



# **21ST MEETING OF THE INTERNATIONAL ICE CHARTING WORKING GROUP**

**SEPTEMBER 21-25, 2020**

**BY VIDEOCONFERENCE**



## **Meeting Report**

Prepared by John Falkingham



# IICWG-XXI

## September 21-25, 2020

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*(Secretariat note: All of the documents, presentations, and posters referenced in this report are available on the IICWG website <http://nsidc.org/noaa/iicwg/>. Presentations are in alphabetic order by presenter.)*

## 1 Introduction

The 21<sup>st</sup> meeting of the International Ice Charting Working Group took place from Monday September 21 to Friday September 25, 2020. Because of the COVID-19 pandemic, the meeting was held virtually using MC Teams videoconferencing software. The meeting was held for 2 hours each day Monday to Friday. One hundred and fifty-six people representing 51 organizations from 22 countries registered for the meeting and about 100 participated in each session. A list of participant is attached as [Appendix A](#).

The organizing committee for the meeting was chaired by John Falkingham and included:

- Alvaro Scardilli (Argentine Naval Hydrographic Service – host)
- Keld Qvistgaard (Danish Meteorological Institute)
- John Parker (Canadian Ice and Marine Service)
- Mike Hicks (International Ice Patrol, USCG)
- Bryan Brasher (U.S. National Ice Center)
- Penny Wagner (Norwegian Ice Service, Met Norway)
- Vasily Smolyanitsky (Arctic and Antarctic Research Institute, Russia)
- Jan Lieser (Bureau of Meteorology, Australia)
- Marc de Vos (South African Weather Service)
- Shanna Combley (NOAA)
- John Falkingham and Klaus Strübing of the IICWG Secretariat.

The videoconference meeting was held for 2 hours each day, 1100-1300 UTC. While this made for a very early start for the west coast of North America, and a late evening for Australia, this time was deemed the best compromise to encourage participation. Because of the limited time, session introductions and speaker bios were provided in background documents ahead of time.

Before the meeting, a “social” event was held virtually, complete with South American wines for toasting in honour of Buenos Aires, the intended venue for the meeting. The event was held at 1700 UTC and repeated at 2300 UTC so everyone across the time zones could participate at a relatively convenient time. The event gave everyone a chance to see one another and get familiar with the Teams interface.

## 2 Meeting Opening

To open the meeting, John Falkingham welcomed the participants and walked through the logistics and protocols for this Teams videoconference. These had been provided to registrants in advance.



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#### ***2.1 Co-Chairs Welcome***

The co-chairs, Russ White, Director-General for Prediction Services from the Meteorological Service of Canada, and Marianne Thyrring, Director-General of the Danish Meteorological Institute, introduced themselves and welcomed the participants. Russ thanked everyone for joining noting that it was very early in the morning for some and late in the evening for others.

He remarked that we did consider cancelling this meeting because of the pandemic and some of the challenges that it brought, but that we felt there was some really important work ongoing that needed collaboration and sharing of perspectives and points of view. He noted the ROSE-L team that needs the involvement of all of us so we can keep the SAR L-band and C-band ice classification moving forwards; the success in engagement with the maritime training centers that needs to be shared to get reactions from the group as a whole; and, he pointed to some difficulties that Task Team 3 has faced in terms of making progress in getting our products into e-Navigation systems.

Russ reminded everyone that we would not be doing lengthy introductions for the sessions nor any of the speakers and that all of the background information is on a shared drive. He thanked the organizing committee for all the hard work that was done, initially to organize the meeting for Buenos Aires, and then to re-examine the agenda and come up with a meeting suitable for videoconferencing that will be productive and would keep us moving forward as a group.

Russ turned the chair over to Marianne who also welcomed everyone and introduced the first session.

#### ***2.2 COVID Pandemic Impacts Discussion***

This meeting was held some 8 months after the COVID-19 pandemic began forcing countries and organizations to enact extraordinary protocols to curtail the spread of the virus and reduce infections as much as possible. IICWG-XXI itself had originally been planned as a normal meeting in Buenos Aires but, by May 2020, it had become obvious that international travel and large indoor meetings would be impossible. As a result, IICWG-XXI was re-designed as a videoconference meeting. Ice Services provide critical information for the safety of mariners in ice affected waters and are globally deemed essential. They had to maintain the production and delivery of ice information while coping with the pandemic restrictions. This open discussion was intended to allow ice service heads to share their experiences in dealing with the impacts of the pandemic.

The key points from the discussion are below. The full edited transcript of the session is attached as [Appendix C](#).

