Task Information Template

Task Information Updated 2019-09-10

TASK NAME: ROSE-L

TASK TEAM LEAD: Wolfgang Dierking - Wolfgang.Dierking@awi.de

TASK TEAM MEMBERS & CONTACT INFORMATION

- Dean Flett – Dean.Flett@Canada.ca
- John Falkingham – john.falkingham@rogers.com
- Nick Hughes – nick.hughes@met.no
- Keld Qvistgaard – kqh@dni.dk
- Sean Helfrich - sean.helfrich@noaa.gov
- Mike Hicks - Michael.R.Hicks@uscg.mil
- Lisa Lind - lisa.lind@smhi.se
- Patrick Eriksson - Patrick.Eriksson@fmi.fi
- Jan Lieser - jan.lieser@utas.edu.au
- Neal Young - neal.young@utas.edu.au
- Alvaro Scardilli - asscardilli@hidro.gov.ar

BRIEF DESCRIPTION AND ANTICIPATED OPERATIONAL IMPACT

- This task aims at investigating the advantages of using combinations of C- and L-band images for operational ice charting. For this purpose, ALOS-2 PALSAR-2 L-band images are used that are acquired with the shortest possible time gap to Sentinel-1 and Radarsat-2 C-band data.

- Different ice centers and ice analysts will receive a set of C- and L-band images for producing examples of ice charts, first using only the C-band information as in the usual mapping process, and then complementing the analysis of ice conditions by adding the information from L-band.

- For providing realistic scenarios, the images are acquired in wide-swath / ScanSAR mode. If the time gap permits a direct combination of L- and C-band image layers, automated segmentation will be carried out by the Centre for Integrated Remote Sensing and Forecasting for Arctic Operations and by the Alfred Wegener Institute (responsible in both cases: Dierking).

- From results of studies reported in the literature we expect that the addition of L-band data to the ice charting process will in particular enhance the identification of deformed ice zones (ridges, rubble fields) and alleviate ambiguities between first-year ice and nilas/grey ice covered with frost flowers. L-band signatures are less affected by the snow cover. Because of the larger penetration depth of L-band waves, the classification performance during the melting season improves.
In addition, the detection of icebergs in combinations of C- and L-band data is assessed.
The ice centers / ice analysts have to agree on a number of test sites (Arctic, Antarctic, Baltic Sea). For pre-ordered Radarsat-2 or for Sentinel-1, ESA will order the matching PALSAR-2 images. Argentina Ice Service will contribute with SAOCOM L-Band imagery over Antarctic test areas.

OUTCOMES (DELIVERABLES)
- Each ice service / ice analyst delivers one (a few) example(s) of (an) ice chart(s) based on only C-band data and on the matching combination of C- and L-band data. If possible, identifications of icebergs in C- and corresponding L-band images are demonstrated.
- If time and manpower permit, also a chart based on L-band as stand-alone is provided.
- A short written assessment shall be given.
- The individual results are summarized by the task leader and provided to ESA (Malcolm Davidson).

ACTIVITIES / STATUS
- IICWG to provide endorsement for Copernicus Polar High Priority Candidate Missions (ROSE-L, CIMR)
- Provide advice on sensor parameters (polarization, dynamic range, noise floor, etc.) for ROSE-L
- Ice Services to participate in demonstration of use of C- and L-band SAR data for ice charting
- Spring 2019: Start of data acquisitions of PALSAR-2 imagery.
  - JAXA schedules PALSAR acquisitions every month for (at present) the next 12 months to cover seasonal variation with the following scheme:
    - Use the 50 x 50 km regions selected by Keld to schedule all acquisitions i.e. both high-resolution SM mode and ScanSAR. The positions of the test regions have been passed on to the JAXA PALSAR operations team.
    - 2 back-to-back short time interval ScanSAR acquisitions per month over each test site (short time interval to support ice drift estimation)
    - 2 back-to-back short time interval SM mode acquisitions per month over each test site (short time interval to support ice drift estimation)
    - ESA adjusts the S1 acquisition scenario to acquire as close in time as possible to each of the PALSAR acquisitions
    - First acquisitions planned during the cycle starting on April 22nd
    - JAXA will communicate their acquisition scenario asap to Malcolm Davidson/ESA
    - Adjustments will be made on a monthly basis as required and also based on feedback of the IICWG (yet not possible since we don’t have access to the data at this stage).
- May 8 - ESA has ordered ALOS-2 images over different sites in the Arctic but have to confirm whether these can be shared with different Ice Services and how to organize this.
At present we cannot do a real operational exercise, only a post-operation analysis by complementing an operationally acquired C-band image with an L-band image taken with the smallest possible time difference, and see what is gained when using L-band in addition, and also judging the usefulness of L-band as single source of information.

