NOAA vessels (better w/davit)
- Speed and endurance allowed 100 nm transit to deploy in lee of island. Once in water – DriX has excellent sea-keeping ability and can transit at high speed



As replacement for crewed launches - OCS - OMAO

FORCE MULTIPLIER FOR MAPPING

- Dual vessel operations were simple – full data telemetry and situational awareness to limit of MBR (~20 km)
- >95% of data collected met or exceeded NOAA specifications for water depths
- Many junctions with LIDAR, old MBES and NAUTILUS MBES
- LIDAR collected to ellipsoid – no VDATUM transformation model – working on best tide model

DriX08 - Nihoa 2022

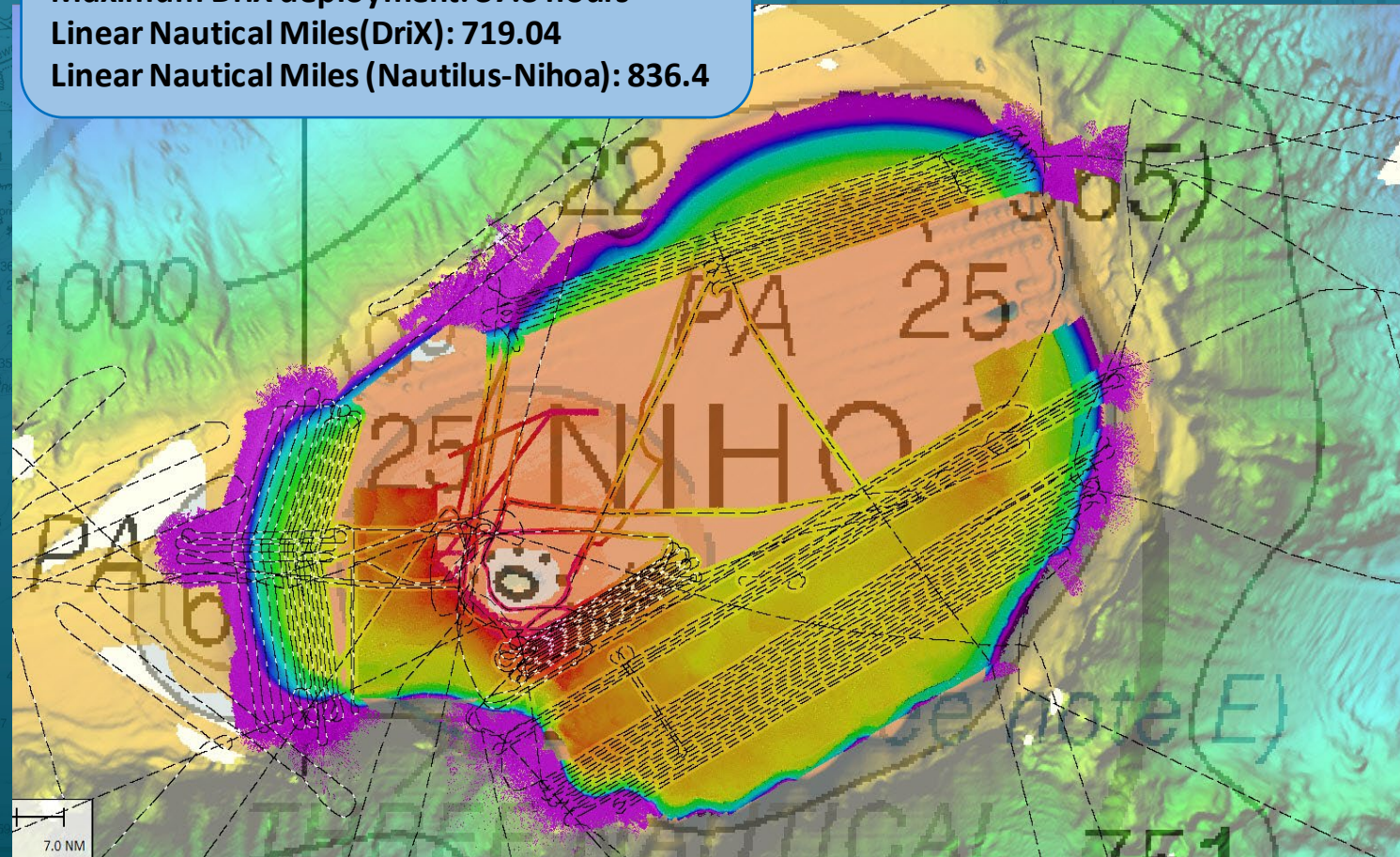
Total time deployed: 6 days, 15.4 hours

Maximum DriX deployment: 37.3 hours

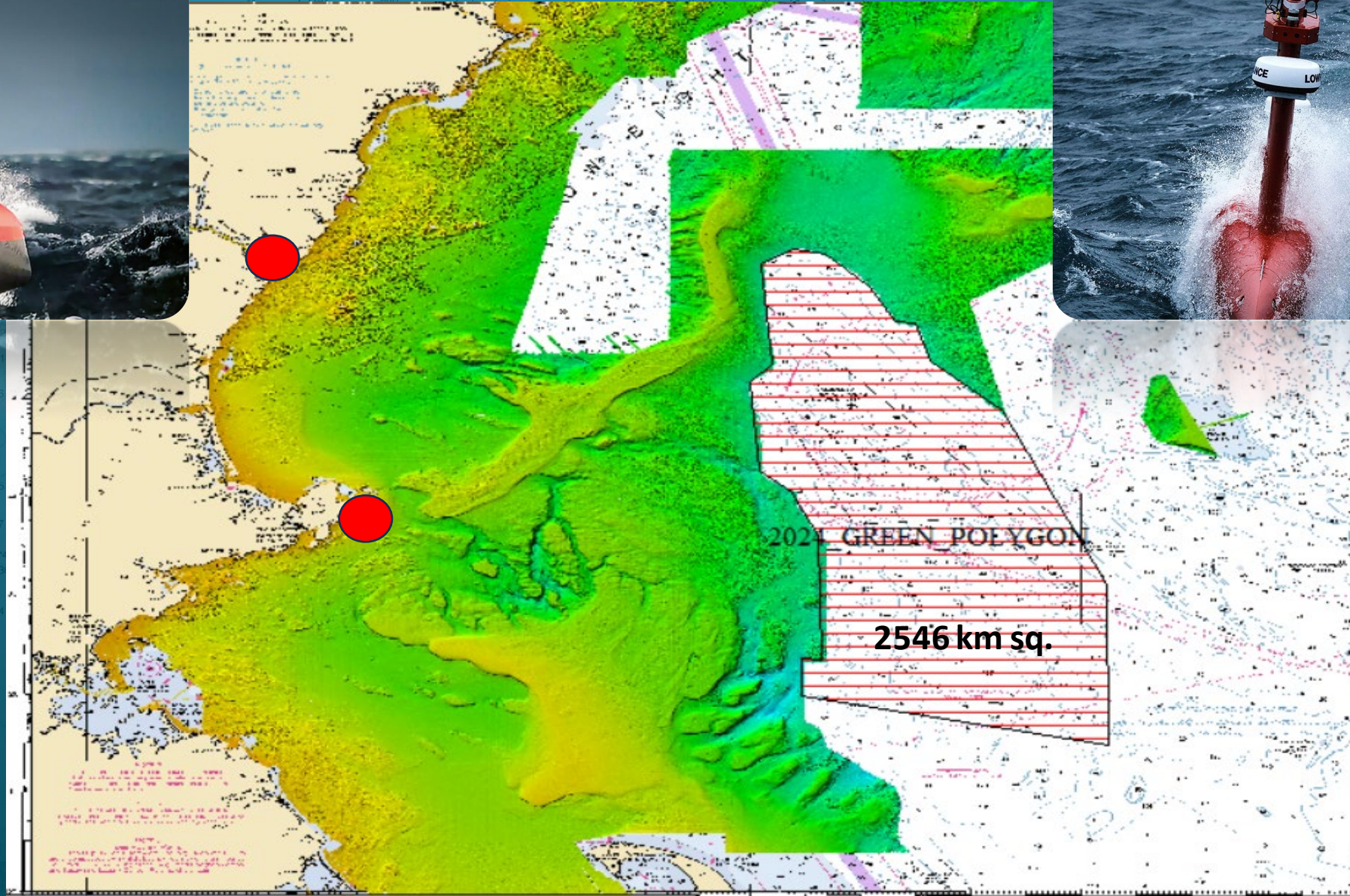
Linear Nautical Miles(DriX): 719.04

Linear Nautical Miles (Nautilus-Nihoa): 836.4

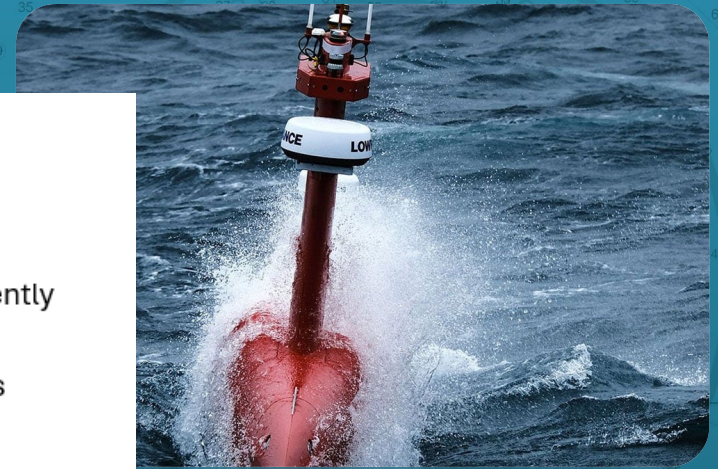
Lt Airlee Pickett's Thesis



Multiple Vehicles



