15th Conference of the Capacity Building Sub-Committee (CBSC15)

Paramaribo (Suriname) – June 7-9, 2017

Subject: Harnessing the e-learning techniques for the IHO capacity building programme.

Submitted by: France

1. Context

Training is a main IHO asset for capacity building. In that scope, distance learning technologies are not yet part of the IHO toolbox whereas the use of such technologies in capacity building activities could contribute to provide inter-regionalized, multi-lingual training resources, covering a wide range of the expertise in hydrography.

Following up decision 16 adopted by the IHO Assembly at its 1st session in April 2017 regarding the "development of the IHO e-learning capacity" (Proposition #2):

The Assembly directed the IRCC to take into account e-learning in the IHO Capacity Building Strategy and to consider using e-learning in its Capacity Building activities.

The present discussion paper aims at defining the overall principles regarding the use of distance learning technologies within the IHO Capacity Building Strategy and to seek ways forward for its implementation in capacity building programmes.

2. General considerations

2.1. Nowadays, training in hydrography faces several challenges such as the lack of resources and the growing demand from coastal States worldwide. The limited resources (both human and financial) available entail drastic choices in capacity building Work Programmes, slowing progress. The current training offer is affected by the often long distance between certified trainers and potential trainees, weighting on training costs and restraining the occurrence of training sessions: a regular training course implies high logistics costs due to transportation and accommodation. In that scope, the use of e-learning could reduce these costs and help hydrographers to disseminate knowledge and transfer skills in a more efficient way. As a matter of fact, the development of MSI e-learning training material and the organisation of a MSI guided session as part of the on-going EAtHC e-learning experimentation, have the same cost as a single residential MSI course for a dozen of trainees. Since it is now available, the MSI e-learning contents can be used for future sessions, with a cost of 25% of a regular MSI 3-days course for each session. So, for the cost of a regular academic MSI course, you can deliver 4 MSI distance learning sessions, or 2 sessions if you include the e-learning content development costs.

This estimation is made on the following basis:

- during a guided session, a trainer shall dedicate 2 hours to tutor a group of 10 trainees,
- Logistic costs are reduced to e-learning platform hosting and maintenance costs.

2.2. The current residential training offer also generates an important time between the need expressed by a coastal State, the occurrence of an appropriated course and the nomination of a qualified candidate to this course. Candidate selection tends to be a challenge as well, especially with the lack of follow-up processes to track progress afterwards.

3.3. E-learning technologies shall provide more tailored contents to fulfil the objectives of a designated course:

- an e-learning session, spread over several weeks, enable the trainee to assimilate the course alongside with his professional activities,
- e-learning contents can be easily blended with practical sessions, from distance practical exercises (case study) to face-to-face practical workshop (equipment handling)
- an e-learning content can be read and studied several times and used inside or outside the classroom, whereas an academic course is a one-stand delivery,
- the use of e-learning could improve the trainees selection for advanced courses and follow-up through a platform: for instance, only trainees who passed successfully a distance learning session could access either to the related practical session or to a dedicated face-to-face workshop,
- the availability of a e-learning content shall allow coastal States to at least maintain their existing skills and then help them reach for the next phases of capacity building strategy.

3. Principles on the use of e-learning contents in IHO CB activities

It is proposed to include the following principles on the use of e-learning in the IHO capacity building strategy:

- The allocation of CB funds for e-learning content developments and tutored sessions (the amount/percentage to be agreed by the CBSC),
- To implement the sustainable and inter-regional use of e-learning technologies in IHO capacity building programmes: consolidation of a multi-lingual training offer, better follow-up on trainee's educational path.

These principles could be integrated to the IHO CB Strategy through the suggested amendments to the IHO Capacity Building Strategy (see Annex).

