**TERMS OF REFERENCE: EXPERT TEAM ON SEA ICE**

Excerpt from Resolution 5 (JCOMM-4): Service and Forecasting Systems Programme Area

Agreed at ETSI-6, March 2017

The Expert Team on Sea Ice shall:

1. 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;
2. Provide advice to ETMSS on all aspects of impacts of sea ice relevant to maritime safety, marine pollution response and search and rescue services;
3. Maintain linkages with Expert Team on Operational Ocean Forecasting Systems on the relevant sea ice modelling and forecasting techniques;
4. 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;
5. 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;
6. 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;
7. Maintain and develop formats, nomenclatures and procedures for sea ice data and information exchange as well as relevant ~~terminology~~, coding and mapping standards;
8. Maintain linkages with relevant international organizations and programmes, in particular the ~~Baltic Sea Ice Meeting, European Ice Services,~~ International Ice Charting Working Group, CliC, ~~North American Ice Service,~~ ASPeCt, Global Climate Observing System, the International Hydrographic Organization and the International Maritime Organization.

As a general principle, these terms of reference will be implemented through specific, defined, time-limited projects. Under these terms of reference sea ice also includes icebergs.

**General Membership**

Up to eight Members, including the chairperson, representative of a range of operational 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.

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TERMS OF REFERENCE: ETSI TASK GROUP ON
ELECTRONIC NAVIGATIONAL CHART ICE OBJECTS (TG ENCIO)

(Established at ETSI-3, March 2007; Reviewed and agreed at ETSI-6, March 2017)

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.

**Action items for the INTERSESSIONAL PERIOD**

(ETSI-6, March 2017)

