

EXPERT TEAM ON SEA ICE – FIFTH SESSION

ETSI-5/GDSIDB-13/Doc.2.2

STEERING GROUP FOR THE PROJECT
GLOBAL DIGITAL SEA ICE DATA BANK (GDSIDB) –
THIRTEENTH SESSION

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REPORT OF THE ETSI CHAIRPERSON

Summary and Purpose of Document

This document contains the report of the Chairperson of the Expert Team on Sea Ice (ETSI) to the Fifth session of the Expert Team. It outlines the status of the ETSI activities since its last session (ETSI-IV, St.Petersburg, Russia, March 2010) and priorities for this Team outlined by JCOMM-IV (Yeosu, Republic of Korea, May 2012) and Services and Forecasting Systems Coordination Group (SCG) 7th session (March 2013).

ACTION PROPOSED

The Team is invited to:

- a) Note and comment on the information contained in this document, as appropriate;
- b) Review the current list of SFSPA projects with ETSI involved as a leader and contributor;
- c) Provide guidance and recommendations for further development of ETSI activities for the next intersessional period (2014-2017), together with the overall SFSPA Work Plan.

References: ETSI-IV/GDSIDB-XII final report, JCOMM Meeting Report No.74
Third Ice Analysts Workshop final report, JCOMM Technical Report No.56
SCG-7 final report, JCOMM Meeting Report No.101
JCOMM 4th session final report, WMO-IOC/JCOMM-4/3, WMO-No. 1093

Appendices: 1. ETSI Terms of Reference (Resolution 5, JCOMM-4)
2. Terms of Reference of the Task Group on ENC Ice Objects
3. ETSI Work Plan for Intersessional Period 2010-2012
4. List of SFSPA projects for 2012 – 2017

DISCUSSION

1. The Expert Team on Sea Ice (ETSI) was formally constituted at the First Session of JCOMM (JCOMM-I, Akureyri, Iceland, June 2001), re-established at the 2nd (JCOMM-II, Halifax, Nova Scotia, Canada, September 2005) as a part of the JCOMM Services Programme Area (SPA) and at the JCOMM 3rd and 4th Sessions (JCOMM-III, Marrakesh, Morocco, November 2009 and JCOMM-IV, Yeosu, Republic of Korea, May 2012), now as a part of the JCOMM Services and Forecasting Systems Programme Area (SFSPA).

2. Since JCOMM-IV, May 2012, the Members of the ETSI include the Chairperson – Dr Vasily Smolyanitsky (representing also Russian Federation), eleven experts representing the national services related to sea ice and the ice-covered regions from Argentina, Canada, Chile, China, Denmark, Finland, Germany (vice-chair), Iceland, Japan, Norway and USA and invited representatives of regional and international sea ice bodies, in particular, the Global Digital Sea Ice Data Bank (GDSIDB) Project, the Baltic Sea Ice Meeting (BSIM) and the International Ice Charting Working Group (IICWG). The Group's current Terms of Reference are provided in the Appendix 1 to this document.

3. The current ETSI membership is as follows:

Beatriz LORENZO (Argentina)
 Darlene LANGLOIS (Canada)
 Gonzalo CONCHA (Chile)
 Sihai LI (China)
 Keld QVISTGAARD (Denmark)
 Antti KANGAS (Finland)
 Jurgen HOLFORT (Germany), vice-chair
 Keiji HAMADA (Japan)
 Nicholas HUGHES (Norway)
 Vasily Smolyanitsky (Russian Federation), chair
 Caryn PANOWICZ (United States of America)

4. Part of the Team is the Task Group on Electronic Navigational Chart Ice Objects (TG ENCIO) with an objective “to develop and to maintain an international standard for Ice Objects as a class of Marine Information Objects (MIO) that is based on the standards of the International Hydrographic Organisation (IHO) for Electronic Navigational Charts (ENC)”, formally constituted at ETSI 3rd session in March 2007. From 2013 the Task Team is lead by Juergen Holfort (prior to 2013 – by John Falkingham). TG ENCIO terms of reference are provided in the Appendix 2 to this document.

5. The past work plan for the ETSI was developed at ETSI-IV (March 2010) on the basis, and following priorities, of the JCOMM intersessional work programme for 2009-2012 by JCOMM-III. Further amendments to the plan were provided by the chair based on decisions of JCOMM-IV (May 2012) and 6th and 7th Sessions of the Services Coordination Group (Seoul, Republic of Korea, November 2011 and Tokyo, Japan March 2013). Recommendations from the 3rd and 4th Sessions of the Expert Team on Maritime Safety Services (ETMSS-III, St.Petersburg, Russia, October 2010 and ETMSS-IV, Tokyo, Japan, February 2013) were also used in intersessional work.

6. Key issue of the Team's intersessional activity included response to a new level of requirements for sea ice products and services for the efficiency and safety of ice navigation, and, as a part of that – 1) support for provision of sea-ice information in ENC/ECDIS, 2) support for extending formats for exchange and archival of ice information and 3) support for implementation (before July 2011) and full operational capability (since July 2011) of the new Arctic METAREAS XVII-XXI.