4. Implementation of e-learning in IHO CB Work Programmes

The implementation of e-learning in IHO CB programmes requires addressing the following issues:

Existing e-learning technologies overview	Several E-learning solutions identified: - EAtHC e-learning experimentation: distance learning in challenging conditions (poor internet connexion, language issues, use of tailored pedagogy and communication tools) - Ocean Teacher Global Academy (OTGA): E-learning implementation by an International body

	- IMARest's Maritime Learning Alliance (MLA): advanced student's educational path monitoring tools. - Skilltrade e-learning solution: use of smartphone and tablet applications, IHO/FIG/ICA certified blended course. - CIDCO distance learning platform: use of data processing freeware, definition of pedagogic scheme.
E-learning materials hosting and maintenance	Two options possible: - piggy back an existing e-learning solution, burden sharing option, - development of an IHO owned e-learning platform, requires IT resources to maintain and update the platform and its contents.
Use of e-learning contents	- Asynchronous mode, no tutoring required - Synchronous mode (tutored session), combined with practice or not, - Classroom sessions using e-learning contents - Blended e-learning (E-learning + practice)
Pedagogical scenarios definition	Definition of a precise scope to develop and use e-learning content: - Use for Phase 1 courses delivery (first objective?) - Use Educational content reference for classroom sessions, - Skill and knowledge maintenance, - Basic hydrographic theoretical training, - Advanced skills theoretical training in hydrography and Oceanography, - Multi-lingual access, - Wide range of practical exercise, to fit with trainees region of interest, - Eligibility for practical sessions and workshop conditioned to e-learning session validation. - Set of multi-year combination of e-learning sessions and practical workshops.
E-learning contents development	Two options to be considered: - IHO/MS resources pooling, - dedicated IHO Project team, - subcontracting. Need for syllabus standardization for some of the courses included in CB Work Plan (Procedure 11)? Need to review the e-learning contents periodically?
Tutor network	- Towards a regional tutoring capability? - Organizing Tutor's training sessions on e-learning platforms and tools - Role? Session animation, content update, trainees management and monitoring, trainees support, trainees evaluation (quiz, tests)
IHO Training certification	- Automatic process through the platform? - Manuel process under the tutor's responsibility, taking account to the student's results.

5. **Conclusion**

The CBSC is invited to:

- Consider the proposed amendments to the IHO CB Strategy (Annex),
- Set-up an implementation strategy of e-learning in CB programmes.

Annex: proposal of amendments to the IHO CB Strategy

INTERNATIONAL HYDROGRAPHIC ORGANIZATION

IHO Capacity Building Strategy
Adopted 10 October 2014 by the EIHC5

References:

- IHO CBSC Terms of Reference
- M-2 "The Need for National Hydrographic Services"
- C-55 "Status of Hydrographic Surveying and Nautical Charting Worldwide"
- Safety of Life at Sea Convention (SOLAS), Chapter V
- United Nations Convention on the Law of the Sea (UNCLOS)
- UN General Assembly Resolution A/RES/58/240 dated 23 December 2003
- IHO CB Coordinator Terms of Reference
- EIHC5 Decision 5 and EIHC5 Doc. CONF.EX5/REP.03/Rev1
- A-1 Decision 16 and A-1 Doc. A.1/MISC/03/Rev1

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I.   INTRODUCTION

1.   The IHO and Capacity Building

Capacity building is a vital component of the efforts of intergovernmental technical organizations to support the development goals of the United Nations (UN). The IHO is committed to matching its efforts to those of the International Maritime Organization (IMO), the Intergovernmental Oceanographic Commission (IOC), the International Association of Lighthouse Authorities (IALA), the International Federation of Surveyors (FIG) and other organizations working in allied fields.

In the IHO, capacity building is defined as the process by which the organization assesses the status of current arrangements and assists States to achieve sustainable development and improvement in their ability to meet hydrographic, cartographic and maritime safety obligations with particular reference to recommendations in UNCLOS, SOLAS, and other international instruments. The scope encompasses all hydrographic needs as it underpins every other activity associated with the sea, including safety of navigation, protection of the marine environment, national infrastructure development, coastal zone management, marine exploration, marine resource exploitation (minerals, fishing, etc.), maritime boundary delimitation, maritime defence and security, and coastal disaster management.