| **Item** | **Action** | **By whom** | **When/target** |
| --- | --- | --- | --- |
| 4.1.4 | Develop proper roles of the GDSIDB project, national ice services and ice charting material in MCDS data flow | ETSI chair, ETMC chair/vice-chair | 31 October 2014pending |
| 4.1.5 | Develop an inventory of applicable/available quality control procedures for ice charting material, and an outline for ETSI members for future implementation | ETMC chairETSI chairETSI members | 30 September 2014Pending, possible will be passed to a project under CliC |
| 4.2.14 | Ensure maintenance of metadata for GDSIDB datasets  | AARI, NSIDC | On-going |
| 4.2.15 | Consider assigning doi to GDSIDB datasets | ETSI chair, NICNSIDC | On-going |
| 4.4.3 | Adopt the ‘blended climatology’ as a common approach for sea ice climatology, provide its regular updates  | AARI | On-going |
| 4.5.3 | Prioritize collecting and archiving iceberg position reports, and make them available through the GDSIDB  | CIS | As soon as possiblepassed to IICWG Icebergs Sub-committee  |
| 4.5.3 | Share experience and existing data for iceberg climatology  | AARI | Continuous |
| 4.6.1 | Develop table with new contributions to GDSIDB centers | ETSI chairETSI members | 15 April 2014Done |
| 5.1.3 | Adopt SIGRID-3 revision 3, check the document for possible inconsistencies and provide comments to John Falkingham | ETSI members | 30 April 2014Done |
| 5.1.3  | Prepare final version of SIGRID-3 revision 3, inform the WMO Secretariat and other appropriate bodies on a new major revision of the format and publish the document at JCOMM publication section | J.FalkinghamETSI chairWMO Secretariat | 15 May 2014Done |
| 5.2.1.2 | Provide clarified definitions for “concentration of hills” in consistency with the WMO Sea-Ice Nomenclature and refine “stage of melting” definition | V. Smolyanitsky | 30 April 2014Done |
| 5.2.1.2 | review “Ice Objects Catalogue” version 5.2 for possible inconsistencies and provide comments to TG-ENCIO (John Falkingham) | ETSI members | 30 April 2014Done |
| 5.2.1.2 | Develop a proposal to combine “convergence” and “divergence” in one attribute and keep “compacting strength” separate, and circulate this proposal for approval by the Team, by email | J.Falkingham | 15 April 2014Done |
| 5.2.1.2 | Prepare final version of “Ice Objects Catalogue” version 5.2, and submit the WMO Secretariat for publication, and to other appropriate bodies on a new major revision of the format | J.Falkingham | 15 April 2014Done |
| 5.2.1.3 | Review “Ice Objects Catalogue” version 5.2 on possible inconsistences and provide comments to TG-ENCIO through J.Falkingham | ETSI members | 30 April 2014Done |
| 5.2.1.3 | Prepare the final version of “Ice Objects Catalogue” version 5.2, and submit it to the WMO Secretariat for publication and to other appropriate bodies to inform a new major revision of the format | J.Falkingham | 15 May 2014Done |
| 5.2.2.2 | Adopt the proposed “Ice in ECDIS” S-411 document as version 1.0, check the document for possible inconsistencies, provide comments to TG-ENCIO  | ETSI members | 30 April 2014Done |
| 5.2.2.2 | Assign the JCOMM TD number to “Ice in ECDIS” S-411 | WMO Secretariat | 1 April 2014Done |
| 5.2.2.3 | Report to IHO TSMAD on adoption of the “Ice in ECDIS” S-411 | Juergen Holfort | 1 April 2014Done |
| 5.2.2.3 | Interact with NSIDC on testing of the format | Juergen HolfortPeter Pulsifer | 31 October 2014Pending, possibly should be dropped |
| 5.2.3.2  | Develop revised contents for Ice Chart Color Standard, including additional colours for residual ice and compact ice | ETSI chair | 2015Done |
| 5.2.3.3 | Consider further updates to “Ice chart Colour Standard” including use of hatching above the colour and ensure further revisions of the document when required | ETSI chair | On-going |
| 5.2.3.4 | Explore better ways to include the refined iceberg information, including an additional layer and/or additional attributes and portrayals for areas with clusters of icebergs  | K.Quistgaard, D.Langlois | 2015Done |
| 5.3.2 | Collaborate with NSIDC on ontology project and to ensure linkages between the WMO “Sea-Ice Nomenclature” vol.I and other existing glossaries | ETSI chairPeter Pulsifer | On-going |
| 5.3.2 | Revisit terminology related to the shape, size of icebergs and try to rationalize it including the codes | Canada, Argentina | 31 December 2014Done |
| 5.3.2 | Provide pattern for description of photos of the “Illustrated Glossary” | ETSI chair | 30 April 2014 |
| 5.3.2 | Provide updates to “Illustrated Glossary”  | ETSI members | On-goingpending |
| 5.3.2 | Provide regular updates of the master electronic version of the “Sea-ice Nomenclature” vol. I-III, provide updated versions to WMO Secretariat for regular update of the METEOTERM publication | ETSI chairWMO Secretariat | On-goingpending |
| 5.4.2 | Extend WMO –No.574, Part I, section 4 with information on Arctic Ocean METAREAs | Caryn Panowicz | 30 June 2014Done |
| 5.4.2 | Extend WMO–No.574, Part I, section 4 with clear definition of sea ice products and check Part II of publication for possible inconsistencies  | Darlene LangloisETSI members | 30 June 2014Done |
| 5.4.2 | Extend WMO –No.574 with a new Appendix showing maximum and minimum propagation of sea ice in the Arctic and Antarctic based on ice charting | ETSI chair | 30 June 2014pending |
| 5.4.3 | Collect amendments and finalize WMO –No.574 update 2014  | ETSI chair | 31 July 2014Done as year 2015 and 2017 updates |
| 5.4.3 | Organize and ensure regular update of WMO –No.574 and visibility of updates at appropriate sites (JCOMM, IICWG, etc) | Leader of project #ETSI chair | On-going |
| 5.5.2 | Make inquiry within the user communities on usage of code tables related to sea-ice from BUFR-CREX and GRIB | ETSI Chair, WMO Secretariat | 31 July 2014pending |
| 5.6.1 | Finalize license agreement for the publication of “Old ice in summer” document as a WMO publication | CanadaWMO Secretariat | ASAPPending, possibly should be dropped |
| 5.6.2 | Review content of the proposed ”Manual for sea-ice observers” for consistency with national and regional ice practices and provide input to the leader | ETSI members | 2015Pending, possibly should be dropped |
| 6.3.2 | Share best practices in data assimilation between the ice services | ETSI members | On-going |
| 6.4.1 | Develop vision and strategy for inter-operability and integration of sea ice products | C.Panowicz, ETSI members | 2015Passed to IICWG |
| 10.1 | Develop description a project on SAR in Polar Regions | C.Panowicz, ETSI members | October 2014Done |
| 12.1 | submit the WMO Secretariat a set of direct links to such information, key information portals for operational sea ice services, as well as the latest versions of the Manuals, Guidelines and reference documents for national sea ice services | ETSI Chair | 30 April 2014done |

