**IHO File No S3/8151/S-100**

### SURVEY ON S-100 OPERATIONAL ANALYSIS

References:  A.  S-100 Implementation roadmap for Implementation Decade 2020-2030 (Decision A2/29, A2/30 and A2/31)
B.  Action C4/19
C.  Decision IRCC13/18

Dear Hydrographer,

1.    The 13th meeting of the Inter-Regional Coordination Committee (IRCC-13) approved the questionnaire on "HO's feelings over the introduction of S-100" proposed by ITALY and invited the IHO Secretariat to distribute this questionnaire via Circular Letter to the IHO Member States (Reference C).

2.    The introduction of S-100 will revolutionize Hydrographic Offices' (HO's) work and the products delivered on board. Like any other innovation factor, the HO's will be called to implement the questionnaire in their organization and make it part of their business strategy. The questionnaire in Annex A has been prepared to collect information on managerial, economic and operational perspectives on how S-100 will affect the work of HO's, maritime operators and mariners' daily work.

3.    The outcome of the survey is planned to be made available on the repository webpage requested by Council (Reference B) to facilitate the accessibility and maintenance of the S-100 Implementation roadmap in Reference A (https://iho.int/en/s-100-implementation-strategy).

4.    As requested by the IRCC (Reference C), the IHO Secretariat now invites Member States to participate in the survey, by email (cl-lc@iho.int when using the form in Annex A), but preferably using the IHO Online Form System by accessing the following link:

https://IHO.formstack.com/forms/cl27_2021

5.    Responses should reach the IHO Secretariat **not later than 20 September 2021**.

On behalf of the Secretary-General
Yours sincerely,

Luigi SINAPI
Director

Annex A : Questionnaire on "HO's feelings over the introduction of S-100"

**HO's FEELINGS OVER THE INTRODUCTION OF S-100**

**QUESTIONNAIRE FOR MARITIME NAVIGATION**

*(to be returned to the IHO cl-lc@iho.int **by 20 September 2021**)*

The University of Genoa, in a joint effort with the Italian Hydrographic Institute is conducting research on how the introduction of S-100 based products for marine navigation is perceived by Hydrographic Offices and how it is going to revolutionize them in the upcoming years. A part of the research will be based on the present questionnaire. The survey has been forwarded to IHO Member States and is structured into three parts:

1. **How S-100 can affect Hydrographic Offices** – this part is meant to analyze how the introduction of a new product line can affect HOs' operability and what are the challenges and risks that HOs will have to face in the future.

2. **How S-100 can affect seafarers** – this part is meant to understand how the producer thinks that his work will affect the final user who is out at sea. At this stage, even though it is still premature to have a full view of how the future bridge will look like, the analysis of the producer's overall feeling can be useful to start understanding it.

3. **How S-100 can affect maritime shipping companies** – beyond seafarers, the introduction of new systems and services depend on maritime companies' investments, this part of the survey is mean to detect how the hydro community can make S-100 ECDIS appealing to private companies.

In some questions you will be asked to choose your answer in a scale of options that goes from Certain to Rare. When answering, consider that each option has the following meaning:

- Certain, close to 100%;

- Likely, 75% of possibility that it will happen;

- Possible, 50% of possibility that it will happen;

- Unlikely, 25% of possibility that it will happen;

- Rare, close to 0%.

| Organization: | |
|---|---|
| Submitted by: | |
| Email address: | |

For any clarification or question, please contact (Valentino Palma – Italian Hydrographic Institute) at the following email address: valentino_palma@marina.difesa.it

## How S-100 can affect Hydrographic Offices:

1. The introduction of S-100 may require your organization to adapt to a new production factor and to a different way of managing your institutional activity. For each cost component, choose how much it will be affected by the introduction of S-100 (choose one option per column):

| | Human Resources' costs | Software licences' costs | Hardware components' costs | External coordination costs (e.g. with other organisations like the Coast Guard) | Internal Horizontal coordination costs (between different departments of your organization) |
|---|---|---|---|---|---|
| Sensible Increase (specific investments will be necessary) | | | | | |
| Moderate increase (easily manageable through daily management) | | | | | |
| No change | | | | | |
| Moderate decrease (marginal savings) | | | | | |
| Sensible decrease (consistent savings) | | | | | |
| I prefer not to answer | | | | | |

2. Depending on various aspects (personnel's average age, hiring policies, etc.), the management of a new production factor may require new investments in human resources. Based on new hires and on training activities, choose how much the following activities will affect the current Human Resources budget (choose one option per column):

| | More people to hire (quantity) | Recruitment of more specialized personnel (quality) | Training costs for the existing staff |
|---|---|---|---|
| Sensible Increase (increase of more than 20%) | | | |
| Light increase, (increase within 20%) | | | |

| | | | |
|---|---|---|---|
| No change | | | |
| Light decrease, (decrease within 20%) | | | |
| Sensible decrease, (decrease of more 20%) | | | |
| I prefer not to answer | | | |

