

## Paper for Consideration by NIPWG

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

<b>Submitted by:</b>	United States (NGA)
<b>Executive Summary:</b>	A review of underkeel clearance information in S-49, including new definitions regarding Underkeel Clearance Management Systems.
<b>Related Documents:</b>	NIPWG 5-08.6 (Global Underkeel Clearance Management (UKCM) System) Standardization of Mariners' Routing Guides.(S-49) Edition 2.0.0 (April 2010) Resolutions of the International Hydrographic Office (M-3) IHO Hydrographic Dictionary (S-32)
<b>Related Projects:</b>	S-127 (Traffic Management Test Data Set)

**Introduction / Background**

The IHO publication "Standardization of Mariners' Routing Guides" was developed to give information on complex routing systems composed of multiple related routing measures, lengthy special provisions, and associated recommendations on navigation which apply to vessels using the system. The routing guide would give full information on all aspects of the routing measures in a standardized format.

Edition 2.0.0 (April 2010) was prepared by a sub-working group of the Chart Standardization and Paper Chart Working Group (CSPCWG), now known as the Nautical Cartography Working Group (NCWG), in 2009.

**Analysis/Discussion**

Three Information Categories have been developed to determine the content of a Routing Guide, as follows:

1. ESSENTIAL (E)—Information deemed to be of major importance to the safety of navigation.
2. USEFUL (U)—Information deemed to be important to safe navigation in a particular geographic area on which information would be helpful to the mariner and its collection in a single document (the MRG) would facilitate its use.
3. NOT APPROPRIATE (N)—Information which either does not contribute to the enhancement of safety of navigation or which by its inclusion may actually reduce safety by obscuring presentation of essential information or by enticing the mariner to use the MRG as a nautical chart.

Underkeel clearance information is considered ESSENTIAL Item No. E2.3 is defined as "Underkeel clearance criteria and specific advice to deep draught vessels" if not included in the following S-49 Items:

1. Item No. E2.1—IMO-approved rules or recommendations on planning a passage through the area.
2. Item No. E2.2—Specific advice, extracted where necessary from national Sailing Directions, on planning a passage through the area.
3. Item No. E2.3 is also cross-referenced to U6.1 (Tidal height as shown by co-tidal diagrams or other suitable methods as appropriate, negative surges, and swell). The information provided could include diagrams to show predicted squat for large vessels, examples of calculations of "Tidal Windows," etc.

Edition 2.0.0 of S-49 was developed (2009/2010) before the implementation of Australia—Underkeel Clearance Management System in the Torres Strait (2011) and Canada—St. Lawrence Seaway Draft Information System (2012), both of which are Dynamic UKCM Systems. Does Item No. E2.3 of the MRG need to be updated to reflect the existence of both Dynamic UKCM Systems as well as Static UKCM Systems?

While NIPWG is the "owner" of the information authorized by S-49, the NCWG is the owner of the document as far as developing standards is concerned. If the decision is made to update Item No. E2.3, it requires collaboration with the NCWG. Would this also be an appropriate time to review S-49 in its entirety for any additional changes?

Note: FOR REASONS OF ECONOMY, DELEGATES ARE KINDLY REQUESTED TO BRING THEIR OWN COPIES OF THE DOCUMENTS TO THE MEETING

What new terms need to be defined?

1. **Underkeel Clearance (UKC)**—Defined in the International Hydrographic Dictionary.

The distance between the lowest point of the ship's hull, normally some point on the keel, and the sea floor. (*IHO Hydrographic Dictionary*)

2. **Underkeel Clearance Management (UKCM) System**—No official definition. Two concept definitions are available. The Australian Maritime Safety Authority (AMSA) uses a very short definition stating a UKCM System is an Aid to Navigation. An IHB paper (Modern Underkeel Clearance Management published in the International Hydrographic Review, Monaco LXXV(2), September 1998) from the mid-90s was used to develop an additional concept definition for the purpose of the Global Underkeel Clearance Management (UKCM) System paper (NIPWG 5.08-6).

(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*)

3. **Static UKCM System and Dynamic UKCM System**—No official definitions. Two concept definitions were developed by a NIPWG Member State for the purpose of the Global Underkeel Clearance Management (UKCM) System paper (NIPWG 5.08-6).

**Static System**—Vessels use pre-calculated information to determine their underkeel clearance, with no shore or web-based interactions. (*NIPWG*)

**Dynamic System**—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*)

Should definitions for UKCM System, Static UKCM System, and Dynamic UKCM System be developed? If yes, a good starting point would be with the unofficial definitions listed in paragraphs 2 and 3 above. In addition, what would be the proper dissemination process for the new definitions?

1. Resolutions of the IHO (M-3)?

NIPWG has recent experience with submitting M-3 amendments (Submarine Cables 4/1997 as amended) and is in the process of developing additional M-3 amendments (9/1932, 5/1937, 4/1962, 4/1982, and 7/2009). However, developing the three new definitions would involve submitting a new M-3 Resolution rather than amending an existing one. The time frame between NIPWG5 and HSSC9 is too short (only 2 months) to properly work on and submit a new resolution. If the new definitions are developed, the new M-3 Resolution should be prepared for submission at HSSC10 in May 2019.

2. IHO Hydrographic Dictionary?

The most recent NIPWG interaction (as SNPWG) with the HDWG was in 2011 when amended definitions for underkeel clearance and underkeel allowance were proposed. The definitions were approved by the HSSC and were added to the Hydrographic Dictionary in 2014. The development of the definitions can be followed on the HDWG Discussion Forum, which has been inactive since 2014. The HDWG would need to be contacted to confirm the submission process for new entries to the Hydrographic Dictionary.

Note: FOR REASONS OF ECONOMY, DELEGATES ARE KINDLY REQUESTED TO BRING THEIR OWN COPIES OF THE DOCUMENTS TO THE MEETING

### **Conclusions**

Underkeel clearance information requirements in S-49 were developed prior to the implementation of Dynamic UKCM Systems (Canada—St. Lawrence and Australia—Torres Strait) and are not reflected in the document.

The developments of Dynamic UKCM Systems, Static UKCM Systems, and UKCM Systems in general are not reflected in M-3.

### **Recommendations**

Item No. E2.3 in S-49 should be updated to ensure underkeel clearance information applies to Dynamic UKCM Systems as well as Static UKCM Systems.

Liaise with NCWG to determine the feasibility of conducting a thorough review of S-49.

In conjunction with the UKCM Project Team (UKCMPT) (Subgroup of the S-100WG), develop definitions for UKCM Systems, Static UKCM Systems, and Dynamic UKCM Systems for promulgation in one of the following documents:

1. Amendment to M-3.
2. Additions to the International Hydrographic Dictionary (S-32).

### **Justification and Impacts**

Justifications and impacts would be:

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

### **Action Required of NIPWG**

The NIPWG is invited to:

- a. Note this paper.
- b. Develop a new E2.3 definition in S-49.
- c. Discuss the possibility of a complete review of S-49 in conjunction with NCWG.
- d. Work with the appropriate IHO WG (HDWG or UKCMPT) to develop new definitions for UKCM Systems, Static UKCM Systems, and Dynamic UKCM Systems.