7. Overall Team's activities (initially planned for 2010-2012, then extended to 2014) encompassed coordination and advice of the Members' ice services to support navigation and sea ice monitoring, interaction with the ETMSS on sea ice Marine Safety Information (MSI), development and revision of sea ice technical guidance material and standards, support for CB including training in sea ice analysis, interaction with the Expert Team on Marine Climatology (ETMC) on a guidance of the Global Digital Sea Ice Data Bank (GDSIDB) or sea ice climatology, and linkages with other relevant bodies, in particular IHO TSMAD, WMO GCW and regional and international sea ice projects and alliances including IICWG, BSIM and CliC.

8. ETSI completed most of the parts of its past work plan, included as Appendix 3 and containing notes for achieved tasks.

9. The International Ice Charting Working Group (IICWG), which brings the national ice services together with their partners and clients to address issues of common concern, served as an active and vital advisory body to the Team and contributed to completion to the most of the activities during the intersessional work.

10. Among the highlights of the achievements are

- 1) The five new Arctic METAREAs XVII-XXI of the Global Maritime Distress and Safety System (GMDSS) came into Full Operational Capability (FOC) from July 2011. Preliminary Team's work included developing a) specifications for sea ice information coding for the GMDSS SafetyNET bulletins, b) regulations for information exchange including naming conventions for the regions and provision of continuity of the ice edge across the bounding METAREAs and c) testing the new standards in practice.

The latter was successfully done with a help of the 3rd "Ice Analysts Workshop" in June 2011 (Copenhagen Denmark, DMI) with new standards and dedicated web-server (<http://gmdss.aari.ru/bull>) for operational exchange of products immediately put in practice in July 2011. New specifications for ice in SafetyNET bulletins along with sea ice abbreviations for GMDSS NAVTEX bulletins were further revisited by the Team in 2012, submitted to ETMSS and in May 2012 approved by JCOMM-IV as a part of WMO MSI regulations (No. 471, 558).

- 2) Sea ice information is mandatory for presentation on Electronic Navigational Charts (ENC) though the scope of sea ice parameters and presentation mechanisms differ across the IHO standards (MIO, AML and S-10x) and implementations of sea ice presentation in various Electronic Chart Display Information System (ECDIS). In 2006 the ETSI entered into partnership with the IHO Transfer Standard Maintenance and Applications Development Working Group (TSMAD) and in 2007 adopted the first version 4.0 of the "Ice Objects Catalogue" which was based on the harmonized existing national practices and intended to extend the IHO S-57 standard for sea ice both for 'ice' and 'ice-free' navigation.

In 2010 the Team agreed and adopted the next 5.x version of the catalogue. During 2007-2012 the Catalogue versions 4.x and 5.x underwent harmonization, were tested and implemented in Canadian and Russian manufactured ECDIS along with corresponding presentation library. Results of the activity were reported to TSMAD in 2010-2013 and presented to JCOMM-IV as a static presentation during its technical workshop ("Ice in ENC/ECDIS") and as a live-presentation. The Catalogue is now submitted to the IHO Registry of Marine Information Objects by the TG ENCIO, undergoes regular update and presently available from the IHO depository as a version 5.0.1. Closely related to the Catalogue activity is developing of the ice specifications as a new IHO standard S-107 carried out by TG ENCIO with support of the German Ice Service since 2012.

- 3) The WMO sea ice technical documentation is regulating the descriptive (nomenclature and glossaries), coding, exchange and presentation procedures for sea ice cover as well as existing sea ice best practices for observations and services on regional and world-wide

scale. In a broader sense, it would be favorable for observational, operational and research community if the same documentation will be developed for all kinds of floating ice – sea, lake and river ice with all kinds of topology (point, linear, area, grid), thus answering requirements from the NWP community and the WMO GCW / GCW Cryonet.

During 2010-2013 The Team developed updates to "Sea Ice Nomenclature" (WMO-No.259) catching harmonization with other sea ice standards (Vol I: "Terminology" and Vol III: "International system of sea-ice symbols") and succeeded in availability of the whole publication in electronic form in a 4 WMO languages (EN/FR/RU/ES). One annual update of the "Sea Ice Information Services in the World" was completed.

Thorough updates were developed for the sea ice exchange format "SIGRID-3. The last, proposed for discussion during the current meeting 3rd revision of the format provides compatibility with the "Ice Objects Catalogue" and possibility for coding linear and point ice objects in addition to areal.

The above proves the ETSI vision of the relationships between the Sea Ice Nomenclature, now with SIGRID-3 and the Ice Objects Catalogue that the *Ice Objects catalogue represents a subset of the WMO Sea Ice Nomenclature being at the same time a driving force for amending the Sea Ice Nomenclature with an intention of including the navigators' feedback in the future.*

Two documents proposed as new WMO publications - "Understanding and Identifying Old Ice in Summer" and "Manual for Ice Experts – Ice Observers" are pending additional decisions from the Team and the Secretariat.

