6th S-129 UKCM Project Team Meeting
Record of Meeting

1230 – 1600 UTC, 08 December 2022
Hybrid meeting (IHO HQ, Monaco + GoToMeeting)

1.1 Welcome and Introductions / Review of Meeting Agenda

The Chair opened the meeting at 1230 UTC and welcomed S-129 Project Team (PT) members as well as other delegates from the S-100 Working Group (WG). Refer to Annex A for the list of participants.

During the opening session, the Chair provided an overview of the draft meeting agenda (Annex B), which included a session to review the last meeting's action items. The session also included discussions on the addition of a new feature that was proposed in the last S-129 PT meeting, and the amendment of existing features used in the S-129 product. The review of changes to the S-129 Product Specification Edition 1.0.0 (PS) to date was also included in the session.

The draft meeting agenda also included a session to identify changes to the S-129 PS based on S-100 Edition 5.0.0. Emphasis was to be made on the S-129 metadata and exchange set, based on S-100 Part 17. The session also included the review of the existing S-129 workplan.

Benjamin Hell (Swedish Maritime Administration) proposed that the PT allocate a time during the meeting to discuss ongoing trials and testbeds. The Chair agreed and suggested setting aside a time during either the planned Session 2 or Session 3 of this meeting to discuss test and trial opportunities for S-129.

2.1 Review of Previous Meeting Action Items

The Chair provided an update on the progress of action items from the 5th S-129 PT meeting, which was held on 23 March 2022 (see Annex C).

With regards to action item PT5-5 ("Clarify data encryption requirements in PS"), Ed Weaver (WR Systems) asked if S-421 (Route Plan) Product Specification mandated data encryption, noting S-129's relationship with S-421. This question prompted discussions around data protection for S-129, particularly around whether encryption was necessary.

Hannu Peiponen (IEC) indicated that digital signatures are mandatory for datasets to be cyber-secure. Meanwhile, data encryption was optional and provided additional data protection benefits to data providers.

Svein Skjaeveland (PRIMAR) pointed out that encryption may be feasible for pre-plan S-129 datasets, which are transmitted in relatively infrequent intervals. However, for "actual plan" and "actual update" datasets, which are provided much more frequently, encryption of the data could cause transmission delays.

Svein further commented that during the S-129 Operational Test in Norway, S-129 datasets were provided via a direct link between the data provider (OMC International) and the end-user application, in order to mitigate delays. Hannu added that, as S-129 datasets are intended for a specific vessel,

data exchange should occur between a UKCM service provider and the vessel, and thus not expected to be exchanged through a "middleman".

Alison Contreras (UKHO) asked if S-129 datasets were digitally signed during the S-129 Operational Test. Svein replied that datasets were not signed at the time.

Hannu Peiponen (IEC) emphasised that while digital signatures are compulsory, data encryption is voluntary, as per S-100.

Ed then raised that Eivind Mong (CCG) may be able to provide input around data streaming concerns for S-129, given similar concerns encountered for S-124 Navigational Warnings. Eivind outlined that the data streaming concerns for S-124 is now somewhat superseded by moving towards SATCOM for data exchange. Svein asked if communication exchange through SATCOM is so secure that digital signature would no longer be rquired. Hannu responded that data always need to be signed by the data source/provider, as otherwise data may be introduced by entities other than the intended data provider.

The Chair then noted that data protection requirements needed to be outlined in the S-129 PS, as they currently were not. The PT agreed with this being necessary, partly due to data signature and data encryption needing to be specified in the PS as metadata fields. The Chair had drafted changes to the PS, based on similar wording currently available in the S-102 PS pertaining to data protection requirements. The Chair suggested the PT collectively review the draft changes during latter parts of the meeting.

2.2 Draft feature addition/amendment

The PT proceeded to discussions around the addition of a "non-assessed" area, which was proposed from the S-129 Operational Test conducted in Tjeldsunde, Norway, as part of the S-100 Demonstrator Project.