- July 2019: After considerable discussion with the Ice Services about the relative pros and cons of a S-1/ROSE-L tandem mission vice a constellation mission, the recommended configuration is a tandem C+L configuration with as short a time difference as possible.
- July 2019: Through the efforts of Alvaro Scardilli of the Argentine naval ice service, CONAE will also be conducting an L+X band experiment in Antarctica using SAOCOM and COSMO. CONAE has also indicated a willingness to share SAOCOM imagery of the Arctic for science and safety at sea.
- July 2019: ESA has now access to the PALSAR images already acquired over our test sites, so our actions may be able to start soon.

**MILESTONES STATUS SEPTEMBER 2019**

- Collecting suggestions for different test sites from team partners => DONE
- Establishing contacts for possible collaboration with external partners => DONE
- (CMEMS SITAC via Juha Karvonen, SAOCOM via Alvaro)
- Together with ESA, ordering of data from JAXA => DONE
- Establishing plan B => NOT REQUIRED
- **Distribution of data sets => IN PROGRESS** - distribution of datasets has commenced. AWI, DMI, IIP and MET Norway have all begun assessing images
- Generation of ice charts based on L-band images alone and in combination with C-band, judgment of ice analysts from the participating ice centers => NOT STARTED YET
- Collection of judgments and summary of results provided by the task leader => NOT STARTED YET

**NOTES / REMARKS**

- Any delay in the analysis of L-band images (together with C-band imagery) is more critical for ESA because they need our input latest in fall 2019– for the ice services, such analysis is useful in any case, even if we get results later.
- Demonstrations need to be finished until fall 2019 so that they can be included in the Mission Requirements Document prepared by the ROSE-L Mission Advisory Group of ESA.
- Use of archived data needs to be discussed (Envisat, Radarsat-1, ALOS-1 PALSAR, SAOCOM)
- Since PALSAR images are ordered over a whole year, melting conditions are included in the analysis.
Task Information Template

Updated 2019-08-30

TASK NAME:  ICEBERG MODEL MODERNIZATION

TASK TEAM LEAD:  Mike Hicks - Michael.R.Hicks@uscg.mil

TASK TEAM MEMBERS & CONTACT INFORMATION

- Wolfgang Dierking - Wolfgang.Dierking@awi.de
- Dean Flett – Dean.Flett@canada.ca
- Doug Leonard – Douglas.Leonard@canada.ca
- Nick Hughes - nick.hughes@met.no
- Philippe Lamontagne - Philippe.Lamontagne@nrc-cnrc.gc.ca
- Keld Qvistgard - kqh@DMI.dk
- Alvaro Scardilli - asscardilli@hidro.gov.ar
- Kristen Serumgard – Kristen.L.Serumgard@uscg.mil
- Neal Young - neal.young@utas.edu.au

BRIEF DESCRIPTION AND ANTICIPATED OPERATIONAL IMPACT

The goal of this task is to advance the implementation of iceberg drift and deterioration modeling. The focus of this task is to first share an updated version of the North American Ice Service (NAIS) model with IIP and NIC to evaluate the use of different ocean current forcing (e.g., US GOFS 3.1 and/or Canadian RIOPS). Key components of the task are to establish version control and examine the scope of work necessary to convert existing code from Fortran to a more modular programming language (e.g., Python). Once this is completed, a revised version of the NAIS model will be provided to interested IICWG parties e.g., Argentina, Denmark, Norway, others?

OUTCOMES (DELIVERABLES)

- Standalone version of NAIS 2.0 Iceberg Models shared with NIC & IIP, others
- Version control system owned/managed by Canadian NRC.
- Modernized modular coding for NAIS model to facilitate deployment on multiple platforms using various environmental data.

ACTIVITIES / STATUS

- Develop and document iceberg modeling requirements.
- Continue to evaluate the implementation of the North American Ice Service (NAIS) Iceberg Drift and Deterioration Model in Argentina, Denmark, and Norway. Report status to Iceberg Modeling Task Team.
- Discuss need/desire for Argentina, Denmark, and Norway to receive version of NAIS Iceberg Model revised by CIS Science in 2018 (NAIS 2.0)
- Sign Technology License Agreement (TLA) to share NAIS 2.0 iceberg drift and deterioration model with IIP and NIC/US Naval Research Laboratory.
• Establish NAIS Model version control server accounts at Canadian NRC.
• Begin testing the use of GOFS 3.1 (HYCOM) and RIOPS (NEMO) currents.
• Explore resourcing options to re-code NAIS v2.0 from Fortran to a modern, modular programming language.
• Assuming resources are available for (5), develop NAIS v3.0.
• Investigate availability and applicability of other iceberg drift and deterioration models.