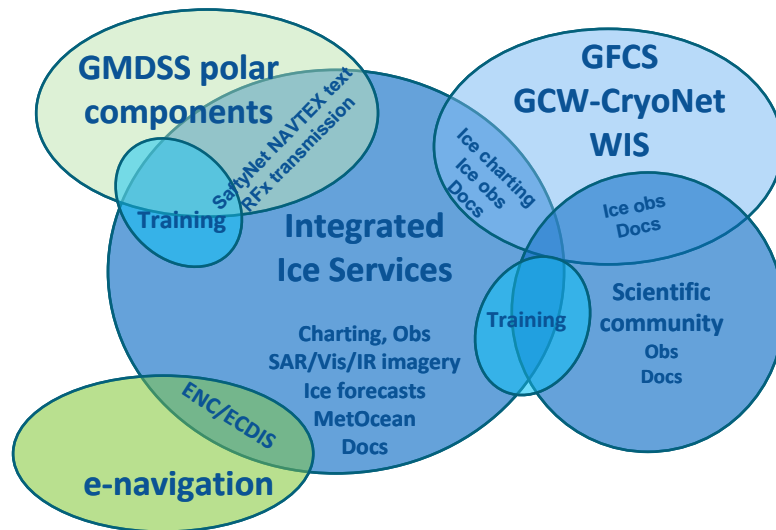
Most of the sea-ice documentation in the latest version is available at JCOMM web-site Services section (<http://jcomm.info>).

- 4) The Team's activity for the sea-ice climatology was concentrated within the "Global Digital Sea Ice Data Bank" (GDSIDB), initiated by the WMO CMM in 1989 and aimed to support access to collections and development of the means of processing the historical ice charting material. Since 1990s most of the ice services including BSIS, Canada, Japan, Russia, USA, are contributing to the project. Presently most of the ice charting data prior to 2000s are stored in a 0.25°x0.25° raster SIGRID and SIGRID-2 (WMO, 1989 and 1994) or Ease-grid formats, while after 2000s the data is stored in a more flexible vector SIGRID-3 format (WMO, 2004).

A significant success for the project is that whole sea ice charting collection for the period of instrumental ice observation (i.e. ~1933 till present moment, i.e. March 2014) is available either via the GDSIDB centers at AARI (<http://wdc.aari.ru/datasets>) or NSIDC (<http://nsidc.org>) or dedicated web geo-portals at USA NIC (<http://www.natice.noaa.gov>) or AARI (<http://gisa.aari.ru>). The latter two along with advance with the SIGRID-3 format, form the basement for providing the sea ice charting material to the WMO Global Cryosphere Watch (GCW), availability of sea-ice material to the end-users NWP community as well as 'merging' the se-ice material with the WMO Information System (WIS). Other progress in technique included development in 2012-2013 of a new blended dataset of sea ice total concentration.

- 5) Training on sea ice analysis included support of the very productive 3rd "Ice Analysts Workshop" in June 2011 (Copenhagen Denmark, DMI) which, besides developing and testing the regulations for the SafetyNET bulletins, included several cases studies aimed both to share the experience of national ice services in ice charting in summer and winter state of ice development as well as underline the differences in analysis and facilitate its harmonization.
- 6) Concept of linkages of integrated ice services - national practices – scientific community –

CryoNet – GCW as reported to several JCOMM (SCG, ETMSS), WMO (GCW, EC-PORS), IICWG meetings is given below.



Concept of linkages of integrated ice services - national practices – scientific community – CryoNet – GCW

JCOMM-IV

11. The JCOMM at its fourth session in May 2012 analyzed the progress achieved by its bodies including the ETSI, endorsed among others, its work and re-established the Team. As during the previous session, JCOMM requested tighter collaboration across the Programme Areas and individual Teams (i.e. for ETSI – across the Services and Forecasting Systems PA, in particular with ETMSS and ETOOFS). For ETSI, the following priority activities were outlined (agenda item 12.2.1):

- 1) Enhance activities to support research and development for climate services (5.4.1, 5.4.3)
- 2) Continue to maintain and extend as appropriate WMO sea ice technical documentation, in cooperation with the International Ice Charting Working Group (8.3.4)
- 3) Continue working on the definition of Object Catalogues for the provision of numerical information for mariners, as a set of IHO S-1xx formats, and broadcasting MSI in text format; 2) explore issuing MSI in text format that can be displayed on ENC systems (8.3.7)
- 4) Continue to contribute to the development of IMO e-Navigation, by providing input on weather and ice safety related to Polar Code development (8.3.10)
- 5) Continue to develop MPERSS beyond the current minimum requirements to provide tracking for objects adrift (8.3.14)
- 6) Continue organizing capacity development initiatives, includingtraining workshops on sea ice analysis, workshops on maritime safety services and marine service quality management (9.05)

12. Other relevant to ETSI future work priorities to be implemented under the leadership of / in collaboration with other Teams include:

Services

- 7) Develop a coordination framework for operational coupled seasonal climate forecast systems, with relevant international groups and seasonal forecasting community (SFSPA (through ETOOFS) and DMPA, 5.4.6)
- 8) Complete first Guide to Operational Ocean Forecasting System, with content contributions of writers and reviewers from Members/Member States (ETOOFS, 8.1.1)

Observations:

- 9) Improve observations in high latitudes and in marginal seas, and engage further with