Hannu suggested that it was more important to define a UKCM "service area", and not only a "non-assessed" area. Even if "non-assessed" areas were defined, a boundary would still be needed to clearly distinguish between:

- "non-assessed" areas within a UKCM service area, and
- areas located outside the UKCM service area,

thereby mitigating the possibility of users misinterpreting outside areas as "go" areas. Thus, discussions should revolve around how the "service area" is portrayed. A service area could either be:

1. a polygon comprising only the "no go" and "almost no go" areas, OR
2. a "box" comprising "no go", "almost no go" areas, as well as "non-assessed" areas

Svein then walked the PT through how the proposal for "non-assessed" areas had resulted from the S-129 Operational Test in Tjeldsundet. The "non-assessed" areas represented locations outside the test area, for which UKC information was available, but still within the coverage of the test data model. During the Operational Test, the "non-assessed" areas were manually depicted in grey by the end-user application, as they would otherwise be portrayed as red "no go" areas.

Chris Hens (OMC International) further explained that "no go" and "almost no go" areas are computed for a predictive plan of a vessel going forward. However, there is no plan for the vessel "going

backwards", as it is unknown if a vessel would turn around, and subsequently unknown at what times the vessel will be at different locations behind the vessel. Hence, "non-assessed" areas behind the vessel represent locations within the "corridor" but cannot be assessed.

Chris then asked if it is feasible for the "service area" to be dynamically updated as the ship progresses, should it be provided as a polygon. Hannu commented that the data size of the "service area" polygon will probably not be large compared to the "no-go" and "almost no-go" areas, thus the penalty for incorporating "service area" into S-129 datasets would likely be minimal.

Eivind mentioned that S-127 Marine Traffic Management provides possibility to declare a S-129 service area. Hannu remarked that this would introduce interdependency between S-129 and S-127, and it would hence be more useful to define UKCM service area as a feature in the S-129 PS.

Chris floated the idea of "implying" the service area boundary based on the "no go" and "almost no go" areas, rather than defining the service area as a feature in S-129. Hannu commented that S-100's machine readability requirements dictate the need for a "service area" feature, as end user applications are not expected to determine portrayals of undefined features, based on other existent features.

The PT agreed that a "service area" feature will need to be added to the S-129 PS, with the portrayal of the "service area" to be determined (e.g. "thick magenta line" with a level of transparency).

Ed questioned if the "service area" should be defined as a complex feature that comprises other feature types. Hannu suggested it should not be defined as a complex feature type, noting the possibility of a substantial number of "no go" and "almost no go" areas existing in S-129 datasets, particularly in isolated spots.

Svein noted there being four existing "service area" features defined in the IHO GI Registry (i.e. "Radio Service Area", "Radio Service Area Aggregate", "Reportable Services Area", and "Vessel Traffic Service Area"), and suggested these are used as references for defining a new UKCM service area.

The Chair proposed a sub-group be formed to determine how the UKCM service area should be portrayed, and Ben remarked that S-98 Data Product Interoperability would need to be considered for this. Hannu added that S-129 datasets should be displayed on end user applications as overlays (i.e. Level 0 interoperability) with transparency, as they are not required to be interleaved with, or replace, the underlying S-101 layers.

Ben further asked if the edge of the UKC "no go" and "almost no go" areas should be styled similarly to the S-98 safety contours, so that they are easily recognised by end users. Hannu suggested they should not resemble the appearance of safety contours. Rather, the portrayal of -129 data should be distinguished, due to being data computed onshore, whereas safety contours are derived onboard. Svein also cited end user feedback received during the S-129 Operational Test, which indicated the "no go" and "almost no go" areas as being portrayed clearly. No user feedback was provided regarding any obscurity of other product layers (e.g. S-101) caused by the portrayal of S-129 data. It was noted that during the S-129 Operational Test, the "no go" and "almost no go" areas were overlaid on the ENC with no transparency. Hannu queried whether any user feedback was given pertaining to the portrayal of control points, to which Svein confirmed that none were given.

