



UK Hydrographic
Office

ADMIRALTY

UKHO / UK MWDC

Exploitation of data collected by Maritime Autonomous Systems (MAS)

Robin Ponting – UK Mine Warfare Data Centre Subject Matter Expert

Lee Contreras – Defence Products & Services Manager



Main topics

- Delivering today for existing MCMVs and developing ASVs and AUVs
- Understanding the requirements for future systems and developing appropriate databases
- Developing new S100/500 standards to fully enable seamless data sharing



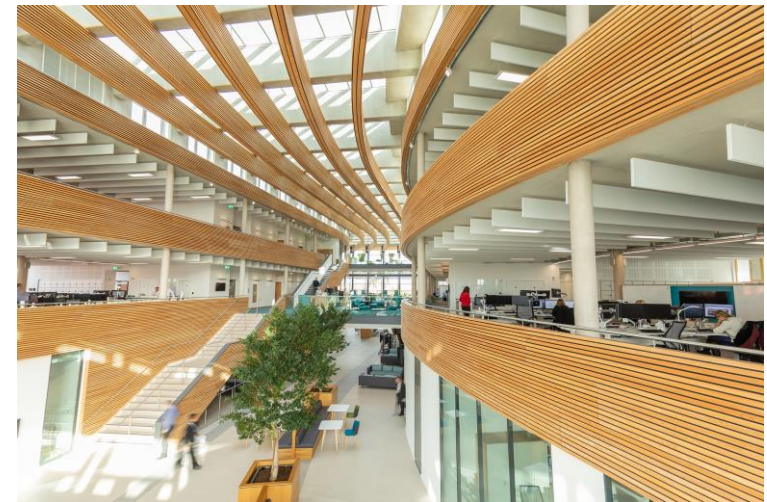
**Robin Ponting –
UK MWDC Subject Matter Expert**

- UKHO and general role supporting SOLAS and Defence
- MCMVs and current standards & products used
- Opportunities and challenges afforded by new MAS technology



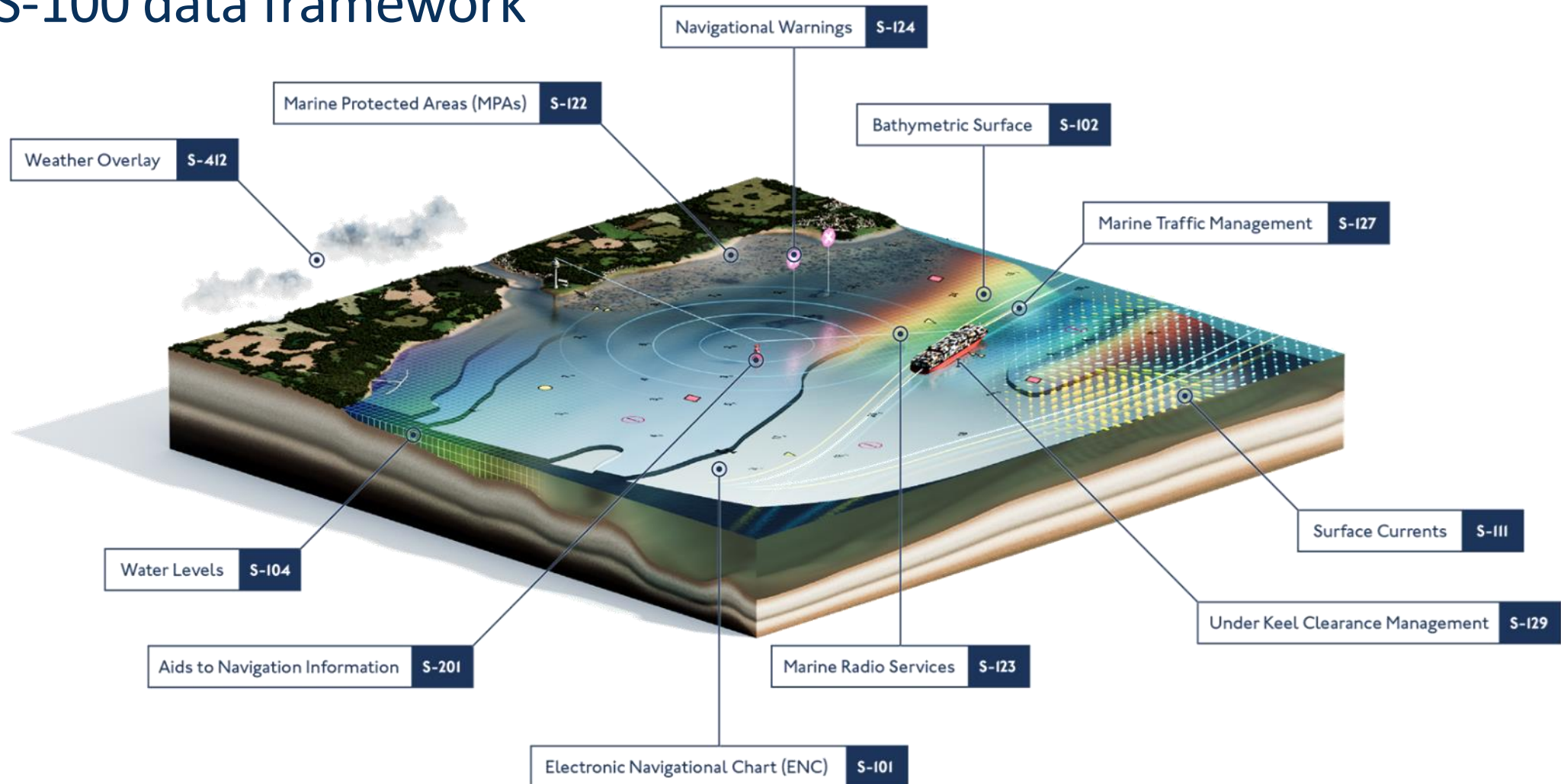
UK Hydrographic Office – Specialist Maritime Geospatial Centre