The IHO Capacity Building Committee (re-designated a Sub-Committee in 2009) was established in 2003 to coordinate this effort, and the members developed a strategy paper drawing on the experience of the former FIG/IHO Technical Assistance and Coordination Committee (TACC). That strategy paper has been updated several times. The XVIIIth International Hydrographic Conference in 2012 tasked the Capacity Building Sub-Committee (CBSC) to review the CB Strategy and report back to the next Conference. This version has been reviewed and amended by the CBSC in liaison with the IRCC and the industrial and academic sectors. It will be presented at the 5th Extraordinary International Hydrographic Conference in 2014 for endorsement.

2.   Vision Statement

The vision behind this policy paper is to provide strategic guidance for IHO capacity building to ensure the optimum contribution to safety of life at sea, to the protection of the environment, and to national economic development.

II.   PRINCIPLES AND OBJECTIVES

3.   Principles

The strategy and its implementation will be consistent with the following principles:

3.1   Individual national needs for infrastructure, together with a nation's capacity for infrastructure development, should be assessed firmly against the 3 phases of development as defined in M-2 and shown in Figure 1.

3.2   Skill and technology transfers must result in solutions which are appropriate and sustainable.

3.3   Wherever possible, capacity building projects should be coordinated regionally and be supported through regional cooperation.

3.4   The national administration of a State with developing hydrographic services must embrace and support the concept of capacity building as being in its national interest.

3.5   The focus should be on achieving enduring output which will benefit safe navigation, safety of life at sea, protection of the marine environment and economic development, rather than on creating enabling infrastructure per se.

3.6   Funding of Non MS is generally limited to technical visits and Phase 1 projects (this will include an overall assessment of the status of hydrography and information of relevant authorities). Exceptions to this have to be reflected against the resources provided, the expected output and the situation in the country.

3.7   Funding of equipment shall be limited to those cases, where it is embedded into a comprehensive programme (see Chapter 5) requesting such equipment to remain in-country to complete the project, and insuring a sustainable effect and ongoing support. Whenever possible, external funds should be included, taking into account the relatively high costs of equipment and assuring a reasonable cost-benefit-ratio for the improvement of the hydrographic capacity;

3.8   Comprehensive programmes (see Chapter 5) may be supported by start-up funds to allow participation in, or preparation of, externally funded projects, especially when substantial additional funds can be expected;

3.9   The use of consultants will be permitted if this supports the vision and the objectives of this strategy;

3.10   CB funds may be allocated for administrative purposes (the amount/percentage to be agreed by the CBSC);

3.11   CB funds may be allocated for e-learning content (MOOC) developments and tutored sessions (the amount/percentage to be agreed by the CBSC).

PHASES OF DEVELOPMENT OF HYDROGRAPHIC SURVEYING AND NAUTICAL CHARTING CAPABILITY

Phases of Development	National Activity
Phase 1 Collection and circulation of nautical information, necessary to maintain existing charts and publications up to date	• Form National Authority (NA) and/or National Hydrographic Coordinating Committee (NHCC). • Create/improve current infrastructure to collect and circulate information • Strengthen links with charting authority to enable updating of charts and publications • Minimal training needed • Strengthen links with NAVAREA Coordinator to enable the promulgation of safety information
Phase 2 Creation of a surveying capability to conduct: • Coastal projects • Offshore projects	• Establish capacity to enable surveys of ports and their approaches • Maintain adequate aids to navigation • Build capacity to enable surveys in support of coastal and offshore areas • Build capacity to set up hydrographic databases to support the work of the NA/NHCC • Provide basic geospatial data via MSDI • Requires funding for training, advising & equipment or contract survey
Phase 3 Produce paper charts, ENC and publications independently	• The need shall be thoroughly assessed. Requires investment for production, distribution and updating • Alternatively, bi-lateral agreements for charting can provide easier solutions in production and distribution (of ENC through RENCs) and rewards. • Further development of MSDI

Figure 1

4.   Objectives

The willingness of the IHO to assist capacity building has been expressed in terms of short and long term objectives, providing a clear signal of the desired effect which the Organization is seeking. These objectives also constitute guidance for the work of the CBSC in implementing this strategy.