##### ***2.2.1 Key Messages***

- All ice services have been able to maintain essential services throughout the pandemic.
- All services are using work-at-home to a significant extent. Access to offices is generally restricted to essential personnel. For those activities that must be done in the office, physical distancing measures are employed including using separate offices and establishing traffic patterns to maintain 2 metre separation.



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- Some services have recruited and trained additional personnel to fill in for staff that may have to cease work because of positive COVID-19 tests themselves or families.
- In some cases, research activities have been severely curtailed. In other cases, the quieter environment has allowed development projects to advance faster than planned.
- Ice services in the Southern Hemisphere have not been affected significantly yet but expect increasing impacts as the austral summer shipping season ramps up.

## 3 Session 1: Multi-Spectral SAR (Task Team 1)

### 3.1 Introduction

This session was organized by Task Team 1 (ROSE-L) and consisted of two introductory presentations followed by a panel discussion. The background document provided to all participants in advance is attached as Appendix D1. An edited transcript of the full session is attached as [Appendix D](#).

The presentations were:

- Wolfgang Dierking (AWI/UiT): *Use of L- and C-band SAR Satellites for Sea Ice Monitoring (ESA project LC-ICE)*
- Constanza Salvo (SHNA): *Comparison of L-band (SAOCOM), C-band (Sentinel-1), and X-band (COSMOS SkyMED) SAR Imagery – A review and analysis of their application in operational activities*

### 3.2 Panel Discussion

The objective of the discussion was to provide an overview of the experience of ice services with multi-frequency data (specifically including L-band), to judge the benefits versus efforts to implement a multi-frequency analysis into the daily routine work, and to emphasize special requirements of operational ice services with regard to ROSE-L (e. g. technical issues such as available polarizations, spatial resolution etc).

Moderator: Wolfgang Dierking (AWI / UiT)

Panelists:

- Dean Flett (CIS)
- Constanza Salvó (SHNA)
- Mike Hicks (IIP)
- Keld Qvistgaard (DMI)
- Nick Hughes (MetNorway)

#### 3.2.1 Key Messages

- L-band is shown to be very effective at identifying icebergs in sea ice.



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- L-band images at 100 metre resolution detects icebergs as well as C-band at 50 metres.
- Combination of L-band provides different information about the ice surface from C-band but the causes are not well-explained. L-band should provide another instrument in the box of SAR image analysis tools but more research is needed to understand what is being sensed.
- The choice between wide swath and high resolution depends on the operational context. Wide swath is preferred for large scale monitoring over wide areas. Finer resolution swaths are needed when detailed observations are required – such as community hazard mapping.
- Small icebergs present the greatest hazard to shipping because of the difficulty in detecting them, whether on ship, or by satellite. There is a question about whose responsibility it is to map the smallest icebergs. Where does the responsibility of the national ice services end and the maritime operator's responsibility begin?

## 4 Session 2: Maritime Training Center Engagement (Task Team 8)

### 4.1 Introduction

The objective of this session was to briefly report on the maritime training center survey, to reflect on the important outcomes and recommendations, and to examine the steps that Ice Services and the IICWG can take in response to the survey. The session was opened with an introductory presentation followed by a panel discussion. The presentation was:

- Keld Qvistgaard (DMI): *Maritime Training Center Engagement*

The background document attached as Appendix E1 was provided to registrants beforehand. An edited transcript of the full session is as [Appendix E](#).

### 4.2 Panel Discussion

The panel discussion follows on the presentation by Keld Qvistgaard on the outcomes of the surveys of mariners and maritime training institutions conducted by Task Team 8. The panel discussed the results and offered their views on the survey responses.

Moderator: Keld Qvistgaard

Panelists:

- Bjørn Kay (Marstal Maritime Academy, Denmark)
- David (Duke) Snider (Martech Polar, Canada)
- Jan Lieser (Bureau of Meteorology, Australia)
- Tatyana Alekseeva (Arctic and Antarctic Research Institute, Russia)
- Guillermo Palet (Argentine Navy Captain (R))



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#### **4.2.1 Key Messages**

- Responses from the maritime training centers were very similar to those from the previous survey of mariners themselves.
- The Polar Code is much more than just ice charts. The ice charts of our services are only a small fraction of the entire Polar Code basic or advanced training.
- There is a need for manuals and handbooks on board vessels on how to observe ice, use ice charts and interpret satellite images.
- There is a need for online resources for remote e-learning and also to allow trainees to go back to refresh their training.
- Maritime training centers need ice information products almost as much as mariners at sea. Ice services need to promote awareness of their products and expertise with the training centers and develop more personal connections with the training centers.
- Task Team 8 has completed the work it set out to do but has identified a set of new actions to continue to make progress in engaging the maritime training centers.

