MINUTES OF MEETING

6TH EAHC CHARTING AND HYDROGRAPHY COMMITTEE (CHC) MEETING
16TH TO 18TH AUGUST 2017
TOKYO, JAPAN

WELCOME AND OPENING ADDRESS

1.   Dr Arata Sengoku, Chief Hydrographer of Japan Hydrographic & Oceanographic Department (JHOD) in his welcome address stated that considerable economic growth in the East Asian region has made the region into one of the busiest waterways in the world. For that reason hydrographic services are more important now than ever. He added that the work of hydrographers extends beyond nautical charts and that hydrography plays a vital role in ensuring not only the safety of navigation but also marine development, disaster mitigation and environmental sustainability. He encouraged delegates to keep in mind their responsibility of providing hydrographic products to mariners throughout the meeting.

2.   Chair (CHC) opened meeting and emphasised the need for the EAHC to keep up with and respond appropriately to the rapid changes in the hydrographic community and technology, in order to remain relevant. He added that the Agenda for the meeting contains important topics for discussion, and highlighted that MSDI is an important field that has gained more momentum recently. He also shared the need to begin focusing on areas such as the UN-GGIM, digitalisation of marine information, e-Navigation, Seabed 2030 and Crowd-Sourced Bathymetry.

3.   The List of Participants appears as **Annex 1**.

ADOPTION OF AGENDA

4.   The provisional Agenda was adopted with additional items proposed by member States.   The approved Agenda appears as **Annex 2**.

UPDATE BY EAHC PERMANENT SECRETARY (PS)

5.   Japan, as EAHC PS provided an update on the EAHC webpage and the presentation appears as **Annex 3**. Member States were encouraged to provide feedback to improve the website. In response, Singapore highlighted that the EAHC website is linked to the TRDC website which is maintained by ROK.

6.   Indonesia proposed adding a link to the profiles of each of the member State Hydrographic Office (HO). Japan explained that there is already a link to the websites of each member States. However, it was suggested and agreed that there should be a consistent format of presenting the profile of each HO similar to that profile published in the IHO yearbook. Additional links could be added to provide more information such as organisational structures, activities, etc. Japan agreed to work on this and to propose these additional pages at the next SC meeting.

Action Item 1: EAHC PS (Japan) to draft a proposal for additional pages to the EAHC website for information on Member States HO profiles to the next SC meeting for consideration.

REPORT ON IRCC9 RELATING TO RHCs

7.   Chair (EAHC) presented a summary report of IRCC9 highlighting items relating to RHCs. He added that his observation is that compared to other RHCs, the EAHC is very active and has a high level of cooperation among its Member States.

8.   Chair (CHC) further updated the Meeting on the key issues arising from IRCC relating to RHCs/EAHC and the presentation. The key Action Items for RHCs to follow up with, appears as **Annex 4**. A summary of the key issues are as follows:

Key Issues	Comments from Chair (CHC)
MSDI	It is important for EAHC to focus on the work of the MSDIWG and to harmonise information shared at a regional level. There was also a needs to have a discussion on the appointment of an EAHC MSDI ambassador.
CSB Activities	There is a document on guidelines on how crowd-sourced bathymetry information should be collected, managed, quality-assured, etc. which can be taken reference from. This is an important area of focus in terms of EAHC's contribution to Seabed 2030 objectives.
Bathymetric Data in Shallow Coastal Areas	It was highlighted at many forums that the EAHC has contributed the most comprehensive information on shallow waters, specifically in the South China Sea (SCS). The information is needed as a result of the Tsunami at Aceh and Fukushima.
Review of IHO Resolution 1/2005 IHO Response to Disaster	Japan was tasked to work with MSs that had made comments to the Resolution. The Chair (SWPHC) has also agreed to assist Japan in amending the Resolution to be less prescriptive. This should be brought up at the 2nd Council meeting in 2019.

9.   With regards to the Review of IHO Resolution 1/2005, Chair (TRDC-BOD) said that at the prior TRDC-BOD meeting, the meeting noted IHO SG's comments at SC4 on the need for capacity building for MSI services. The TRDC-BOD suggested to carry out an assessment of States' MSI capabilities and infrastructure so that MSI capacity building can be more effective.

SOUTH CHINA SEA (SCS) AND EAST ASIA (EA) ENCs

10.   Chair (CHC) recalled the discussion leading to the suspension of the SCS ENC cells, which was subsequently approved at SC4 by the EAHC Steering Committee. Following the suspension, the Secretary General IHO has sent a letter to the EAHC Member States enquiring on the rationale for the suspension of the SCS ENCs. His letter was prompted by feedback from the shipping lines that were concerned with the unavailability of the SCS ENCs. The presentation on this issue appears as **Annex 5**.

