



NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY
Know the Earth... Show the Way... Understand the World

Underkeel Clearance Management (UKCM) Systems in S-49 (Standardization Of Mariners' Routeing Guides), M-3 (IHO Resolutions), and S-32 (IHO Hydrographic Dictionary)

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13 March 2018





Agenda

- Background on S-49.
- Information categories.
- Underkeel clearance information.
- Definitions and concepts.
- S-49 overtaken by events.
- Future work items.
- Potential benefits and impacts.

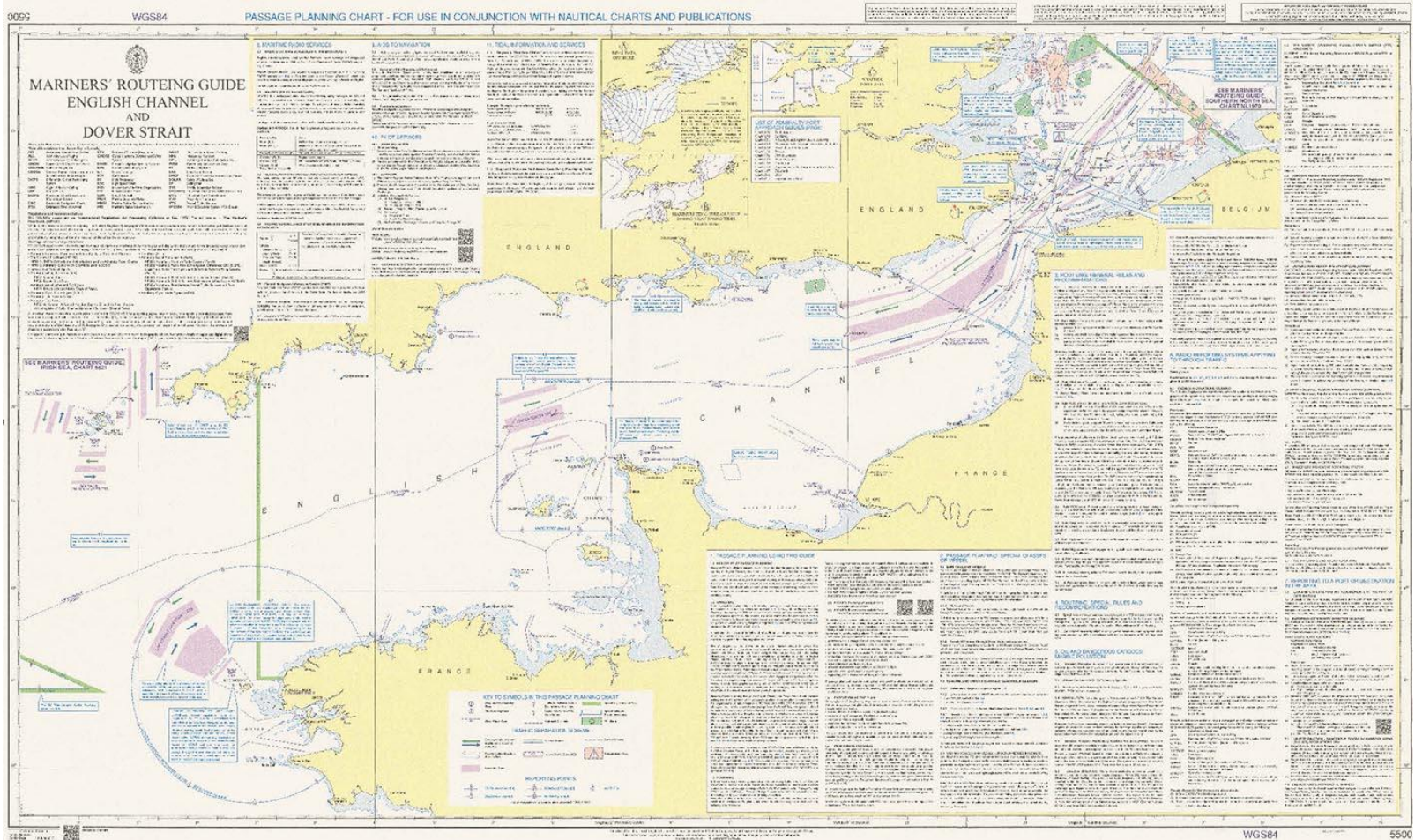


Standardization of Mariners' Routeing Guide (S-49)

- Information on complex routeing systems composed of:
 - multiple related routeing measures.
 - lengthy special provisions.
 - recommendations on navigation which apply to vessels using the system.
- Edition 2.0.0 (2010 edition) prepared by the Chart Standardization and Paper Chart Working Group (CSPCWG), now known as the Nautical Cartography Working Group (NCWG), in 2009.