 **2017-2019 SFSPA PROJECTS AND WORK PLANS**

**RELEVANT TO ETSI ACTIVITIES**

(Review and agreed at ETSI-6, March 2014)

**Project #13: Capacity Development**

**Project co-leader (ETSI): Alvaro Scardilli**

**Project members (ETSI): NH, DL, CP**

**Project Description:**

Capacity Development (CD) remains a core activity at the heart of most JCOMM activities. All individual projects have some capacity development aspects, whether these be high level scientific and technical workshops, hands on training activities, or Guides, Manuals and other guidance and training materials, including online course material.

At its fourth Session of JCOMM in May 2012, it was decided that focused efforts should be made for preparation and management of technical guidance material in conjunction with the regular review and update of the Guides and Manuals (addressed within other SFSPA projects). In addition, Specific project related training and capacity development are described under the individual projects, particularly to serve for Members’ / Member States’ capacity development and technology transfer needs.

Opportunities for training and technology sharing include the joint workshops supported by JCOMM and the Tropical Cyclone Programme (TCP) – to provide hands on training on operational wind wave and storm surge forecasting, and to contribute to the ongoing development of the Storm Surge Watch Scheme (SSWS), as well as joint workshops on sea ice analysis.

* **Expected Outcomes:**
	+ Support Capacity Development workshops
	+ Publish and update the Guides on marine meterology and oceanography, including those on marine meteorological services, ocean forecast systems, waves and storm surge forecasting
* **Key Activities:**
	+ Support JCOMM-TCP training workshops on wave and surge forecasting
	+ support for “Ice Analysts Workshop” on regular scale (1-2 interval)
	+ support for sea-ice training documentation and courses including COMET modules and manual for ice experts – ice observers.
	+ Support METAREA Coordinators and Issuing Services for Maritime Safety Services
* **Timeline/milestones:**
	+ 4th JCOMM “Ice Analysts Workshop” (Helsingki, Jun’14)
	+ 8th JCOMM-TCP Training Workshop on Storm Surge and Wave Forecasting, for East Africa (Nairobi, Nov’12)
	+ 9th & 10th JCOMM-TCP Training Workshops on Storm Surge and Wave Forecasting (TBD)
	+ Maritime Safety Services Enhancement Workshop, for METAREA coordinators and Issuing Services, in conjunction with IHO/WWNWS session (Aug’14, NZ)
* **ETs, Other Organizations and participants:**
	+ ETWCH, TCP, ETSI, ETOOFS, ETMSS, COMET
* **Implementation of JCOMM-4 decisions** (by paragraph number of JCOMM-4 report)
	+ 8.1.11 (training)
	+ 8.2.3 (continuing JCOMM-TCP workshop series)
	+ 9.5 (workshop in Africa)
	+ 9.9 (harmonized training responding to Members’/Member States’ needs)

**Project #20: Catalogue on Met-Ocean Object Class for ENC and e-Navigation**

**Project Leader(s):** NOAA, ***Henri Savina***

**Project Description:**

Since 1999, ETMSS has been working on the implementation of graphical/numerical Maritime Safety Information (MSI) broadcast within the GMDSS. The WMO Executive Council, at its sixtieth session (Geneva, June 2008) re-emphasized the continuing importance to mariners in receiving graphical products via radio transmissions and requested JCOMM to continue researching methods for transmitting graphical products to marine users. On the other hand, the WMO Executive Council, at its sixty-first session (Geneva, June 2009), encouraged WMO Members to investigate low-cost options for on-demand approaches that are compatible with Electronic Navigation Charts (ENC). In addition, the imminent increase of ENC systems on SOLAS vessels as regulatory material and the emergence of the e-navigation concept within IMO should reinforce the priority given to this requirement and the need to find appropriate resources to develop a suitable service. Both the ETMSS and ETSI have been working on this issue and ETSI has already developed the *Sea Ice Objects Catalogue* in accordance with IHO standards. The ETMSS has initiated the development of a catalogue on *Met-Ocean Object Classes and Attributes*, which would be an essential tool to enable NMHSs to develop products specifically for Electronic Navigation Chart Systems, allowing the implementation of software to decode and display met-ocean information by the manufacturers of these systems, using the S-100 chart data exchange standards.