- operational agencies to sustain ocean observations (OPA, 6.0.4bis)
- 10) Continue efforts with GHRSSST, to develop a dialogue with the satellite communities to better understand their needs, to define a realistic set of in situ requirements, and to initiate pilot projects to demonstrate the value of new synergies (OPA, 6.34)
 - 11) Develop further capacity in maintaining metrics and drawing up metrics by Essential Ocean Variables (EOV) and by individual Members/Member States, as well as by platform type (OPA, 6.1.1)

Data management

- 12) Continue efforts in integrated in situ/satellite data management system, and improve the integration and comparison of satellite and in situ data, e.g. address the climatic and non-climatic requirements for in situ and satellite data, and consider data homogenization and interoperability issues (DMPA, 7.03)
- 13) Finalize the BUFR Master Table 10 (DMPA, 7.04)
- 14) Organize the fourth JCOMM Workshop on Advances in Marine Climatology (CLIMAR-IV) around 2014, and the fourth MARCDAT in 2016 (DMPA, 7.10, 7.2.2.)
- 15) Investigate and promote possible cooperation between EEA and JCOMM and its relevant groups and ET in GMES and sustainable access to in situ marine data (all PA, 7.2.15)
- 16) Develop synergies between ODP and WIS, especially in terms of (i) WMO and IOC data policies, (ii) implementation of ODP and the implementation of WIS nodes so as to avoid duplication (DMPA, 7.4.1)

Relationship with other programmes and bodies

- 17) WMO Programmes and Technical Commissions related to coastal hazards, Quality Management Systems, and in the context of the emerging Global Framework for Climate Services (GFCS) (11.01), International Polar Initiative (11.03), the International Maritime Organization (IMO), the International Hydrographic Organization (IHO), the International Mobile Satellite Organization (IMSO) and Inmarsat on safety-related marine meteorological services (11.04)
13. Currently the SFSPA projects with ETSI as a leader include (Appendix 4):
- #26 Support and enhance the polar components of GMDSS
 - #27 Support and enhance ENC/Electronic chart Display Information System (ECDIS) for ice navigation
 - #28 Maintain and update sea ice technical documentation
 - #29 Support for Sea ice climatology
 - #31 Enhancing the integrated ice services and forecasting

with the following projects with ETSI as a contributor:

- #13 Capacity Development
- #20 Catalogue on Met-Ocean Object Class for ENC and e-Navigation

Full description of the above project is given as Appendix B to the Doc ETSI-5/GDSIDB-13/Doc.2.1.

14. The Team and the Meeting is proposed to follow this template for the next intersessional period taking into account the Team's, the SFSPA and cross-cutting priorities developed by JCOMM-IV.
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Appendix 1

Resolution 5 (JCOMM-4) to JCOMM 4th session final report, WMO-IOC/JCOMM-4/3, WMO-No. 1093 SERVICES AND FORECASTING SYSTEMS PROGRAMME AREA

..... Expert Team on Sea Ice

Terms of Reference

The Expert Team on Sea Ice shall:

- (a) Coordinate and advise Members/Member States on products and services required by user communities in sea ice areas, to support navigation, coastal and off-shore activities, monitoring of the sea ice cover;
- (b) Provide advice to ETMSS on all aspects of impacts of sea ice relevant to maritime safety, marine pollution response and search and rescue services;
- (c) Maintain linkages with Expert Team on Operational Ocean Forecasting Systems on the relevant sea ice modelling and forecasting techniques;
- (d) Maintain linkages with projects and programmes related to the role of sea ice in the global climate system, including through the World Climate Research Programme and the Global Cryosphere Watch;
- (e) Develop technical advice and guidance material, software exchange, specialized training and other appropriate capacity development activities with regard to sea ice observations, analysis and services, and provide assistance to Members/Member States as required;
- (f) Keep under review and provide guidance as appropriate on the operations of the Global Digital Sea Ice Data Bank, in collaboration with the Expert Team on Marine Climatology;
- (g) Maintain and develop formats, nomenclatures and procedures for sea ice data and information exchange as well as relevant terminology, coding and mapping standards;
- (h) Maintain linkages with relevant international organizations and programmes, in particular the Baltic Sea Ice Meeting, CLIC, European Ice Service, International Ice Charting Working Group, North American Ice Service, ASPeCt, Global Climate Observing System and the International Hydrographic Organization.

As a general principle, these terms of reference will be implemented through specific, defined, time-limited projects.

General Membership

Up to eight Members, including the chairperson, representative of a range of activities related to sea ice and the ice-covered regions within JCOMM, and to maintain an appropriate geographical representation. It is expected that, in general, the ETSI will be self-funding. ETSI representatives will also act as full members of ETMSS and ETMC.

Representatives of regional and international sea ice bodies in particular the Baltic Sea Ice Meeting, European Ice Service, International Ice Charting Working Group and North American Ice Service will also be invited to participate at their own expense.

Additional experts may be invited as appropriate, representative of the range of activities related to sea ice, on a self-funded basis, and in general with no resource implications to JCOMM.

