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12th North Indian Ocean Hydrographic Commission
Colombo, Sri Lanka

Capacity Building and Industry

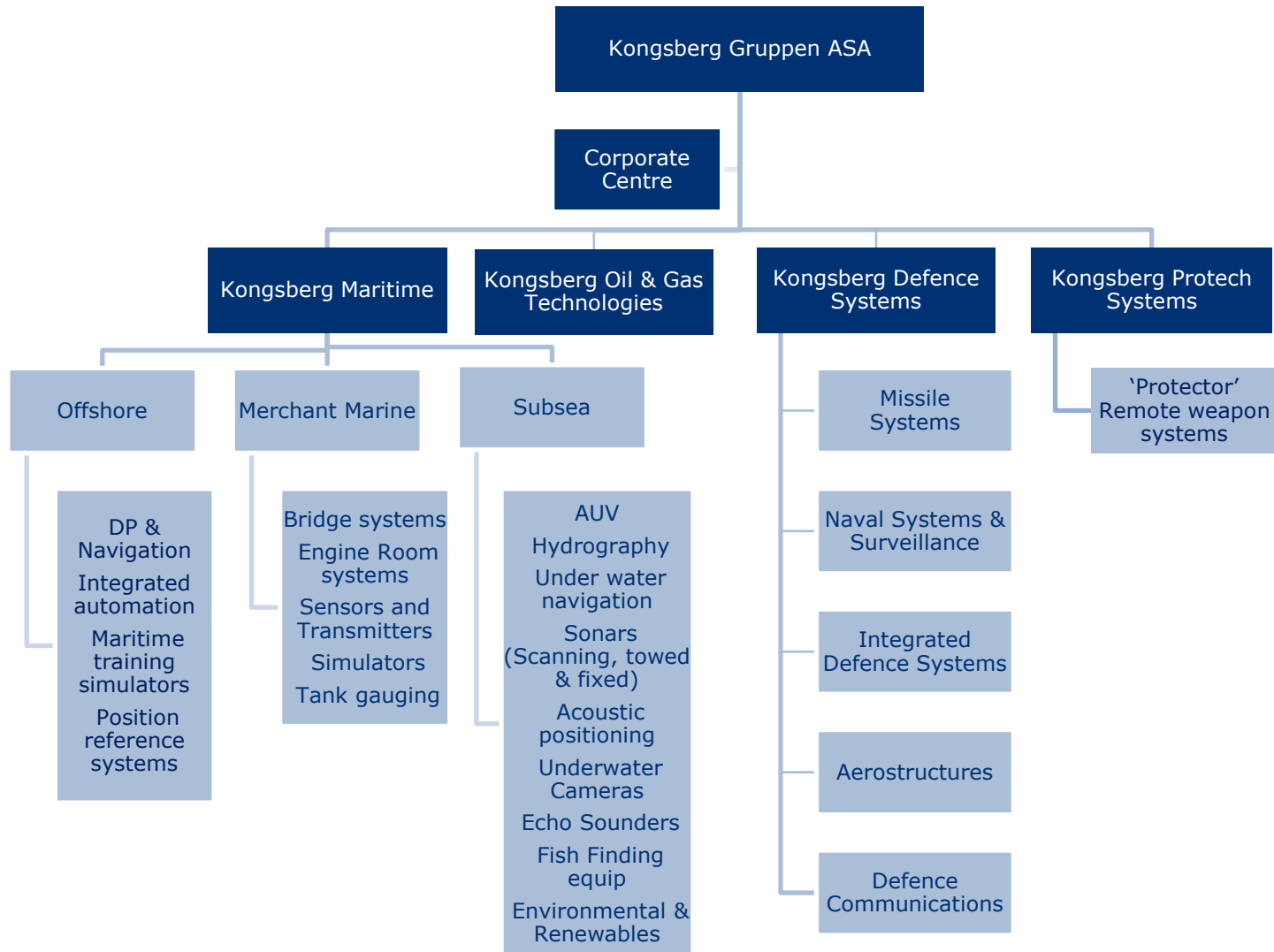
Commander Richard 'Bungy' Williams RN (Rtd)
Kongsberg Maritime



Organisation



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Operations in more than 25 countries



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1) Kongsberg, Horten, Asker, Oslo, Kjeller, Trondheim, Stjørdal, Tromsø, Stavanger, Kristiansand (Svalbard)

Kongsberg Maritime Regional Support Centres 24h



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- Technology Explosion
 - Early 70's – Sextant and crude SBES
 - Mid 70's – Line of sight electronic positioning
 - Late 70's – Sidescan sonar
 - Mid 80's – Satellite navigation possible
 - Late 80's – MBES technology emerging
 - Early 90's – Precise positioning & MBES accepted
 - Early 90's – AUV Technology evident
 - 90's onwards continual improvement in all systems
- 40 years of continual improvement
 - Escalation of technology
 - Escalation of costs
 - Training burden increase
- Customer demand driven for increasingly high end products



- IHO remain committed to assisting nations
- IHO 'end game' is to have well surveyed waters, capable of supporting ENC chart production for safe navigation
- Suitable equipment always been an issue
 - Mid 80's scheme (FIG- IHO TACC) of equipment transfer
 - Suffered with technology explosion
 - Generally unsupported equipment – prone to failure
 - Capacity Building Strategy introduced in 2003
 - Training provision
 - Well supported and attendees keen and interested
 - Often lacks equipment to support practical training
 - Skill fade inevitable
 - Equipment for surveying expensive (and now complex)
 - Many smaller nations cannot afford such as a permanent asset
 - However:
 - Right equipment at right time, with training, can add value to all involved
 - Product based output benefits the host nation



- An example of a good idea and taking advantage of an opportunity: Bridgetown, Barbados
- In 2010, Kongsberg Maritime, CARIS, Fugro and UKHO contributed to the IHO Capacity Building programme through the auspices of the Meso American & Caribbean Sea Hydrographic Commission (MACHC)
 - The opportunity was attended by 25 Regional states and International Organisations
 - Substantial commitment of resources by participants
- The purpose of the project was to demonstrate hydrographic surveying with modern equipment so that regional maritime authorities could understand the concept of necessary products and services to comply with the basic requirements for safety of navigation in the area.
- This was further developed in Antigua



- Resources delivered – a true team effort
- Kongsberg – Equipment and personnel
 - EM3002 system and full installation kit
 - Including all shipping and Engineer attendance
- CARIS – Data processing and personnel
 - CARIS HIPS/SIPS and BASE Editor processing software
 - Hydrographer for survey planning and data processing
- FUGRO – Training input and hydrographic advice
- Port of Bridgetown – Survey platform
 - Pilot vessel, crew and fuel
 - Survey requirements
- UKHO – Background data
 - Latest Raster Navigational Charts of Barbados coastal waters

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Technology to assist nations with their survey responsibility



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Kongsberg contribution:

- Provision of all hydrographic equipment
 - Installation and integration of EM3002
 - One week prior to Workshop
 - Integration of positioning system
 - Integration of attitude sensor
 - Calibration of equipment
 - Consideration of environmental constraints
 - At sea demonstrations for students
 - 2 to 3 students per session
 - Survey operations



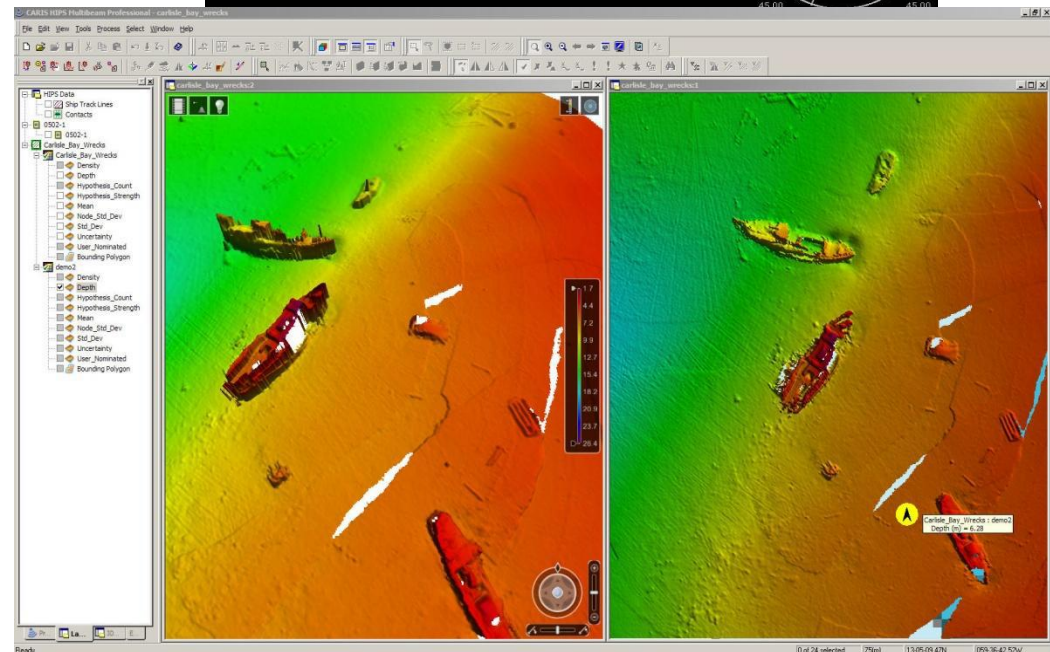
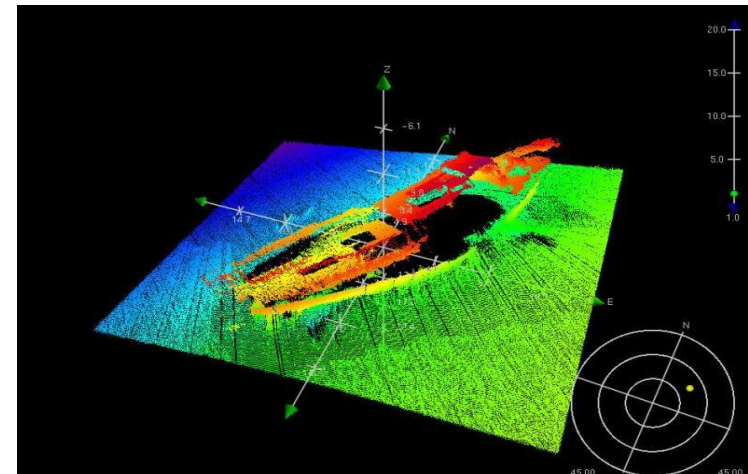
12th NIOHC Technology to assist nations with their survey responsibility



