

Report of the Hydrographic Surveys Working Group

Submitted by:	David Parker, Chair, HSWG
Related Documents:	S-44 v6.1 [Proposed]
Related Projects:	S-44 Drafting Team Manual on Hydrography Project Team (C-13) Satellite Derived Bathymetry Project Team
Chair:	David Parker, UK
Vice-Chair:	Megan Greenaway, USA
Secretary:	Carlos Videira Marques, Portugal
Member States:	Australia, Belgium, Brazil, Canada, Chile, China, Croatia, Denmark, Ecuador, France, Germany, India, Indonesia, Iran, Italy, Japan, Korea, Latvia, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Turkey, UK, USA
Expert Contributor Organisations:	AFHy, AML, David Evans and Associates, ECA Robotics, EGS, Fugro, IFHS, Institut Teknologi Bandung (ITB Indonesia), IIC Technologies, iXBlue, JOA Surveys, Kongsberg Maritime, Teledyne Marine
<i>see Annex A for full details</i>	

Meetings Held During Reporting Period

1. HSWG1 held via VTC 29th June to 1st July 2021. ~50 Attendees.
 - HSWG Work plan further established, and consensus reached.
 - Two Project Teams (C-13 and SDB Best Practice) and S-44 Drafting Team Established.
2. HSWG2 held via VTC 15th to 18th February 2022. ~60 Attendees.
 - In-person meeting in Ireland organised but abandoned due to covid.
 - 2 days of break-out sessions for PTs and S-44
 - Amendments to S-44 agreed, v6.1 created, update cycle set.
 - C-13 Manual on Hydrography update progressed.
 - SDB Best Practice Guide progressed.
 - Liaisons established with all other relevant HSSC WGs.

Work Program

- S-44

The key output from the past year is the update of S-44 v6.0 to create v 6.1. This was achieved through a consultation phase with WG members followed by a document update by a dedicated Drafting Team. This updated v6.1 was then approved by the whole WG at the conclusion of HSWG2. Overall, changes were relatively minor and are all listed within the changes list provided within the v6.1 document. A summary of the revisions is as follows:

- Clarification of terms: reference frame/system, uncertainty component, horizontal distance between registered positions and range line/leading lines.
- Insertion of TVU equation to Table 1 Minimum Bathymetric Standards
- Grammar updates

A substantial new version (i.e. 6.1 not 6.0.1) was required to meet IHO Strategic Objective 2.2.2 to monitor downloads of S-44. A lesser change will not have prompted parties to re-download.

An Impact Assessment survey is now underway with the WG and will be completed by the end of April 2022.

A future 2-year update cycle for S-44 has been agreed (see Annex C).

- **Manual on Hydrography Project Team**

The MHPT have met during break-out sessions within HSWG1 and 2, as well as one intersessional meeting in December 2021. MHPT is Chaired by Nickolas Rocher (Brazil), supported by Iain Slade (IFHS/Fugro) and Poerbandono from Institut Teknologi Bandung (ITB Indonesia).

They are maintaining their own work plan which is subordinate to the HSWG Work Plan. See annex D.

Meetings to date have focused on what existing C-13 content is still relevant, defining new content required as well as discussing delivery formats (i.e. PDF, Web Based etc).

- **Satellite Derived Bathymetry Project Team**

The Satellite-Derived Bathymetry best practice Project Team (SDBPT) has been formed under the HSWG Framework. SDBT is Chaired by Knut Hartman (EOMAP), supported by Poerbandono from Institut Teknologi Bandung (ITB Indonesia).

They are maintaining their own work plan which is subordinate to the HSWG Work Plan. See annex E.

SDBPT held an intersessional meeting in October 2021 as well as two breakout sessions during the HSWG2. Their core objective is to structure the activities and responsibilities for the C-2 work item, the Satellite-Derived Bathymetry Best Practice Guidelines. Teams of subject matter experts, timelines and structure have been defined and we look forward to good progress within Q1 and Q2 2022. Both HSWG2 sessions were well attended with more than 20 participants each from 16 countries. The breakout session hosted guest speakers from the satellite providers Planet and Airbus providing a valuable overview of the current capabilities of the satellite fleets.