- › We operate as an Executive Agency of the MOD with trading fund status, and self-funded from the sales of our Admiralty products and services
- › Our Purpose – Supporting safe, secure and thriving oceans
- › Our Vision - Be a global centre of hydrographic understanding
- › Supporting Safe Navigation – the heart of what we do
- › Global marine geospatial information – seabed to the coast, to offshore and beyond. Collated, processed and published to serve a wide range of users
- › Support to UK Government - Delivering HMG's Safety of Life at Sea (SOLAS) obligations – Providing specialist hydrographic data and advice
- › Supporting Defence with specialist expertise – All UK Defence vessels, from ships to submarines, rely on our navigational and operational products and services.





Supporting the next generation of navigation - IHO S-100 data framework





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Discussion points and questions from CNE 2023



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Given the rise in Maritime Autonomous Systems over single role Mine Counter Measure Vessels, and the will to remove the person from the minefield, which methodology, or mix of systems, is best suited for the task?



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What do we do with the data?



RN MCMVs

› Hunt Class

›Hull Mount Sonar

› Sandown Class

›Variable Depth Sonar

› Means of Identification

›Mine Disposal System

›Command Diving Element





Contact comparison from multiple sources

- › MCMVs
- › MHU
- › UUVs/AUVs
- › USVs/ASVs
- › HELO
- › Survey Ships





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- › **MHC/MMCM**
- › **Future Platforms**
- › **Future Sensors**
- › **Future Taskings**