11.   Chair (EAHC) highlighted that the IHO Secretary General has requested a response by 31 October 2017.

Geographical Naming Issue – Way Forward

12.   After substantial deliberation and discussion, Chair (CHC) presented the various options on the way forward (and their pros and cons) as appears in Annex 5.

Option	Description
1	No changes in geographical naming (i.e. Existing names)
2	Having two or more names displayed in the ENCs
3	Highlight names to show that there are more than one name
4	Omit geographical names from the ENCs
5	Each concerned MS to produce their own SCS ENC and withdraw EAHC SCS ENCs

13.   Options 1 to 4 were explored at the last CHC meeting and a new option – option 5 – was proposed. As the SCS ENCs belongs to the Member States that have contributed to the product, Option 5 proposes for the ENCs to be updated and returned to each of the MS. Chair (CHC) emphasised the importance of resolving the issue and working towards a technical solution to update and release the SCS ENCs for the safety of navigation.

14.   Chair (EAHC) urged MSs to work together in finding a positive way forward and emphasised that as MSs of the EAHC, all MSs have a say in the discussion of the SCS ENCs.

15.   Indonesia, in principle, supports the development of EA ENC. From an economic perspective, reinstating the SCS ENC could generate revenue that could be channelled towards EAHC capacity building, as earlier agreed at previous meetings. Indonesia mentioned that specifications for geographical naming is found in the IHO Publication S-4 Chart Specifications, section 500. The consistent use of standardized geographical names is an essential element of effective global communication and is therefore a requirement for nautical charts and nautical publications, which are very valuable to mariners. Indonesia summarised that the geographical names which are included in nautical charts and nautical publications are for the convenience of hydrographic offices when compiling charts and nautical publications for navigational safety. Indonesia emphasised that maintaining positive relationships among EAHC MSs should be the priority. To that end, Indonesia advised undertaking option 5 and harmonising ENCs bilaterally as a viable solution. Chair (CHC) explained that if Option 5 is adopted, it would be on an interim basis, until a permanent arrangement is agreed upon. Chair (CHC) invited MSs to give their views on the issue and on option 5.

16.   Thailand opined that if the geographical names in the SCS ENCs do not have any significant impact on safety of navigation, it would not matter which names are used. Thailand added that their mandate from Ministry of Foreign Affairs is to support the option of having two or more geographical names, where applicable.

17.   Singapore emphasised that for the purpose of safe of navigation, there is still a need for SCS ENCs to be made available. Singapore was in favour of either having two or more geographical names or no names, but since there was no consensus, expressed that option 5 could be considered as this would at least offer a provision of the SCS ENCs to mariners.

18.   ROK noted the importance of the SCS ENCs given the wide use by mariners. ROK added that they are not a MS which has interest in the SCS so it would be difficult to express their views on any particular option.

19.   Philippines expressed their position of using common geographical names and needs to discuss and consult with higher authorities regarding the options presented before they can advise on a preferred solution.

20.   Malaysia maintained their position of either having common geographical names or no geographical names in the SCS ENCs, as this would conform to the technical specifications for the ENCs. Malaysia also agreed with Philippines that they also need to consult with their counterparts and authorities on the proposed option 5

21.   Japan emphasised that from the users' point of view, seafarers are waiting for the SCS ENCs to be available, and will use any available version regardless of which MS publishes them. They further added that the present situation is unfavourable to both EAHC MSs and ENC users. Japan reiterated the serious concerns expressed by IHO SG and urged delegates to come to a conclusive decision early.

22.   China stated that it recognised that all MSs are keen to find a technical solution to the geographical naming issue. China recalled that they had requested for being provided with data that prove that the present geographical names in Edition 2 has caused obstacles to safe navigation, but to date no comments have been received. China added that Edition 2 has been widely used for more than a decade and that from technical perspective, the present geographical names are satisfactory. China emphasised that the issue should not deviate from technical path and that any interim arrangement should not alter the focus items under discussion (i.e. geographical names in Edition 2). China reiterated that under multilateral circumstances, compromises are necessary but compromise cannot be expected without sound and reasonable grounds. China proposed updating the technical data in Edition 2 without any change to the existing geographical names and cited three benefits of this proposal: (i) it meets the needs of seafarers; (ii) it allows EAHC to respond quickly to IHO SG's queries; and (iii) it opens an opportunity for further discussion in the future.

23.   Chair (CHC) explained that given that there is still an impasse on the issue and MSs have expressed the need to seek prior consultation from their higher authorities, the focus at this point should be on how EAHC should appropriately respond to IHO SG.