**TERMS OF REFERENCE OF THE TASK GROUP ON ELECTRONIC NAVIGATIONAL CHART
ICE OBJECTS (TG ENCIO)
(ETSI-III Report, March 2007, JCOMM Meeting Report No. 51)**

1. Objective

To develop and to maintain an international standard for Ice Objects as a class of Marine Information Objects (MIO) that is based on the standards of the International Hydrographic Organisation (IHO) for Electronic Navigational Charts (ENC).

2. Guiding Principles

The framework for the Ice Objects standard includes:

- Use of **IHO S-57** including:
 - Object Catalogue;
 - MIO Product Specification;
 - MIO Encoding Guide.
- Establishment of an **Ice Objects Register** for additional real-world, ice features, attributes, and enumerations that are not already contained in IHO S-57 Edition 3.1 Object Catalogue.
- Use of the **Open ECDIS Forum** (OEF) as a means of communication and discussion for continuing development and maintenance of the Ice Objects Register.
- Alignment with the future **IHO S-100** Standard for Geospatial Data.

3. Authority

JCOMM ETSI is recognized as the competent international technical group on sea ice and icebergs by:

- World Meteorological Organization;
- Intergovernmental Oceanographic Commission;
- International Hydrographic Organization (IHO) – Committee on Hydrographic Requirements and Information Systems (CHRIS).

4. Participants

Register Owner:	WMO Secretariat
Register Manager:	WMO Secretariat
Register Users:	anyone interested in sea ice or iceberg MIOs
Control Body:	ETSI ENC Ice Objects Task Group
Submitting Organization:	WMO
Proposers:	ETSI Members from Canada, Germany, Russian Federation and USA

5. Composition

The Ice Objects Task Group will be composed of at least three standing ETSI Members appointed by the ETSI, in addition to the Register Manager. The Task Group Members shall serve until the subsequent intersessional meeting of the ETSI, at which time they may be re-appointed or replaced. The Task Group will elect a Chairperson from among them.

6. Meeting Schedule

The Task Group will meet on an as-required, as-agreed basis. Members will fund their own attendance at meetings. Much of the business of the Task Group will be conducted by e-mail and telephone.

7. Management of the Ice Objects Register

Any Member of the ETSI can submit a proposal to the Ice Objects Register but the proposal must:

- be in a format established by ETSI;
- describe how the new object (or feature) will be accommodated in the Ice Objects Encoding Guide.

The Ice Objects Register Manager:

- reviews the submitted proposal for completeness, and may request additional information/clarification from the Proposer. The proposal is also distributed to Ice Objects Task Group (Control Body) and other Register Managers for review/comment.
- officially posts the proposal on the Ice Objects ENC Register. It is initially flagged as **NOT-VALID**.
- places the proposal on the Ice Objects Discussion Forum (OEF website) for discussion.

Eight weeks after the proposal is placed on the Ice Objects Register:

- if a consensus is reached to accept, the proposal is then flagged as **VALID**.
- if no consensus is achieved, it remains flagged as **NOT-VALID**. In this case:
 - the submitter can decide to withdraw the proposal;
 - the proposal can be revised and re-submitted;
 - any participant of the ETSI can ask that the proposal be considered at the next meeting of the ETSI.
- the Register Manager announces the outcome on the Ice Objects Discussion Forum.

8. Regular ETSI Review

As owner of the Ice Objects Register, ETSI will carry as a standing agenda item on its meetings, a review of any outstanding recommendations from the Task Group.

WORKING PLAN FOR THE NEXT INTERSESSIONAL PERIOD
(decisions from ETSI-IV/GDSIDB-XII)

Ref.	Action	By whom	When	Status at
2.2.11	Review ETSI Terms of Reference to ensure that they include appropriate reference to the work of the TG-ENCIO	TG-ENCIO	ETSI-V	Done, no changes proposed; planned for possible review at ETSI-V
2.4.1.21	Finalize and distribute report from 2 nd Ice Analysis workshop	ETSI Chair	As soon as possible	Published as JCOMM-TR-049 WMO/TD-NO.1517
2.4.1.28	Chair of the BSIM to provide reports on behalf of the small Baltic countries	BSIM Chair	ETSI-V	Planned for ETSI-V
2.5.1.7	Identify a focal point to work with ETMSS to help develop the catalogue of Met-Ocean Object Classes and Attributes	ETSI Chair	May 2010	Timothy Rulon; title changed to "Weather Overlay Feature Catalog"; latest Phase 2 review proposed in Dec 2013 – Jan 2014
2.5.1.8	Organize sea ice information on Ice Logistics Portal by METAREAs	Holfort	June 2010	done
2.5.1.8	Make links from Ice Logistics Portal to GMDSS website and request a reciprocal link from GMDSS website	Holfort	June 2010	done
2.5.1.9	Review Terms of Reference of ETSI and of ETMSS to ensure they provide for appropriate interaction between Expert Teams; send comments to ETSI Chair	ETSI Members	Sep 2010	Done thrice - for ETMSS-III, JCOMM-4 and ETMSS-IV
2.5.2.10	Prepare summary of ice information available in the Antarctic and send to ETSI Chair for provision to METAREA coordinators in the Southern Ocean	Panowicz	Oct 2010	Ongoing; further actions planned for IAW-4 in June 2014
2.5.4.5	Update relevant IHO and WMO publications to define the "ice edge" as being delineated by a maximum of 10 points per sub-area	ETSI Chair	June 2010	Done; finalized during IAW-3 in June 2011
2.5.5.4	Determine what countries transmit ice charts by radiofax and advise WMO Secretariat to update Publication No. 9 accordingly	ETSI Chair / Members	June 2010	Done; information provided to ETMSS-III in Oct 2010
2.5.5.6	Review list of proposed NAVTEX abbreviations for completeness and consistency and provide comments to Chair of BSIM	ETSI Members	Jul 2010	Finalized during IAW-3 in June 2011
2.5.5.6	Produce final draft list of NAVTEX abbreviations for sea ice for approval by the ETSI; transmit to chair of ETMSS for inclusion in document	Chair of BSIM	Oct 2010	Done; provided to ETMSS-3 in Oct 2010; revised in spring 2012 for JCOMM-4
2.5.5.6	Propose a standard format for ice information in NAVTEX messages and circulate to ETSI members for comment	Chair of BSIM	Jul 2010	Done; provided to ETMSS-3 in Oct 2010; revised in spring 2012 for JCOMM-4