Example of Mariners' Routing Guide





S-49 Information Categories

- **ESSENTIAL (E)**—Major importance to the safety of navigation.
- **USEFUL (U)**—Important to safe navigation in a particular geographic area, helpful to the mariner, and collected in a single document to facilitate its use.
- **NOT APPROPRIATE (N)**—Does not contribute to the safety of navigation or its inclusion may reduce safety by obscuring essential information or by enticing the mariner to use the Mariners' Routing Guide as a nautical chart.



S-49 Underkeel Clearance Information

- Underkeel clearance information considered ESSENTIAL.
- Designated as Item No. E2.3.
- Defined as “Underkeel clearance criteria and specific advice to deep draught vessels.”
- Connected with other S-49 items:
 - Item No. E2.1—IMO-approved rules or recommendations on planning a passage through the area.
 - Item No. E2.2—Specific advice, extracted where necessary from national Sailing Directions, on planning a passage through the area.
 - Item No. U6.1—Tidal height as shown by co-tidal diagrams or other suitable methods as appropriate, negative surges, and swell.
- **Note.**—Unable to find an example of Item No. E2.3 in a Routeing Guide.



Definitions and Concepts

- **Underkeel Clearance (UKC)**—The distance between the lowest point of the ship's hull, normally some point on the keel, and the sea floor. (IHO Hydrographic Dictionary)
- **Underkeel Clearance Management (UKCM) System**—(1) A contemporary *Aid to Navigation* (AtoN) which enhances navigational safety. (AMSA)
(2) A real-time and nowcast/forecast model system, in conjunction with the vessel response prediction systems, giving the vessel's master the information need to effectively manage the vessel's underkeel clearance. (Adapted from *Modern Underkeel Clearance Management* published in the *International Hydrographic Review*, Monaco LXXV(2), September 1998)



Definitions and Concepts (continued)

- **Static Systems**—Vessels use pre-calculated information to determine their underkeel clearance, with no shore or web-based interactions. (NIPWG)
- **Dynamic Systems**—Vessels monitor their underkeel clearance in real-time using either a web-based system (vessel must pre-register to participate in the system) or a hardware/software-based system (vessel must purchase an approved system loaded with appropriate software to obtain real-time information concerning its underkeel clearance). (NIPWG)



S-49 Edition 2.0.0 Overtaken by Events

- S-49 Edition 2.0.0 was prepared in 2009 and released in 2010.
- Dynamic UKCM Systems did not exist at time of latest release of S-49 Edition 2.0.0:
 - Australia—Underkeel Clearance Management System in the Torres Strait (2011).
 - Canada—St. Lawrence Seaway Draft Information System (2012).
- Need for new definitions for UKCM System, Static UKCM System, and Dynamic UKCM System?
- Need for a current review/update of S-49?



Future Work Items?

- Update E2.3 to reflect Static vs. Dynamic UKCM Systems.
- Develop new definitions for UKCM System, Static UKCM System, and Dynamic UKCM System (with S-100WG Underkeel Clearance Management Project Team (UKCMPT) and/or Hydrographic Dictionary Working Group (HDWG) input).
- Proper location for new definitions:
 - IHO Hydrographic Dictionary (S-32)?
 - New M-3 Resolution?
- Review/update S-49 (with NCWG input)?



Potential Benefits and Impacts

- Upgrade the Hydrographic Dictionary, S-49, and/or M-3 with up-to-date information concerning UKCM Systems.
- Review of S-49 to ensure all requirements are pertinent.
- All work done by correspondence.
- Liaison with S-100WG UKCMPT, HDWG, and/or NCWG.
- Based on past experience, the time frame would be:
 - HDWG process—2 to 3 years.
 - M-3 process—1 to 2 years.
- Medium priority.



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