## **5 Session 3: e-Navigation (Task Team 3)**

### **5.1 Introduction**

The IICWG has been struggling with the problem of getting ice charts accepted into general practice by e-Navigation systems for many years. We have developed the tools to communicate ice chart information to Electronic Chart Display and Information Systems (ECDIS) including a transfer and portrayal standard, S-411, registered with the International Hydrographic Organization (IHO). We have developed software to convert ice charts from our own SIGRID-3 format to S-411 and made these available on the Ice Logistics Portal. As recently as last year's survey, we have heard that mariners' need for scalable ice information is increasing. What then is the challenge for the ice services? Where should our focus be for e-Navigation?

The goal of this session was to hear directly from mariners and ECDIS users to better understand the evolving needs and to identify some concrete areas where work should be targeted. The entire session was devoted to a panel discussion. A background paper distributed before the meeting is attached as Appendix F1. An edited transcript of the session is as [Appendix F](#).

### **5.2 Panel Discussion**

The panel of experts discussed concepts of ice information in e-Navigation systems, including ECDIS and others. It was not about the technical aspects of S-100 based products, but about the needed and possible content and what users expect.

Moderator: Jürgen Holfort (BSH)



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#### Panelists:

- Michael Bergmann (Bergmann Marine)
- Friedhelm Moggert-Kägeler (7Cs)
- Joseph Sienkiewicz (NOAA)
- Tim Oliver Burgold (University of Wismar)
- Jan-Daniel Stangier (University of Wismar)
- Ivan Sitnikov (NavDevelopmentCo)

#### 5.2.1 Key Messages

- E-Navigation refers to *enhanced* navigation (not electronic)
- Ice should not be treated separately from weather and wave information – they need to be integrated for the mariner. We need to determine how to best serve the mariner, not only from our own work but by collaborating with other data providers.
- Adding more and more information layers to ECDIS systems is not helpful to the mariner. Even if it is easy to select among them, the mariner must still integrate all the information himself. Smart e-navigation systems could prioritize information for the mariner and push irrelevant data to the background.
- Shoreside information aggregators can assist the mariner in route planning and execution by preprocessing data so that the most important information comes to the top. But the master is still responsible for operating a vessel safely and must have the final say in navigation decisions. There must be a collaboration between ship and shore.
- In considering ice information for voyage execution, the ship's own radar should not be neglected as a data source
- Information for navigation should come from an authoritative source, such as national ice and weather services, even if it goes through a preprocessor or aggregator.

## 6 Session 4: Implementing Ice Modelling in Daily Production

### 6.1 Introduction

This session comprised three introductory presentations followed by a panel discussion. The three presentations were:

- Michael Hicks (IIP) - *NAIS Iceberg Model Developments in the North Atlantic*
- Gaston Lopez (SHNA) - *Implementation of the NAIS Iceberg in the Southern Ocean Model*
- Sandra Barreira (SHNA) - *Antarctic Sea Ice Forecast. Development and Validation*

A background document was distributed before the meeting and is attached as Appendix G1. An edited transcript of the session is as [Appendix G](#).



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#### **6.2 Panel Discussion**

This panel discussion focused on the use and application of sea ice and iceberg models and model outputs in operations to enhance products and services in support of maritime safety.

Moderator: Dean Flett

Panelists:

- Mike Hicks (IIP)
- Sandra Barreira (SHNA)
- Marc DeVos (SAWS)
- Phil Reid (BOM)
- Nick Hughes (MetNorway)
- Kevin Berberich (NIC)

##### **6.2.1 Key Messages**

- Some ice services (e.g. USNIC) use sea ice models to support daily production. Other services (e.g. Norway) use a variety of models to support various operations. Still others (e.g. South Africa and Australia) are just beginning to look at how models can be used operationally.
- Environmental input to models is crucial to accuracy but often highly suspect. Some necessary model parameters are practically unobtainable (e.g. iceberg underwater shape). Ice model output is still useful but must be considered in light of these deficiencies.
- Ice services generally have a very small number of scientific staff able to develop models. Partnerships among ice services and with other scientific institutions are critical to success.
- Ice modelling community in the Antarctic is not as well connected as that in the North. Representatives from all of the Southern Hemisphere ice services indicated a desire to work more closely and collaboratively. Connecting with the IICWG Data Assimilation and Sea Ice Modelling group might be a way forward.
- Validation and verification of model output and ice information products is essential but difficult. Close ties between ice services and their clients to obtain both in situ observations and feedback on products is invaluable.
- Ultimately, the purpose of ice models is to produce forecasts of future ice conditions that can be used for decision making. At present, model output is, at best, only suited to use by expert ice analysts. Considerable work is needed to transform model output into risk assessment or hazard warning tools directly applicable to mariners.