The IMO e-Navigation concept reinforce the need to go forward on this issue, to be able to finalize the catalogue on Met-Ocean Object Class for ENC and e-Navigation, especially for parameters included in MSI. A strong support and contribution from ETSI is expected, as the Team has already developed such catalogue for sea ice. WMO, through the Secretariat and ETMSS, need also to be proactive in dealings with IHO and IMO on e-navigation development, to ensure compatibility between e-navigation and future metocean services by Members.

* **Expected Outcomes:**
	+ Met-Ocean object class for parameters included in MSI (wind, wave height, etc…) and additional met-ocean parameters (surface current,…), based on templates from the Ice Objects Catalogue.
* **Key Activities:**
	+ Establish the first version of the catalogue for registration in IHO S-10x
	+ Engage with IHO and TSMAD for the creation of a IHO Domain for a Met-Ocean Feature Catalogue
* **Timeline/milestones:**
	+ Feb 2013: ETMSS-4
	+ June 2014: Finalize the first version of met-ocean object class
* **ETs, Other Organizations and participants:**
	+ NOAA (lead), ETMSS (H. Savina, B. Hackett, G. Coppini, J. Parker, N. Moodie), ETWS, ETSI (Jürgen Holfort), IHO, IMO

**Project #26:        Support and enhance the Polar components of GMDSS**

**Project Leader:    Darlene Langlois**

**Other project members: Nick Hughes,**Vasily Smolyanitsky, Alvaro Scardilli, all ETSI members

**Project Description:**

Polar components of the GMDSS as well as provision of MSI for areas with occurrence of floating ice differ in many aspects from mid-latitude or ice free areas of the World Ocean. Navigation near or within the ice needs appropriate ice information for safety and efficiency. The current standard for information is an ice edge in text format; however, graphic and electronic formats may also be used. In the high latitudes, there are challenges with the coverage of Inmarsat but HF can be used.

Since June 2011, ice information has been available for the 5 Arctic METAREAs via SafetyNET and NAVTEX bulletins. To promote a consistent ice edge, a special "ice" GMDSS server (<http://gmdss.aari.ru>) has been set up to support exchange of information between the Preparation Services.

The objective of the project will be for the ETSI to continue to work with IICWG, ETMSS, IMO and IHO to support and enhance the polar components of GMDSS including the Southern Ocean and under the agreed scheme for IMO e-Navigation including the Polar Code.

 **•   Expected Outcomes:**

* Ensure ice information is available for mariners around the world.
* Increase the availability of graphic products.
* Ensure the Polar Code has appropriate recommendations related to navigation in ice-infested waters.

**•   Key Activities:**

* Support for operational exchange of information for consistent ice information within GMDSS
* Harmonization of format of the bulletins,
* Develop standards for provision of iceberg information.
* Exchange and transition experience to all METAREAs and sub-AREAs / regions with ice or icebergs.
* Hold regular workshops to improve consistency of products and increase knowledge on topics relevant to mariners.
* Develop, test and implement updates to ice in SafetyNET and NAVTEX standards supporting graphic presentation of information as appropriate.
* Support safe operations in ice infested waters by providing input on ice related to Polar Code development to IMO.

**•    Timeline, Major milestones:**

* May 2014 – provide input into the Polar Code.
* June 2014 - 4th "Ice Analysts Workshop" to include session on METAREA bulletin ice information for the Southern hemisphere
* MMSW-2 and Fall 2014 –METAREA preparation and issuing services to meet to discuss formats and standards; perhaps during IICWG-14
* Oct 2014 – Report to IICWG (Chile)
* March 2015 – ice information from issuing services available in shape format on ice server
* June 2015 – workshop for exchange of information
* Fall 2015 – provision of ice information METAREA bulletins for the southern hemisphere

 **•    Implementation of JCOMM-4 decisions** (by paragraph number of JCOMM-4 report):

–    8.3.4 (Safety-related Marine Meteorological Services)

–    8.3.10 (Safety-related Marine Meteorological Services)

**Project #27: Support and enhance ENC/Electronic Chart Display Information System (ECDIS) for ice navigation**

**Project Leaders: Juergen Holfort** (ETSI TG ENCIO and BSH)

Other project members: Vasily Smolyanitsky, DL, AS, SL

**Project Description:**

Having developed the Ice Objects Catalogue and the S-411 sea ice specification within the IHO S-100 context, these documents need maintenance and updates depending on changes for sea ice information as defined by ETSI and also according to users’ needs. It is also needed to foster the use of sea ice information on the Electronic Chart Display Information System (ECDIS), respective within the context of e-Navigation. Care must be given to overviewing and helping in the implementation of the standards in systems on the bridge.