**UPDATES**

• After US Coast Guard legal review, TLA was approved and signed by both Canadian National Resource Council (NRC) and IIP on 11 July 2019. TLA formally allows IIP to share NAIS 2.0 model with USNIC/NRL for further evaluation.
• CIS plans to compile and upload the NAIS 2.0 model by the end of August. This version of the model corrected a known issue of “flying bergy bits” that provides a more realistic solution for very small iceberg drift. This code is written in Fortran and will serve as the basis for further sharing – both with IIP and others within IICWG (DMI, Argentina, Norway).

**MILESTONES**

<table>
<thead>
<tr>
<th>Month</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2019</td>
<td>Complete USCG Legal Review and sign TLA for sharing NAIS 2.0 Iceberg Model</td>
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</tbody>
</table>
| August 2019      | - CIS complete instructions for downloading, compiling, and installing NAIS 2.0 model  
|                  | - Host telecon to update team on status and discuss process for sharing model. |
| September 2019   | - Refresh NRC’s Wiki Page, if necessary. Establish or validate user accounts for download.  
|                  | - CIS upload NAIS 2.0 model to NRC’s Wiki Page  
|                  | - Task team members attempt to download model and report any issues. Further installation and operational implementation is at each service’s discretion.  
|                  | - Update status at IICWG meeting and discuss path forward for 2020.  
|                  | - USNIC/NRL begin evaluation of GOFS 3.1 environmental forces.  
|                  | - NRC continues work in evaluating Python version of NAIS 2.0 model. |
| January 2020     | - IIP adopts NAIS 2.0 as primary operational model |

**ADDITIONAL NOTE:**

• US Department of Homeland Security Science and Technology and IIP completed a campaign to deploy GPS-tracked beacons onto icebergs within the IIP Operating Area. The primary objective was to collect sufficient ground truth data for development of a machine learning algorithm. Data will also support drift model validation. A total of 120 icebergs were tagged with a wide range of duration. There will be a detailed presentation during the IICWG meeting by the IIP Commander.
Task Information Template
Updated 2019-04-25

TASK NAME:  E-NAVIGATION

TASK TEAM LEAD:  Jürgen Holfort - juergen.holfort@bsh.de

TASK TEAM MEMBERS & CONTACT INFORMATION
• Mike Hicks - Michael.R.Hicks@uscg.mil
• Keld Qvistgaard - kqh@DMI.dk
• John Falkingham – john.falkingham@rogers.com
• Vasily Smolyanitsky - vms@aari.aq

BRIEF DESCRIPTION AND ANTICIPATED OPERATIONAL IMPACT
• This work is intended to promote and facilitate the presentation of ice information in form of ice charts on the ECDIS on board of ships. One requisite for this is to keep the S411 format up to date, incorporating also new features. Assistance must be given to the producers of ECDIS so they can easily incorporate the format into their systems. Important is also the continuation in making the S411 charts readily available and develop the ability to produce charts in S411 format at every ice service issuing ice charts.
• Although the idea is that S411 production has only minor impact on the regular ice chart production, it will be possible that, for individual ice services, some changes in the production will be necessary due to the needed standardization (stricter metadata requirements and error checking, interplay with other S100 data).

OUTCOMES (DELIVERABLES)
• New S411 version in line with the latest S-100 documents (preferable S100 4.0.0 due December 2018).
• Python scripts using open source libraries for the conversion of Sigrid-3 shapefiles into S411 and vice versa.
• Updates to the ice objects catalog and portrayal (with a special emphasis on icebergs). Basic updates ready for decision of acceptance at next ETSI meeting, more far-reaching updates to be presented at IICWG meeting 2019 for broader discussion.
• Ideas and examples of scale dependent portrayals to be presented at next IICWG meeting in 2019

ACTIVITIES / STATUS
• Promote the availability of ice charts in S-411 format with the ECDIS manufacturers. (Action 17-1)
• Develop Iceberg Standard Format for ECDIS
• Investigate how to prevent the accidental use of old information (in the context of ECDIS charts and imagery
- Develop potential sea ice portrayals taking into account the possibilities of electronic display systems for scaling, symbol merging, etc. and including possibilities to combine the hatching and the color schema and to better incorporate melting (Action DC 18-2)
- Review, compare, and harmonize iceberg polygon and point classes for iceberg concentration, max length/height, and non-ice S57 attributes in SIGRID-3 and Ice Objectives Catalogue. Include symbology for “Isolated, Few, Many”. (Action IC 18-1)
- Review, compare, and harmonize new symbols and color coding contained within Sea Ice Nomenclature I and III, Color Code Standard, and S-411 for the areas and boundaries of iceberg shape, size, number, and concentration. (Action IC 18-2)