24.   Chair (EAHC) proposed that the Meeting deliberate and agree on a solution that would allow for more time to respond to IHO SG, especially since MSs needed to consult their counterparts and higher authorities back home for direction.

25.   Chair (CHC) proposed a new option (Option 6) for the Meeting's consideration, which is to identify the SCS ENC cells which were not affected by the naming issue and update and release them. He explained that this would be a way forward to keep the maritime community aware that the SCS ENCs are being updated. Chair (CHC) suggested to consider option 6 and requested for Chair (EAHC) to send a Circular Letter seeking MSs' views on and acceptance of option 6 as this would give them time to consult with their respective higher authorities first. The Meeting noted that the main benefit of option 6 would be that the counterparts and SCS ENC cells will progressively be updated and hopefully the complete updated version of all cells will eventually be released.

26.   Regarding option 6, Japan expressed concern that mariners may ask about the cells that are not updated. Chair (CHC) suggested that given the numerous ENCs updates to be

done, it would take time to update all the ENCs together. Hence, the response would be that the ENC cell will be released progressively.

27.   Philippines asked whether the proposed option 6 needs to be brought up at the next EAHC SC meeting for approval. Chair (EAHC) explained that due to the tight timeline given to the Secretary General IHO, he recommended that he would draft a response after receiving inputs from Member States. This will be carried out through a Circular Letter.

28.   Member States unanimously agreed that option 6 would be a reasonable and good way forward and this should be explored further.

> **Decision 1:** MSs to consider option 6 – identifying the SCS ENC cells which are not affected by the geographical naming issue and update and release them, subject to consultation with their respective counterparts and higher authorities.
>
> **Decision 2:** Chair EAHC to write a Circular Letter to MSs seeking their views on and acceptance of Option 6. The CL would include a draft response to IHO SG. The CL should be issued by mid Sep 2017 and for MSs' to reply by mid Oct 2017.

MSDI

Sharing of National MSDI Plans

29.   Singapore presented on their updates on MSDI and the presentation appears as **Annex 6**. The Meeting noted Singapore's updates.

30.   Thailand presented on their updates on MSDI plans and the presentation appears as **Annex 7**. The Meeting noted Thailand's updates. In response to Chair (CHC)'s question, Thailand responded that because of the MSDI capacity building training received through the IHO Capacity Building Programme, that they were able to produce their comprehensive "One Marine Map".

31.   Thailand also elaborated that about 22 agencies were involved in the project to coordinate and compile the information for their "One Marine Map" In reply to the platform used to carry out the project, Thailand explained that the Royal Thai Parliament was the overall coordinator and that ArcGIS will be used for the project.

32.   ROK reported that they will be creating an MSDI education video which will be completed by the end of 2017. ROK explained that their government was currently focused on ROK's land SDI rather than marine and added that they plan to publish marine MSDI products by next year. ROK further added that they are planning an International MSDI workshop in Seoul, Korea, from 11 to 12 November 2017 and have already invited the Chair and Vice Chair of IHO MSDIWG to attend. ROK will provide further information on this workshop through an EAHC Circular Letter.

33.   Malaysia presented their NMSDI project and the presentation appears as **Annex 8**. In reply to Indonesia enquiry on whether the MSDI information is open to public access or only within Malaysian government agencies. Malaysia replied that currently as MSDI is part of the Malaysia Geospatial Data Infrastructure Programme (MyGDI), it is still in the developmental stage. The data currently is only being shared within government agencies and stakeholders and will be open to public access later when ready. Chair (CHC) observed that eventually the

information could be accessed after the setting up of frameworks and policies for access controls.

34.   Japan reported that JHOD has been operating an MSDI based on a webGIS system called "Marine Cadastre" where various marine datasets are layered. Japan explained that Marine Cadastre is operated under the governance of Headquarters for Ocean Policy. Japan informed that they have updated the SC meeting in 2016 on their activities on Marine Cadastre and that there have been no major changes since then. Japan expressed their willingness to contribute their experience to the EAHC MSDIWG.

35.   Indonesia presented on their updates on Indonesian MSDI and the presentation appears as **Annex 9.** Indonesia informed that their Hydrographic Data Centre is accessible through a web portal (http://hdc.dishidros.go.id). Indonesia mentioned that the application for safety of navigation is open to public. They further added that through this portal, mariners can plan their routes by plotting their routes and being informed of which charts and versions they would need for those routes. Indonesia updated that the Indonesian MSDI is already being used by stakeholders in Indonesia as a basic marine information system, in particular, connecting to their geospatial portal.

