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Suitable for Intended Use: Charting a Course for Human-Centric AI use in Maritime Navigation

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Lightning Round Abstract

The principle that geospatial data must be safe for navigation and suitable for intended use has long been a cornerstone of maritime cartography. This concept acknowledges that navigational products are not merely data sets, but critical safety tools used to keep humans and ships safe. As the discipline embraces advances in Artificial Intelligence (AI) and Machine Learning (ML), this principle takes on new urgency. This presentation will argue that as we automate the production of maritime safety information, we must continue to evolve our quality assurance frameworks beyond simple specification conformance to ensure data is fit for purpose in an increasingly complex navigational environment shared by both human mariners and autonomous systems.This challenge is not new. Two decades ago, the Maritime Safety Office (MSO) recognized that the transition from paper charts to Electronic Chart Display and Information Systems (ECDIS) required more than data that was to spec and machine-readable. The digital data, whether in ENC or DNC format, had to be intuitively usable by human navigation teams. The "cartographer in the loop" was essential then to guarantee that the presentation of digital information on a screen provided the same level of cognitive certainty and safety as a paper chart. This historical precedent firmly establishes the need for human-centric validation in any technological shift.

Today, the MSO is integrating a new generation of AI, ML, and automation tools into its hydrographic and cartographic production processes. These technologies promise significant gains in efficiency for creating the data that underpins safety at sea. However, they also introduce the risk of generating outputs that, while technically correct, are not practically suitable for their intended use. An AI-derived feature may conform to every rule in our specification, yet be misleading or confusing to a mariner on a vessel's bridge, thereby failing its ultimate purpose.

Therefore, this presentation asserts the need for a quality review process that validates AI/ML-assisted data to ensure it is suitable for intended use. This review must serve a dual, forward-looking purpose. As the maritime community moves toward a future that includes Maritime Autonomous Surface Ships (MASS), our data products must be unambiguously safe for both human interpretation and AI-driven navigation. Can we enhance our products to improve safety and efficiency for both? This question demands that we, the human experts, remain firmly in the loop.

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This lightning talk will use compelling visual examples to illustrate the critical need for a modern quality review of maritime data. It will contend that the cartographer's most vital role in the age of GeoAI is not just as a producer of data, but as the ultimate arbiter of its fitness for use, ensuring that technology serves, rather than subverts, the goal of safe navigation for all.