MILESTONES
- February 2019 – Circulate draft S-411
- March 2019 (next ETSI meeting) – S-411 version for discussion/acceptance by ETSI
- March 2019 (next ETSI meeting) – Basic updates to the ice objects catalog and portrayal (icebergs)
- Spring 2019 – Circulate new Python scripts for SIGRIDéS-411 conversion and make available to ice services for final testing
- September 2019 - Far-reaching updates to the ice objects catalog and portrayal for broader discussion at IICWG-XX

NOTES / REMARKS
- Scaling of Ice Charts.
  - The first idea was to make the scaling on the fly according to the scale currently active on the ECDIS. But not continuously but in Scale regions. For example one scaling for 1:1.000.000 to 1:500.000, a second one for 1:500.000 to 1:100.000, etc. After talking with some navigators I came to the conclusion that it is probably better to give the user the choice of ice chart scaling independently from the actual ECDIS scaling.
  - For radar targets there is a method already in use to distinguish what features can be separated and which not. At least the thinking behind it can be used also in our choice how to join features. Can also be dependent on how well we now the position of the feature (e.G. iceberg position accuracy). My feeling now is that it is better to join very generously, we always have to keep in mind that the user has much more layers on the screen compared to “our” restricted ice chart view.
- Portrayal
  - I hope to meet persons of 7Cs to discuss with them portrayal issues within next month, but surely before eastern.
- S411 document
  - I hoped for a student to work on this, but the planned internship did not happen.
- S411 production
Rewriting the S411 production code to open source python libraries (compared to now using ARCGIS libraries) is still work in progress. But in March there will be a python training course at the BSH, which hopefully will solve some of the problems still present. Then also the preview/quicklook production at the ice logistics portal will be more robust and inclusive (now only 2 charts made, Arctic and Greenland). But that is more an QGIS-Python interplay problem.

**Ice Objects Catalogue / Sigrid 3**

While including error checking in the S411 production it would be nice to make some changes. Some error routines are in place, but still not tested, as I don’t have input data using them. For example ia_SFA, ia_FFA, etc. No problem if nobody uses the attributes, as changing would be easier. Probably best is to ask first who is using what attributes.
INTERNATIONAL ICE CHARTING WORKING GROUP (IICWG)

First steps:

- Make a list of ECDIS producers and other industry partners working already on the implementation of S411.
- Contact further producers to promote the implementation.
- See what open source alternatives exists to replace the Arggis python libraries used in the actual conversion scripts.
- Check if metadata needed according to most recent S100 definition is given in the actual S411 definition. Identify all needed data and ask all ice services producing ice charts if they can provide the needed information (S-100 Part 4a).
- Check what metadata data quality attributes are needed and how to best define them for sea ice and icebergs (S-100 Part 4c).
- Check the ice objects catalog. There are often different possibilities to express the same or very similar parameters; there is also some inconsistency in it. Define error checks to validate actual data.
- Get information of the iceberg task team regarding new or changed objects and portrayals.
- Check if the GML encoding used in the actual S411 is in accordance with S-100 Part10b.
- Change the S411 portrayal definition to reflect the actual S-100 standard and then put the S411 portrayal into the S100 portrayal registry. Make use of the new features to refine the portrayal (e.g. placement of symbols on the line and rotation of symbols).
- Explore the possibilities of the Lua programming language in regard to scale dependent portrayals.
- See what ideas and possibilities are written out in the S-100 part 14 for the online data exchange.
- Try to attend IHO meeting related to S100, especially those working on interoperability.
- Evaluate the need of gridded products in S411 or if other S100 based format are suitable (model, ice). If the need is there, dig into S-100 Part 8.
Task Information Template

Updated 2019-09-06

TASK NAME:  UNCERTAINTY

TASK TEAM LEAD:  Sean Helfrich - Sean.Helfrich@noaa.gov

TASK TEAM MEMBERS & CONTACT INFORMATION

- Penny Wagner
- Nick Hughes
- Antti Kangas
- Chris Readinger

BRIEF DESCRIPTION AND ANTICIPATED OPERATIONAL IMPACT

- Develop mechanisms to quantify the uncertainty in ice charts and convey that information to users
- Provide path for utility of ice charts into ice model assimilation
- Communicate confidence metrics for navigators regarding unknowns about ice charting data.