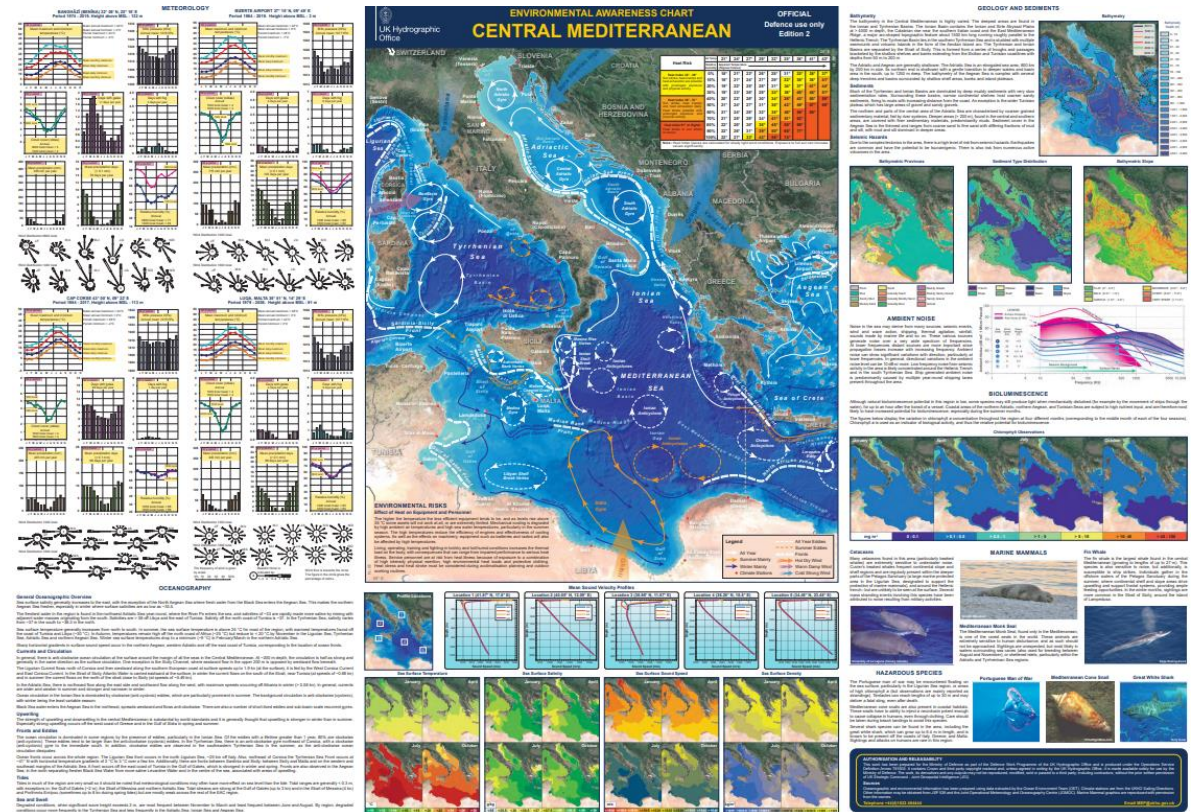




Collect once – use many times

Miniaturisation of survey ship sensors

- › Oceanographic data gathering opportunities
- › Routine data collection
- › ADCP – currents
- › Temperature / Salinity / Depth
- › Bioluminescence
- › Ambient noise





The need for assured GEOINT and a Spatial Data Management Plan

MAS Advantages:

- › Mine Warfare, survey, and oceanographic data collect.
- › Full sea floor coverage – far more detail.

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MAS Challenges:

- › Understanding tactical advantage required
- › Transfer of huge datasets between platforms, forward operating locations and MWDCs
- › Analysis of data – requirement for some type of machine learning to enable operators
- › Fully exploiting collected data for other users – databasing, providing supporting products/services
- › Seamless updating of databases



The need for assured GEOINT and a Spatial Data Management Plan

Geospatial Intelligence (GEOINT) which includes provision and exploitation of assured Geospatial Information as well as Imagery Intelligence (IMINT) and geospatial analysis, is vitally important for Defence. Everything happens somewhere and location presented on a map, chart, image or digitally, provides essential context for understanding. Rapid and seamless discovery, access, exploitation, and dissemination of assured GEOINT is required to inform timely decision-making to optimise military effect, as well as being fundamental to safe navigation and legal targeting. Standardisation is essential; bespoke or legacy geospatial standards and outputs are not viable, affordable or sustainable.

Foreword to Defence GEOINT Policy, by Chief of Defence Intelligence (CDI).