SDBPT are due to have initial draft of the SDB Best Practice Guide available in Q2 of 2022.

- **Other**

HSWG have established liaisons with other key WGs, such as S-100, HDWG, DQWG and TWCWG. This is intended to lead to better interactions, such as an agreed mapping between S-44 and CATZOC.

Progress on HSSC Action Items

As above.

Problems Encountered

1. No significant problems encountered to date, other than adapting to limitations of pandemic.
2. Meetings via VTC only remain challenging. However, this has only slightly impacted on progress of C-13 only.
 - VTC does enable high participation rates.
 - Hybrid meetings difficult and expensive.
 - HSWG intends to hold two meetings a year – one in person, one virtual.

Any Other Items of Note

- HSWG intends to hold two meetings a year – one in-person, one virtual.
- HSWG Chairing team and Project Team Leads content to remain in post for a three-year term (to start of 2024).

Conclusions and Recommended Actions

- An updated version of S-44 has been successfully completed. These are primarily minor corrections and clarifications. However, this enables tracking of downloads of this new version in line with Strategic Objective 2.2.2. HSSC are requested to review and approve for onward MS approval.
- A two-year update mechanism for S-44 has been established.
- MHPT have made a start on an update to C-13. However, this is a big task which will take a considerable amount of time.
- SDBPT have made good progress on their SDB Best Practice Guide, due to be complete in 2022.

Justification and Impacts

- Updates to S-44 have been agreed by consensus of the HSPT. These are primarily minor corrections and clarifications, so should not cause any issues to MS or industry.
- An S-44 v6.1 Impact Assessment survey is underway with HSWG Members, to be completed by the end of April 2022.
- S-44 v6.1 will require MS and Industry to download this new version. This can now be tackled by IHO to monitor uptake, a requirement of Strategic Objective 2.2.2
- All other activity is work in progress in line with published work plans.

Action Required of HSSC

The HSSC is invited to:

- a. Approve S-44 v6.1
- b. Note proposed S-44 update cycle
- c. Agree and support proposed work plans

Membership of [WG]

Member State	Name of Delegate	email
Australia	Andrew Coulls	andrew.coulls@defence.gov.au
Belgium	Axel Annaert	axel.annaert@hzs.be
Belgium	Johan Verstraeten	johan.verstraeten@mow.vlaanderen.be
Brazil	Anderson Peçanha	a.pecanha@marinha.mil.br
Brazil	Nickolas Roscher	nickolas.roscher@marinha.mil.br
Canada	Andrew Leyzack	Andrew.Leyzack@dfo-mpo.gc.ca
Chile	Luis Montecinos	lmontecinos@shoa.cl
China	Chao ZHU	541762219@qq.com
China	Jin Wu	13825086995@139.com
China	Liang Chen	Chenliang_msa@163.com
China	Lingzhi Wu	3511431@qq.com
China	Shujuan Jia	Lymkguo@163.com
China	Yulei DONG	Yulei0539@126.com
China	Zhengwei CHEN	64204429@qq.com
Croatia	Hrvoje Čikotić	hrvoje.cikotic@hhi.hr
Croatia	Ljerka Vrdoljak	ljerka.vrdoljak@hhi.hr
Croatia	Vinka Kolić, M.Sc.	vinka.kolic@hhi.hr
Croatia	Ante Glavurdic	ante.glavurdic@hhi.hr
Croatia	Goran Olujic	goran.olujic@hhi.hr
Denmark	Belén Jiménez Barón	bejim@gst.dk
Ecuador	Jorge Alovera Alvarado	jorge.alavera@inocar.mil.ec
France	Jeremy Rossetto	jeremy.rossetto@shom.fr
Germany	Jean-Guy Nistad	jean-guy.nistad@bsh.de
India	Kuldeep Singh	kuldeepsingh.r@navy.gov.in
India	Vishal Sharma	inho@navy.gov.in
IR of Iran	Ali Soltanpour	asoltanpour@yahoo.com
Italy	Enrico Zanona	enrico.zanone@marina.difesa.it
Italy	Ilenia Batzu	ilenia_batzu@marina.difesa.it
Italy	Claudio Caporale	claudio.caporale@marina.difesa.it
Japan	Masanao Sumiyoshi	ico@jodc.go.jp
Korea	Tae-Heon Kim	heukchoo@korea.kr
Korea	Yeong-hwa Jeong	skarein@korea.kr
Latvia	Bruno Spels	bruno.spels@lhd.lv
Mexico	Adrián Montúfar	icn.adrianmontufar@gmail.com
Netherlands	Merte Peeters	MPJ.Peeters@mindef.nl
New Zealand	Bradley Cooper	bcooper@linz.govt.nz
Norway	Kjetil Jensen	Kjetil.Jensen@km.kongsberg.com
Norway	Arne Edmund Ofstad	Arne.Ofstad@kartverket.no
Portugal	Carlos Videira Marques	Videira.Marques@hidrografico.pt
Portugal	João Vicente	dt.hi.chf@hidrografico.pt