OUTCOMES (DELIVERABLES)

- Generate an intercomparison data portal
- Refine formula for Ice polygon uncertainty based on analyst subjectivity results
- Study of modeler and navigator needs for uncertainty information
- Present findings of user needs for uncertainty at the 9th International Workshop on Sea Ice Modelling, Data Assimilation and Verification

MILESTONES

- Using the parameters from DC17-4, develop a draft method to estimate the ice chart confidence level and present at next IICWG. (DC 17-5) - COMPLETED
- Work with the analyst to characterize the impacts that subjectivity, confidence and skill have on uncertainty estimates. Conduct an inter-comparison of analysis and address topic at next IAW meeting (DC 18-4) COMPLETED to be presented at IICWG-XX
- Construct 2 studies or find of modeller and navigator user needs for ice chart uncertainty. Present findings at IICWG meeting 2018. (DC 18-5)

ACTIVITIES / STATUS

- Angela Cheng et al. conducted a study to compare the accuracy of visually estimated ice concentrations by eight analysts at the Canadian Ice Service against three standards. The study is published in an article *Accuracy and Inter-Analyst Agreement of Visually Estimated Sea Ice Concentrations in Canadian Ice Service Ice Charts*
NOTES / REMARKS

- Working with NOAA CoastWatch/PolarWatch on intercomparison data ingest (Oct 2018) – Approved for work in CoastWatch and currently working with Contractors to add ice datasets and ice charts
- Need more effort on analysis inter-comparison of ice charting.
#### Template

**Task Information Updated 2019-08-30**

**TASK NAME:** ICE ANALYST/FORECASTER COMPETENCIES

**TASK TEAM LEAD:** Scott Weese (Canada): scott.weese@canada.ca

**TASK TEAM MEMBERS & CONTACT INFORMATION**

- Penny Wagner (Norway): penelope@met.no
- Jürgen Holfort (Germany): juergen.holfort@bsh.de
- Lisa Lind (Sweden): lisa.lind@smhi.se
- Jan Lieser (Australia): jan.lieser@utas.edu.au
- Ekaterina Afanasieva (Russia): afanasieva@aari.ru
- Antti Kangas (Finland): antti.kangas@fmi.fi
- Angela Ottoson (USA): angela.ottoson@noaa.gov

**BRIEF DESCRIPTION AND ANTICIPATED OPERATIONAL IMPACT**

- A set of competencies that would be embraced by all Ice services and promote a standardized approach to Ice forecaster/Ice analyst training internationally.

**OUTCOMES (DELIVERABLES)**

- Overview plan for ice analyst training to include GIS, analysis basics, WMO regulations, Polar Code, and basic knowledge required for position. Draft for use now and as possible input for future certification through WMO.
- Forecaster competencies will be specific to ice centers and customers, but our goal is to create a baseline.

**ACTIVITIES / STATUS**

- Third draft of ice forecaster and analyst competencies are now completed and were endorsed with a few minor suggestions (included in the documents) at the 7th meeting of Expert Team on Sea Ice (ETSI) In Geneva in May.
- We’ll now seek WMO acceptance. We will target the 2020 Congress for WMO approval

**NOTES / REMARKS**

- We discussed within our group that **WMO Marine Weather Forecaster Competence Framework** should be revisited and relevant ice competences should be removed from there.
- It was agreed upon the fact that there are overlaps with the WMO Marine Weather Forecaster competencies that must be addressed – the two competencies do not have to be
mutually exclusive but they must be mutually compatible; this could be an action for ETSI to discuss with the Expert Team on Maritime Safety Services (ETMSS).

- For the upcoming IICWG in Denmark: I do think that members of other groups can have many good ideas/suggestions for shaping Analyst/Forecaster Competencies and we definitely could benefit from the knowledge of the larger group to help advance this project. Of a high interest, in my opinion, would be a tight collaboration with the Mariner Training Needs group.

- Subjects like:
  - Enhanced collaboration between ice services and marine training centers.
  - Standard, similar approaches to the training of ice navigators and ice analysts/forecasters with respect to ice in order to maximize the understanding of the ice products generated by the ice centers.
  - An international standard for Polar Code ice information products.

  ....would be worth discussing.