ACTION PT6-1 – Draft name and definition of "UKCM service area" for proposal to add in GI Registry

ACTION PT6-2 – Chair to coordinate subgroup to discuss portrayal of "UKCM service area"

The Chair then asked if the PT was happy with the proposed changes to the existing feature definitions, summarised in Table 1 below. The PT agreed with the proposed definition changes.

Table 1 Proposed amendments to "no go" and "almost no go" features definitions

Name	CamelCase	Existing Definition	Proposed Definition
Under Keel Clearance Almost Non Navigable Area	underKeelClearanceAlmostNonNavigableArea	An area of depth almost less than the calculated safe limit, as established for the waterway.	An area of under keel clearance almost less than the calculated safe limit, as established for the waterway.
Under Keel Clearance Non Navigable Area	underKeelClearanceNonNavigableArea	An area of depth less than the calculated safe limit.	An area of under keel clearance less than the calculated safe limit.

ACTION PT6-3 – Submit proposals to the IHO GI Registry for amendments to definitions of "underKeelClearanceNonNavigableArea" and ""underKeelClearanceAlmostNonNavigableArea"

Ben queried how "almost no go" is defined quantitatively. Chris and Hannu clarified that "almost no go" areas would be derived from a limit as defined by the data provider, based on local knowledge and risk assessment. Ed then asked how the limit is set, and if it should be set as a percentage of vessel draught. Hannu replied that percentage of draught is globally not feasible, as typical vessel draught ranges can vary significantly between regions. Thus, it would be more appropriate for the limit to set in absolute terms (in metres or part thereof).

2.3 Review S-129 PS changes since March 2022 meeting

2.3.1 Inconsistencies in attribute multiplicities between S-129 PS Chapter 7 and Data Classification and Encoding guide (DCEG)

As part of reviewing changes to the S-129 PS since the previous PT meeting, the Chair raised the inconsistencies in attributes' multiplicities between Chapter 7 of the PS and the DCEG. These inconsistencies had been identified during the hands-on validation of the PS conducted during the S-129 Operational Test. The Chair explained that it was difficult to determine which of Chapter 7 and the DCEG was the correct source to compare against, given similar inconsistencies were detected between the S-129 Feature Catalogue and GML schema.

Eivind recommended contacting Jonathan Pritchard (IIC Technologies), as IIC Technologies has been involved in work concerning GML formats, alongside Teledyne CARIS and Raphael Malyankar (Portolan Sciences).

Eivind further commented that, with the latest changes to S-100, updating of a product specification's GML schema based on the feature catalogue is now an easier process. Eivind then remarked that Teledyne CARIS is in the process of developing a methodology for near-automatic translation from a feature catalogue to a GML schema. Under this methodology, a feature catalogue can be created and then fed into a tool to generate the GML schema.

The Chair offered to reach out to Jonathan Pritchard to seek clarification.

ACTION PT6-4 – Chair to contact Jonathan Pritchard and ask about schema generation from Feature Catalogue

2.3.2 Specifying data protection requirement in S-129 PS

The PT reviewed the new sub-sections drafted by the Chair pertaining to S-129 data signature and data encryption requirements. The PT agreed on the following sub-sections (to be added under Chapter 18 – Data Product Delivery):

18.3 Data Integrity

S-100 Part 15 defines the algorithms for compressing, encrypting, and digitally signing datasets, based on the S-100 Data Model. The individual Product Specifications provide details about which of the processes are being used and on which files in the dataset.

18.4 Data Encryption

Dataset files may or may not be encrypted. If encrypted, the encryption method defined in S-100 Part 15 must be applied.

18.5 Use of Digital Signatures

Digital signatures shall be used on all files. The signature method is defined in S-100 Part 15.

ACTION PT6-5 – Chair to add proposed sub-sections to Chapter 18 for S-129 Edition 1.1.0 Product Specification

3.1 Identifying changes to S-129 PS in line with S-100 Edition 5

With the introduction of S-100 Edition 5, several possible flow-on changes have been identified for the S-129 PS. The PT disscused these potential changes, as outlined in sub-sections 3.1.1 and 3.1.2 below.

