



GEBCO-Nippon Foundation Alumni Team's solution for Shell Ocean Discovery XPRIZE Competition

presented on behalf of the GNFA Team by

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Geological Institute of Russian Academy of Science



GEBCO Symposium: Map the Gaps
Portsmouth, 2019





A \$7 million global competition challenging teams to advance deep-sea technologies for autonomous, fast and high-resolution ocean exploration.

Create solutions that advance the autonomy, scale, speed, depths and resolution of ocean exploration

<http://oceandiscovery.xprize.org>

Preliminary phase (Dec 2016): written description of the proposed solution

Round 1 (Nov 2017)
Min. **100 km²** in **16 hours**
48 h of data processing
Max. Depth – **2,000 m**

Round 2 (Nov 2018)
Min. **250 km²** in **24 hours**
48 h of data processing
Max. Depth – **4,000 m**



Shell OCEAN DISCOVERY XPRIZE®



GEBCO-NF Alumni



Dr Rochelle Anne Wigley
Project Coordinator and Management



Dr Yulia Zarayskaya
Geologist and Data Product Developer



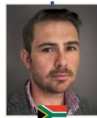
Dr Karolina Zwolak
Hydrographer and Sonar Specialist



Jaya Roperez
Hydrographer and Data Processor



Hadar Sade
Hydrographer and GIS Specialist



Neil Timmouth
Project Management and Business Development



Dr Evgenia Bazhenova
Geologist and Data Product Developer



Masanao Sumiyoshi
Hydrographer and Data Processor



Seeboruth Sattiabaruth
Surveyor



Christina Lacerda
Hydrographer and Cartographer



Tomer Ketter
Hydrographer



Ivan Ryzhov
Geologist



Dr Mohamed Elsaied
Geophysicist



Andres Fitzcarrald
Hydrographer



Aileen Bohan
Hydrographer and Data Processor



Bob Anderson
GEBCO



Robin Falconer
GEBCO



LCDr Azmi Rosedee
Hydrographer and Data Manager



Timothy Kearns
Numarus



Benjamin Simpson
Hushcraft Ltd.

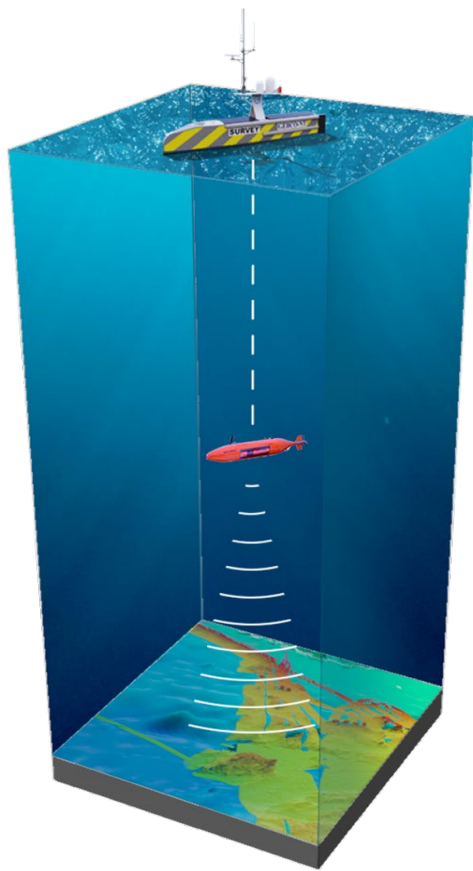


Dr Alison Proctor
Technical Operations Manager
Subsea Project Engineer, OFG



Dr Wetherbee Dorshow
GIS Specialist
Earth Analytic





New **autonomous surface vessel** capable of AUV deployment & retrieval

- Hushcraft Limited SEA-KIT *USV Maxlimer* with KM HiPAP
- Remote and Autonomous operations facilitated by Kongsberg Maritime K-MATE