Spain	Jose María Cordero Ros	jcorros@fn.mde.es
Sweden	Hans Öiås	hans.oias@sjofartsverket.se
Turkey	Nurî Karaaslan	nkaraaslan@shodb.gov.tr
UK	Ian Davies	ian.davies@ukho.gov.uk
UK	David Parker	david.parker@ukho.gov.uk
USA	James Walton	james.walton@amloceanographic.com
USA	Jason Creech	jasc@deainc.com
USA	Doug Roush	Douglas.L.Roush@nga.mil
USA	Megan Greenaway	Megan.Greenaway@noaa.gov
USA	Neil Weston	neil.d.weston@noaa.gov
USA	Steven Posey	steven.c.posey@navy.mil

Observer Organisation	Name of Delegate	email
AFHy	David Vincentelli	david.vincentelli@ixblue.com
ECA Robotics	Sebastien Tavvry	tavvry.s@ecagroup.com
EGS	Chris Howlett	chowlett@egssurvey.co.uk
EOMap	Knut Hartmann	hartmann@eomap.de
Fugro	Hugh Parker	h.parker@fugro.com
Fugro	Marco Filippone	m.filippone@fugro.com
Fugro	Iain Slade	i.slade@fugro.com
IFHS	Iain Slade	iain.slade@outlook.com
IIC Technologies	Jose Arias	jose.arias@iictechnologies.com
iXBlue	Fabien Germond	fabien.germond@ixblue.com
iXBlue	David Vincentelli	david.vincentelli@ixblue.com
JOA Surveys	Nathan Wardwell	nathan@joasurveys.com
Teledyne Marine	Vitad Pradith	vitad.pradith@teledyne.com
Institut Teknologi Bandung (ITB Indonesia)	Poerbandono, Prof.	poerbandono@itb.ac.id poerbandono@gmail.com

HSWG Proposed Work Plan - 2021 to 2022

HSWG Tasks

A	Conduct at least annual meetings of HSWG and its sub-group(s) and project team(s) (IHO Tasks 2.1.2.9).
B	Maintain and promote IHO publication S-44 – <i>Standards for Hydrographic Surveys</i> – preparing and proposing revisions and amendments to reflect changes in the demands of hydrographic data users, particularly those pertaining to data quality and standards.
C	Update, maintain, and promote IHO publication C-13 – <i>IHO Manual on Hydrography</i> – to reflect current techniques, methodologies and survey systems, in particular to ensure harmonization with the standards articulated in S-44.
D	Develop and promote Satellite Derived Bathymetry (SDB) best practice and identify future development priorities.
E	Maintain close liaison with other HSSC and IRCC working groups, in particular the work of the Data Quality Working Group (DQWG) to meet the presentation/visualization requirements of nautical data to the maritime customer, and the CBSC to support the educational and best practice elements.
F	Identify new systems, technologies and methodologies and exchange experiences, best practice and challenges amongst member states in line with the IHO objectives.
G	Act as a focal point for hydrographic surveys industry engagement with the IHO.
H	Liaise with other relevant IHO Working Groups to promote harmonization across IHO standards.