Multiple Vehicles



Personnel:

Assumptions:

- Crewing is staffed (24/7) in a three staging area is center. (Co-located)
- Each operations center

...nned concurrently
...tion, a vehicle
...ther operations



Personnel

Staging Area

Drive

Drive

Operations

Drive

Drive

Operations

Drive

Drive

Data Processors may be located anywhere, but are preferentially near one of the operations centers.

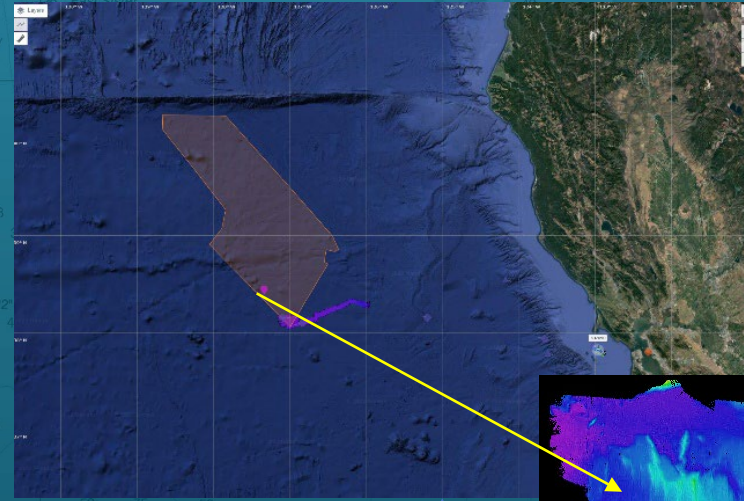
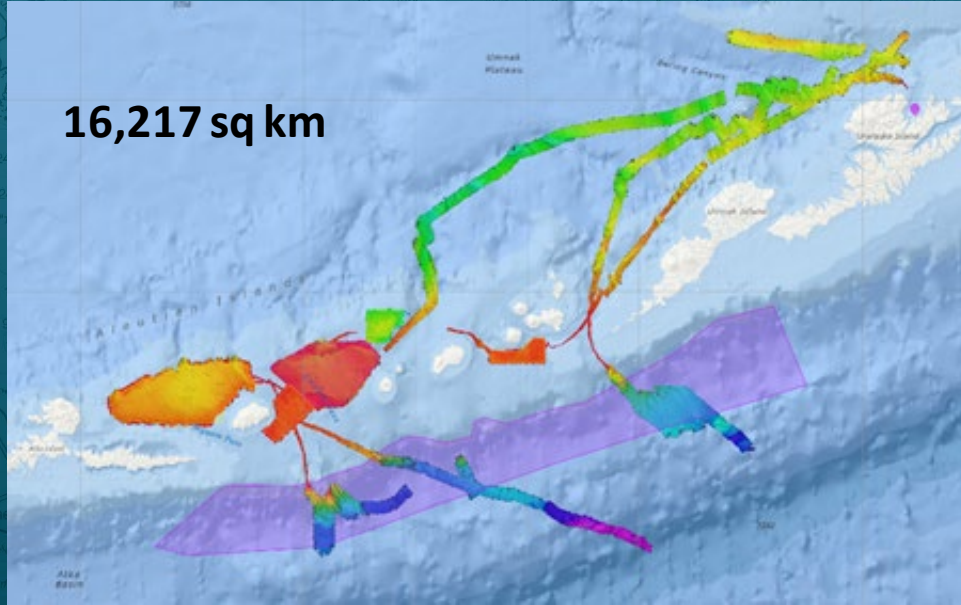