3. The introduction of S-100 will change the portfolio of products provided by your HO. The production of the new products may require changes in the professionalism which you rely on. Based on your current work force, for each education type category, choose if any change will be necessary (choose one option per column based on the number of total staff you already have in force):

| | Computer science | Geologists | Nautical science | Naval Engineering | TLC Engineering |
|---|---|---|---|---|---|
| Sensible Increase (over 20%) | | | | | |
| Light increase (within 20%) | | | | | |
| No change | | | | | |
| Light decrease (within 20%) | | | | | |
| Sensible decrease (over 20%) | | | | | |
| I prefer not to answer | | | | | |

4. The introduction of S-100 will change the portfolio of products offered by HOs to the seafarers. For each of the options, choose how probable is it that they will affect your organization's revenues (choose one option per column):

| | Wider choice of products offered | The switch from product oriented to service oriented for some nautical publications | The same data can be used differently into multiple products | Sales Paper Chart |
|---|---|---|---|---|
| Certain | | | | |
| Likely | | | | |
| Possible | | | | |
| Unlikely | | | | |
| Rare | | | | |
| I prefer not to answer | | | | |

5. Based on your perception of S-100 and also on the experience developed with S-57, when talking about your organization mission[1] and vision[2], please choose one of the following options:

   a. Both mission and vision will be affected by S-100.

   b. Only the mission will be affected.

   c. Only the vision will be affected.

   d. The mission and the vision will not be affected by S-100.

6. Considering that the adoption of S-100 will ask HOs to rethink their operations, based on the readiness level of your organization, please select one the following options:

   a. My organization is fully conscious of how S-100 will affect its future work. The implementation of S-100 is already part of its business plan[3];

   b. My organization is fully conscious of how S-100 will affect its future work and is currently working in changing its business plan.

   c. My organization has a general perception on how S-100 will affect its future work but is not ready yet to estimate how its production will be affected. The business plan will be changed based on IHO's directives and based on other HOs' experience.

   d. My organization has a general perception on how S-100 will affect its future work but it is not ready yet to estimate how its production will be affected. No change in the business plan will be necessary to face the introduction of this new standard.

   e. My organization has no perception on how S-100 will affect its future work, it is too early to have think about how to change my business plan.

   f. I prefer not to answer.

7. When talking about S-100 production and the future challenges of Hydrographic Offices, write the most relevant concept connected to each of the following aspects (Opportunities-threats-Strengths-Weaknesses). Please enter a one-line answer:

   a. **Opportunities** - positive external factors (example: An increase in sales):

   _____

   b. **Threats** - negative external factors (example: Working with other organizations like Coast Guard or weather service):

   _____

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[1] The mission defines the company's business, its objectives, and its approach to reach those objectives (What do we do? Whom do we serve? How do we serve them?)

[2] The vision describes a long-term, future-oriented, and comprehensive view of an organization's development. It mainly focuses on a broader picture of the organization's future, which is intended to be emotionally appealing. The vision is further broken down into specific organizational goals that organization members can aspire to.

[3] A business plan is a formal document containing the goal of your organization, the methods for attending those goals and the timeframe for their achievement.

c. **Strengths** - <u>positive internal factors</u> (example: Familiarity with S-57):

_____

d. **Weaknesses -** <u>negative internal factors</u> (example: The structure of my HO needs to be reorganized):

_____

## <u>How S-100 can affect seafarers:</u>

1. Considering the application of S-100 based products on board, what are the negative consequences for the bridge personnel (choose one option per column) - LIKELIHOOD?

| LIKELIHOOD | Seafares can over trust S-100 and be less aware | Displaying data on a screen may cause over-scaling problems like what happens with ENCs. | Older personnel may find difficult to get familiar with the system. | More attention on electronic navigation will reduce the performance of traditional navigation. In case of distress, personnel would not be able to react. |
|---|---|---|---|---|
| Almost Certain | | | | |
| Likely | | | | |
| Possible | | | | |
| Unlikely | | | | |
| Rare | | | | |

2. Considering the application of S-100 based products on board, what are the negative consequences for the bridge personnel (choose one option per column) – IMPACT[4]?

| IMPACT | Seafares can over trust S-100 and be less aware | Displaying data on a screen may cause over-scaling problems like what happens with ENCs. | Older personnel may find difficult to get familiar with the system. | More attention on electronic navigation will reduce the performance of traditional navigation. In case of distress, personnel would not be able to react. |
|---|---|---|---|---|
| Insignificant | | | | |
| Minor | | | | |

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[4] Insignificant, minimal impact, no significant threats; Minor, any risk which will have just mild impact on the process; Moderate, risks that can cause some problems; Major, risks that can jeopardize some aspects of the process; Significant, a risk that can prove detriment of the whole process.

| | | | | |
|---|---|---|---|---|
| Moderate | | | | |
| Major | | | | |
| Significant | | | | |