Work item	Title	Priority H-high M-medium L-low	Next milestone	Start Date	End Date	Status P-planned O-ongoing C-completed S-Superseded	Contact Person(s)	Related Pubs / Standard	Remarks
A-1	Organise and conduct HSWG1 meeting	H	Complete	April 2021	July 2021	C	Chair HSWG Sec		
A-2	Organise and conduct HSWG2 meeting	H	Complete	July 2021	Feb 2022	C	Chair HSWG Sec		
B-1	Review S-44 Edition 6.0.0	M	Identify review cycle	2021	Jan 2022	C	All		Chair team to develop proposal for WG to review
B-2	Prepare next S-44 edition v 6.1	M	Establish editorial board	April 2021	March 2022	C	S-44 editorial board		Dependencies: IHO website metrics available Next task: editorial board propose change recommendations
B-3	Develop S-44 promotional material	H	Consolidate and share material	April 2021	On going	O	All		
B-4	Develop S-44 education material	H	Consolidate and share material	April 2021	On going	O	All		
B-5	Identify translation opportunities for S-44	L	Supply translated material to IHO	April 2021	On going	O	Chair group		Dependency: Member states to supply translated documents
B-6	Monitor S-44 uptake worldwide	H	IHO Secretariat accept action to set up IHO download monitoring system	2021	On going	P	IHO		IHO Strategic Plan 2021-2026 (Goal 2 – Target 2.2.2 – page 7) Dependencies: -IHO website metrics available -New edition of S-44 available
C-1	Review C-13 Edition 1.0.0	H	Initial meeting of project team (MHPT)	July 2021	December 2021	C	MHPT		PT to develop work plan and establish leadership mechanism by 31 December 2021
C-2	Prepare next C-13 edition	H	Compile updates and change recommendations	January 2022	December 2022	O	MHPT		Dependency: Format to be agreed by entire HSWG.
C-3	Develop C-13 promotional material	L	Consolidate and share material	July 2022	On going	P			