Saildrone Surveyor



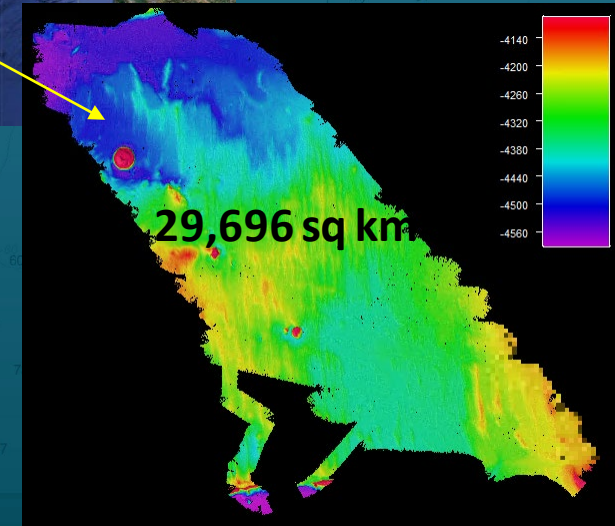
Aleutians

16,217 sq km



Northern CA

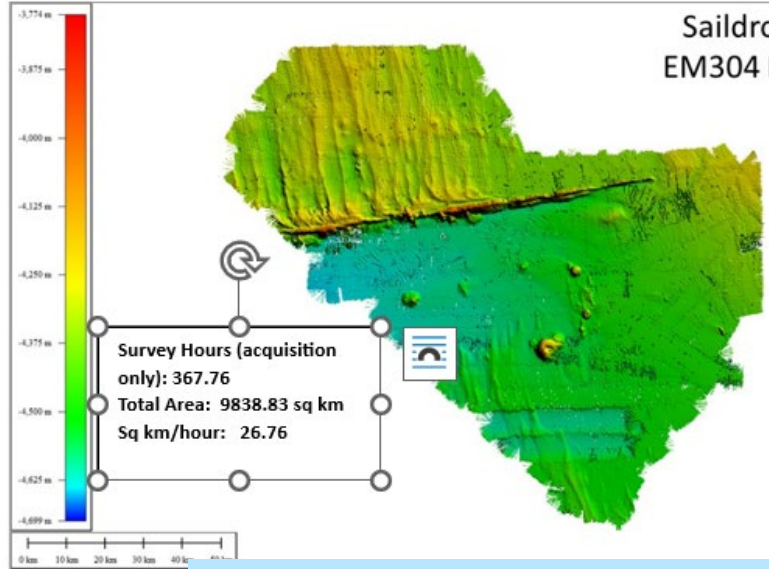
29,696 sq km



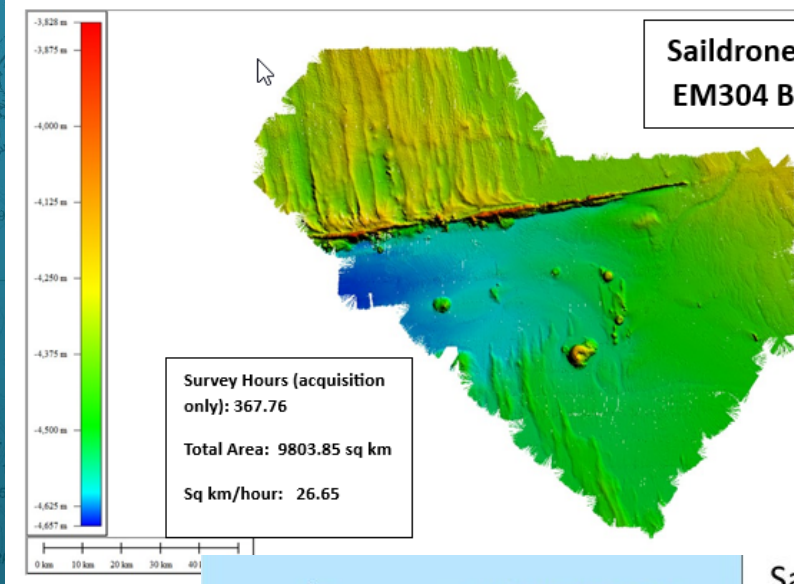