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CARIS Contribution

- Provision of survey planning and processing
 - Survey area & line planning
 - To meet immediate req't
 - High volume data processing using HIP/SIPS and BASE editor software
 - Motion corrections
 - Water level corrections
 - Survey operations
 - Processing tuition
 - Product delivery to Port Authority
 - At end of workshop
 - Raster and Vector products



12th NIOHC Technology to assist nations with their survey responsibility



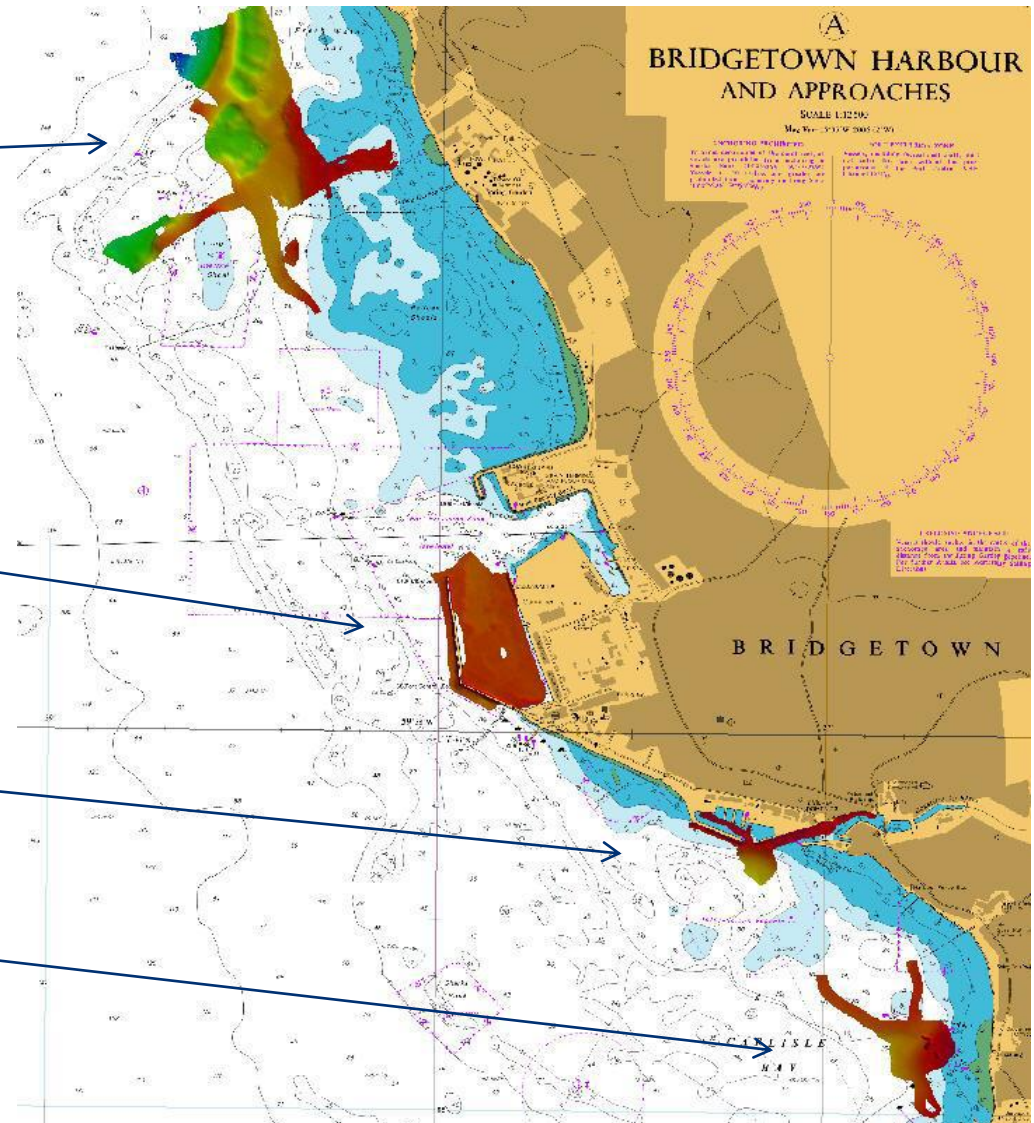
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Spring Garden

Harbour

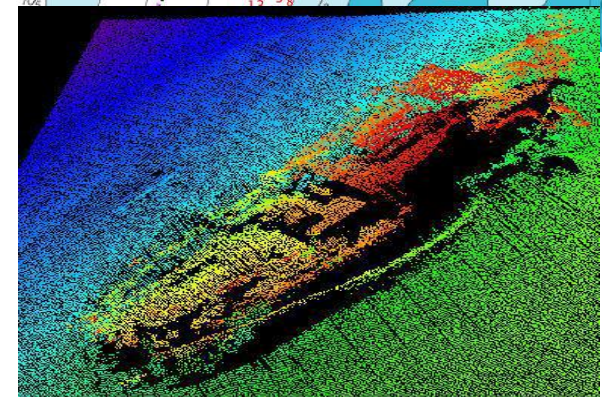
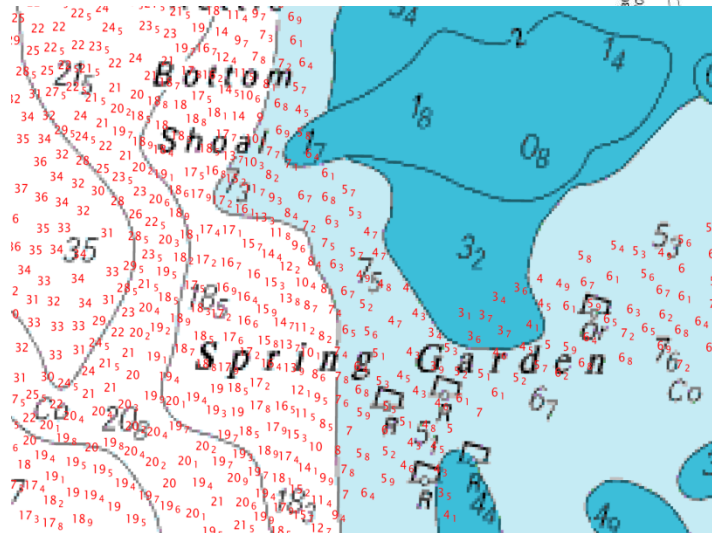
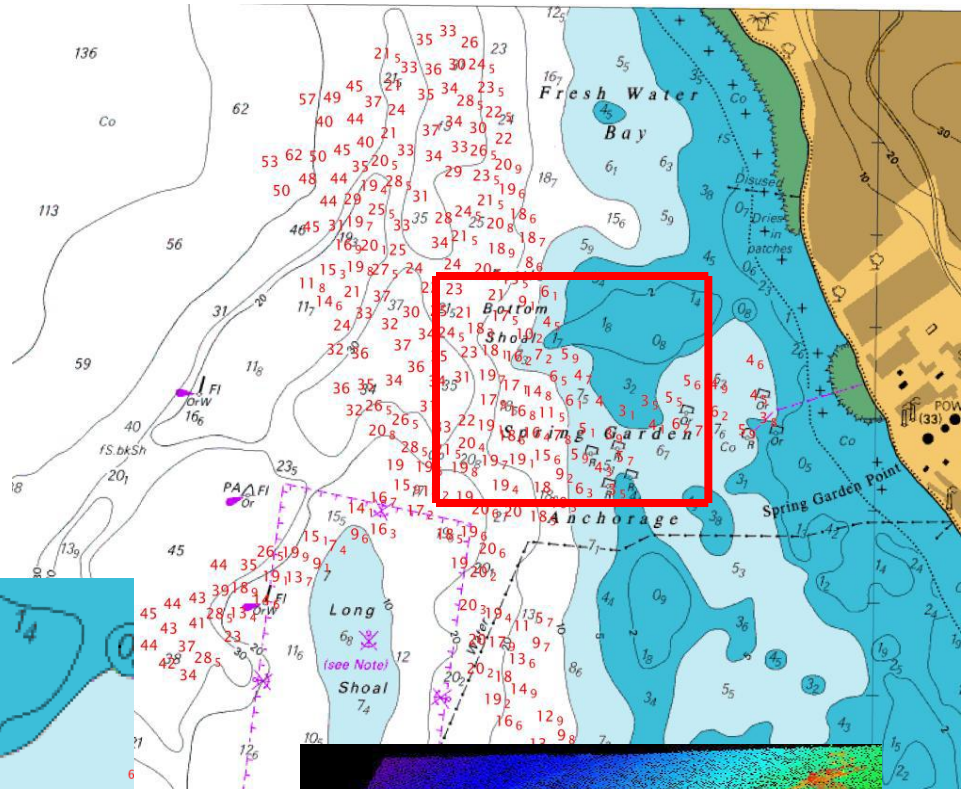
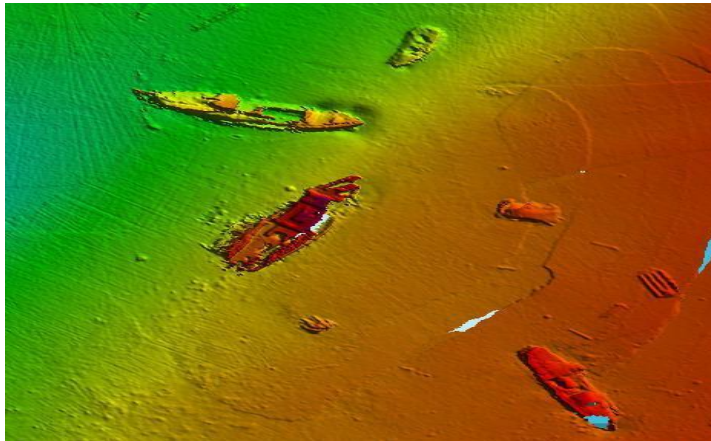
Careenage