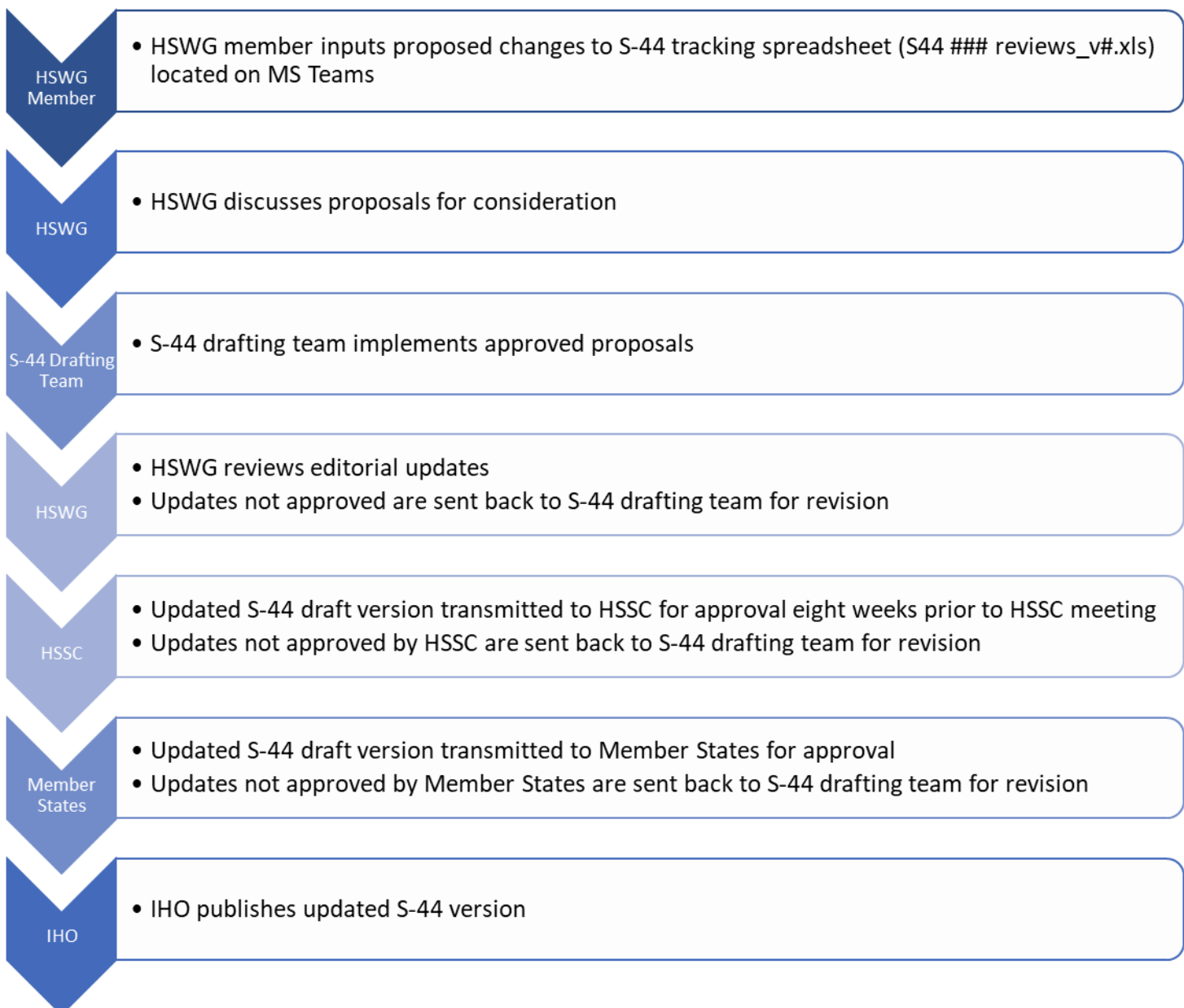
Work item	Title	Priority H-high M-medium L-low	Next milestone	Start Date	End Date	Status P-planned O-ongoing C-completed S-Superseded	Contact Person(s)	Related Pubs / Standard	Remarks
C-4	Develop C-13 education material	L	Consolidate and share material	July 2022	On going	P			
C-5	Identify translation opportunities for C-13	L	Supply translated material to IHO	2023	On going	P			
D-1	Develop SDB best practice guidelines	M	SDBPT to draft best practice guidelines	July 2021	October 2022	O	Knut Hartmann		HSWG established SDBPT and its governance structure
D-2	Identify future development priorities	L	Develop secondary work plan	July 2022	October 2022	P	Knut Hartmann		
E	Maintain liaison with HSSC and IRCC subordinate bodies – DQWG, HDWG, TWCWG, S100WG	H	Initial meetings with WGs.	July 2021	On going	P	Chair group to facilitate		Liaison for each WG established at HSWG1
F-1	Attend relevant industry events	M	Share event dates	2021	On going	P	All		Send IHO event dates
F-2	Develop new system/technology presentation material and supporting documents	M	Provide briefings to HSWG	2021	On going	P	All		
G	Attend and represent HSWG at relevant industry fora	M	Provide briefings to HSWG	2021	On going	P	All		
H	Identify areas of overlap and potential conflicts across standards	H	Provide a list of potential standards conflicts	July 2021	On going	O	Chair group		

HSWG Process for Updating S-44 Standard for Hydrographic Surveys

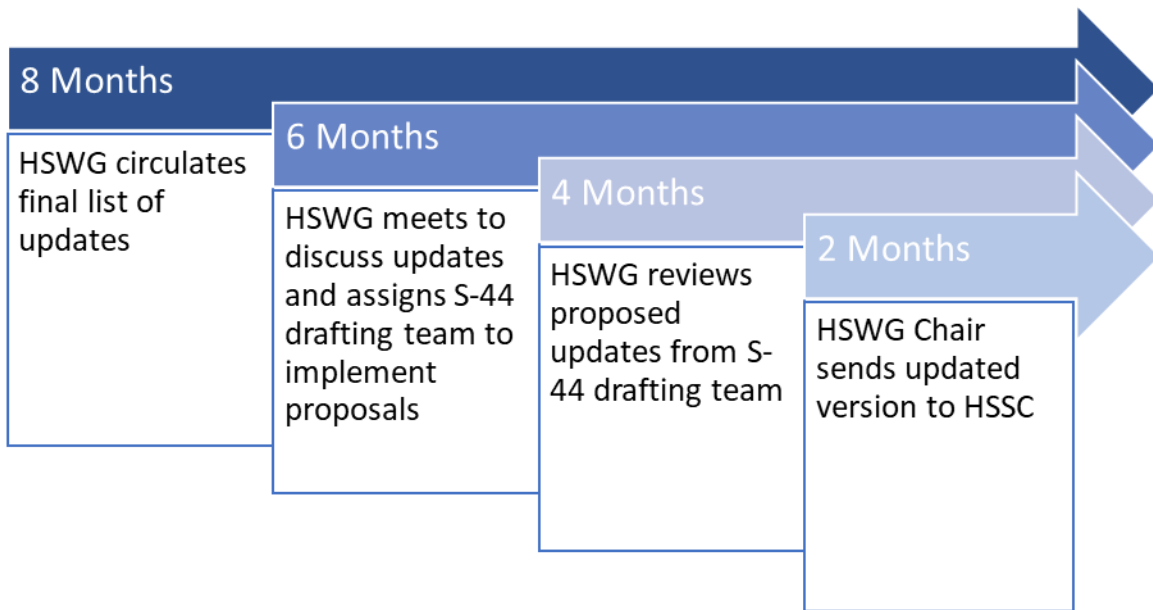
The following is the workflow for the S-44 Standards for Hydrographic Surveys update process.