36.   China updated that at the present stage, they have yet to complete their development of MSDI. They further updated that they have joined the EAHC MSDIWG.

37.   Philippines presented their Philippine Geoportal via their website (www.geoportal.gov.ph). Philippines explained that the Geoportal contains data from approximately 50 to 60 partner agencies and that it is managed by NAMRIA. The Geoportal has 3 modules: (i) Map Viewer; (ii) Map Builder; and (iii) the Map Apps. Philippines then gave a live demonstration of their Geoportal and its modules.

38.   Chair (CHC) asked who/which agency sets the standards for data for other agencies to comply with and whether NAMRIA manages all the data from the various agencies. Philippines replied that several interagency technical working groups were created for this purposeand that the system is housed and managed byNAMRIA. The Meeting noted that for larger countries like Philippines, it is can be a challenge to convince and coordinate the many agencies to share their data. The Philippines shared that from their experience, it was beneficial to have a data sharing policy to facilitate the data sharing.

39.   Singapore highlighted that the common characteristics of the MSs' MSDIs is that ENCs form the base information and that HOs are, by default, the coordinators of MSDI among their respective national agencies. Singapore suggested that this is a good starting point when looking towards an East Asian regional MSDI and suggested holding a workshop or brainstorming session to share ideas on how to coordinate MSDI efforts, train officers in MSDI etc., and to establish a national and regional MSDI roadmap.

40.   Chair (CHC) highlighted that MSs' MSDIs are taking shape, but at different levels of development and emphasised that MSDI is the way forward in getting marine information integrated into a single platform to serve multiple uses and stakeholders. He directed the Chair of the EAHC MSDIWG Chair (ROK) to look at the issues that were discussed and to come up with recommendations to SC5 for consideration.

41.   MSDIWG Chair (ROK) proposed writing a Circular Letter to gather ideas and recommendations when drafting a plan for the MSDIWG, including recommendations for the

International MSDI Workshop in November 2107. Chair (CHC) urged MSs to respond with positive feedback and share their information and experiences with their own MSDIs. With regard to the request by the IRCC to appoint an MSDI Ambassador for the region, it would be appropriate that ROK being the Chair of the EAHC MSDIWG should be appointed.

> **Decision 3:** MSDIWG Chair (ROK) to draft a Circular Letter seeking MSs' inputs and recommendations in drafting a plan for the MSDIWG and information on their experiences with their respective MSDIs.
>
> **Decision 4:** EAHC PS (Japan) to establish an access point in the EAHC website for MSs' to share their MSDI progress and plans.
>
> **Decision 5:** ROK is appointed as the MSDI Coordinator for EAHC.

HARMONIZATION OF STANDARDS AND SPECIFICATIONS OF ECS AND ECDIS

42.   Singapore presented their updates on ECS for Singapore harbour craft and the presentation appears as **Annex 10**.

43.   Japan asked if all the ECS in Singapore display ENCs and Singapore explained that the application software functions are not as extensive as the full ECDIS, but it contained basic functions of zooming in and out of the ENCs, ENC updating and route planning.

44.   Malaysia asked if the ECS is produced by MPA and how MPA regulates the use of ECS. Chair (CHC) explained that an open tender was called for a manufacturer to develop and supply the ECS that is integrated with AIS "B". In addition the ECS must be able to receive updates remotely (via Wi-Fi or 3G). The rationale is because harbour craft owners were unlikely to manually update the ECS. He mentioned that there are interest in this area, Singapore could be shared the specifications.

45.   ROK asked whether there were any challenges with implementing the mandatory ECS for harbour craft. Chair (CHC) explained that before accepting the ECS from the manufacturer, MPA had officers to trial the ECS and evaluate the functionalities to ensure that there were no issues with display on the ECS (e.g. no overlapping of ENCs, especially when zooming). Chair (CHC) noted that the smaller ECS display screen was because the smaller size of harbour craft made on-board power supply was a key consideration.

46.   Singapore added that ECS User Guides and training on the use of ECS were provided to the masters of the harbour craft and added that the main challenge was getting harbour craft operators who are used to paper charts to start using ECS as a new technology.

47.   ROK expressed concern over whether the standards and specifications used for ECS in displaying ENCs are sufficient for HOs to be safe from liability should a harbour craft encounter accidents or grounding when using ECS. Chair (CHC) suggested that ECS can be Typed Approved by Classification Societies with standards and specifications based on RTCM and IEEC. The Meeting noted that Singapore's ECS complies with Class C RTCM ECS standard.