The experience in implementing the catalogue and S-411 is also a valuable asset to help in the implementation of other metocean data into e-Navigation.

**Key outcomes:**

* Wide usage on ships of ice charts
* Capability at National Ice Services to produce ice in S-10x and S-57

**Key activities:**

* Formal management of Ice Objects Catalogue and S-411
* Interact with ENCS manufacturers and OGC to develop software to accept ice data
* Support National ice services to develop capability and to begin production of S-4xx data files
* Support implementation of MetOcean Catalogue as S-4xx

**Timeline / Milestones:**

* Draft S-411 and presentation to IICWG (Oct’2012)
* Preparation of a portrayal registry for parameters of the ice objects catalog (2013)
* Formalization of documentation and reports to ETSI-V (Mar’14), IICWG (Oct 2013 and 2014) and TSMAD (Jun 2013 and further)
* End 2014: increased availability of ice charts in S-411
* November 2014: report to IHO-HSSC

**ETs, Other Organizations and participants:**

* ETSI TG ENCIO, BSH, IICWG, TSMAD

**Implementation of JCOMM-4 decisions** (paragraph number of JCOMM-4 report)

* + 8.3.4 (Safety-related Marine Meteorological Services)
	+ 8.3.10 (Safety-related Marine Meteorological Services)

**Project #28: Maintain and update sea ice technical documentation**

**Project Leader:** Keld Quistgaard,

Other projects members: Darlene Langlois, JF, CP (for WMO 574), KH, AS

**Project Description:**

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 is developed for all kinds of floating ice – sea, lake and river ice with all kinds of topology (point, linear, area, grid).

Following requirements from the end-users, in the framework of implementation of CryoNet as well as in connection with anticipated requested from the International Polar Partnership Initiative (IPPI), ETSI will maintain, update and extend as appropriate the WMO sea ice standards in interaction and cooperation with the .International Ice Charting Working Group (IICWG).

**Expected outcomes:**

* Harmonization and updates to WMO ice documentation following progress in ice in ECDIS standards
* Updates to WMO ice standards in parts of river/lake ice/point/linear/gridded objects
* Documentation on ice observations and best practices

**Key activities:**

* Updates to “Sea Ice Nomenclature” (WMO-No.259) catching harmonization (Vol I – “Terminoloy” and Vol III - “International system of sea-ice symbols”) and training issues ( vol. II - “Illustrated Glossary”);
* Updates to sea ice exchange and presentation formats (“SIGRID-3: a vector archive format for sea ice charts”, WMO/TD-No. 1214 and “Ice Chart colour code standard” WMO/TD-No. 1215);
* Developing “Understanding and Identifying Old Ice in Summer”, “Manual for Ice Experts – Ice Observers” and others docs (e.g. Canadian MANICE) as the new WMO sea publications for sea ice observations and analysis;
* Provide harmonization across the sea ice standards arising from adopted additions

**Timeline / Milestones:**

* Finalize additions arising from the “Ice Objects Catalogue” version 5.1” (ETSI-5, Mar’14)
* Finalize additions on ice objects arising from end-users, Cryonet and ice observations requirements (ETSI-5, Mar’14; IICWG,2014)

**ETs, Other Organizations and participants:**

* + ETSI, IICWG, CryoNet team

**Implementation of JCOMM-4 decisions** (by paragraph number of JCOMM-4 report)

* + 8.3.4 (Safety-related Marine Meteorological Services)
	+ 8.5 (Future priorities for the services and forecasting system programme)

**Project #29 Support for sea ice climatology and ice information systems**

**Project Leader:** Vasily Smolyanitsky, Caryn Panowicz,

**Project Description:**

In 1989 the WMO CMM initiated the “Global Digital Sea Ice Data Bank” (GDSIDB) project to support development of the sea ice climatology based on the ice charting with 2 archival centers – AARI, Russia and NSIDC, USA. Since 2001 the JCOMM Expert Team on Sea Ice in cooperation with the International Ice Charting Working Group (IICWG) is supervising the project and cooperates with JCOMM ETMC.