Carlisle Bay





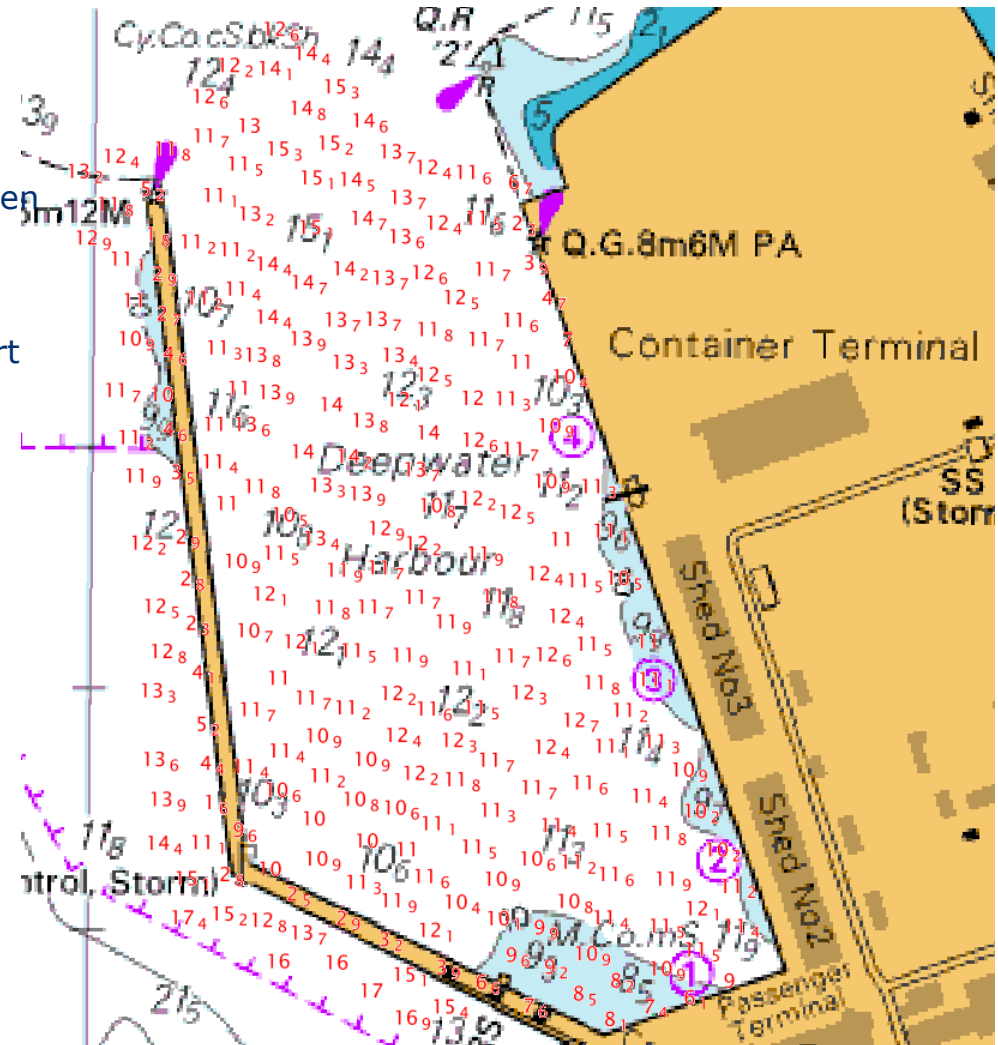
Deliverables



12th NIOHC Technology to assist nations with their survey responsibility

Recipe for success ??

- A good idea put into practice and proven
 - Repeated the following year off Antigua
- Requires financial and resource support
- Requires Host commitment
- Requires attendance support
- Requires Organisational support
- Requires Industry support
- training content is substantial
- Output is of direct benefit
- Output aligns with IHO Objectives





- In conclusion
 - Internationally driven Capacity Building is the future
 - Modern technology is expensive and complex but is able to deliver a viable output in a timely manner
 - Commitment and resource can provide real benefits
 - Product delivery
 - Enhanced training provision
 - Ad hoc initiatives not viable in the longer term but have proven a concept
 - Kongsberg will, where possible, continue to support CB initiatives
- I offer these thoughts
 - Can Capacity Building strategy be continued to be developed and be taken another step forward with portable, supported modern equipment and key personnel either at Inter-regional, Regional or Sub-regional level ?
 - The benefits could easily outweigh the costs
 - IHO objectives would be taken forward with tangible results.

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Technology to assist nations with their survey responsibility



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Kongsberg Maritime – The Full Picture