3.1.1 Metadata and Exchange Set

Svein raised that ECDIS should not be expected to read more metadata than what is stipulated in S-100 Part 17. However, some product specifications currently do contain more metadata than specified in S-100 Part 17. The PT agreed to examine the S-129 metadata as outlined in Chapter 19 of the PS, and remove any "extra" metadata that is identified as being unnecessary.

Initially, the PT attempted during the meeting to compare S-129 PS Exchange Catalogue (Section 19.5) and S-100 Part 17 side-by-side to identify discrepancies. However, the PT ultimately decided to appoint a member to perform the comparison outside of the meeting as a starting point for aligning the S-129 PS with S-100 Part 17. Ben volunteered to conduct this work.

Svein emphasised that the following should be performed as part of this comparison:

- Check metadata multiplicities and identify attributes, which need to be more restricted in S-129 than in S-100
- The "Remarks" column should be used to indicate if the S-129 PS deviates from S-100 or restricts a metadata field more than S-100 (similarly to other product specifications, incl. S-101 and S-111),)

ACTION PT6-6 – Benjamin Hell to review S-129 PS Section 19.5, and identify differences to S-100 Part 17

3.1.2 S-129 PS Scope Clarification

Considering the perceived similarities of S-129 to S-98 Water Level Adjustment, the Chair proposed that the PT review the S-129 PS to identify any need to clarify the product scope.

Upon inspection of the PS, the PT agreed that the abstract under Chapter 6 (Dataset Identification) could be improved.

Proposed improvements included emphasis on:

- Information provided by S-129 datasets being vessel-specific and voyage-specific.
- Frequency of dataset update depending on the voyage and local conditions, for which the datasets are produced.

The PT drafted an update to the abstract, as shown in Table 2. The Chair will review the update with the Vice-Chair and Yong Baek (IHO Secretariat).

Table 2 Prposed changes to abstarct under Chapter 6 (Dataset Identification) in S-129 PS

Existing Abstract (Chapter 6 – Dataset Identification)	Proposed Changes to Abstract (Chapter 6 – Dataset Identification)
The dataset is a file containing under keel clearance data for a particular geographic region and set of times, along with the accompanying metadata describing the content, variables, applicable times and locations, and structure of the dataset. Under keel clearance management data includes depths assessed as being navigationally safe and windows within which these assessments are valid, based upon observed or mathematically predicted values.	The dataset is a file containing under keel clearance data for a particular geographic region and set of times, along with the accompanying metadata describing the content, variables, applicable times and locations, and structure of the dataset. Under keel clearance management data includes vessel and voyage specific areas assessed as being navigationally safe or unsafe with regards to under keel clearance, and windows within which these assessments are valid, based upon observed and/or mathematically predicted values. The frequency of dataset updates depends on the voyage and local conditions.

ACTION PT6-7 – Chair and Vice-Chair to review the updated abstract under Dataset Identification section with Yong Baek.

3.2 Testing Opportunities for S-129

Ben provided a report on a current project idea under the lead of the Swedish Technical Research Institute. The Technical Research Institute is exploring a project for a “reference implementation” of a UKC management engine, which could run onshore, as well as on onboard applications.

The Technical Research Institute has led similar projects, previously, with a focus on navigational safety from a traffic perspective. The Technical Research Institute is now interested in navigational safety in a 3D perspective, thereby prompting the involvement of the Swedish Maritime Administration (SMA), which has been interested in UKC management for a long time.

At this stage, the project is exploring the type of calculations and modelling that are needed, as well as what the data and quality requirements are.

The project is seeking funding from EU research projects associated with the Galileo GNSS, and is intended to be more of an open reference implementation, rather than a commercial one.

If funding is granted, the project is planned to commence around late-2023 or early-2024, and is expected to run for several years.

The project also seeks to utilise precision positioning facilitated through the Galileo GNSS.

Data providers for the project are the French Naval Hydrographic and Oceanographic Service (SHOM), SMA, and potentially the meteorological administration in Sweden.

The project is currently planned to be conducted on two different settings: (1) the Baltic Sea, and (2) a high tide location in France.