- In addition, now, that the documents were approved at ETSI and hopefully in the near future at WMO, a logical next step would be the creation of a Forecast Training Program (IFTP) and an Ice Analyst Training Program (IATP), mirroring the Basic Instruction Package for Meteorologists (BIP-M) [https://library.wmo.int/pmb_ged/wmo_1083_en.pdf](https://library.wmo.int/pmb_ged/wmo_1083_en.pdf)

- Moreover, our task team tried to find out if international Standard Operating Procedures for Issuing Marine Weather Forecasts and Warnings existed. We could not find any. In Canada, we use the Manual of Standards Operating Procedures for Issuing Marine Weather Forecasts and Warnings (MARPRO). It is my belief that the mariners would appreciate standard forecasts and warnings wherever they navigate.
Task Information Template

Updated 2019-05-08

TASK NAME:  REGIONAL CLIMATE CENTRE CONTRIBUTIONS

TASK TEAM LEAD:  Adrienne Tivy – Adrienne.Tivy@canada.ca

TASK TEAM MEMBERS & CONTACT INFORMATION

- Shanna Pitter-Combley – shanna.pitter@noaa.gov
- Keld Qvistgaard, Denmark – kqh@dmi.dk
- Nick Hughes, Norway – nicholsh@met.no
- Antti Kangas, Finland – antti.kangas@fmi.fi
- IICWG expert from Sweden
- IICWG expert from Iceland
- Vasily Smolyanitsky Russian Federation – vms@aari.aq
- Rick Thoman, NOAA/IARC – rthoman@alaska.edu

BRIEF DESCRIPTION AND ANTICIPATED OPERATIONAL IMPACT

- Task group to provide input for the Regional Climate Centres (RCC) where sea ice information is important within their domain.
- At first this will be mainly for the Arctic RCC (ArcRCC) as it began its demonstration phase in May 2018. Work with the Antarctic RCC will be needed in the future.
- Sea Ice seasonal outlook information is part of the mandatory function of the RCC and is delivered through the Pan-Arctic Climate Outlook Forum twice yearly, with one additional update mid-winter.
- Canada is the LRF lead and will contribute a multi-model ensemble sea ice forecast to the seasonal outlook.
- The final outlooks will be delivered in the form of graphics, tables, narratives and impact statements culminating in a consensus statement from the 8 Arctic Nation countries participating in the ArcRCC.
- Collaboration with the experts within IICWG was identified early on in the planning phase for the RCC.

OUTCOMES (DELIVERABLES)

- Collaboration and review of the sea ice seasonal outlooks up to three times per year (two main releases in the May and October timeframes with an update mid-winter (February).
  - Contribute impact statements where relevant
  - Contribute to the consensus statement
- Contribute to the evolution of the sea ice component of the Arctic RCC
  - Share best practices on heuristic and statistical methods to generate client focused seasonal forecasts
  - Share best practices on subjective and objective validation of seasonal outlooks.
INTERNATIONAL ICE CHARTING WORKING GROUP (IICWG)

- Share client needs for seasonal forecast products

NOTES / REMARKS
- IICWG was recognized by the ArcRCC Network members as an important partner in the implementation and on-going commitment to this new pan-arctic climate service.
- Network members and IICWG members do overlap, so this will facilitate some of the coordination required.

STATUS UPDATE 2019-05-08
- An initial team is established, members from Iceland and Sweden have yet to be identified
- The team participated in the May PARCOF by providing the following summer seasonal outlook for key shipping areas in the Arctic: Northwest Passage, Northern Sea Route, Coastal Beaufort Sea and Svalbard
  - Arctic Summer 2019 Season Outlook was published by the 3rd Session of the Pan-Arctic Regional Climate Outlook Forum (PARCOF-3) in May.
INTERNATIONAL ICE CHARTING WORKING GROUP (IICWG)

Task Information Template
Updated 2019-09-22

TASK NAME: ARCTIC COUNCIL INTERACTION

TASK GOAL: The purpose of this Task Team is to try to follow the development during the Finnish Presidency of the Arctic Council in order to maintain the Finnish priority “meteorology” into the future deliberation of the Artic Council. The Presidency will turn to Iceland in Spring 2019.

TASK TEAM LEAD: Marianne Thyrring - mth@DMI.dk

TASK TEAM MEMBERS & CONTACT INFORMATION
- Shanna Pitter - shanna.pitter@noaa.gov
- Katherine Wilson – katherine.wilson@canada.ca
- Antti Kangas – antti.kangas@fmi.fi
- Jürgen Holfort - Juergen.Holfort@bsh.de