Saildrone Surveyor

15.25 days @ 3.95 knts = 26.65 sq km / hr 58.6% overlap

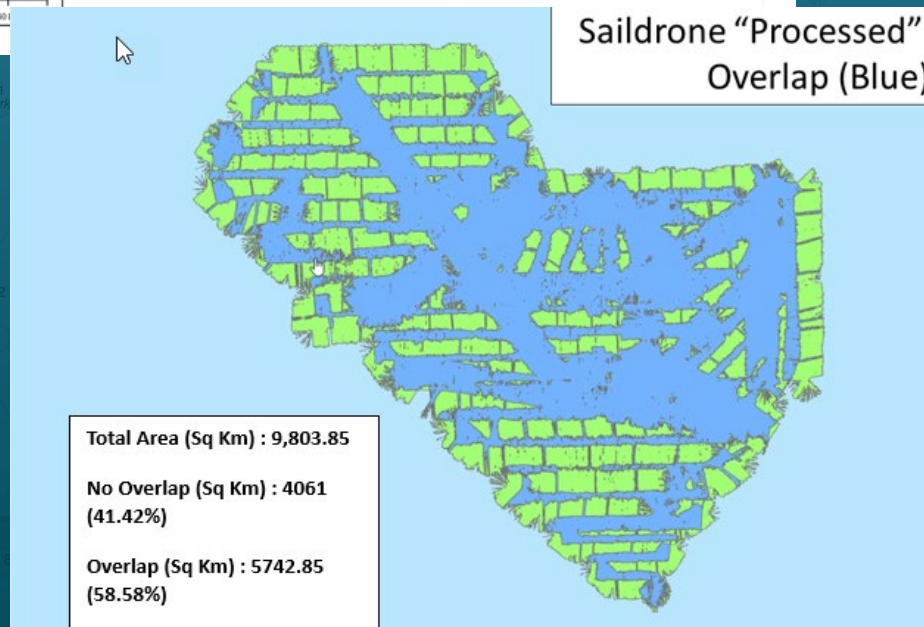
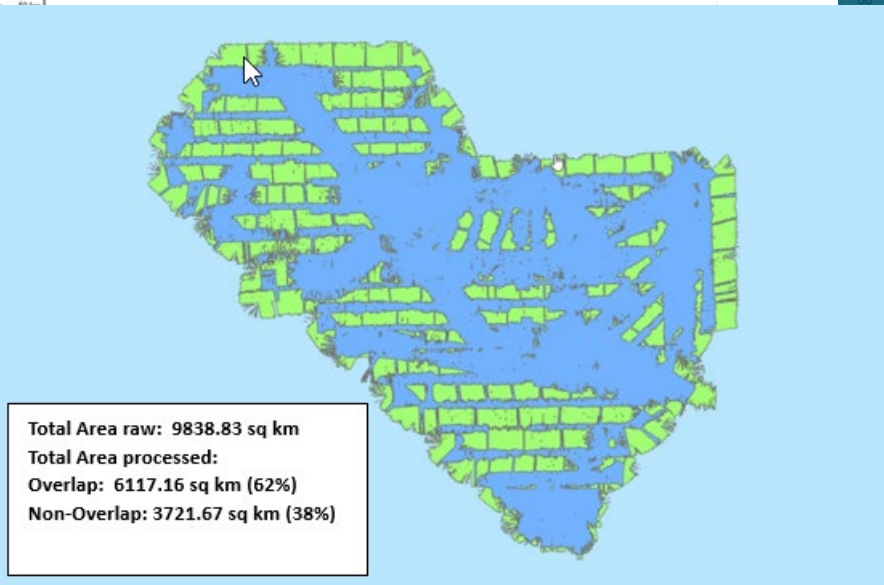
Saildrone "Raw" EM304 Bathymetry