Svein also mentioned that PRIMAR has been invited to participate in the project from a service delivery perspective, facilitating data streams from producers to end user applications.

Ed provided an update that WR Systems is currently working to update the Port Voyager application to support S-100 Edition 5 as well as S-98 interoperability testing.

The Chair noted that the EU project outlined by Ben may line up well with the current plan timeline for S-129. Ben commented that the project was not dependent on a completely mature version of S-129, and that it will be interesting to see if any improvements will be identified for both onshore and onboard application.

3.3 Review of Work Plan for 2023

The PT reviewed the current S-129 work plan that was established in the previous PT meeting (Annex D). The PT concluded that the current timeline, aiming for submission of S-129 Edition 2 to HSSC 2024, appeared feasible, especially if GML format changes in S-100 had minimal impact on S-129.

It was noted, however, that the S-129 plan timeline did have dependency on the S-100 Toolkit Launcher being updated in line with S-100 Edition 5 – currently scheduled to be completed by March 2023.

3.4 Alarms and Indications

Ed questioned if the S-129 PS needed to incorporate alarms and indications. Hannu pointed out that, to implement alarms and/or indications in S-129, these would need to be reflected in IMO's performance standards for ECDIS. Hannu further commented that alarms imply immediate actions being required to avoid hazardous situations, of which S-129 should not need be concerned, as it does not need to "wake the operators".

3.5 Other

Ben requested the Chair examine the IHO website, and ensure S-129 information is up to date. The Chair agreed to check the IHO website.

ACTION PT6-8 – Chair to review IHO website and ensure S-129 information is up to date

Ed asked if OMC would create new test datasets with updates to the S-129 PS. The Chair replied that test datasets would need to be created with each update, but it would be more beneficial to wait for the S-100 Toolkit Launcher update in line with S-100 Edition 5.

Svein pointed out the need to review Annex E (Data validation checks) of the S-129 PS, so that:

- It can be structured as discussed during the S-100 Validation Test Workshop (S-100WG7-08), and
- S-129 specific checks can be identified and forwarded to the S-100 Validation Sub Working Group.

ACTION PT6-9 – Review structure of Annex E (Data validation checks) of the S-129 PS to identify S-129 specific checks

3.6 Next Meetings

The Chair proposed for the next two S-129 PT meetings to be tentatively scheduled for March 2023 (VTC) and November 2023 (in-person), to align with the next Test Strategy Meeting and S100WG8, respectively.

The main aim for the next planned meeting in March 2023 is to review the next planned revision (Ed 1.1.0) of the S-129 PS. In preparation, the PS will need to be updated following the completion of different action items raised in this (08 December 2022) meeting.

ACTION PT6-10 – Draft S-129 PS Edition 1.1.0 (based on changes resulting from PT6-1, PT6-2, PT6-4, PT6-5, PT6-6, and PT6-8)

Annex A

List of Participants:

Name	Organisation
Alison Contreras	UK Hydrographic Office
Benjamin Hell	Swedish Maritime Administration
Chris Hens (remote)	OMC International
Edward Weaver	WR Systems
Eivind Mong (remote)	Canadian Coast Guard
Hannu Peiponen	IEC / Furuno
Jason Rhee – Chair	OMC International
Kevin Kim (remote)	KMOU
Lindsay Perryman – Vice-Chair (remote)	AMSA
Seojong Lee (remote)	KMOU
Svein Skjaeveland	PRIMAR

Annex B

Draft Agenda for the S-129 Project Team Meeting

(08 December 2022)

Venue:

IHO HQ, Monaco
(with remote participation enabled via GoToMeeting)

Time:

December 8th: 1330 – 1700 CEST (1230 – 1600 UTC)
(GoToMeeting link: https://meet.goto.com/181999229)

Chair: Jason Rhee (OMC International)
Vice-Chair: Lindsay Perryman (AMSA) – remote attendance