E-MIO SUB-WORKING GROUP

Report on the Working Group Activities and a Way Forward

48. ROK presented their updates on e-MIO working group and the presentation appears as **Annex 11**. ROK emphasised that the e-MIO is aimed at addressing the need to protect the marine environment and support the blue economy.

49. ROK updated that Phase 1 has been completed with regards to the test bed study based on S-57 and development of the S-57 e-MIO Viewer. They invited MSs to consider suspending the e-MIO project considering Phase 2 was experiencing slow progress with respect to the development of S-100/10X. Chair (CHC) asked if ROK could share the S-57 tools and products with MSs as many MSs are still producing S-57 products.

50. Indonesia mentioned that the results of the e-MIO would be useful to them and that they can implement the e-MIO prototype in their HO as they work with CARIS as well. ROK mentioned that the production tool can be made available and implemented as long as the HO has the CARIS software and that they can contribute their experience and guidelines on how to establish an e-MIO environment. ROK also agreed that they can share the viewer and test dataset.

51. Singapore suggested that a possible way to continue promoting the e-MIO is to park the project (Phase 2) under MSDI, under the purview of the EAHC MSDIWG. The reason was that since the MSDI and the marine environment was gaining greater attention, the e-MIO project could continue its development under the auspices of MSDI. ROK expressed that they could consider the suggestion but would have to discuss this internally first.

52. Chair (CHC) remarked that MSDI might not be a relevant platform because e-MIO does not only concern datasets, but largely concerns S-100. He added that it would be more relevant to place e-MIO under S-100 because the e-MIO tools in Phase 2 will be developed based on S-100 and the encoding format will be the new OGC GML standard rather than ISO 8211. ROK replied that since one of the four components of MSDI is standards, e-MIO may still be relevant under MSDI and ROK can contribute their experience with S-100 in e-MIO with the MSDIWG.

53. Chair (EAHC) opined that e-MIO should be kept separate as it would contribute to the marine environment and it should be recognized as a useful contributor to the Blue economy.

Decision 6: ROK agreed to offer to share their e-MIO S-57 tools and viewer with MSs. ROK to also write to Chair (EAHC) to write a Circular Letter informing MSs of ROK's offer.

Decision 7: ROK agreed to consider that e-MIO can be considered in EAHC MSDIWG.

S-100 STUDY GROUP

Report on the KHOA S-100 and e-Navigation activities

54. ROK presented a video on S-100 and their presentation on updates on KHOA S-100 activities and e-Navigation. Their presentation appears as **Annex 12**.

S-100

55.   Chair (CHC) asked ROK if they had a list of areas which are sensitive receptors, e.g. sensitive to oil spills and mentioned that Singapore could provide ROK with such a list. ROK replied that that would be helpful and Chair (CHC) asked Singapore to follow up on this.

56.   Philippines commented that since the developments of S-100 new specifications, mariners and users of new products will exhibit different levels of acceptance as many will find it challenging to adjust from one system to another. Philippines added that this would mean resources required to train users, manufacturers, etc. on using new products and asked what the potential effects of this would be.

57.   Chair (CHC) explained that S-10X is being developed specifically for this. ROK added that if the processes of S-100 is followed, datasets can be utilised in S-100 publications, ECDIS and GIS.

58.   Chair (CHC) sought clarification from ROK on whether the planned release of the S-101 product specifications in 2018 is still achievable, given the limited resources available. ROK explained that the content for the implementation guidelines comes from the current S-52 but with modifications made to it, so there should not be any issues with releasing the implementation guidelines.

e-Navigation

59.   ROK highlighted that the key importance of e-Navigation is the transfer of marine information from shore to ship (and vice versa) where the information is displayed on ECDIS. ROK added that there is also the need to move towards digital services and explained that only through digital services could other information like surface current and tidal information be harmonised and overlaid on ENCs.

60.   Chair (CHC) emphasised that the next generation of mariners and ship owners will have different demands for different products as we move rapidly into the digital age, HOs and EAHC need to be prepared to meet these new demands. He cited the example of ship owners requiring e-Navigation for route planning for fuel efficiency as part of an IMO vessel fuel-efficiency programme.

61.   Indonesia mentioned that Indonesia also has a programme to improve their e-Navigation and requested for ROK to provide support and assistance. Chair (CHC) asked ROK to continue updating the CHC on the progress of e-Navigation and asked China to play a role in e-Navigation development for EAHC and to provide a report on e-Navigation at the next meeting.

62.   Indonesia asked if e-Navigation could be part of the TRDC Capacity Building Programme. Chair (CHC) replied that alternatively this could be proposed to the SC to consider establishing an e-Navigation WG to continue monitoring the development and progress of e-Navigation.