4.1   Long Term Objective

- To enable all states which have navigable waters to achieve Phase 1 of development (i.e. timely collection and promulgation of hydrographic information for their national waters), and to develop a national plan to put in place appropriate elements of Phases 2 and 3 or alternative cooperative regional or bilateral arrangements.
- In conjunction with the IMO's Technical Cooperation Committee and IALA's World Wide Academy a series of 'country profiles' will be developed to accurately measure the state of hydrography in every coastal state.

4.2   Short/Medium Term Objectives

- To implement a programme of events to raise awareness of the importance of hydrography at all relevant levels.
- To establish a GIS-based electronic version of C-55 presenting an accurate picture of the status of hydrographic services world-wide, as available to mariners.
- To enable the IHO to present clear priorities for capacity building action to the UN and subordinate technical organizations and funding agencies, and to national governments.
- To enable Regional Hydrographic Commissions (RHCs) to establish a suite of capacity building initiatives and a prioritisation process for regional cooperative efforts.
- To enable RHCs, where significant progress is required, to develop a holistic approach to capacity building, designed to deliver wide ranging assistance with sustainable outcomes. This would include training, technical cooperation, organizational and structural advice which may be part of a donor programme.
- To implement appropriate management of an IHO Capacity Building Fund.
- To produce and maintain an auditable IHO Capacity Building Management Plan.
- To implement sustainable and inter-regional use of e-learning technologies throughout IHO capacity building programmes.

III.   PROCESS

5.   The Process and Management

5.1   The 4 steps in the process

The capacity building process is built around 4 steps: awareness, assessment, analysis and action (the 4 As of Capacity Building).

The IHO CBSC recognises that the first step must be the raising of awareness of the significance and impact of hydrography on maritime safety, at the highest political levels in each country, and in the UN and subordinate technical organizations, regional maritime associations and funding agencies. Without this, adequate resources will not be secured and sustained for the implementation of the strategy. Assessment is underway on a permanent basis through the revision and update of C-55 and through technical visits. The subsequent steps of analysis, including prioritisation and identification of actions, and then the management and implementation of appropriate actions, require more detailed development within this policy paper and are itemised below. The degree of engagement required from each contributor to the process is suggested in the following table.

	IHO	CBSC	RHC	Country
Awareness	XXX	XXXX	XX	X
Assessment	X	XXX	XXXX	XX
Analysis	XXXX	XXX	XX	X
Action	X	XX	XXX	XXXX

Table 1: Degree of engagement (X = Low, XX = Medium-low, XXX = Medium-high, XXXX = High)

The process will require development of the following elements:

1. Intensification of efforts to raise awareness of hydrography and to provide reference documents on the minimum requirements for national hydrographic services in accordance with SOLAS Chapter V Regulation 9.
2. Implementation and management of a CB fund.
3. Completion of the revision of the C-55 database to identify key deficiencies.
4. Development of assessment criteria to determine appropriate and sustainable national capacity.
5. Implementation of effective RHC processes for analysis and prioritisation of capacity building needs within the region.
6. Definition of an Action Plan to address selected goals within specific timescales, and to identify and manage funding.

In some RHCs, it may be appropriate to consider a comprehensive, multi-year, programme of work, including multiple projects. This may include precise assessment of the first priority requirements, definition of the target capacity, identification of complementary funding, installation and coaching of an organization, training, delivery of some equipment etc. These actions should be conducted in a strongly integrated way, in order for each project to

contribute as a part of a holistic programme. A rigorous project methodology should be applied, to ensure successful implementation in terms of scope/budget/timeframe and monitoring/reporting to ensure the expected benefits are realised.