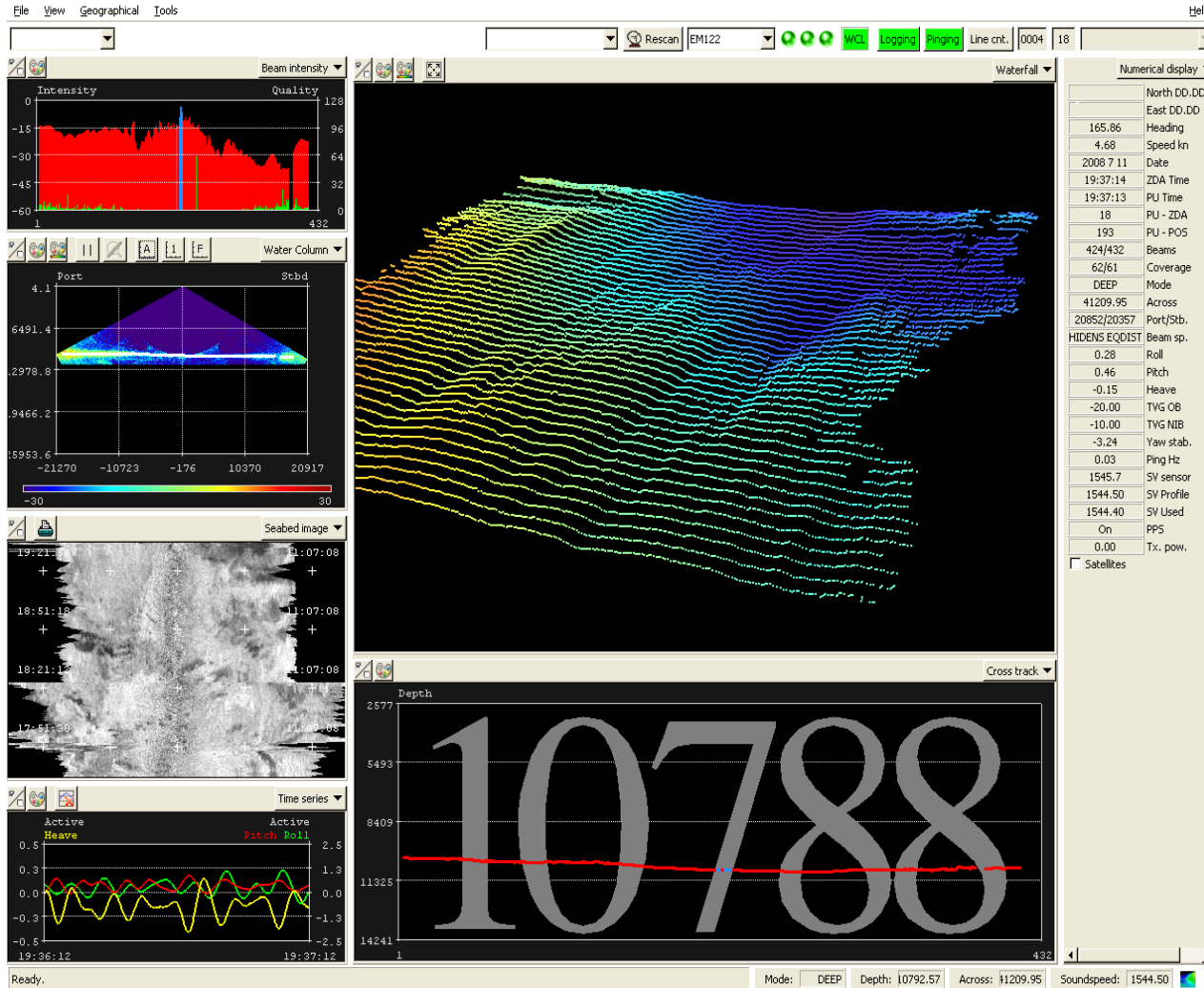
EM122 – Full Ocean depth MBES

EM302 – Deep Water MBES

EM710 – Medium depth MBES

EM2040 – Shallow Water MBES

A range of SBES and SSS



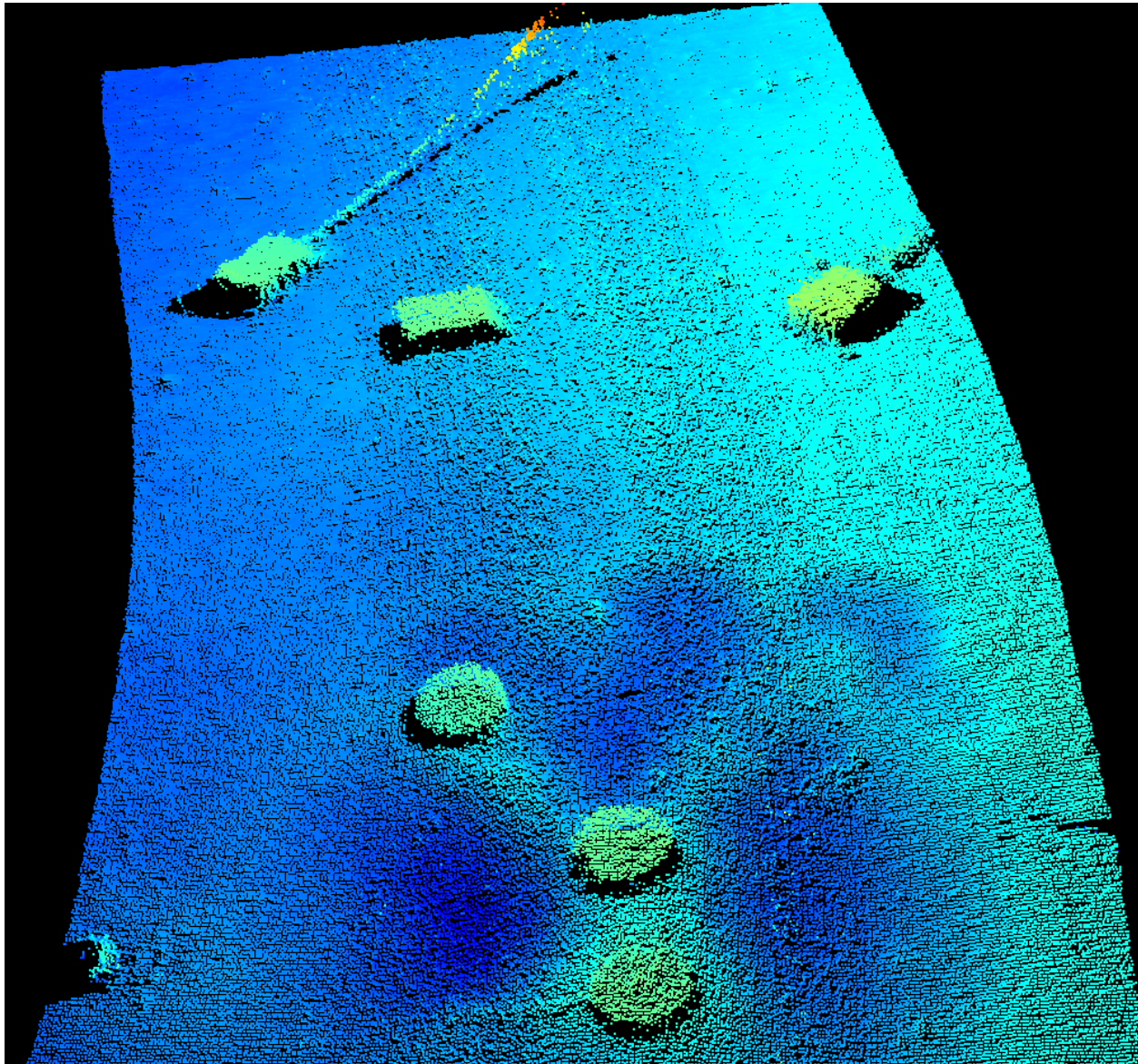
Courtesy of NAVO

41209 meter
across
62/61° coverage

Marina moorings (1m diameter), allpoints



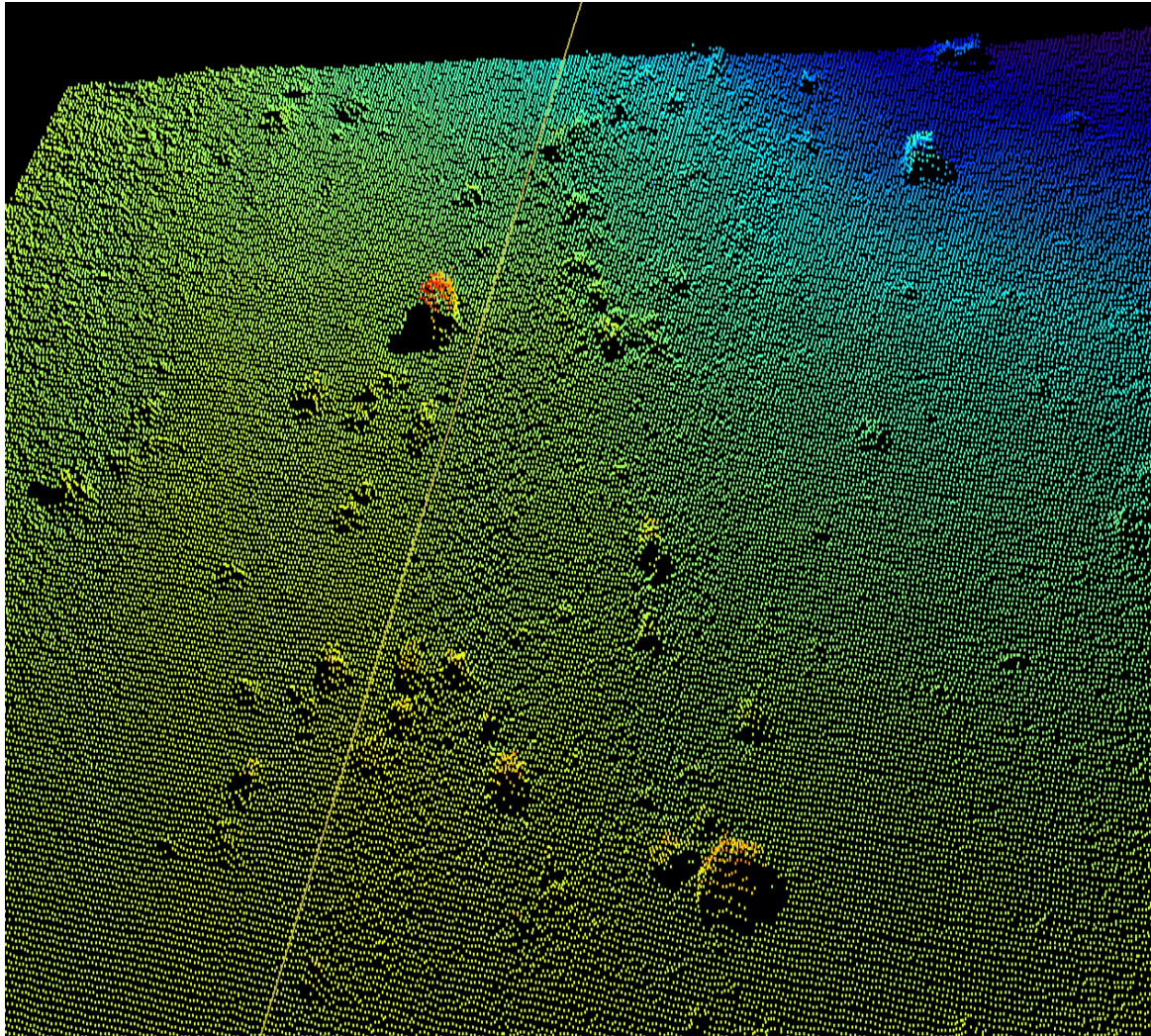