> **Action Item 2:** Singapore to provide ROK with a list of types of sensitive receptors with respect to a marine oil spill.
>
> **Decision 8:** ROK and China to continue updating CHC on the progress of e-Navigation.

UPDATE ON JOINT HYDROGRAPHIC SURVEY IN THE MALACCA AND SINGAPORE STRAITS

63.   Malaysia presented their updates on the Joint Hydrographic Survey is the Malacca and Singapore Straits and the presentation appears as **Annex 13**.

64.   Indonesia remarked that from their current hydrographic survey of the Malacca and Singapore Strait, they found several areas with sand wave and expressed that they would like to have the opportunity to learn more about sand wave movement. Chair (EAHC) supported having studies on sand waves and Chair (CHC) suggested that for project proposal the Cooperative Forum could be the forum to seek funding support for the studies, if needed.

65.   Mr Ito (JHA) added that they have found sand waves near the One Fathom Bank area during the Phase 1 of the survey, but were unable to identify how much movement the sand waves experience because of the lack of historical data. However, the results from the Phase 2 Survey in 2018 could be used to compare with results from Phase 1 results in order to gain a better understanding of the sand wave movement. Chair (CHC) remarked that it is important to study sand waves and that studies of sand waves should be carried out over a long term.

UPDATE ON SATELLITE DERIVED BATHYMETRY (SDB)

66.   Mr Matsumoto of JHOD Ocean Research Lab presented Japan's update on the SDB study and the presentation appears as **Annex 14**.

67.   Chair (CHC) asked if there was any correlation between water clarity (i.e. turbidity) and depth of penetration. Japan replied that this has not been numerically evaluated as they did not have the water clarity data. Japan further added that in Choshi port, the area was divided into areas of turbid and clear water and that the analysis data improved to some extent but since the system could not fully cope with variations in turbidity, there is no clear quantitative evaluation of the correlation between water clarity and penetration depth.

68.   Mr Kamei of Remote Sensing Technology Centre of Japan (RESTEC), gave an introduction to RESTEC and its core activities, and presented on satellite remote sensing for oceans and the presentation appears as **Annex 15**.

69.   Chair (CHC) asked whether the received satellite data was used to classify sea grass. Mr Kamei replied that the satellite was used to detect sea grass, seaweed, etc. but could not distinguish the types of sea grass and that this could only be done by optical satellite imagery.

70.   Indonesia mentioned that they are also still working on developing an SDB system and that they have starting working with their national aerospace agency, but have not yielded positive results yet. Indonesia expressed that they hope Japan can provide them with support and assistance with SDB. Indonesia also proposed to present their study on SDB at the next meeting with the aim of gaining feedback from MSs who have expertise in SDB.

71.   ROK asked how the remote sensing could verify detected objects as illegal vessels, i.e. vessels that do not transmit AIS signals. Mr Kamei clarified that all ships must carry AIS systems so if an object is detected as a ship by the remote sensing, but does not correlate with an AIS signal then it is potentially an illegal vessel and needs to be investigated. Regarding using SDB in deep waters, Mr Kamei explained that their research indicates that the maximum water depth that SDB can be used for is approximately 30m and depends largely

on water clarity. Mr Kamei added that for waters deeper than this, other survey techniques should be used.

72.   Chair (CHC) asked whether the radar technology allows the detection of oil spill and whether any research has been done in this area (e.g. difference between detecting thick and thin oil). Mr Kamei replied that radar can detect oil spills and that Japan does have experience in detecting oil spills using radar satellites.

73.   Chair (CHC) further asked if all the satellites operate round the clock and what the cost of operation is. Mr Kamei replied that some radar satellites are commercial available but are very costly to use. However, the European Space Agency has launched a satellite called Sentinel which provides data free of charge, similar to Landsat 8.

74.   Japan summarised that the advantage of using SDB are that it provides data quickly and at low cost, but the major disadvantage is that SDB data is not as precise as multibeam survey data and does not comply with S-44. Japan added that SDB data is not good enough for charting but is good for survey planning and prioritisation.

RISK ASSESSMENT IN MANAGING HYDROGRAPHIC SURVEY PLANNING FOR UPDATING OF NAUTICAL CHARTS

75.   Indonesia presented their update on risk assessment in managing hydrographic survey planning and the presentation appears as **Annex 16**. Indonesia also demonstrated their prototype ArcGIS Nautical Chart Risk Assessment System and dashboard showing: (i) AIS monitoring which shows vessel traffic density and vessel destinations; and (ii) chart status, i.e. which charts have been updated with new survey data.

