EIGTH MEETING OF THE INTER-REGIONAL COORDINATION COMMITTEE (IRCC8)

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Paper for the consideration of IRCC

Competence of the Hydrographic Surveyor as a component of the Total Uncertainty Budget of a Hydrographic Survey

Submitted by:	**IBSC**
Executive Summary:	This paper focus on the competence of the Hydrographic Surveyor as a component of the Total Uncertainty Budget of a Hydrographic Survey.
Related Documents:	*a) Draft IHO Publication S-5A Standards of Competence for Hydrographic Surveyors Category "A"* *b) IHO Publication S-5B Standards of Competence for Hydrographic Surveyors Category "B"* c) *IHO Publication C-13 Manual on Hydrography* d) *IHO Strategic Plan (2009)*
Related Projects:	*1) IHO Work Programme 2016 (Task 3.3.9.1)* *2) HSSC WP 2016-2017*

Introduction and Background

1. The IHO Publication S-44 (5th edition, February 2008) details the source of uncertainties that can affect hydrographic data quality, and defines maximum admissible level of total propagated uncertainty admissible for each order of surveys.

2. The total propagated uncertainty is defined as the result of various sources of uncertainties affecting hydrographic sensors and data. Total propagated uncertainty analysis provides an objective way of assessing the data uncertainty, as a function of the uncertainty of each component in the hydrographic system.

3. S-44 stresses that "It is also important to note that the adequacy of a survey is the end product of the entire survey system …" and that "The surveyor is an essential component of the survey process and must possess sufficient knowledge and experience to be able to operate the system to the required standard".

4. The level of data quality, as it is currently defined in the S-44 publication, is described in a systemic way, but omits the human element, i.e. the impact of the level of competence of the hydrographic surveyor. It is however well known that the quality of measurements depend on the skill and judgement of the operator of the measuring system.

5. Annex A of S-44 gives "Guidelines for quality control" and indicates that "*These Annexes are **not** an integral part of the S-44 Standards and will be removed when the information therein is fully incorporated into IHO Publication C-13*.". However, IHO Publication C-13 was last updated in 2011 and there is no plan for its maintenance.

Standards of Competence for Hydrographic Surveyors

6. The output of IBSC activities are a worldwide network of formally recognized programmes of education and training for Hydrographic Surveyors at Category "A" and "B" levels. This supports the following objectives established in the IHO Strategic Plan (2009):

"(b) To improve global coverage, availability and quality of hydrographic data, information, products and services and to facilitate access to such data, information, products and services;

(c) To improve global hydrographic capability, capacity, training, science and techniques;

(d) To establish and enhance the development of international standards for hydrographic data, information, products, services and techniques and to achieve the greatest possible uniformity in the use of these standards;"

7. In the white paper introducing the rationale for separation of the Category "A" and Category "B" Standards, the IBSC described the competence of Category "A" and Category "B" hydrographers as follows:

"Category "B" standards will be aimed at the basic educational and training requirements for hydrographic technicians and field hydrographers (S-5), and nautical cartographers (S-8).

Category "A" standards will be aimed at the theoretical educational and foundational background necessary for Hydrographers/Nautical Cartographers-In-Charge and hydrographic/cartographic managers who will develop specifications for surveys and charts, establish quality control and quality assurance systems, and respond to the specific requirements of a full range of hydrographic/cartographic projects."

Analysis

8. During the IBSC39 meeting, the Board discussed the need to include the competence of Hydrographic Surveyors as a source of uncertainty in the total propagated uncertainty as described in the IHO Publication S-44. The Board agreed on the following:

1. The level of competence and experience of the hydrographer is a source of uncertainty of hydrographic measurements;
2. The IHO Standards for Hydrographic Surveys (S-44) should incorporate the level of competence and experience of the hydrographic surveyor as a component of the total propagated uncertainty of a hydrographic survey;
3. A reference to Standards of Competence (IHO Publications S-5A and S-5B and industrial Standards) should be included in the IHO Publication S-44 as a guideline (or control mechanism) to reduce the level of uncertainty in hydrographic data, linked to the competence and experience of hydrographers; and
4. Annex A of the IHO Publication S-44 (and C-13 in a future update) should clearly indicate the competence and the experience of the Hydrographic Surveyor as an importance component of the quality assurance mechanisms of a hydrographic survey.

Conclusion

9. The IBSC considers that the level of competence of hydrographic surveyor is as a source of uncertainty on hydrographic measurements. The Board suggests that the assessment of the level of competence and experience of the hydrographic surveyor is included in the total propagated uncertainty of a hydrographic survey and that reference should be made to S-5A and S-5B Standards of competence (and possibly other industrial standards of competence) in the IHO Publication S-44.

Action Required of IRCC

10. The IRCC is invited to:

a. **note** this report;
b. **request** to HSSC to consider the aspects listed in 8.1, 8.2, 8.3 and 8.4 in the HSSC work items associated with elements 2.5 (Data Quality) and 2.10 (Hydrographic Data Acquisition and Processing) of the IHO Work Programme 2013-2017; and
c. **take** any other action as appropriate.