MH370 SEARCH –
Managing & Delivering
Large Seabed Data

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The MH370 Disaster

- Search led by Tripartite Committee (Malaysia, Australia, China)
- GA assisting Australian Transport Safety Bureau
# Geoscience Australia’s Role in the search

## Supporting search managers - Australian Transport Safety Bureau (ATSB)

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Phase 1</th>
<th>Phase 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ship-mounted acquisition of multibeam bathymetry (Fugro and Chinese)</td>
<td>Underwater search (Fugro, Go Phoenix and Chinese)</td>
</tr>
<tr>
<td>Contractual support</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Technical specifications – acquisition and data</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>parameters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data QA/QC</td>
<td>X</td>
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<tr>
<td>Multibeam and backscatter data processing</td>
<td>X</td>
<td></td>
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<tr>
<td>Interpretation to identify features of interest</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Data management and archival</td>
<td>X</td>
<td></td>
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<tr>
<td>Technical GIS support – Survey planning</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Mapping, data visualisation, media responses</td>
<td>X</td>
<td>X</td>
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</tbody>
</table>
Product delivery during the search - Data Interpretation

- **NAVIGATION FEATURES**
  - For planning of underwater vehicle surveys

- **RESPONSE UNCERTAINTY FEATURES**
  - Seabed with relatively complex / highly reflective acoustic characteristics that could hinder the detection of plane wreckage and may warrant attention in the subsea survey

- **POTENTIAL TARGETS (for closer examination)**
  - Potential targets based on data anomalies
  - Small features (<250 m in length)
  - Difficult to explain based on the geomorphology
Final Data extent

### Seabed mapping phases

<table>
<thead>
<tr>
<th>Phase</th>
<th>Coverage (km²)</th>
</tr>
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<tbody>
<tr>
<td>Phase 1 – Shipboard (Fugro, China)</td>
<td>278,000</td>
</tr>
<tr>
<td>Phase 2 – Deep-tow, AUV (Fugro, GoPhoenix)</td>
<td>120,000</td>
</tr>
<tr>
<td>Phase 3 – AUV (Ocean Infinity)</td>
<td>112,000</td>
</tr>
<tr>
<td>Transits – Shipboard (Fugro)</td>
<td>430,000</td>
</tr>
</tbody>
</table>
Vertical accuracy

<table>
<thead>
<tr>
<th>Difference map (MBES minus SRTM)</th>
<th>~16%</th>
<th>~20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>-193.3 -500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-49.9 -100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.9 -100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100.1 - 500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500.1 - 1210</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MH370 SEARCH – Managing and Delivering Large Seabed Data
Dealing with big marine data

MH370 seabed product delivery post search – key challenges

- Data volume (~300 TB of raw data to make openly available)
- Diverse array of information (different sensors, file formats, standards)
- Deliver in consistent way
- Develop & coordinate multiple modes of accessing data (web services, database, NCI, Storymap)
- Tailor to a wide range of end-users:
  - A view for the general public AND well-cured data for expert scientific consumption
  - Information products for media
Dealing with big marine data - approach
The back end to deliver curated data for expert scientific consumption

• Stored files on NCI – Super computer with Pb of storage (raster based file system)
• Index every files using POSTGris open source database
• Use geographic footprint to enable quick search (http end points- Thredds served)

MH370 search – Managing and Delivering Large Seabed Data
Enhancing national capability

Australian seabed data management & delivery challenges

- Many end users & uses:
  - Charting
  - Baseline data for coastal & marine planning & management
  - Scientific analyses (including Antarctic science)
  - Operational oceanography
  - Australia’s marine territorial claims

- Data Replication

- Huge data gaps
  - >75% EEZ unmapped at sufficient resolution
Enhancing national capability

**Australian Hydrographic Office (AHO):** mandated to hold all seabed mapping data for the production and distribution of charts

**Geoscience Australia:** unofficial custodian of various seabed data types (receiving/acquiring/collating data) to support non-chart related data uses

**CSIRO:** Collector of large amount of seabed data (*RV Investigator, others*)

**Results:** not one place to access data suited for purpose
To develop initiatives and products to improve the quality, discoverability and accessibility of seabed mapping data for the Australian community.

BECOME A PART OF THE NATION’S SEABED MAPPING FUTURE
Open Data – National Data Hub

Data Customer

International stakeholders (e.g. Seabed 2030)

Data supplier to central repository

National Hub Ledger managed by GA

Local Hub Hydrographic Office Data Custodian

Local Hub Geoscience Australia Data Custodian

Local Hub Other Governments Data Custodian

QC & package

Use

International stakeholders (e.g. Seabed 2030)
Conclusions

MH370 data management project has:

- Enhanced bathy data discovery & delivery
- Shown the way forward with big marine data management
- Informed GA approach to other marine geoscience data management
Next steps in enhancing bathy data delivery – point clouds