76.   Chair (CHC) asked Indonesia how long they took to finish surveying the areas which had been updated. Indonesia explained that up until now, they have completed the survey and updated approximately 35% of all of Indonesia's waters and hope to finish surveying and updating all areas by 2021. They added that they are also working with other maritime agencies to expedite survey coverage.

77.   In reply on where the AIS data was obtained, Indonesia explained that the AIS data was obtained from an ESRI-based system. Indonesia shared that the system is still a prototype and added that they plan to appoint a third party to provide the AIS data after implementation.

78.   Responding to how much input were received from agencies outside of PUSHIDROS. Indonesia replied that they have established an Indonesia Hydrography Council (IHC) which consists of all stakeholders in hydrographic survey and have received support from other agencies through the IHC.

79.   Singapore commented that the prototype Indonesia has established is aligned with the MSDI concept and that it would be useful to learn about the thought process that went into developing the applications. Indonesia was requested to share their experiences and knowledge to the potential courses on risk assessment, which was decided at the earlier TRDC-BOD meeting. Singapore noted that Indonesia's risk assessments are cell-based and asked whether future ENCs will also be cell-based and not chart-based. Lastly, Singapore asked if their applications were developed in-house or by a third party.

80.   Indonesia shared that the applications were developed in-house with the assistance of a third party and that future charts will be cell-based as well, as they have planned to renumber the charts after the completion of all the surveys.

81.   Philippines asked whether Indonesia is going to produce risk assessment charts for specific areas or if the analysis is cell-based. Indonesia replied that the assessment is cell-based and explained that there is no issue with using either chart-based or cell-based in terms of programming but when updating is required, it is easier to do the updates cell-based.

82.   Chair (CHC) summarised that AIS vessel traffic data was an important component to the risk assessment. Indonesia agreed to share their experience once their project on risk management has been implemented. Chair (CHC) suggested that this could be presented at SC meeting in March 2018.

83.   Philippines added that looking ahead, since data is collected from several government agencies and integrated into one server, Indonesia could also consider assessing the economic impacts of accidents, oil spills, ship collisions, etc. In response to Philippines, Indonesia mentioned that they had requested ROK to assist them in developing an e-MIO as they plan to integrate it with their risk assessment application. They added that it was the objective of the Indonesia Hydrography Council to integrate agencies data into one platform and that this is part of PUSHIDROS's efforts to support their government's vision of making Indonesia a global maritime axis.

84.   Chair (CHC) suggested Indonesia should include SDB as a tool for identifying areas of high risk in their risk management paper to the SC.

Decision 9: Indonesia to share their experiences on the risk assessment and report at the SC Meeting in March 2018.

DEVELOPMENT OF PORT AND INLAND ENCS IN INDONESIA

85.   Indonesia presented their update on the development of port and inland ENCs in Indonesia and the presentation appears as **Annex 17**. From the presentation, selected port, inland and waterways ENCs with 1m contour intervals have been produced to facilitate navigation in shallow and confined rivers. Indonesia explained that these ENCs have given greater confidence to users and even helped save cost by reducing the number of tugs required. Indonesia plans to produce more ENCs covering other parts of Indonesia.

86.   Japan asked Indonesia if there was any cooperation with their river maintenance section when producing the inland charts. Indonesia explained that maintenance of rivers is performed by their local port authority. They added that the port authority will report river maintenance works to the hydrographic office to follow up with surveys and that all data collected in the rivers are submitted to the hydrographic office for assessment and charting.

POSSIBLE COLLABORATIVE PROJECTS

Progress on the Concept Study of Tide and Sea level in the SCS

87.   ROK presented their updates on the Concept Study of Tide and Sea Level in the SCS and the presentation appears as **Annex 18**.

88.   Chair (CHC) asked ROK what support they needed from MSs, apart from data, in order to move to project forward. ROK mentioned that there are several teams interested in the research but that funding support for the research and project is first needed to move it forward.

89.   Chair (CHC) proposed that ROK first seek a small funding to support a feasibility study by the researchers on the MSs surrounding the SCS and then explore how this can be translated into a project. ROK replied that they have discussed the issue internally prior to the meeting and concluded that KHOA will be unable to fund the research further, as it is not a technical issue. Chair (CHC) clarified that the main funding for the research will still come from World Bank.

90.   Indonesia expressed that the research is useful especially for mariners, and are willing to share their tidal data. Malaysia also expressed their support for the research as it serves the common interest of EAHC.

> **Decision 10**: ROK to consider if funding support is available to carry out a feasibility study with interested MSs.

ANY OTHER MATTERS

EA RECC

91.   Hong Kong (China) presented on their progress on establishing the EA RECC and the presentation appears as **Annex 19**. They updated that since the SC4 meeting in February 2017, Hong Kong (China) has begun preparatory work for EA RECC establishment in March 2017.