Kongsberg Maritime HUGIN AUV

- Round 1: Ocean Floor Geophysics *Chercheur* AUV: 3,000 m
- Round 2: Kongsberg Maritime: 4,500 m

Seafloor bathymetry and imagery

- Fusion of EM2040 & EM304 MBES, HISAS real aperture bathymetry, HISAS synthetic aperture bathymetry and side-scan imagery
- Spot-focused synthetic aperture HISAS imagery and bathymetry

ROUND 2 PRODUCTS

SURFACES

- 5 m resolution grid of overall combined bathymetric dataset
- 2 m resolution grid of HISAS1032 wide-area mode data
- 1 m resolution grid of standard HISAS1032 mode data
- 1 m resolution grid of EM2040 data
- 5 m resolution grid of EM304 data

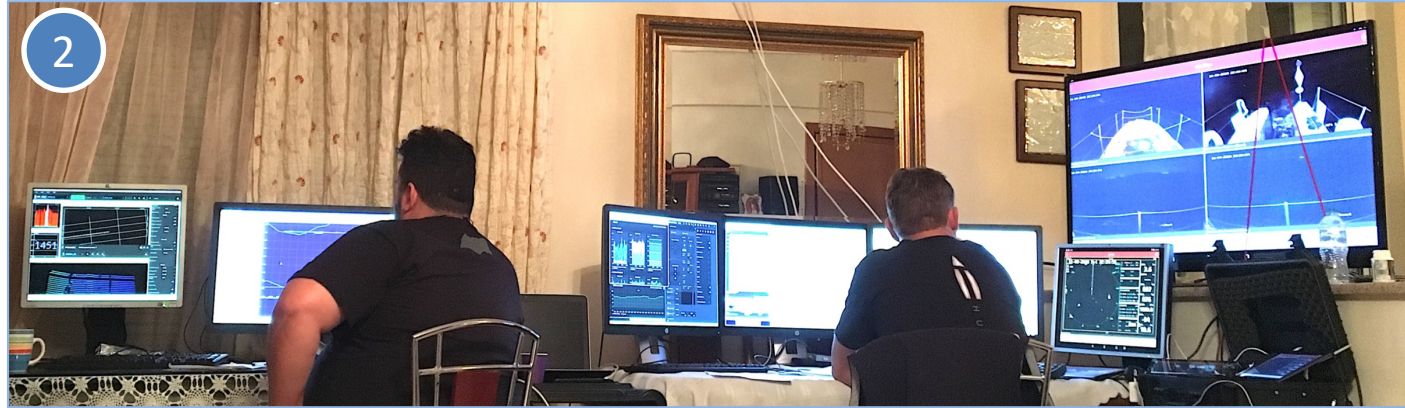
IMAGERY

- 10 cm resolution mosaic of standard HISAS1032 mode
- 1 m resolution mosaic of HISAS1032 wide-area mode
- 1 m resolution mosaic of EM2040 backscatter
- 2 cm resolution Spot processed side-scan images of objects (produced using KM Reflection software)
- 3D images: bathymetry drapes (produced using Fledermaus), point cloud images (using Qimera) produced remotely at UNH