2.5.5.6	Adopt a standard format for ice information in NAVTEX messages; provide document to ETMSS Chair	ETSI Members; ETSI Chair	Oct 2010	Done; provided to ETMSS-3 in Oct 2010; revised in spring 2012 for JCOMM-4
2.5.5.8	Review the IMO/WMO Guidance Document for the World Wide Met-Ocean Information and Warning Service to determine whether other information pertaining to the provision of ocean information in the Polar Regions should be added and provide comments to Chairman of ETSI	ETSI Members	Jun 2010	Done; further actions anticipated after ETSI-V
2.5.5.8	Provide comments on the IMO/WMO Guidance Document for the World Wide Met-Ocean Information and Warning Service, including the addition of a reference to WMO No. 574 – Sea Ice Services in the World, to the Chair of the Expert Team on Marine Safety Services	ETSI Chair	Sep 2010	Done; information provided to ETMSS chair in October 2010
2.5.6.18	Determine a consistent definition of “ice edge” to be used in GMDSS broadcasts	Qvistgaard	May 2010	Done; revised and finalized during IAW-3 in June 2011
2.5.6.18	Establish operating procedures to coordinate ice information between adjacent Arctic METAREAs to ensure continuity of the edge at the METAREA boundary	ETSI Chair	Oct 2010	Done; revised and finalized during IAW-3 in June 2011
2.5.6.19	Provide sample Arctic METAREA ice bulletins to the Arctic METAREA coordinators as a means of verifying formats and coordination of information to ETSI Chair	ETSI Members for Denmark, Canada, Norway and Russia	May 2010	Done; revised and finalized during IAW-3
2.6.1.1	Translate additions to WMO No. 259 Sea Ice Nomenclature into Russian, French and Spanish, provide material to ETSI Chair for inclusion of these definitions to the on-line publication	CIS, Argentina, AARI, ETSI Chair	Jan 2011	Done; revised and finalized for ETSI-V
2.6.1.3	Review the SIGRID-3 code tables to determine if a single code could be used across all tables to indicate “Ice Free”	Falkingham	May 2010	Done; incorporated into SIGRID-3 rev.3
2.6.1.4	Revise the ENC Ice Objects Catalogue Version 4.1 to reflect the decisions of ETSI-IV	Falkingham	May 2010	Done
2.6.2	Revise WMO No 259 Sea Ice Nomenclature Volume I according to the decisions of ETSI-IV	ETSI Chair, BAS	Jun 2011	Done
2.6.2.4	Merge the Baltic Sea Ice Glossary into the Illustrated Glossary of WMO No 259 - Sea Ice Nomenclature	ETSI Chair, FMI	Dec 2011	Baltic Sea-Ice nomenclature provided to ETSI chair; common database created
2.6.2.7	Discuss the proposed terms “Hillocky Multiyear Ice” and “Concentration of Hills” and recommend whether they should be included in WMO No 259 - Sea Ice Nomenclature	ETSI Chair, AARI, CIS	Apr 2011	Postponed; will be revisited after ETSI-V
2.6.2.14	Submit new photos for the Illustrated Glossary of Sea Ice to the ETSI Chair	ETSI Members	On-going	Postponed; will be revisited after ETSI-V