3. How probable is that S-100 guarantee a more conscious usage of maritime data for seafarers?

    a. Almost Certain

    b. Likely

    c. Possible

    d. Unlikely

    e. Rare

4. The study of the impact of S-100 based products on the bridge personnel's practices may be useful to understand how navigation will be performed in the future. Considering some activities already done by the bridge personnel, how probable is that S-100 will change them?

| | The usage of the Radar and other TLC equipment | The usage of those data that today are contained in Nautical Publications | The execution of navigation in restricted waters | The Officer of the watch's job | The Lookout activity |
|---|---|---|---|---|---|
| Almost Certain | | | | | |
| Likely | | | | | |
| Possible | | | | | |
| Unlikely | | | | | |
| Rare | | | | | |
| I prefer not to answer | | | | | |

5. S-100 will give availability of not homogeneous data structured into layers into a single device. Do you have any idea on how this can affect the seafarer's daily work?

| YES | NO |
|---|---|

6. If you have answered "Yes" to the previous question, for each of the following activities, based on the relevance for the seafarer, assign a value from 1 to 5[5] :

| | Combination of data for weather route (S-412) |
|---|---|
| | Better utilization of currents and wind data in order to reduce fuel consumptions (S-111 and S-412) |

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[5] 1 – Very Low, the current procedure won't be affected; 2- Low, minor impact on today's procedures; 3 – Medium, Large impact that can be managed with current procedures; 4- High, High impact that will need to rethink current procedures; 5 – Very High, extreme consequences, current procedures cannot be used anymore; 9 – I prefer not to answer

| | Better awareness of navigational warnings and increase in safety of navigation (S-124) |
|---|---|
| | Rethinking of the pilot's role (S-127) |
| | Water level Information for Surface Navigation (S-104) can overstep the limits of the low spring water level sounding data and the usage of Tides Chart. |
| | S-102 (Bathymetric surface) and S-127 when talking about mega vessel operations. |

7. Which of the following methods is forecastable for S-100 based products distribution:

    a. The current S-57 structure will be fine also for S-100 based products.

    b. A combination of the current procedures and web cloud technologies will be used. The cloud technologies will be used only for those products that are updated very often.

    c. A combination of the current procedures and the web cloud technologies will be used. The S-57 distribution schema will be still available for those area with internet connectivity problems.

    d. S-100 based products will be distributed through a cloud technology.

    e. I prefer not to answer.

## How S-100 can affect maritime operators:

1. In order to make S-100 appealing to maritime operators, what concept will you focus on? If your idea is not listed below, please write your answer in the blank space. (Choose maximum two options, you may choose three if one of them includes option e).

    a. Safety of navigation

    b. Efficiency of navigation in relation to fuel consumption

    c. Efficiency in navigation in relation to GHG emissions

    d. A method to comply with UN sustainability goals

    e. _____

2. Which of the following UN sustainability goals can be boosted by S-100 and by a better usage of maritime data?

    a. Affordable and clean energy

    b. Industry innovation and infrastructure

    c. Responsible consumption and production

    d. Climate action

    e. Life below sea

    f. Partnership for the goals

3. How it will be possible to accelerate the transition to S-100 ECDIS?

    a. The only way to accelerate S-100 transition is to make the S-100 ECDIS IMO compulsory.

    b. With an adequate institutional campaigning focused on the new technology benefits, S-100 ECDIS will find wide adoption in private companies.

    c. Private companies will spontaneously adopt S-100 ECDIS without any IMO's regulatory interference.

4. Considering the investment in the S-100 ECDIS on board, what are the negative consequences for SHIPPING COMPANIES? For each column choose a rating from 1 to 4 (1 - Not relevant; 2 - Somewhat relevant; 3 – Quite relevant; 4 – Highly relevant)

| | |
|---|---|
| | Costs for the acquisition of the new ECDIS and more costs for internet connection |
| | Costs for the crew's training |
| | Overreliance on subscription to official services |
| | The overlying on a cloud web-based distribution will make navigation more vulnerable to cyber attacks |
| | I have no idea. If you choose this option, just mark this box. You can avoid to rate the other options. |

5. Considering the investment in the S-100 ECDIS on board, what are the opportunities for SHIPPING COMPANIES? For each column choose a rating from 1 to 4 (1 - Not relevant; 2 - Somewhat relevant; 3 – Quite relevant; 4 – Highly relevant)

| | |
|---|---|
| | Safety of navigation and safety of personnel on board: a more conscious usage of maritime data can reduce marine casualties. |
| | Safety of navigation and safety of cargo on board: a more conscious usage of maritime data can reduce roll, pitch and yaw movements and consequentially the cargo will be less subject to involuntary movements. Benefits on marine cargo insurance. |
| | GHG emissions: the proper usage of marine data (currents, wind, tides) will guarantee more sustainable and efficient sea operations. |
| | S100 will guarantee the evolution of the slow steaming practice into the smart steaming practices. |
| | I have no idea. If you choose this option, just mark this box. You can avoid to rate the other options. |