1



2



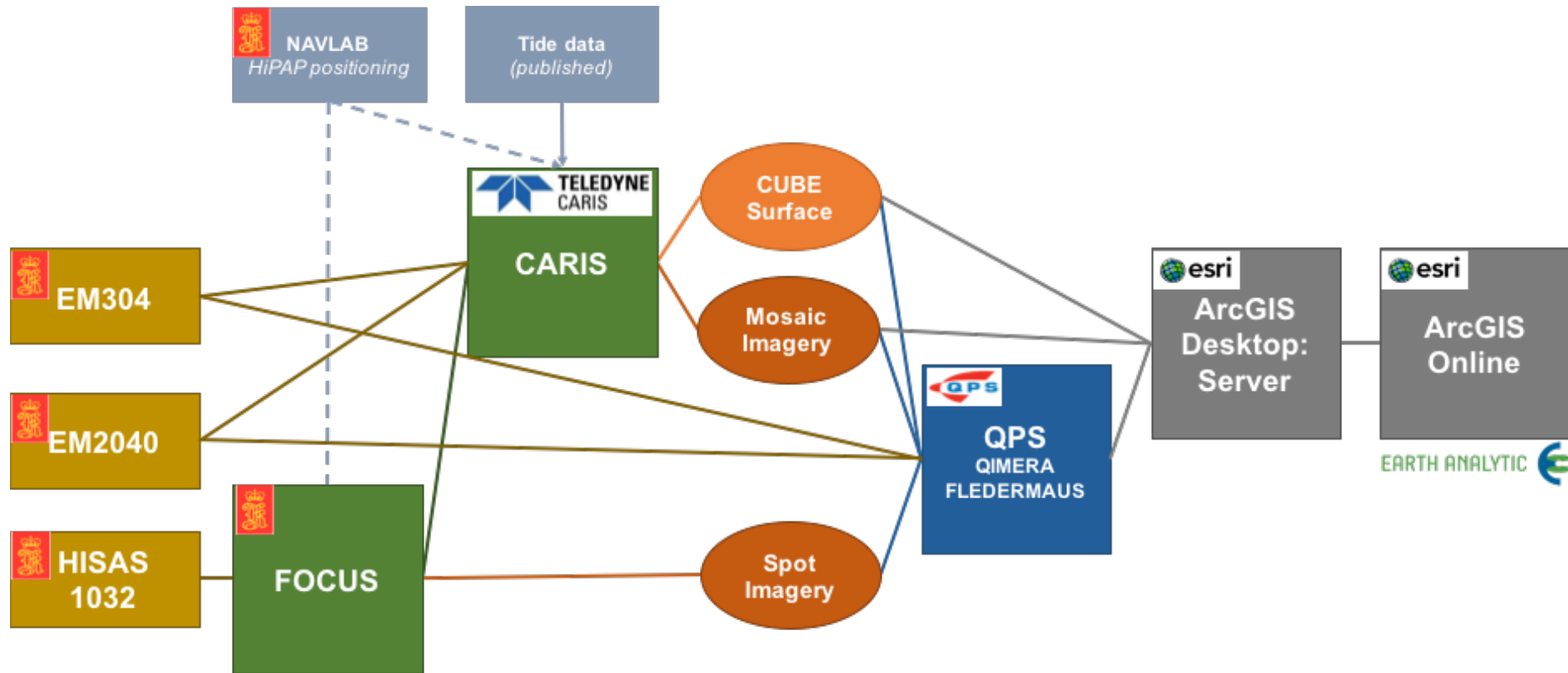
ROUND 2 WORK HUBS

1. Survey equipment
2. Operations Center
3. Data Processing ('Mission Control')

+ NETWORK

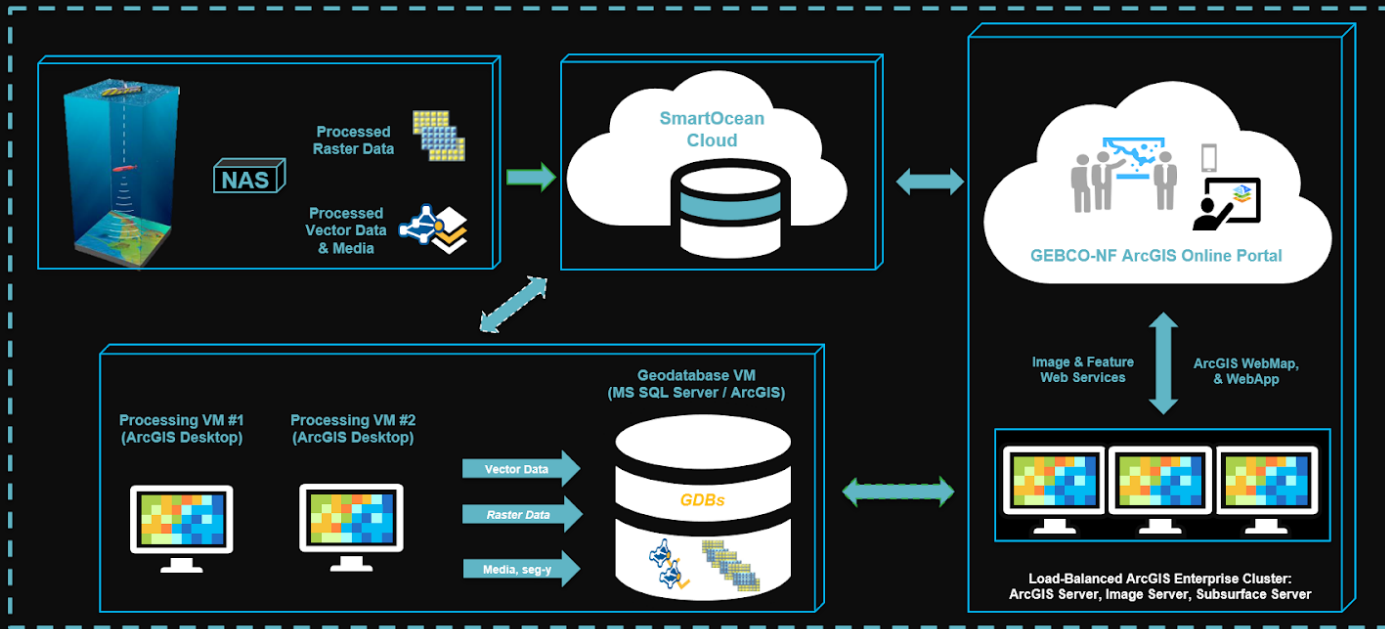