2.6.2.14	Update the Illustrated Glossary with new photos as they become available	ETSI Chair	On-going	Postponed; will be revisited after ETSI-V
2.6.2.20	Ask WMO to consider adoption of the Canadian National Research Council document "Understanding and Identifying Old Ice in Summer"	Secretariat	Apr 2010	Pending action from CNR and Secretariat
2.6.2.21	Develop a new concept for the Sea Ice illustrated Glossary	ETSI Chair in discussion with Members	Jan 2012	Postponed; will be revisited after ETSI-V
2.6.2.21	Investigate whether the document "Understanding and Identifying Old Ice in Summer" is available in electronic format	Falkingham	Apr 2010	Done
2.6.2.22	Develop an electronic update of WMO No 259 Volume III- International System of Sea Ice Symbols (English version)	NIC + AARI, CIS & Argentina	Jan 2012	Done
2.6.3.4	Make suggestions for further revisions to WMO No 259 Sea Ice Services in the World	ETSI Members	On-going	Done
2.6.3.4	Publish WMO No 259 Sea Ice Services in the World on the JCOMM Services Website and announce availability of updates to NMS	ETSI Chair, Secretariat	May every year	Done in 2010 and 2013
2.6.3.5	Ensure that linkages are made to WMO No 259 Sea Ice Services in the World from WMO No. 9, Volume D – Information for Shipping	Secretariat	Oct 2010	Postponed; will be revisited after ETSI-V
2.6.3.5	Inform the National Ice Services and the sea ice community about the availability of the updated electronic version of WMO No 259 Sea Ice Services in the World by means of a mailing list and/or appropriate newsletter articles	Secretariat	June every year	Done partly via the IICWG; will be revisited after ETSI-V
2.6.4.20	Progress report on standards for Ice Charts in ENC's to Rostock Meeting	TG-ENCIO	May 2010	Done
2.6.4.20	Work with AARI/Transas and CIS/Caris to harmonize the standards for Ice Charts in ENC's	TG-ENCIO	End Summer 2010	Done
2.6.5.2	Implement the ENC Ice Objects Catalogue Version 5.0 in the IHO Database	TG-ENCIO	Mar 2011	Done
2.6.5.3	Develop a demonstration suite of Ice Objects in ENC's	TG-ENCIO	JCOMM-IV	Done
2.6.6.5	Discuss the proposed amendment to the Colour Code Standard for bergy water and advise the Chair whether this amendment should be consider again or dropped	DMI, NAIS	Oct 2010	A draft is available for ETSI-V
2.6.7.3	Develop a white paper on the "Vision and Strategy for the Standards for Sea Ice Coding and Presentation" for discussion at IICWG	ETSI Chair in consultation with Members	ETSI-V	Done; superseded by developing the revision 3 of SIGRID-3
2.6.8.3	Review the English language version of the "Manual for Ice Experts – Ice Observers" and identify any corrections or amendments that may be required; provide comments to ETSI Chair	ETSI Chair / ETSI Members	Feb 2012	Postponed for further decision by ETSI-V
2.6.8.3	After it is finalized, send the "Manual for Ice Experts – Ice Observers" to WMO with a recommendation that it be published as a WMO publication	ETSI Chair	May 2012	Postponed for further decision by ETSI-V

2.7.1.2	Work with WMO Secretariat to prepare the proceedings of the Ice Analysts Workshops as a formal technical publication	ETSI Chair	May 2012	Done
2.7.1.6	Develop the theme and agenda for the 3 rd Ice Analysts Workshop to be held in June 2011	Qvistgaard, Gauthier, Hughes, Holfort, Smolyanitsky	Oct 2010	Done
2.7.1.8	Develop a longer term vision for the Ice Analysts workshop series	Qvistgaard, Gauthier, Hughes, Holfort, Smolyanitsky	May 2011	Done; a SFSPA project #13 developed
2.7.3.9	Prepare and submit reports on activities in sea ice modelling systems and assimilation into numerical weather prediction models to ETSI Chair	ETSI Members	Sep 2010	Done
2.7.3.10	Provide a brief update on sea ice modelling systems and data assimilation into NWP models for the Services Coordination Group meeting proposed for May 2010	Carrieres (CIS)	May 2010	Done
2.7.3.10	Prepare a presentation on sea ice modelling systems and data assimilation into NWP models for the information of the ETOOFS and participate in the ETOOFS meeting in Tokyo in October 2010	Carrieres (CIS)	Oct 2010	Additional actions needed
2.7.3.11	Continue cooperation with IICWG for the Modeling/Data Assimilation Workshops and provide feedback to ETSI and ETOOFS	ETSI Chair / ETSI Members	On-going	Done in interaction with IICWG; a letter prepared and sent to ETOOFS
2.8.1.4	Provide input to the WMO Rolling Requirements Review based on the IICWG Socio-Economic Benefits and Observations Requirements document	ETSI Chair	Apr every year	Done
2.8.1.5	Revise the "Statement of Guidance for Ocean Applications" to better reflect sea ice	ETSI Chair in consultation with ETSI Members	Apr 2010	Done
2.8.2.1	Contact IMO to determine the best method to distribute the JCOMM questionnaire to users, especially in the Arctic METAREAs	Secretariat	Mar 2010	?
2.9.5	Make a concerted effort to contribute ice charts in SIGRID-3 format to the NSIDC. Discuss with GDSIDB centres the best method of hosting these charts (in the context of the Polar Decade)	ETSI Members / ETSI Chair	On-going	Done
2.10.1.3	Report to ETMSS Chair on the results of ETSI-IV, including the creation of the sub-group of experts (Norway, Canada, Russia, Denmark)	ETSI Chair	May 2010	Done
2.10.1.7	Discuss with ETOOFS the need for expert on sea ice modelling	SFSPA Coordinator	May 2010	Done though additional actions are necessary
2.10.2.5	Circulate information on the content of the first COMET sea ice module to the ETSI	Panowicz	As soon as possible	Done
2.10.2.5	Provide proposals for content of the second COMET module to Caryn Panowicz	ETSI Members	Oct 2010	Done
2.10.2.8	Contact the COMET team to determine if joint collaboration is possible in the context of the Manual for Ice Experts – Ice Observers	AARI	June 2010	Done