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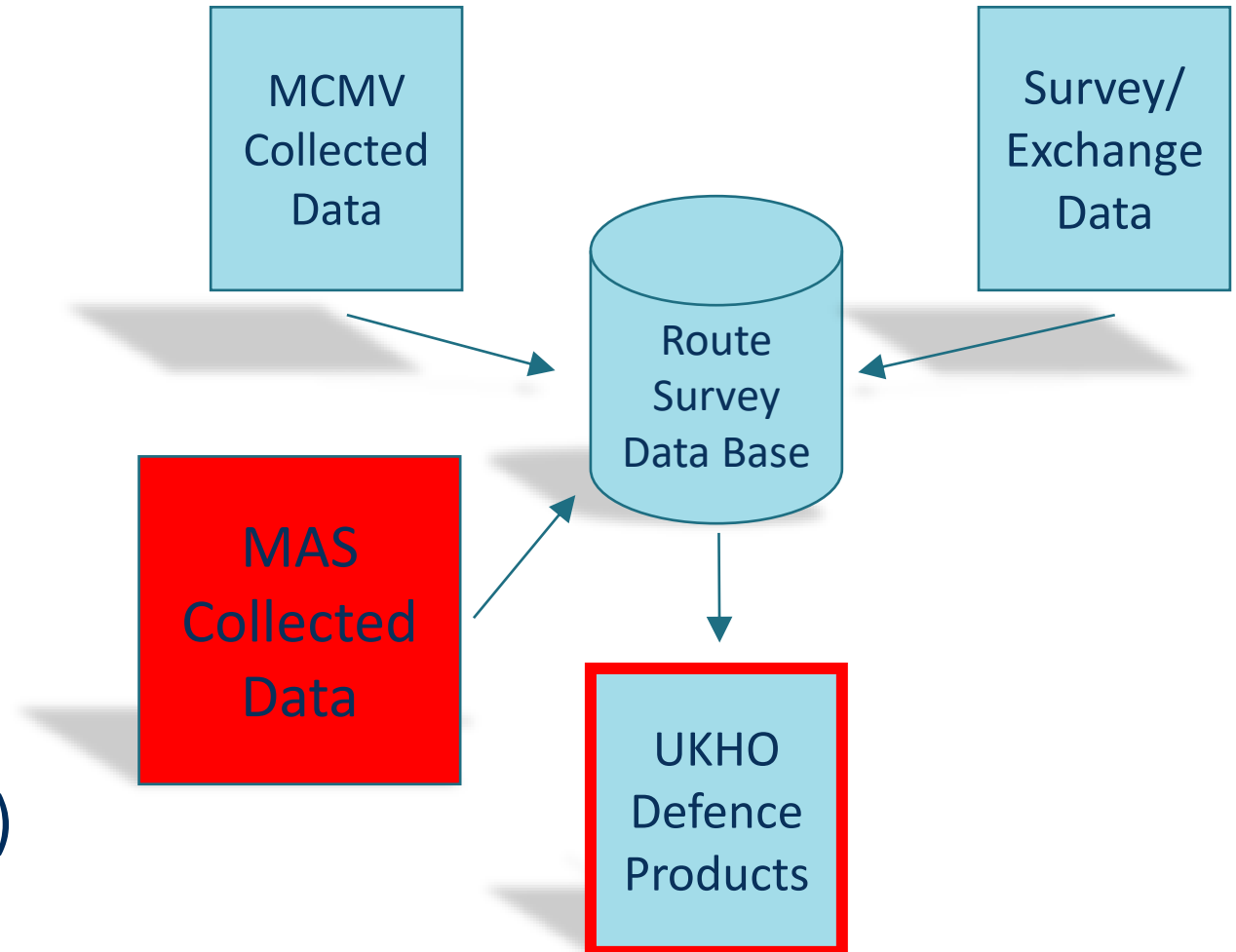
**Lee Contreras –
Defence Products & Services Manager**

- Databasing existing and new platform data
- Future data standards to allow full exploitation and sharing
- Spatial Data Management considerations
- Demonstration of exercise data shown in Caris

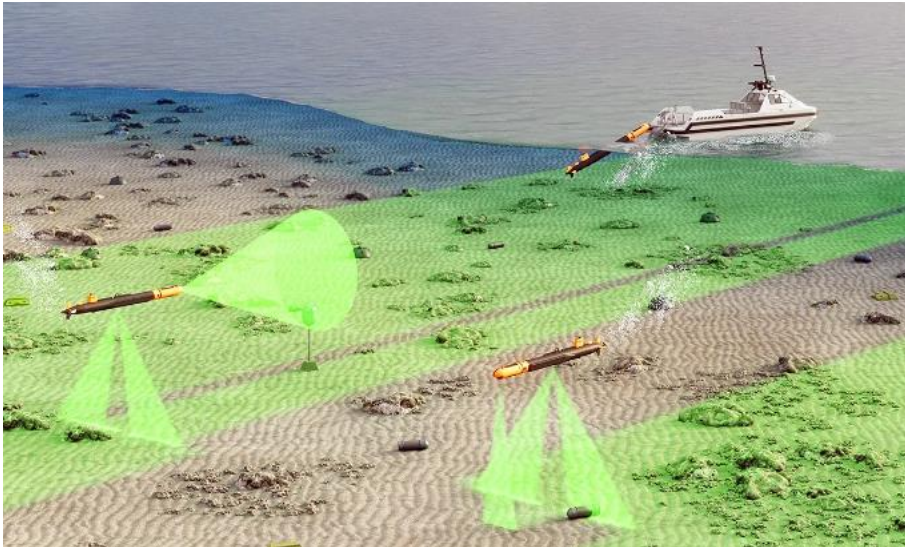
MCMV's and MAS

Route Survey Data Base

- Developed in the 90's
- Ported into ORACLE/CARIS HPD
- Support to MCMV's > 2035
- UKHO Defence Products Generated
- MCMV = 135mb Annually (17)
- MAS = 206gb (18)