BRIEF DESCRIPTION AND ANTICIPATED OPERATIONAL IMPACT
- Interact with the Arctic Council to enhance awareness of the operational sea-ice and iceberg information services provided by Meteorological organizations and ice services in Arctic nations that can contribute to Arctic Council initiatives in:
  - understanding changes in sea-ice and icebergs (AMAP assessments and reports),
  - the impacts of this change (ACIA and Arctic Human Development Reports)
  - adapting to this change (AMAP and PAME working groups, and the two legally binding agreements for international Arctic coordination on maritime search and rescue, oil response, and the new International Code for Ships Operating in Polar Waters mitigation).
- Situate IICWG as the authoritative, collaborative source for sea-ice and iceberg information in the circumpolar Arctic
- Provide input to Iceland’s Arctic Council chairmanship related to emerging operational sea-ice and icebergs issues
  - high variability in conditions (2018 North American Arctic experienced a higher than average sea-ice conditions)
  - increased mobility of sea-ice and icebergs
  - Human activities are on the rise in the Arctic, resulting in an increased demand for the specialized statistical, real-time and forecasting information services and technologies of Arctic ice services to support a variety of traditional and new
users (commercial shipping, community activities, tourism, new indigenous fisheries, natural resource activities, and government and research operations (search and rescue, military, science missions))

OUTCOMES (DELIVERABLES)

- Identify gaps in the PAME Arctic Shipping Best Practices Forum portal and suggest ways to address them, including an extension to the Antarctic and historical data (Ref: Action Item 18-15)
- Brief on the launch of the Arctic Regional Climate Centre providing operational summer and winter sea-ice assessments and forecasts. The ArcRCC fills a temporal and spatial decision-making gap of the Arctic Council working group assessment reports (i.e. PAME and AMAP).
- If possible support and contribute to the development of the Declaration to be adopted when the chairmanship goes from Finland to Iceland

ACTIVITIES / STATUS

- Mail with message to Sarah Grimes, WMO sent, from ICCWG, for her to use in PAME
- Inform GD Juhani Damski (FMI) and GD Arni Snorrason (IMO) about the existence of our task team
  - Suggest sea ice topics for Iceland’s consideration for activities under their chairmanship
  - Serve as a sounding board for Iceland Meteorological service regarding sea-ice related topics for their chairmanship
- Prepared remarks for the Danish Minister to present during the drafting of the Rovaniemi declaration to include mention of IICWG. The effort was not successful due to the structure of the declaration not for allowing specific mention of supporting groups unless they were directly part of the priorities. The Rovaniemi declaration was ultimately not signed, so this action was overcome by events.
- Marianne Thyrring supported FMI’s Arctic Council side event: “Connecting meteorology with traditional knowledge and local knowledge” by serving on the panel of meteorological services directors. Marianne mentioned IICWG’s mission and work in the prepared remarks of the panel.
- Supported the preparations for each country’s Senior Arctic Official for the Arctic Council Ministerial meeting and educated them on the Iceland chairmanship priority of the Arctic Marine Environment.
- Iceland included a focus on improving marine safety with meteorological and oceanographical cooperation in their Arctic Council chairmanship program, aka “Oceans priority”.
“Circumpolar meteorological and oceanographic cooperation also serves to improve safety at sea and should be developed further, in collaboration with the World Meteorological Organization.”

- June 14, 2019. WMO PRs of Arctic nations have an invitation from the Icelandic Chairmanship of the Arctic Council to an Arctic Earth System Modeling Workshop in Reykjavik November 26-27, 2019. It was determined that there were a sufficient number of appropriate people attending and nothing additional from IICWG is required.

- Jurgen Holfort attended the third meeting of the Arctic Council's Arctic Shipping Best Practice Information Forum that took place on June 3-4 2019 at the Embassy of the United States, London. He also attended second meeting related to better interactions with Observers to the Arctic Council.

- Jurgen Holfort attended the Workshop on guidelines and tool for Arctic Marine Risk Assessment on September 17, 2019, in Olso, Norway. The workshop focused on Guidelines for arctic risk analysis that had overlaps with the PAME Arctic Shipping Best Practices but no current links to that website. Ice was identified as one of the larger factors and also many links to ice services and other ice related portals (ice logistics, Polarview, etc.) were listed, although no WMO related site or document (ex. WMO 574). The list of sea ice related links were quite long but other risk factors (like low temperatures) had no links, so there is still work needed.

NOTES / REMARKS
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Task Information Template
Updated 2019-08-30

TASK NAME: MARINER TRAINING NEEDS

TASK TEAM LEAD: Keld Qvistgaard - kqh@dmi.dk

TASK TEAM MEMBERS & CONTACT INFORMATION
- Serumgard, Kristen L CDR Kristen.L.Serumgard@uscg.mil
- Kangas Antti (FMI) Antti.Kangas@fmi.fi
- John Falkingham – john.falkingham@rogers.com
- Mike Hicks - Michael.R.Hicks@uscg.mil

Resource contact points
- Jarmo Teranen jarmo.teranen@samk.fi
- Bjørn Kay bk@marnav.dk
- Vladimir Kuznin vladimir.e.kuzmin@gmail.com
- Igor Slodeev slodeevi@mail.ru
- Duke Snider snider@martechpolar.com