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 is stored in a 0.25°x0.25° raster SIGRID, 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) and are available either via the AARI (<http://wdc.aari.ru/datasets>) or NSIDC (<http://nsidc.org>).

The project will concentrate on a) reprocessing and update of the sea ice ‘blended’ climatology and assessment of uncertainties and b) availability of the sea ice charting metadata and material in information systems and formats required by end-users community (CryoNet, WIS, NetCDF).

**Expected Outcomes:**

 **Procedures for errors and QC**

* + Updated semicentennial and longer sea ice ‘blended’ climatology and uncertainties
	+ Availability of sea ice operational and historical metadata and material in WIS, Cryonet, CMOC framework and other information systems and as geoservices
	+ Identification/referencing datasets by assigning DOI

**Key Activities:**

* + Regular (weekly – monthly - annual) input to GDSIDB ice charting archive in standard WMO formats from contributing ice services / centers
	+ Annual reprocessing of data, update of climatology, assessment of uncertainties and comparison with passive microwave
	+ Coordination of development of protocols and procedures for sea ice charting metadata/material availability in WIS, Cryonet, static NetCDF, geoservices, etc and supporting documentation

**Timeline/milestones:**

* + Report to IICWG ( October 2013, 2014 / regular)
	+ Report to Cryonet (regular)
	+ Report to ETSI, ETMC and decision on information systems and access (ETSI-5, March 2014 / regular)

**ETs, Other Organizations and participants:**

* + ETSI, ETMC, IICWG, CryoNet team

**Implementation of JCOMM-4 decisions (noted by paragraph number of JCOMM-4 report**

* + 5.4.3 (Polar Met-Ocean and sea ice information services)
	+ 8.3.4 (Safety-related Marine Meteorological Services)

**Project #31 Enhancing the integrated ice services and forecasting**

**Project Leaders: Antti Kangas**

Other project members: Nick Hughes

**Project Description:**

Provision of services for the efficiency and safety of navigation and other operations in the ice-covered waters require an integrated approach in terms of the ice and sea state parameters and products to be regularly, timely, and in the binary formats, delivered to end-users (navigators, off-shore platforms, search and rescue, emergency support). Typical parameters should include concentration, stages of development or thickness, form, dynamic processes (ice drift, pressure) and ice surface state (ridges, melt processes, snow on ice) as well as several metocean parameters, while the products should include both ice analysis or charting, high and medium resolution satellite imagery, and short–term numerical ice forecasting. SAR and emergency support may require additional products like medium-range ice and metocean forecasting and prediction of oil spill dissemination. Possible changes to the concept of ice support towards greater demands for products beyond traditional ice charting are progressing.

The objective of the project will be for ETSI, in close collaboration with the International Ice Charting Working Group (IICWG), to coordinate the enhancement of integrated ice services by tracking and summarizing best practices and requirements to products and information, facilitating exchange of experience and resources in ice analysis, operational forecasting and numerical modeling of ice, and the relationship to ice parameters and harmonization of the services. This project should provide advice and input to corresponding projects led by JCOMM ETOOFS and TT on MPERSS (Maritime Pollution Emergency Response Support System).

**Key outcomes:**

* Enhanced ice services following on the user-requirements
* Increased usage of the ice products in the NWP
* Improved integrated ice product usage in users’ digital systems
* Input to MPERSS implementation in Polar Regions

**Key activities:**

* Tracking and summarizing requirements to input data (current and perspective spaceborne information and ground observations) and products;
* Exchange and transition of experience in ice analysis, forecasting and harmonization of practices across the Services, training for developing Ice Services, including support for regular “Ice Analysts Workshops” and “Sea Ice Data Assimilation Workshops”.
* Input to ETOOFS guide

**Timeline / Milestones:**

* 4th Ice Analysts Workshop (June 2014)
* Sea Ice Data Assimilation Workshop (September 2014)
* Reports to IICWG and ETSI meetings

**ETs, Other Organizations and participants:**

* ETSI, IICWG, met.no and AARI for oil spills detection and monitoring

**Implementation of JCOMM-4 decisions** (by paragraph number of JCOMM-4 report)

* + 8.3.4 (Safety-related Marine Meteorological Services)
	+ 8.3.10 (Safety-related Marine Meteorological Services