MAS Data Collection



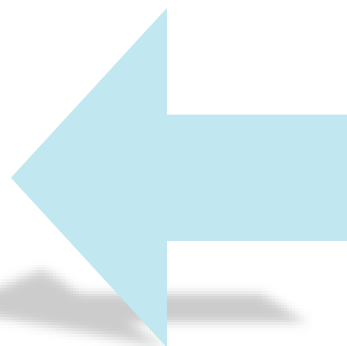
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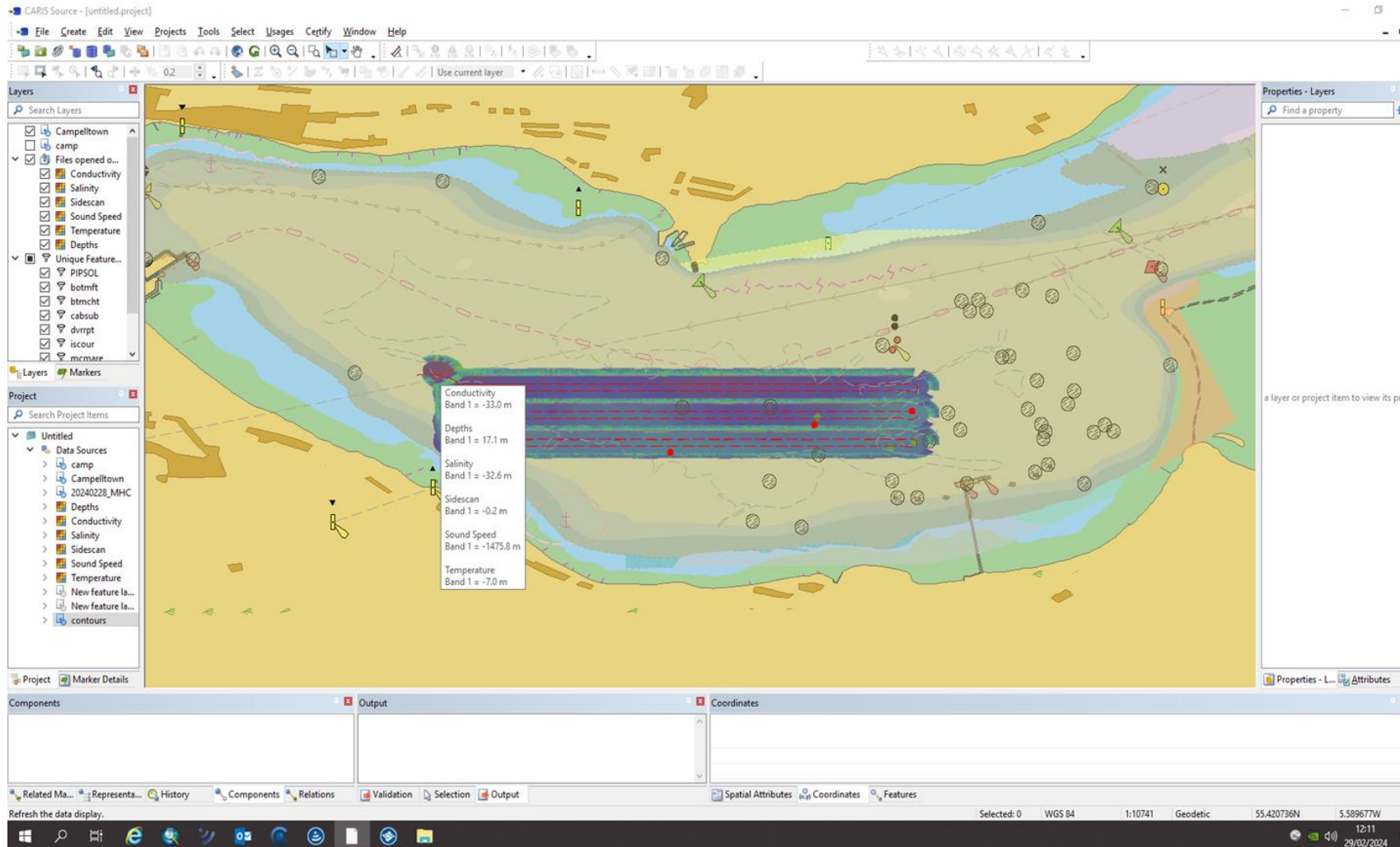
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UKHO/DE&S Project Team
 Spatial Data Management
 Plan