The S-44 standard shall be updated every two years and shall follow the process for making changes to IHO technical standards (see https://iho.int/iho_pubs/misc/M3-E-AUGUST18.pdf page 40 "Resolutions of the International Hydrographic Organization" item 2/2007 Principles and Procedures for making changes to IHO Technical Standards and Specifications).

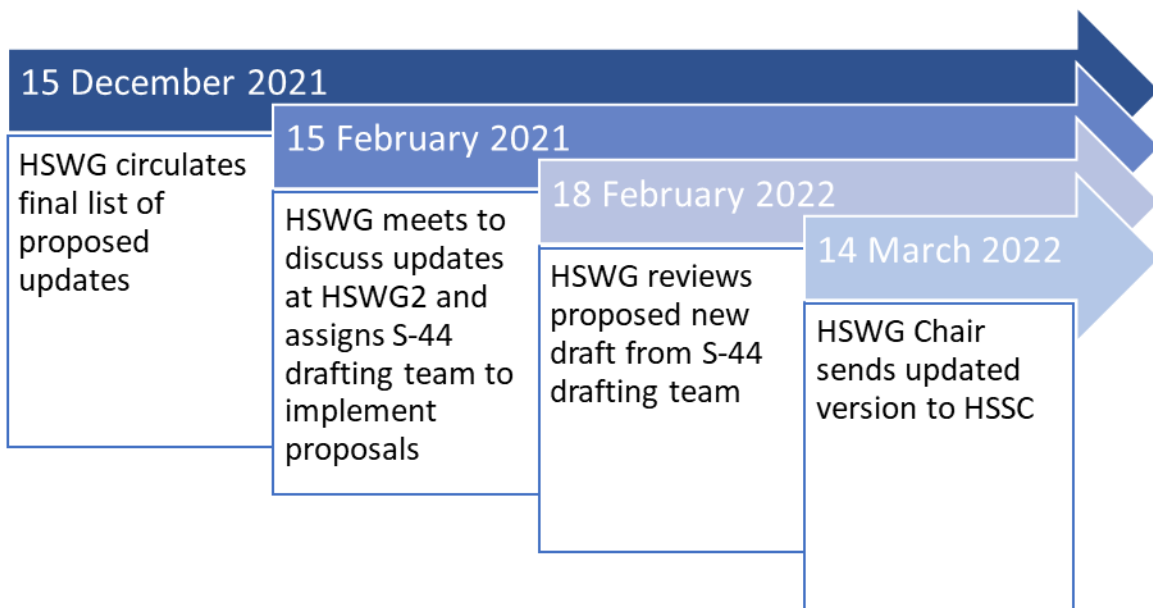
S-44 Update Process



Schedule during update year (# of months prior to HSSC meeting):



Schedule for S-44 version 6.1:



Annex D – MHPT Workplan

Work item	Title		Priority H-high M-medium L-low	Next milestone	Start Date	End Date	Status P-planned O-ongoing C-completed S-Superseded	Contact Person(s)	Related Pubs / Standard	Remarks
C-1	Review C-13 Edition 1.0.0		H	Identify sub-group & potential timeline	2021	2022	O			
C-1a	Revisit the existing C-13 edition to provide points to be addressed on the questionnaire			Draft of questionnaire	Nov 2021	Feb 2022	O			2nd PT meeting mid Nov
C-1b	Questionnaire to HOs, universities etc, Hydrographic Societies, Industry			Questionnaire published	March 2022	Sep 2022	O			Advertise through IHO CL, linkedin etc
C-1c	Interim meeting with HSWG			Interim report on the progress of C-13 survey	Feb 2022 (?)		C			
C-2	Prepare next C-13 edition		H	Compile updates and change recommendations	Oct 2022	Dec 2022	P	TBD		
C-2a	PT Members review current C-13, provide feedback			Define overarching principles	March 2022	Sep 2022	O			Consolidated spreadsheet with feedback
C-2b	Consolidation of questionnaire				Oct 2022	Oct 2022	P			
C-2b	Define scope of final document				Oct 2022	Nov 2022	P			
C-2c	Define delivery format				TBC	TBC	P			
C-2d	Define chapters and chapter leads				TBC	TBC	P			
C-3	Develop C-13 promotional material		L	Identify lead & volunteers	TBC	TBC	P			
C-4	Develop C-13 education material		L	Identify lead & volunteers	TBC	TBC	P			
C-5	Identify translation opportunities for C-13		L	Identify volunteers	2022	On going	P			

Key Tasks

- A Establishment of the SDB-PT
- B Conduct regular meeting of SDB-PT
- C Develop and maintain an SDB Best Practice Guideline, preparing and proposing revisions and amendments to reflect changes in the demands of hydrographic and other SDB data users, particularly those pertaining to data quality and standards;
- D Support IHO's Hydrographic Surveys Working Group (HSWG) in all relevant aspects of SDB
- E Support Capacity Building on SDB
- F Identify new concepts, technologies and methodologies on SDB and exchange experience, best practice and challenges amongst the Members.

Work Item	Title	Priority		Start Date	End Date	Status	Contact
A-1	Formation of the SDB-PT	H	-	-	2021-03-26	C	Chair
B-1	Organise and conduct SDB-PT meetings KO meeting	H	-	2021-03-15	2021-03-17	C	Chair
B-2	SDB-PT meeting 1	M	Confirm and identify date and time	2021-07-15	2021-08-15	C	Chair
C-1	Best Practice Guideline - Concept	H	Concept draft, identify lead & volunteers	2021-06-01	2021-08-31	C	Chair
C-2	Best Practice Guideline - Draft	H	Release of draft version	2021-09-01	Q2 2022	O	Chair
C-3	Best Practice Guideline – 1st version	H	Release of 1st Version	Q2 2022	Q4 2022	P	Chair
C-4	Review of other related materials/documents	M	consolidate existing material which can support on structure or content, such as IHO B-12, C-13 and Gebco CookBook	2021-06-01	Ongoing	O	Chair
D-1	Present and participate at HSWG 1 & 2	H	Invite HSWG members to participate at SDB-PT, collect HSWG demand on SDB	2021-06-29	2022-02-18	C	Chair and Vice Chair
D-2	Engage with C-13 project team	M	Identify synergise and required input to interact with C-13 project team at the HSWG 1	2021-06-29	ongoing	O	Chair and Vice Chair

			meeting				
D-3	SDB-PT to become IHO Project Team as supporting body to IHO's HSWG	H	D-1 and TOR and Work Plan definition	2021-06-30		C	HSWG Chair / Chair
D-4	Provide HSWG with SDB-PT TOR and Work Plan draft and final version	H	TOR and Work Plan available at IHO webpage	2021-06-23	2021-07-30	C	Chair
E-1	Contribution to regional IHO meetings	M	Engage with regional IHO chairs to check interest	Ongoing	ongoing	P	Chair and Vice Chair
E-2	Web Presence	M					See D4 Milestones
F-1	Identification of actions for SDB technology/innovation exercises	L	Prioritization of technological aspects which shall be addressed by SDB-PT	Q2 2021	Q4 2022	P	Chair and Vice Chair