BRIEF DESCRIPTION AND ANTICIPATED OPERATIONAL IMPACT
- Establish Team, add more IICWG members to work on task?
- Extract, summarize highlights from resources’ presentations at IICWG
- Discuss how team wants to address feedback from the Mariner Training Community
- Include resources in continued discussions, concrete examples on where ice services do well – and where we don’t! Mariner’s wish list for simple, reliable, timely, relevant products… at no cost.
- Group examples, group challenges, lack of information, continue discussions with resources
- Summarize discussions, recommendations to IICWG, potential roadmap

OUTCOMES (DELIVERABLES)
- List of identified challenges and potential solutions
- List of areas for continued/focused/enhanced collaboration between ice services and marine training centers.
- Present work/findings at IICWG-20, discussion session to address issues among ice services

ACTIVITIES / STATUS
18-10: Initiate work to develop an international standard for Polar Code ice information products. (Action 18-10)

Develop strategy and actions to address Bjorn’s, Duke’s and Jarmo’s list of improvements that are needed to help the training institutes
- Findings and gaps identified at IICWG-XIX Session 4 are summarized (below)
- Plans to prepare a short questionnaire to focus these ideas; questionnaire can be distributed to mariner through Nautical Institute, given out to students at Makarov Training Centre and other institutes

Investigate why ice charts “vary quite a lot from service to service” – are we not following the common standard?

Explore ways to work with the Nautical Institute and Marine Training Institutes to improve the training of ice navigators with respect to ice
- Letter sent from co-chairs to President and CEO of NI proposing collaboration; Duke Snider on board

Draft of Mariner Training Requirements Survey completed, contains 28 questions
February 18, 2019 - Survey distributed through all of the team member contacts; responses were closed on April 24. 95 responses were received.
May 07, 2019. First round of Task Team’s survey analysis completed.
June/July: detailed analysis, preparation intermediate report to ice services.
July 31, 2019. Intermediate report to ice services completed and sent to Ice Service heads
September: Final report to IICWG.
Key topics/questions we need to learn more about:

1) **Ice definitions.** Requirement: One global standard. We have WMO Sea ice Nomenclature, so we should be using the same terminology. Where are the ice centers missing this? Please provide examples.

2) **Ice information.** Requirement: timeliness, reliability. Where are ice the ice centers lacking? Please provide as many examples as possible. What would be ideal/acceptable from a mariner’s perspective.

3) **Ice information graphical standard.** Requirement: 1 standard. How many standards exist? Which one(s) work? What should be changed? Would it be better if ice services only provided SIGRID3 files to mariners (for bridge display/layering)?

4) **Timeliness.** Requirement: Real time updates. What is required/acceptable concerning timeliness and update frequency (for planning, operations in ice, close to ice, far from ice)?

5) **Ice information in ECDIS:** Requirement: relevant parameter, compatibility. Many ice services produce SIGRID3, convertible to S-411. Why is the industry not requiring more ice information provisions in S-411, instead of graphical standards?

6) **Polar Code Courses and Training:** Requirement: Ice service specialists included in selected parts of basic/advanced modules at the training centers. Standard delivery from the ice services. Which topics to be included/covered in basic/advanced Polar Code modules? Standardization and certification? Flag states? Port states? Classification societies? …?

7) **Individual needs:** Requirement: ice products focused non-iceclass to Polar icebreakers. The ice services would try to standardize ice products and limit number of products, to make production efficient. How are the ice services expected/recommended to handle this?

8) **Satellite image access:** Requirement: Improved access to relevant satellite imagery onboard. Which types of images? Which format/file size for display/transfer? Which training/background is needed to analyze imagery correctly?

9) **Daily Ice chart in operating season.** Requirement: commence production before ships go. What would be ideal production scenarios for the mariners? Area/vessel dependent.

10) **Coverage.** Requirement: no gaps. Identify gaps in ice center response, ice products coverage and updates

11) **Ice chart:** Requirement: relevant, simple, user friendly. Ice eggs to be replaced by colors based on SIGRID3 codes? PDF/GIF to be replaced by SHP/KML?

12) **Basic ice information:** Requirement: simple pdf/gif. Which parameters? How to display analysis versus forecast?

13) **Advanced ice information:** Requirement: complex scalable layer file with many ice parameters provided NRT. Which parameters? How to display analysis versus forecast? Scale versus level of (displayed) details – does this exist (at prototype level)

14) **Ice information portals.** Requirement: easy access, one stop shopping. How can Ice Logistics Portal be improved?