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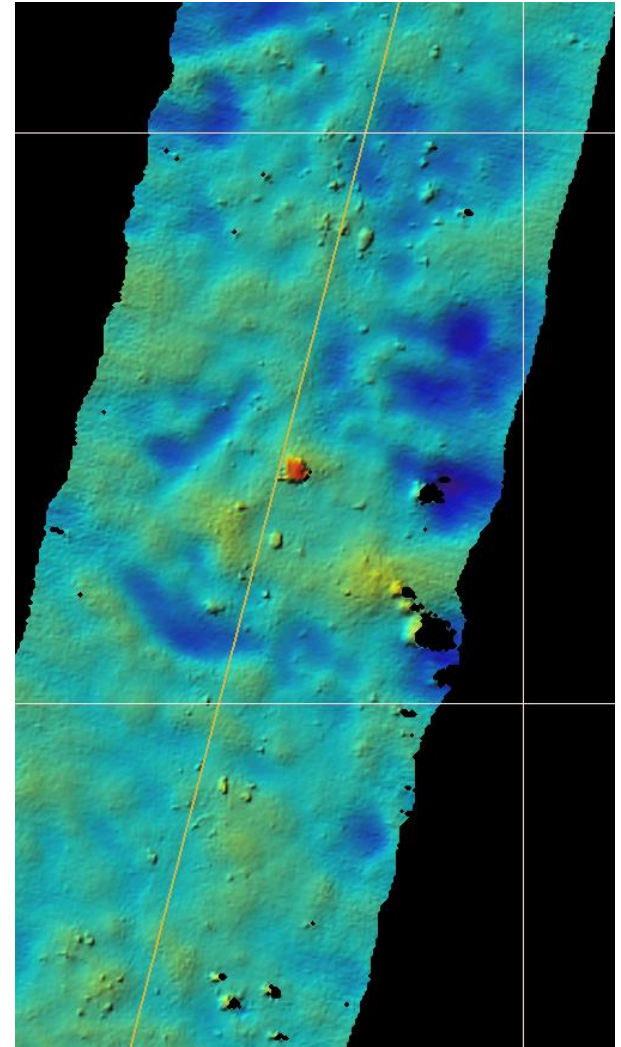
Small rocks down to 20 cm size at 8 m. depth



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Allpoints



Gridded



25 cm pipeline

8 m depth

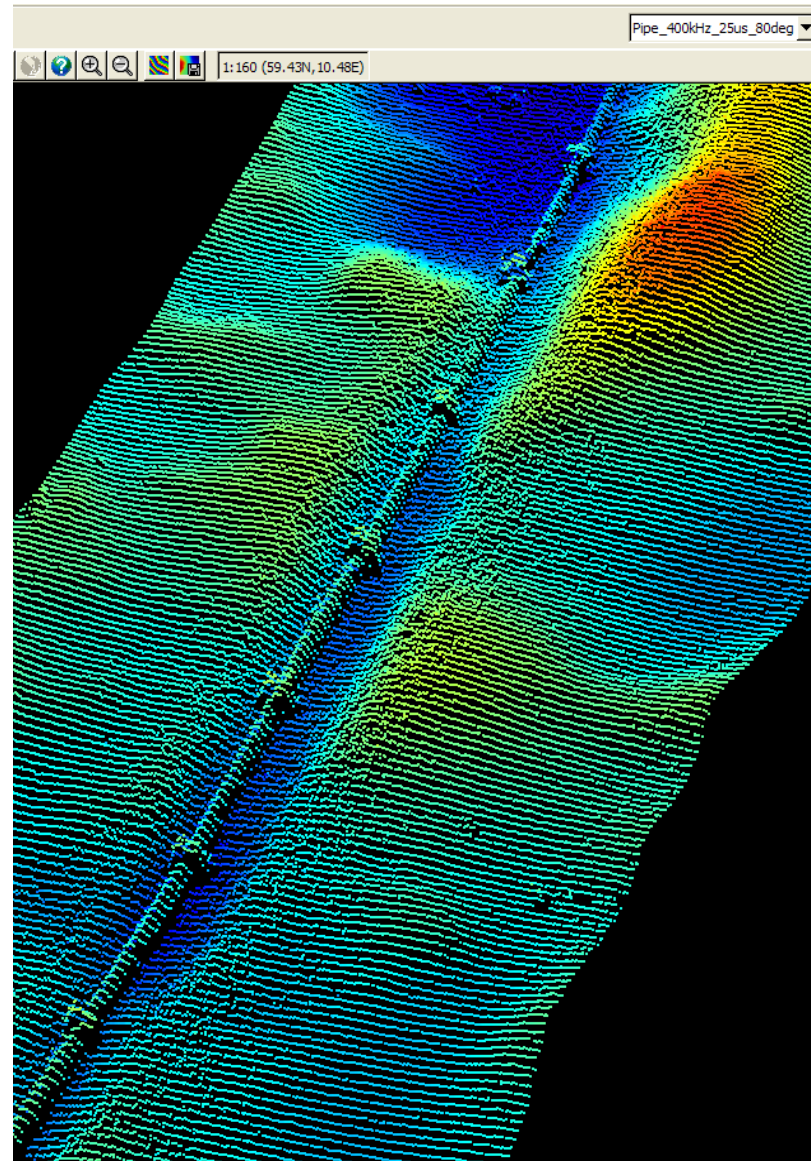
25 cm pipeline

Raw depth points
(Allpoints)

400 kHz, single sector

25 us pulselength (40 kHz
BW)