3.2.3	Develop an inventory of projects that are digitizing ship log books and Ask ship log digitizing projects to extract sea ice information	Hughes	Oct 2010	?
3.4.7	Ask the IICWG task team working on NetCDF to also assess the appropriateness of GRIB for sea ice data in NWP	Hughes	Mar 2010	Done; superseded by activity with the latest SIGRID-3 rev.3
4.1.6	Canada to support John Falkingham as TG-ENCIO leader for the next few months after ETSI-IV to maintain close collaboration with IHO	Gauthier	Mar 2010	Done
4.1.8	ETSI to maintain a close collaboration with the WMO CBS with respect to the integration of the Ice Logistic Portal into the WIS	ETSI Chair	On-going	Interaction initiated in Jan 2014 for general sea ice information
4.1.9	Seek CBS advice and expertise concerning documentation standards when revising ETSI documentation	ETSI Chair	On-going	Done; regular interaction with related WMO Secretariat division
4.1.10	Liaise with the EC-PORS as appropriate in the context of the International Polar Decade	ETSI Chair	On-going	Activity changed to International Polar Partnership Initiative (IPPI); regular input
4.1.13	Request the WMO Secretariats to coordinate an ETSI presentation on historical sea ice data products at the next WCRP Joint Scientific Committee	WMO Secretariat / GDSIDB SG	Apr 2010	Need for a new action
5.1	Plan to hold ETSI-V in Ottawa in May 2012	Secretariat / Gauthier	Nov 2011	Date revised; done

**2012 – 2017 SFSPA projects
(as agreed at SCG-7, 4-6 March 2013, Tokyo, Japan)**

	Workplan / expected outcome, deliverables	ETs (bold)/ Linked With
1	Complete Guide for Operational Ocean Forecasting systems	ETOOFS National Agencies
2	Observational requirements	ETOOFS National Agencies
3	Performance Monitoring	ETOOFS National Agencies and ocean forecast providers
4	Ocean Extremes Monitoring System	ETOOFS National Agencies
6	Coordination in Seasonal Climate Forecast System	ETOOFS national forecasting centers ET-ELRF(CBS) ECMWF OPA
8	Wave and Surge Climate Services	ETWCH ETMC NOAA/NODC DMPA groups GLOSS ETCCDI
9	Implement recommendations from JCOMM Storm Surge Symposium	ETWCH ESA IOC Environment Canada USACE TOWS-WG ITP
10	Develop and update guidance documents	ETWCH ETMSS
11	Wave Forecast Verification	ETWCH ECMWF ESANOPP(US)
12	Wave measurement evaluation and test	ETWCH DBCP Scripps OGP Environment Canada USACE
13(6)	Capacity Development	ETWCH TCP ETSI ETOOFS ETMSS COMET
14	Coastal Inundation Forecast Demonstration Project (CIFDP)	ETWCH CHy
15	Revision overall structure of WMO No. 558 & WMO No. 471 and preparation guidelines for Members applying for Preparation / Issuing Service	ETMSS SFSPA chair & Vice-chair IHO IMO
16	Standardization format(s) for met-ocean MSI in text format	ETMSS IHO IMO
17	Update the joint Manual on MSI and IMO Resolution A.705	ETMSS SFSPA vice-chair IHO
18	Conduct online Survey every 2 years	ETMSS ETOOFS WMO Secreteriat IHO
19	Disseminate MSI on GTS and GMDSS website	ETMSS all Member States concerned
20(7)	Catalogue on Met-Ocean Object Class for ENC and e-Navigation	NOAA ETMSS ETWS ETSI IHO IMO
21(8)	Facilitate implementation of QMS among members of the provision of MSS	ETMSS ETSI MAN COMET
22	Develop guidelines for marine volcanic ash advisory	ETMSS WMO Secreteriat
23	Identify measures to provide marine navigational warnings for severe solar magnetic storms	ETMSS IHO/WWNWS
24	Development of Ocean Emergency Response Support Capability	ETOOFS ETMSS MPERSS AMOCs National agencies and forecast providers GODAE Ocean View IAEA IMO IHO
25	Develop oceanic radioactive hazard tracking system for enhanced MPRESS	TT ETMSS ETOOFS IAEA IMO WMO
26 (1)	Support and enhance the polar components of GMDSS	ETSI ETMSS IICWG Preparation for METAREAS with Floating ice
27(2)	Support and enhance ENC/Electronic chart Display Information System (ECDIS) for ice navigation	ETSI TG ENSIO BSH IICWG TSMAD
28(3)	Maintain and update sea ice technical documentation	ETSI IICWG CryoNet
29(4)	Support for Sea ice climatology	ETSI ETMC IICWG CryoNet
30	Task Team on JCOMM Coordination for Marine Environmental Emergency Responses	ETMSS ETOOFS IAEA IMO WMO & other UN Agencies as appropriate
31(5)	Enhancing the integrated ice services and forecasting	ETSI IICWG met.no and AARI for oil spills