RHCs may also consider the adoption of a CB maturity model where the aspirations of nations can be assessed against each of the 3 CB Phases of development as defined in M-2 and shown in Figure 1. Such a model would identify the appropriate training/assistance/funding required to provide a clear pathway and action plan for a nation to achieve each CB Phase in a sustainable and enduring manner. The model may be used by RHCs to monitor and record a nation's progress towards the creation of a national hydrographic service. This information could become part of a comprehensive country profile as mentioned in Chapter 4.1.

The successive steps in the process are outlined in the paragraphs which follow. The CB Procedures approved by the CBSC contain the detailed information necessary to plan and execute the CB Projects, and are published in the IHO website (www.iho.int > Capacity Building).

5.2   Raising Awareness

The IHB should continue the campaign for the establishment of the hydrographic services required to meet obligations under UNCLOS and SOLAS. The high profile which the IHB has sustained in the UNICPOLOS process, and within the IMO, should assist the CBSC to implement specific actions to target subordinate international and regional agencies. Very significant progress has been made in IMO, and the imminent inclusion of the C-55 database in the IMO Member State Audit Scheme (VIMSAS) will provide effective leverage to commit governments to resource the arrangements required under SOLAS V Regulations 4 and 9.

The Marine Spatial Data Infrastructure (MSDI) provides a framework for the provision of hydrographic information beyond the traditional field of surface navigation. The IHO/CBSC should contribute to raising the consciousness among the HO's of the importance of hydrographic data in order to drive "The Blue Economy" and all it signifies, in terms of economic and socio-economic development.

The CBSC should continue to explore the best means of raising awareness of the importance of hydrography to the funding agencies. The urgency of this task is underlined by increasing evidence of international and regional investment in hydrographic equipment for either marine scientific research or protection of the marine environment, without adequate awareness of measurement criteria for data to support safe navigation.

Raising awareness may be efficiently supported by a risk assessment process, based on the status of hydrographic knowledge, the main characteristics of maritime activities, including shipping, and of their evolution, and an impact study of the consequences of insufficient hydrographic knowledge or services.

M-2 is available, free of charge, together with a general IHO Information Brochure and IHO PowerPoint presentation, on the IHO website (www.iho.int). These are important tools for meetings at ministry level during technical advisory visits, and are continuously updated.

5.3   Assessment and Analysis of Needs

5.3.1   Country profile

A further developed C-55 as a "country profile" will play an even more important role in Capacity Building;

The C-55 data-base on the IHO website contains tables of MSI, survey and charting information for each coastal state or state with hydrographically significant waters. The standard formats for the agendas of the IHO RHCs, and for the National Reports presented to them, provide for the regular review of this information and for the discussion of capacity building initiatives to improve the situation in each country. The main deficiencies in complying with SOLAS V Regulation 4 and 9 in many coastal states are as follows:

- No effective organization for the promulgation of information of importance to safe navigation and the protection of the maritime environment, either as navigational warnings or as inputs to NAVAREA Coordinators and those hydrographic offices with responsibility for charting;
- Outstanding actions to implement the GMDSS;
- No capacity to plan and implement a prioritised survey programme, including a re-survey component;
- Failure to apply IHO S-44 criteria in Marine Scientific Research and offshore industrial surveys;
- The lack of measures to ensure scientific & commercial survey data being incorporated in national bathymetric database;
- Lack of chart information on datum transfer parameters for GPS navigation;
- Lack of INT paper charts and ENC to support international navigation, especially in dangerous and VTS areas.

5.3.2 Technical Visits

Technical visits provide a powerful means of working with local administrators and experts to determine the arrangements for delivering SOLAS V obligations which are appropriate and sustainable for their country. Follow up visits may be required to support the recipient of the technical visit to implement the recommendations to establish hydrographic services.