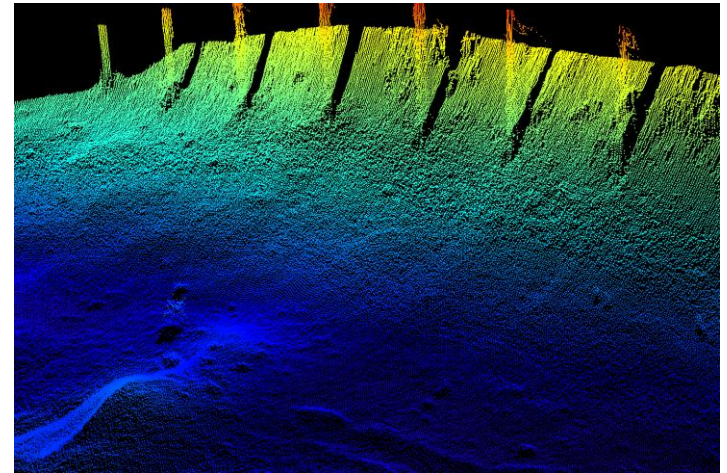
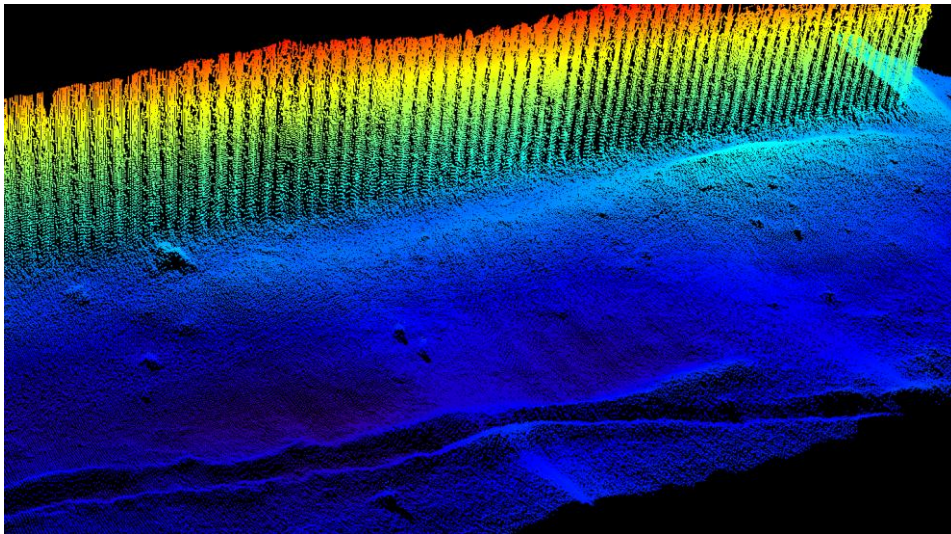
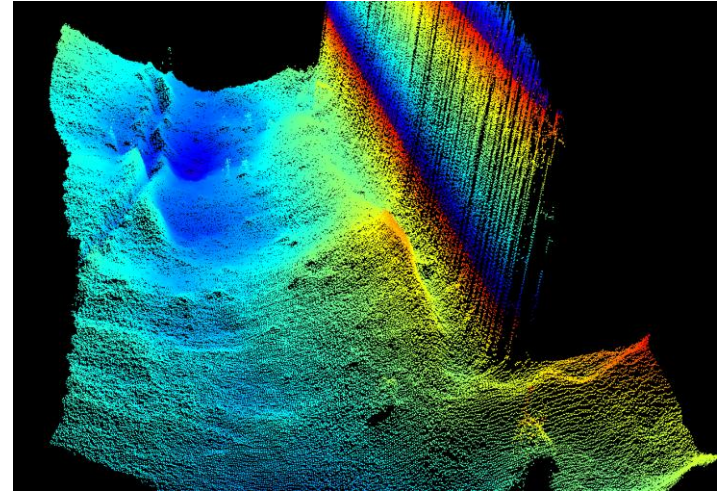
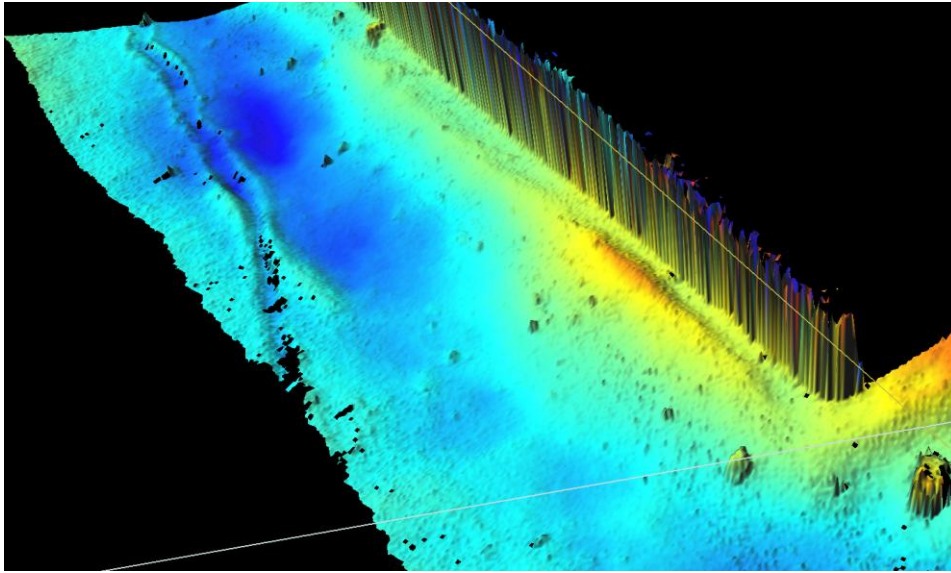
80 deg sector



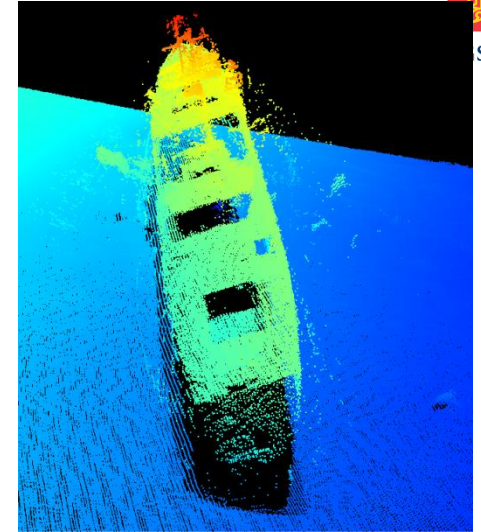
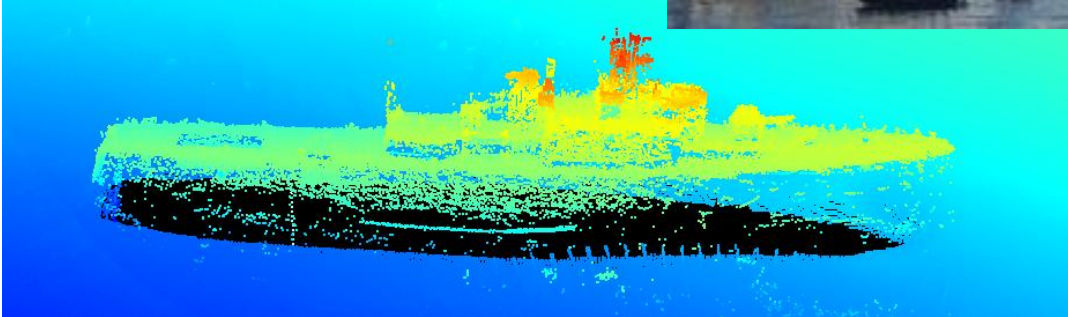
Pier, grid and allpoints



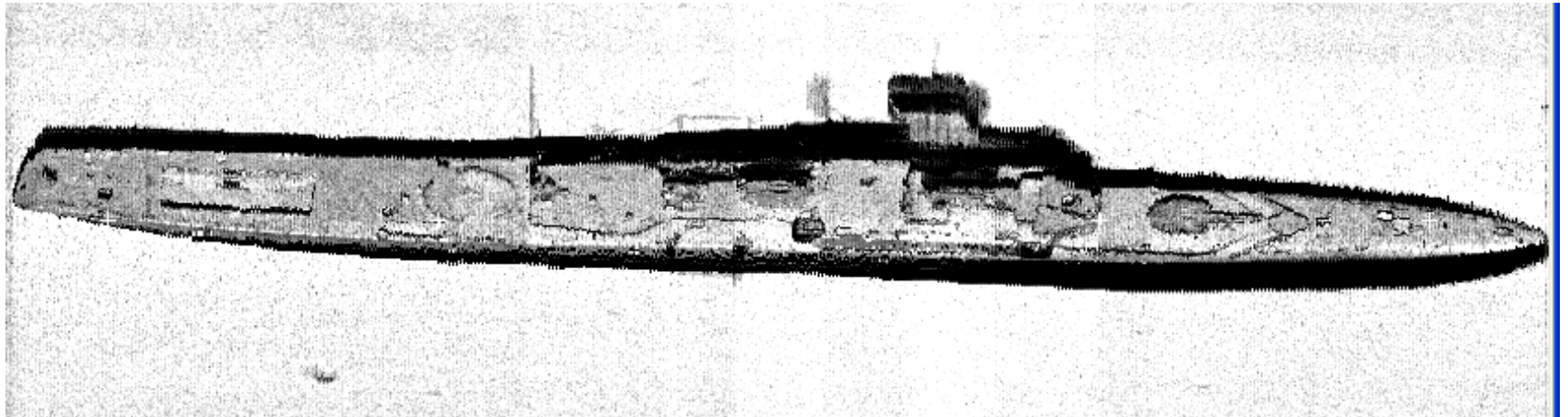
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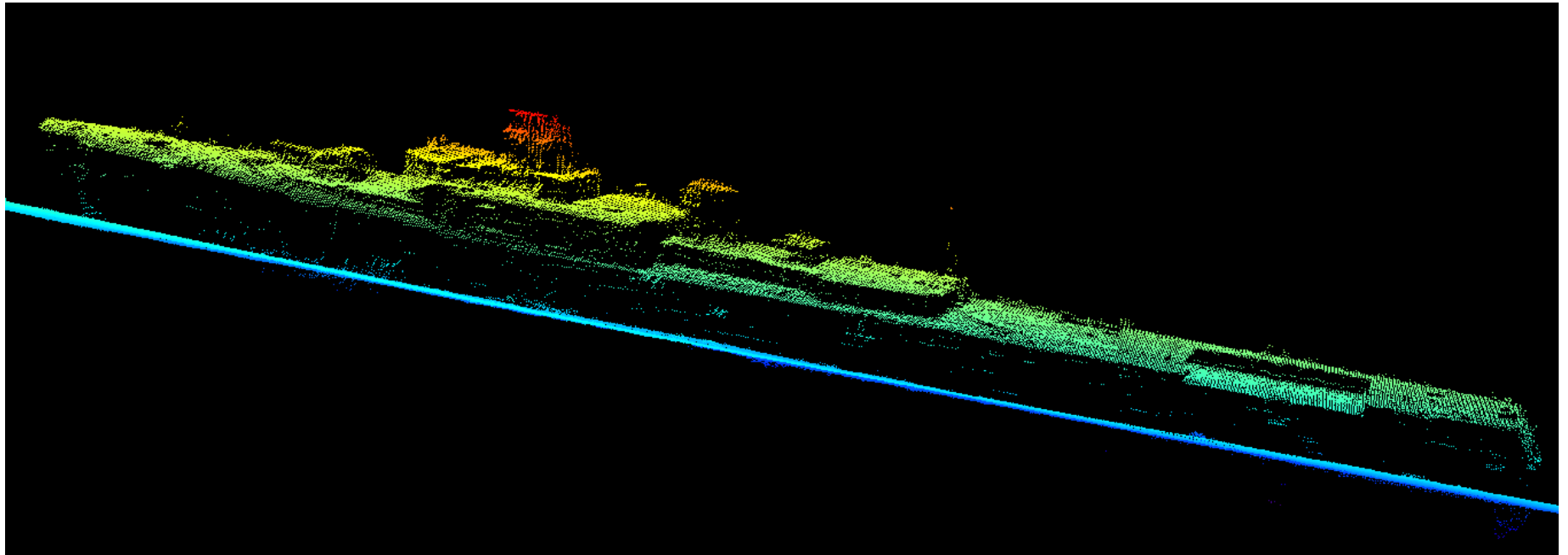


HMCS MacKenzie



SBERG





File View Tools

Default

None Rescan

Not Logging Not Pinging Line.cnt. 0

Geographical Numerical display

1:351 (48.72N, -123.36E)

11.95 29.45

Ready.