Mine Hunting Capability - Spatial Data Management Plan



Nav Track & Contacts
Imported into CARIS

Geotiffs of additional
Environmental data

GB ENC

UK MWDC Route
Survey Data Base

New Data Standards S100/S500

S100 will provide the DATA framework for the development of next generation maritime digital products



Supports a wide variety of hydrographic-related digital **data products and services**

- File based/Static
- Dynamic/Real time
- Hybrid



Internationally recognised – built on the ISO 19100 Series of Geographic Information Standards



Supports data compatibility and interoperability – enabling display and interrogation of multiple S-100 products



Flexible updating – use of dynamic machine-readable catalogues which can accommodate future requirements that may arise through developments in autonomous capability



S100 for Defence

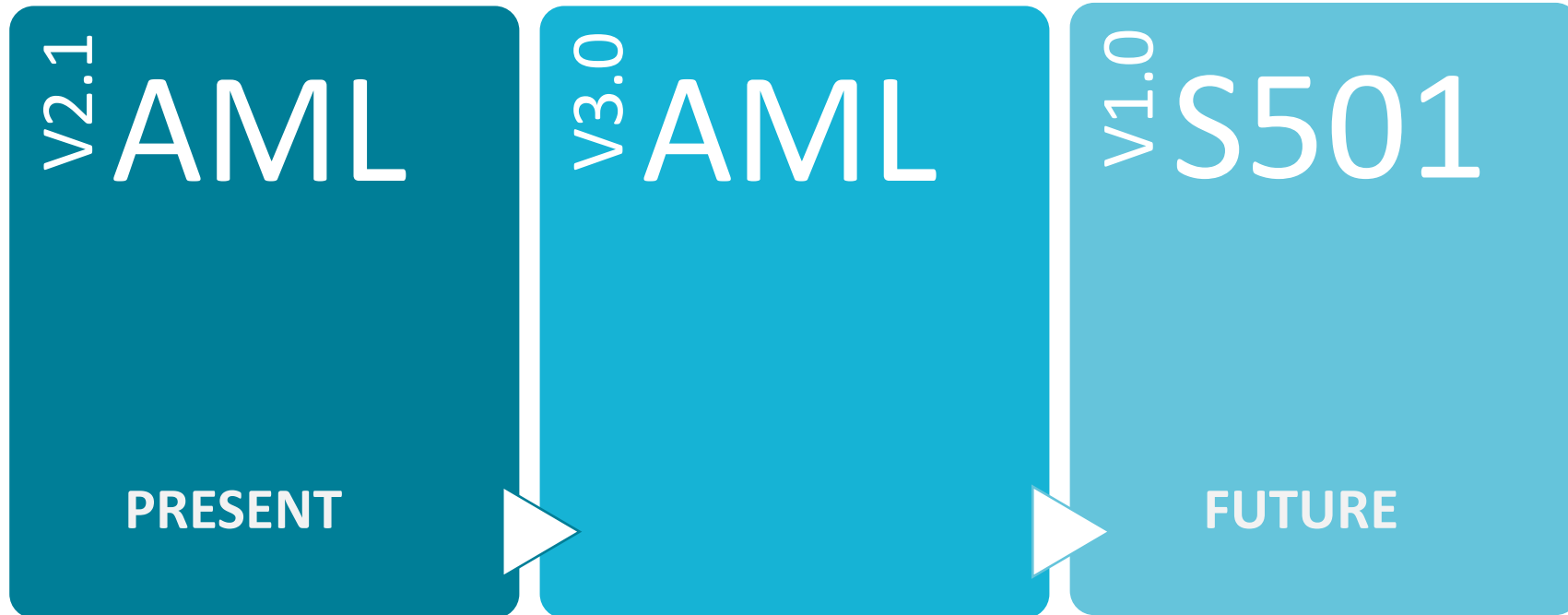
S100 will provide an opportunity to....

- *Maintain and improve **military advantage** both navigationally and operationally to **support decision making**.*
- ***Develop** new products and services that better reflect customer requirements*
- ***Improve portrayal and display** in navigation and tactical systems that consume maritime geospatial situational awareness data.*
- *Better understand decisions specific to the military user, which could be improved based on **dynamic decision making** from the underlying products.*



S500 for Defence

S500 will replace current S57 AML Catalogues





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Questions