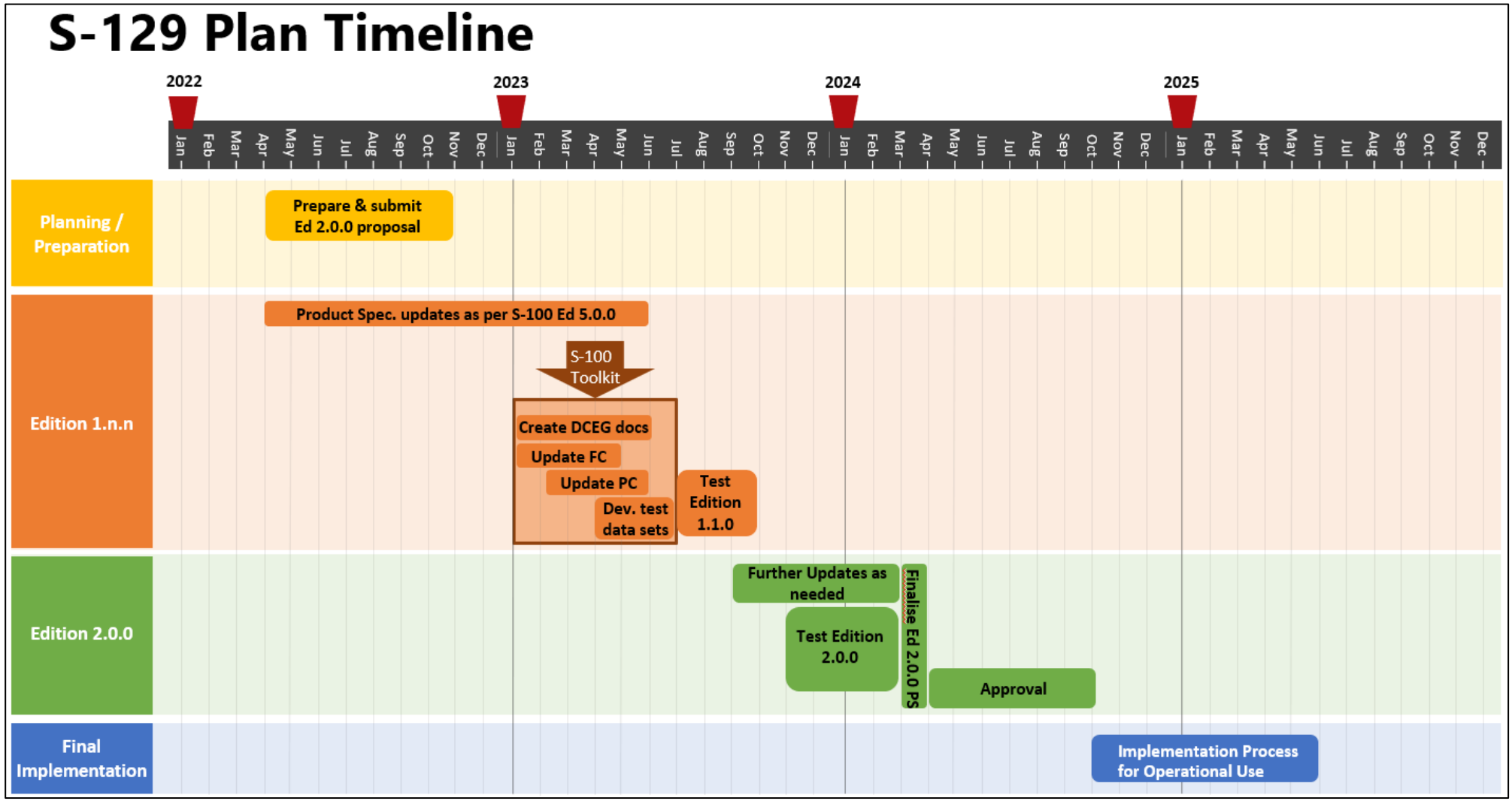
Time (CEST)	Thursday December 8th (1330 – 1700 CEST)	
1330 – 1400	**Session 1** Welcome and introductions Review of meeting agenda	 (All) (Chair)
1400 – 1500 1400 – 1415 1415– 1430 1430 - 1500	**Session 2** Review action items from March 2022 meeting Draft feature addition/amendment Review S-129 PS changes since March 2022 meeting	 (Chair) (Chair) (All)
1500 – 1530	**Break**	
1530 – 1700 1530 – 1630 1630 – 1700	**Session 3** Identifying changes to S-129 PS in line with S-100 Ed. 5 • metadata & exchange set • Other Review of work plan for 2023	 (All)

Project team members are requested to provide comments or change proposals for any of the agenda items to the PT Chair by no later than 07 December 2022.