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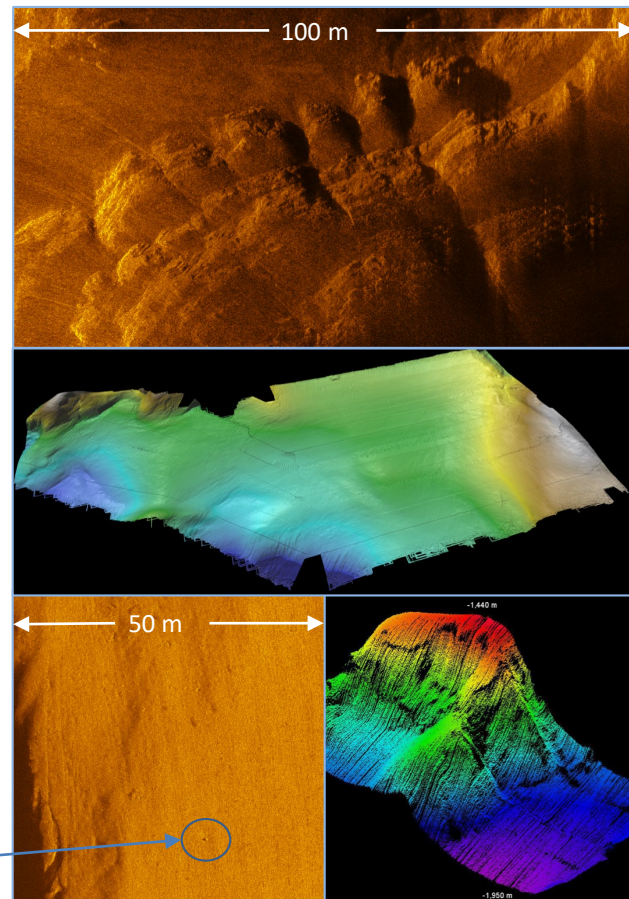
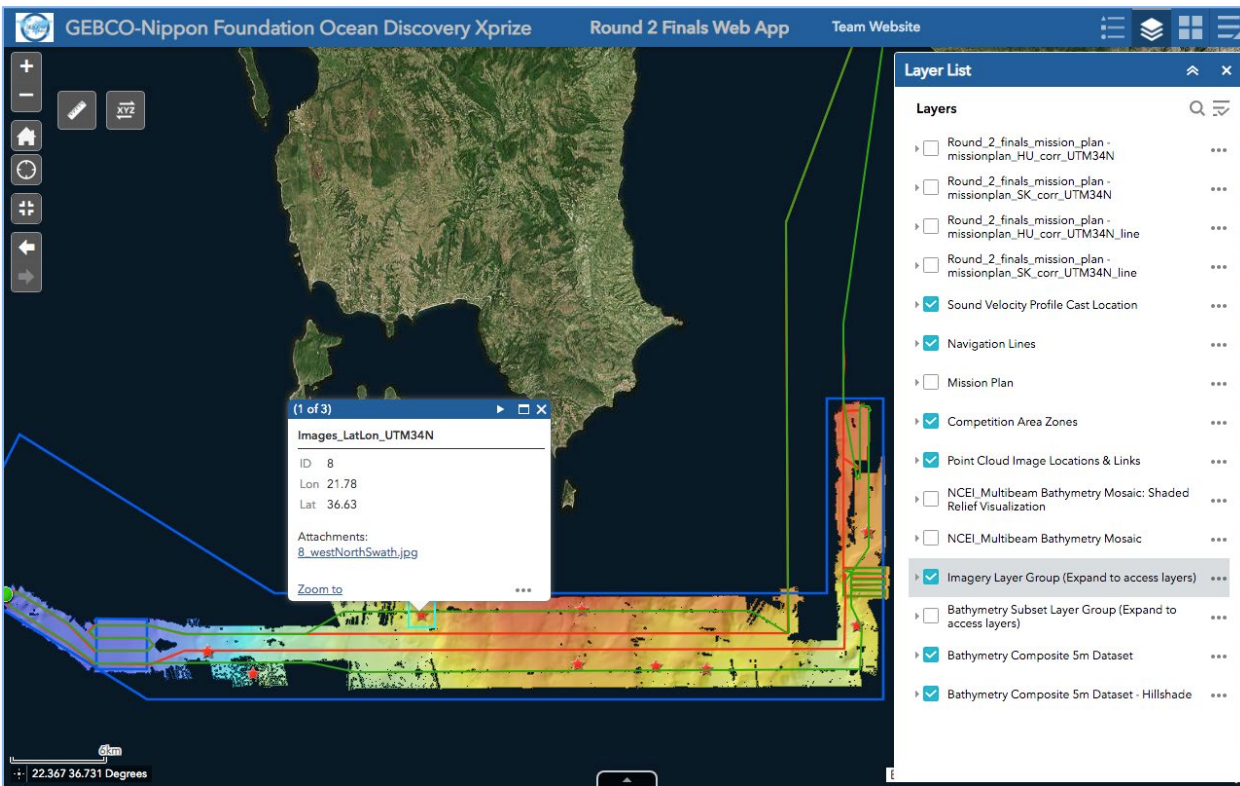


GEBCO NF Alumni Geospatial Architecture





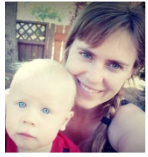
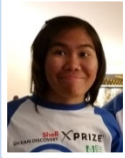
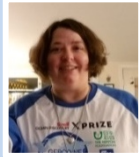
Shell OCEAN DISCOVERY XPRIZE[®]



Object - Size: 0.33 x 0.49 m; Height: 0.14 m



Shell OCEAN DISCOVERY XPRIZE[®]



Thank you