Saildrone Processed EM304 Bathymetry



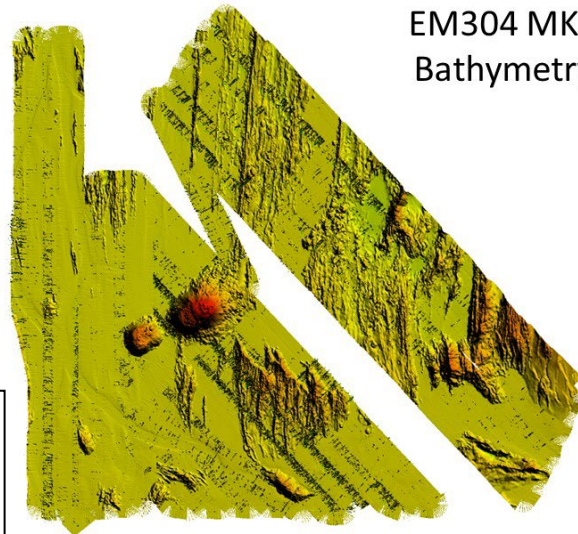
Saildrone "Processed" Overlap (Blue)



Okeanos Explorer

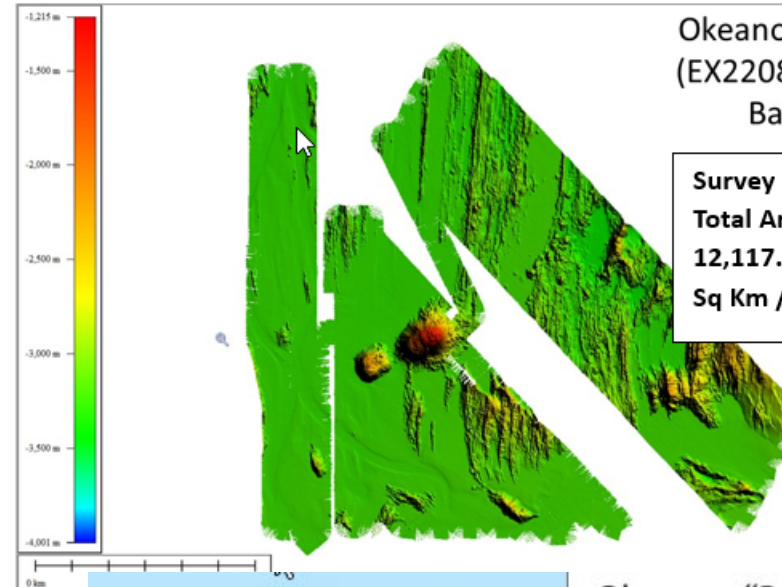
44.2 sq km / hr 76% overlap

Okeanos (EX2208)
EM304 MK2
Bathymetry



Survey Hours : 274.1341
Total Area (Sq Km) :
12,866.17
Sq Km / Hour = 46.93

Okeanos "Processed"
(EX2208) EM304 MK2
Bathymetry



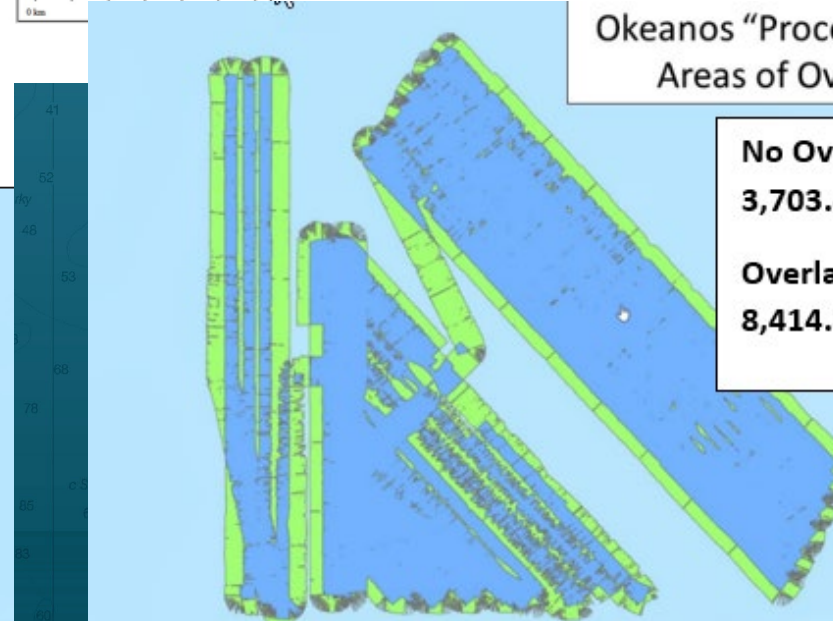
Survey Hours: 274.13
Total Area (Sq Km) :
12,117.71
Sq Km / Hour = 44.20