PT Chair: Jason Rhee - j.rhee@omcinternational.com

Annex C

Action	Description	Assignee	Status
PT5-1	Submit S-129 progress update and plan timeline to S-100 WG Chair	Jason R	Done
PT5-2	Provide Yong B, Svein S, and Eivind M with access to S-129 SharePoint group	Lindsay P	Done
PT5-3	Update PS based on S-129 Operational Test findings, particularly to correct discrepancies identified between Chapter 7 and DCEG	Jason R with assistance from Svein S	Ongoing
PT5-4	Review PS scope in consideration of S-129's similarities to S-98's water level adjustment function	Jason R, with assistance from Lindsay P and Yong B	Ongoing
PT5-5	Clarify data encryption requirements in PS	Jason R & Lindsay P, with assistance from Chris H	Ongoing
PT5-6	Draft feature name and definition for "not assessed" area, and circulate with PT for review	Jason R & Lindsay P with assistance from Chris H	Ongoing
PT5-7	Circulate S-100 Part 17 and associated UML diagrams to PT	Jason R	Ongoing
PT5-8	Provide S-100 Chair with S-129 Operational Test report and outcomes	Jason R	Done
PT5-9	Enquire Seojeong Lee (KMOU) about any S-129 trial/project that may have been conducted in South Korea	Jason R	Done/ongoing


S-129 Plan Timeline
2022
2023
2024
2025
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Planning / Preparation
Prepare & submit Ed 2.0.0 proposal
Edition 1.n.n
Product Spec. updates as per S-100 Ed 5.0.0
S-100 Toolkit
Create DCEG docs
Update FC
Update PC
Dev. test data sets
Test Edition 1.1.0
Edition 2.0.0
Further Updates as needed
Test Edition 2.0.0
Finalise Ed 2.0.0 PS
Approval
Final Implementation
Implementation Process for Operational Use

Annex E

6th S-129 UKCM Project Team Meeting - List of Action Items:

Action	Description	Assignee	Due Date
PT6-1	Draft name and definition of "UKCM service area" for proposal to add in GI Registry	Jason R, Lindsay P	27 Feb 2023
PT6-2	Coordinate subgroup to discuss portrayal of "UKCM service area"	Jason R	25 Feb 2023
PT6-3	Submit proposals for amendments to definitions of "underKeelClearanceNonNavigableArea" and "underKeelClearanceAlmostNonNavigableArea"	Jason R with assistance from Lindsay P	18 Feb 2023
PT6-4	Contact Jonathan Pritchard and ask about schema generation from Feature Catalogue	Jason R	20 Jan 2023
PT6-5	Chair to add proposed sub-sections to Chapter 18 for S-129 Edition 1.1.0 Product Specification	Jason R	01 Mar 2023
PT6-6	Review S-129 PS Section 19.5, and identify differences to with S-100 Part 17	Benjamin H	20 Jan 2023
PT6-7	Review the updated abstract under Dataset Identification section with Yong Baek	Jason R & Lindsay P, with assistance from Yong B	30 Jan 2023
PT6-8	Review IHO website and ensure S-129 information is up to date	Jason R	20 Jan 2023
PT6-9	Review structure of Annex E (Data validation checks) of the S-129 PS to identify S-129 specific checks	Svein S	20 Jan 2023
PT6-10	Draft S-129 PS Edition 1.1.0 (based on changes resulting from PT6-1, PT6-2, PT6-4, PT6-5, PT6-6, PT6-7 and PT6-9)	Jason R, with assistance from various S-129 PT members	01 Mar 2023