5.3.3 Risk Assessment

A risk assessment provides a robust basis for prioritising a national/regional charting programme. The risk analysis methodology is evidence-based and objective against set criteria. It includes AIS traffic analysis and an economic assessment. The main output is a risk heat map which allows governments, charting authorities and other interested parties to come to a conclusion about the nature and scope of charting improvements and related maritime safety initiatives. A GIS is used for the analysis and to display the results. This allows complex data to be easily accessed and understood by key stakeholders to aid decision making and presents a compelling case for action.

5.4   Mechanisms for Action

The following mechanisms are available for capacity building action:

5.4.1   Contact with decision-makers and advice to national experts:
- IHO input to projects championed by IMO and other organizations;
- IHB advisory visits;
- RHC Visit Teams;
- Technical Workshops.

5.4.2   Technical assistance

IHO and RHC assistance in coordination of regional survey, charting and MSI projects,

including advice on liaison with funding agencies and with industry.

5.4.3 Bilateral assistance by other IHO MS, by MOU, or on contract or aid-funded basis:

- provision of SOLAS-compliant hydrographic services by other MS through legal administrative arrangement;
- loan of skilled staff;
- training, including options in region;
- output-based project assistance, with out-sourcing fully evaluated and exploited;
- appropriate and sustainable skill and technology transfer, including advice on organization and planning as well as support for practicing hydrography.

Specific regional comprehensive programmes, as mentioned in Chapter 5, may be prepared by a study, possibly outsourced, on the feasibility of building a generic multi-year CB programme, taking into account sustainable expected progress, funding sources and their availability, possible synergies with complementary international cooperation programmes, languages issues and the level of commitment of concerned nations.

5.5 Management of Capacity Building Action

The CBSC has established an IHO Capacity Building Fund (CB Fund). All transactions are transparent. Any donor may pledge funding for a particular purpose or project if desired.

The disbursement of the IHO CB Fund is controlled by using a costed Management Plan to derive annual Work Programmes. It enables the CBSC to assess and prioritise proposals submitted through the RHCs, and to approve appropriate responses for which costs and benefits have been balanced. Further details are given in the relevant Procedures.

5.6 Training methodologies and cooperation

Training is a very important part of the IHO CB. The methodologies and the means of cooperation with training facilities play an important role in the success of funded trainings. The following list encompasses the main rules and fields of work for the capacity building efforts of the IHO:

- Maritime Safety Information (MSI) will be given priority in order to achieve the first long term objective of this Strategy, based on a multi-year MSI CB Plan to be developed jointly by the CBSC and World-wide Navigational Warning Service Sub- Committee (WWNWS);
- CAT A and B – Depending on funding, consideration will be given to using IHO funds for CAT A and B survey training and CAT B cartography training for candidates from MS only.
- Training for the trainer (TFT), to improve the availability of trainers within a region or country.
- Standardization of trainings beyond CAT A and B where feasible, providing a structure of training possibilities for certain topics.
- MSDI training – MSDI Courses will be developed to cater for the different requirements of the various phases of Hydrographic development.
- Ensuring that syllabi of trainings are widely available, preferably in different languages.
- ~~Investigation of the practical benefit and a possible implementation of blended and e-learning.~~ Implementation of e-learning technologies in blended pedagogical process to consolidate multi-lingual training offer and to improve the follow-up on trainee's educational path.

5.7   Cooperation with Stakeholders

The CBSC works closely together with stakeholders, such as Nations, international and regional organizations and Non-Governmental Organizations (NGOs) to find a broad basis for the cooperation for the benefit of the IHO CB Strategy.

IV. PERIOD IN FORCE

6. Review and updates

The first version of the IHO Capacity Building Strategy Paper was approved by the members of the CBSC on 30 November 2006 and has been updated since then. This updated version was approved by the CBSC in May 2014 and adopted by the 5th Extraordinary International Hydrographic Conference in October 2014.