OKEANOS (EX2208)
AREAS of OVERLAP
RAW BATHYMETRY



Total Area (Sq Km) :
12,866.17
No Overlap (Sq Km)
: 3,118.86 (24%)
Overlap (Sq Km) :
9,747.31 (76%)

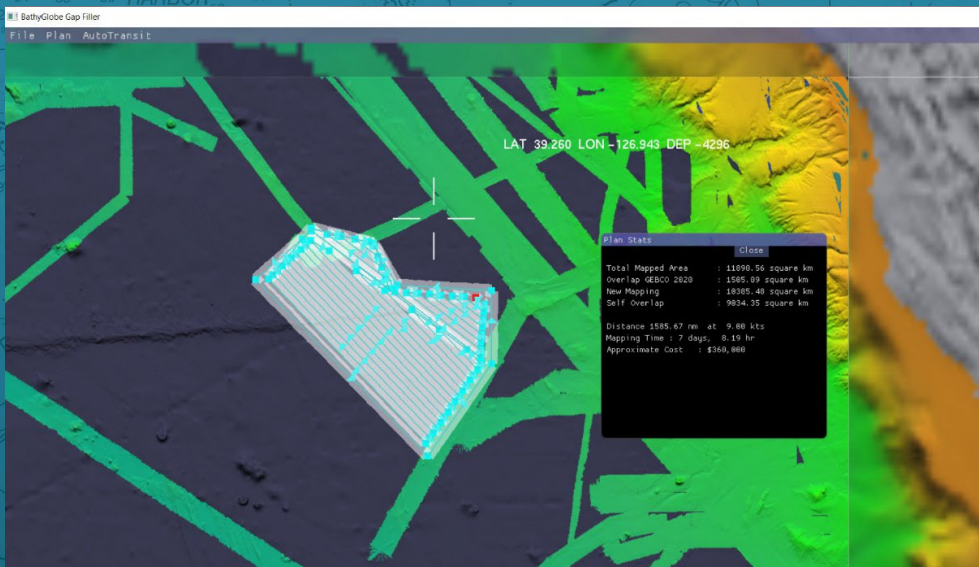
Okeanos "Processed" (EX2208)
Areas of Overlap (Blue)



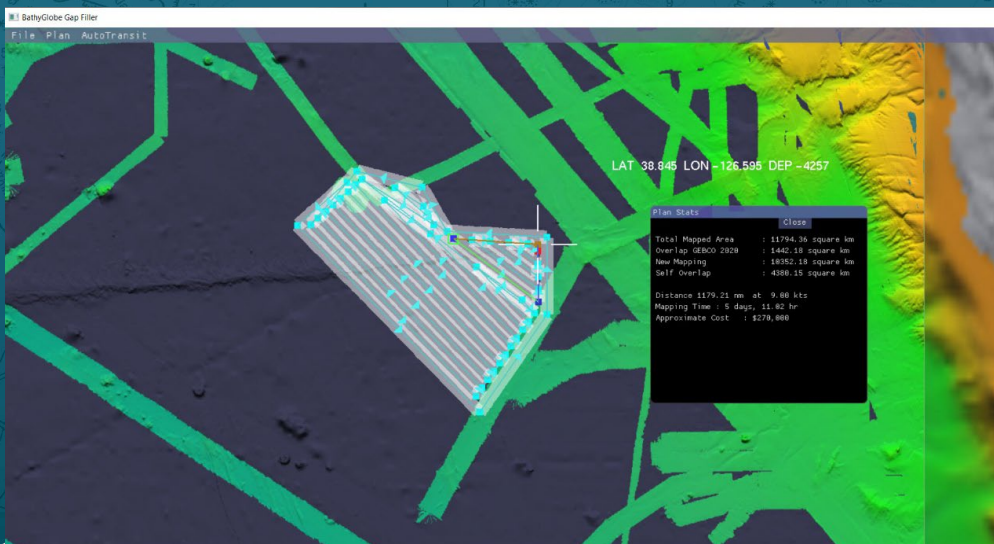
No Overlap (Sq Km) :
3,703.41 (24%)
Overlap (Sq Km) :
8,414.3 (76%)

Okeanos Explorer EM304

Saildrone 15.25 days @ 58.6% overlap



7.33 days @ 100% overlap



5.5 days @ 58.6% overlap

3.58 days @ 100% overlap if EM124 (12 kHz)

Does not address issues of crew safety, carbon footprint and relative costs.