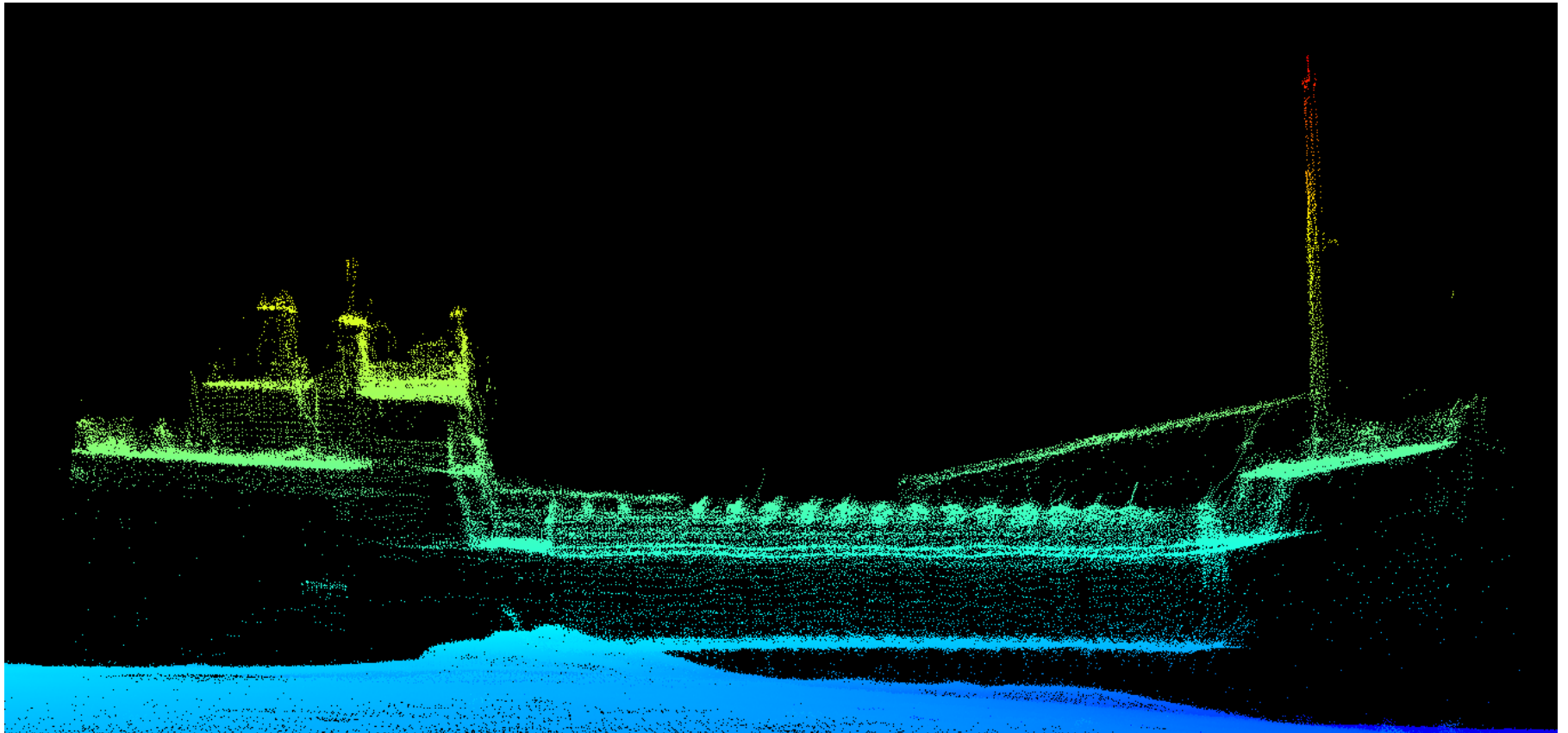
Seabed image

Satellites

N 0.00000	North DD.DD
E 0.00000	East DD.DD
0.00	Heading
0.00	Pitch
0.00	Roll
0.00	Heave
0.00	Speed kn
0 0 0	ZDA Date
00:00:00	ZDA Time
00:00:00	PU Time
0	PU - ZDA
0	PU - POS
0.00	Depth
---	Mode
---	Beam sp.
0/0	Beams
0/0	Coverage
0/0	Port/Stb.
0.00	SV Profile
0.00	SV Used
-9999.0	SV sensor
0.00	Ping Hz
0.00	HDOP
0	Qfactor
---	PPS
0.00	Height
0	No. sat.
0.00	TX pow.
0	PU load
0.00	Tide
0.00	Geo. und.
0.00	Geo. vref.
OFF	RTCM Log.
---	Dual swath
-99999.0	Temp. probe C



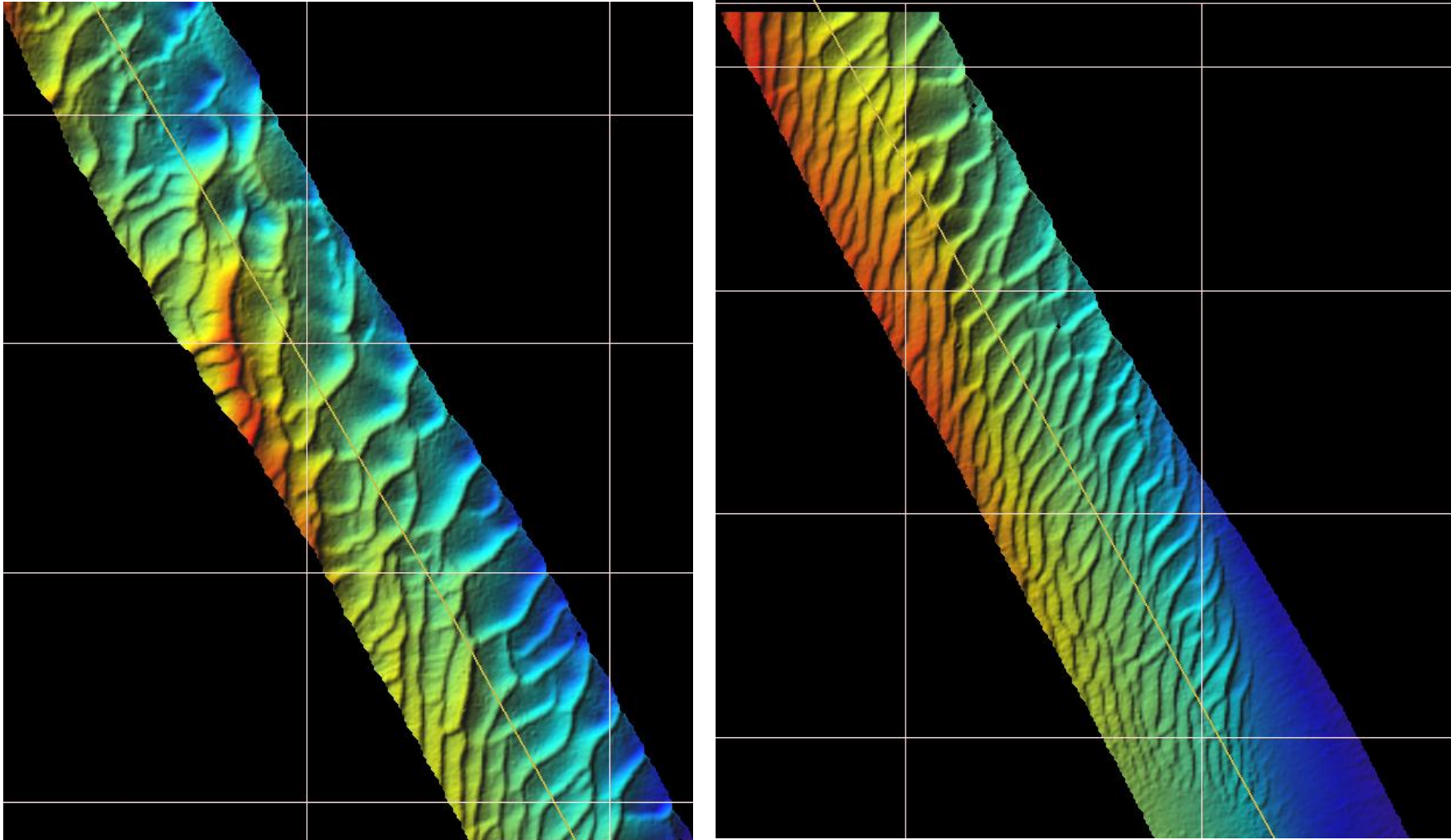
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Grid display, sand waves at 30-40 m depth