92.   Hong Kong (China) further invited EAHC MSs to join the EA RECC and invited enquiries on matters related to the development and operations of the EA RECC. The details of the contact persons are included in the presentation (Annex 19).

93.   Chair (CHC) suggested Hong Kong (China) to send invitation letters to all EAHC MSs to join EA RECC. Chair (EAHC) agreed and suggested to include in the letter terms of references, details of the roles of EA RECC, and the benefits of joining the EARECC.

94.   Chair (EAHC) asked Hong Kong (China) about on the outcomes of discussions with IC-ENC after the workshop with IC-ENC and EA-RECC staff in July 2017. Hong Kong stated that the IC-ENC will present a paper to SC (IC-ENC) on the details of workshop and that IC-ENC sees an opportunity for collaboration, and there is a need to identify areas RENCs can collaborate on.

> **Action Item 3:** Hong Kong (China) to send invitation letters to MSs through Chair (EAHC), outlining the details and roles of the EA RECC.

USE OF ENCs ON SMART PHONES

95.	Indonesia shared on the use of ENCs on smartphones for navigation. They explained that mariners in Indonesia use their ENCs on smartphone applications for navigation, for example the Navionics app. Indonesia explained that they do not have an agreement with Navionics on the use of their ENCs. Hence, Indonesia sought MSs' views on how they have managed such commercial vendors.

96.	Hong Kong (China) shared that they do not have any agreement with any company to publish or reproduce their ENCs in any other format. Hong Kong explained that about 3 or 4 years ago, they found that Navionics had copied their ENCs and data, which were outdated. Hong Kong said that they had asked Navionics to withdraw the ENCs but Navionics explained that they had an agreement with UKHO to reproduce Hong Kong (China) charts/ENCs. Hong Kong (China) later found out that UKHO confirmed that no such agreement existed and subsequently Navionics had to withdraw the ENCs.

97.	Hong Kong further explained that after Navionics withdrew Hong Kong's ENCs, they received feedback from local mariners asking why they prohibited Navionics from using their ENCs and data. Hong Kong emphasised that the impact of commercial companies taking and using ENCs data without permission is a growing problem.

98.	Chair (CHC) asked what are the lessons learnt from the experience. Hong Kong (China) mentioned that they are still trying to find a solution because this matter largely concerns policy. Hong Kong (China) highlighted that the most important aspect is the matter of liability, since HOs cannot control how these companies display and alter the data after they derive them. Hong Kong explained that they are looking at developing some web and/or mobile applications which they hope to complete in a year and distribute to local users free of charge, so that they could obtain high quality data for their usage.

99.	Japan explained that they have had similar experiences with Navionics and that they have taken action to stop Navionics from using their data. Indonesia updated that they have sent an email to Navionics 3 months ago but have yet to receive a reply or acknowledgement from them. Chair (CHC) advised the delegates to take the matter up with their respective legal departments for advice.

INTRODUCTION OF KOREA HYDROGRAPHY AND RESEARCH ASSOCIATION (KHRA)

100.	ROK presented an introduction of KHRA and the presentation appears as **Annex 20**. ROK gave an overview of KHRA's history, organisational structure and activities.

101.	The Meeting noted ROK's introduction of KHRA.

WORLD HYDROGRAPHY DAY 2017

102.	Philippines presented on their activities during their celebration of World Hydrography Day in June 2017 and the presentation appears as **Annex 21**.

103.	Indonesia shared their activities as part of their World Hydrography Day 2017 celebration. They reported that the month long celebration will conclude with a World Hydrography Day seminar on 31st August 2017 and invited MSs to participate in the seminar.

TERMS OF COMMITTEE CHAIRS

104.   Chair (EAHC) proposed, as part of the long term plan, for MSs to consider the working committee to be chaired by the second tier of officers while Chief Hydrographers would Chair the SC. Chair (CHC) said that this should be raised at the next SC meeting, where chair appointments and tenures could also be discussed.

DATE AND VENUE OF NEXT MEETING

105.   Thailand expressed that they will consider hosting the next CHC meeting subject to their management's approval. As a back-up, the Meeting appointed Indonesia to host the next meeting.

106.   Indonesia said that they could offer to host as a backup meeting venue.

ADOPTION OF THE MINUTES OF MEETING

107.   The minutes of the meeting was adopted.

CLOSE OF MEETING

108.   Chair (CHC) closed the 6th EAHC CHC Meeting and thanked the delegates for their active participation and cooperation in the meeting. He also expressed his gratitude towards Japan for hosting the meeting.

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