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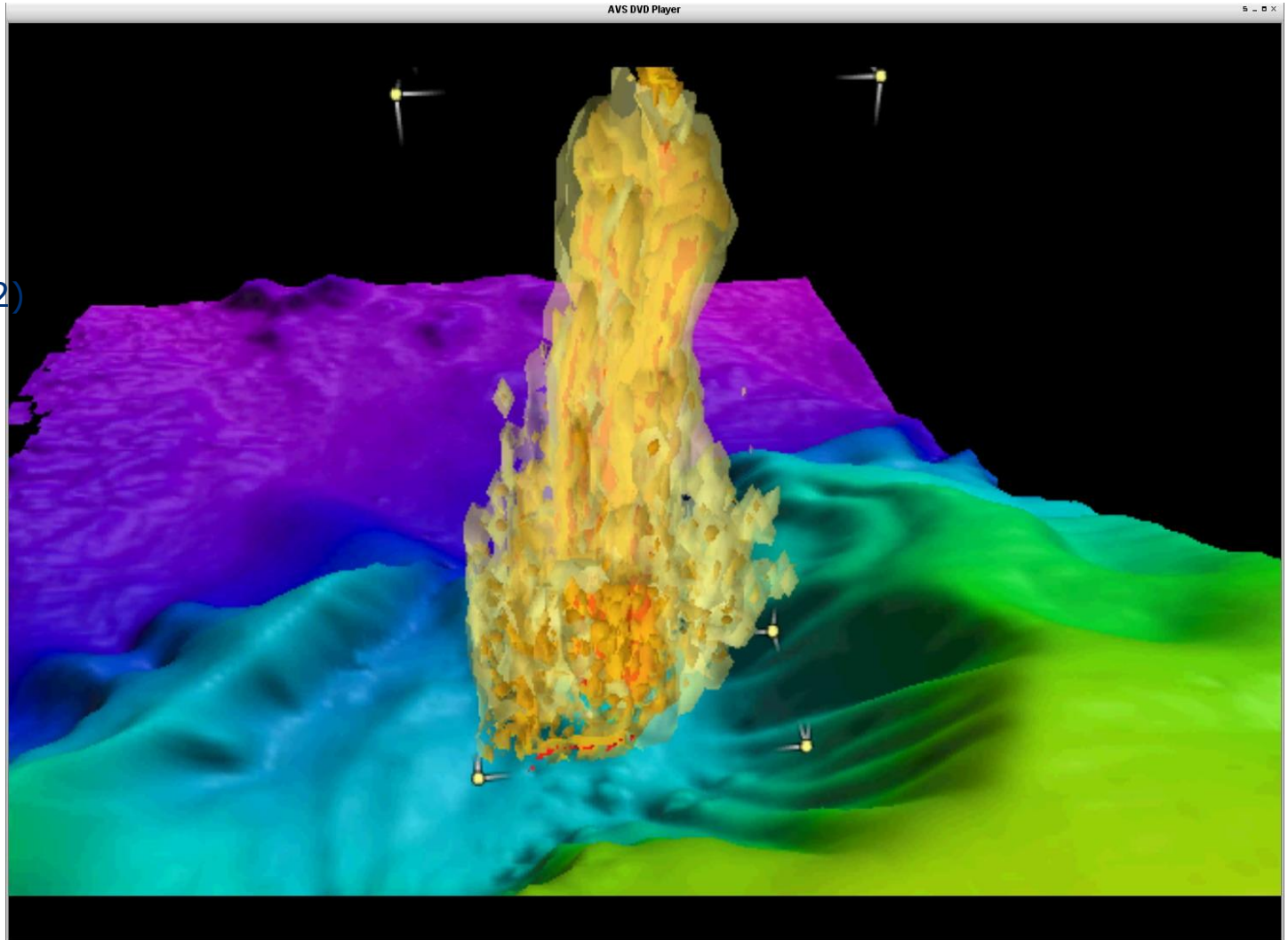


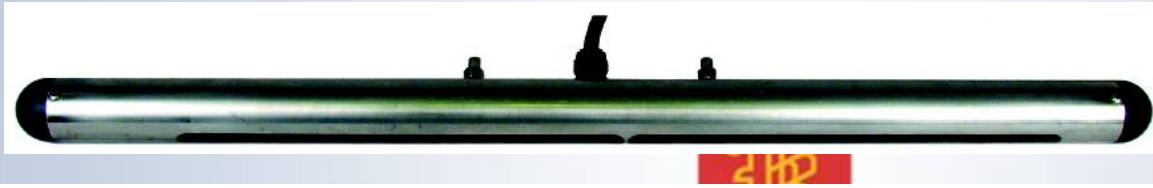


Bubbles
from Subsea
Chimney (EM302)
Detected using
Water column

Similar for EM122

Courtesy of
NOAA Using
Okeanos
Explorer

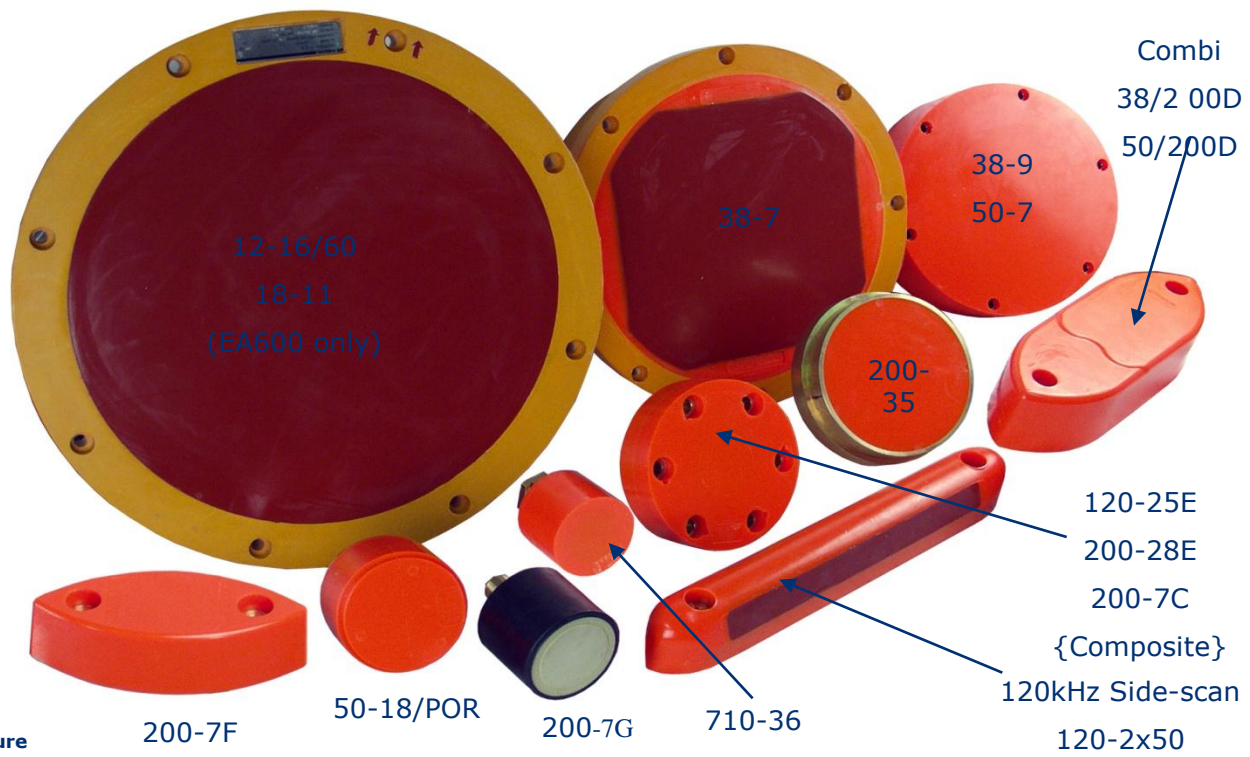




Transducers are available at frequencies ranging from 12 to 710 kHz where the lowest frequency for EA400/400SP is 33kHz.

(12, (15), 18, (24), (33), 38, 50, 120, 200, (210) & 710)

EA400/600 TRANSDUCERS



Maximising performance by providing The Full Picture



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Thank you