## **7 Session 5: Maritime Operations in the Southern Ocean**



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#### **7.1 Introduction**

This session was intended as a set up for the next meeting, planned for Buenos Aires, to identify some actions that could be initiated now to deliver some results in 2021. The session started with an overview presentation by Alvaro Scardilli on the ice information services that are available for the Southern Ocean. A panel of Antarctic ship captains followed to discuss what they really need to navigate safely in icy waters and what is missing from the current services. A second presentation by Andrew Fleming described the ice information available on the Polar View website, an important source of information for the Southern Ocean.

A background document was distributed in advance of the meeting and is attached as Appendix H1. An edited transcript of the session is as [Appendix H](#).

#### **7.2 Panel Discussion**

The panel was comprised of users of ice information who have been asked to provide their views on what kind of ice information is needed in the Southern Ocean and what is missing from currently available information. The moderator directed prepared questions at each of the panelists in turn and invited questions and comments from all panel members and the audience.

Moderator: Penny Wagner (Norwegian Ice Service)

Panelists:

- Mark van der Hulst (IAATO)
- Miguel Angel Ojeda (COMNAP)
- Capt. Karl Robert Røttingen of RV Kronprins Hakon
- Capt. Alan Gross of MV Ushuaia

##### **7.2.1 Key Messages**

- Mariners navigating Antarctic waters get as much information as they can from many sources to make their navigating decisions. They make the best of whatever information they can get.
- Ice charts are not available as frequently as needed in some areas of the Antarctic.
- Growlers and bergy bits, especially if they are embedded in concentrated sea ice are the greatest hazard to ship in the Antarctic. Knowing where they are is a crucial need.
- Forecast ice information including ice drift and concentration, for at least 24 hours, is the most critical information gap. For some voyages, multi-day forecasts are needed.
- Captains and officers are generally knowledgeable about ice information and navigating in ice. Vessels are generally manned by competent personnel at the present time. There is, however, concern that there will be a shortage of competency when all of the new polar yachts and cruise ships being built are put into service



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- Except for departure and arrival dates and ports, cruise ship captains in Antarctica have a lot of freedom about where to take their ships.

## 8 Meeting Summary and Close

### 8.1 Task Team Review

A complete summary of the Task Team reports, decisions, and next steps is attached as [Appendix I](#).

#### 8.1.1 Task Team 1 – ROSE-L (Wolfgang Dierking)

As this task was the subject of Session 1, there was little further discussion.

<b>Decision:</b> Continue Task Team 1 (ROSE-L) in an extended configuration integrating the services and groups from the Southern Hemisphere. Alvaro Scardilli to co-lead the task with Wolfgang Dierking.
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Next steps:

- (1) Continuation of support to the ROSE-L Mission Advisory Group of the European Space Agency and the L-C-band synergy project under the lead of the University in Tromsø, with a focus on the Arctic (the task's "NH-branch"). This includes:
  - (a) development of strategies to match C- and L-band images for easy comparison and automatic classification
  - (b) application of classification algorithms and comparison of results obtained at C-band, L-band, and the combination of both
  - (c) production of ice charts based on C- and L-band images separately, and on the combination of both
- (2) Planning the interaction between SH groups regarding the use of L-band, C-band and X-band images, and development of a research plan. Steps (a), (b), and (c) are also valid for the "SH-branch" of the task.

#### 8.1.2 Task Team 2 – Iceberg Model Modernization (Michael Hicks)

Mike had reported on the results of this Task Team in Session 4. In summary, the objectives of the task were:

- Advance the implementation of iceberg drift and deterioration modeling by sharing an updated version of the NAIS iceberg model in a version control system.
  - COMPLETE – Wiki site established to share and version control model code; model implemented at the Canadian Ice Service, U.S. Naval Research Lab, and Argentine Naval Hydrographic Service
- Evaluate model using global (vice North Atlantic only) environmental forces.



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- COMPLETE – Comparisons of model output using Canadian Meteorological Centre, U.S. Global Ocean Forecast System, and Copernicus and HYCOM inputs
- Convert Fortran version of model code to Python for R&D purposes.
  - COMPLETE – Model code converted to Python by Philippe Lamontagne at the National Research Council of Canada

**Decision:** Task 2 – Iceberg Model Modernization is complete. The task team proposed three areas where follow-on work is needed.

1. Document lessons learned through case studies, both in the North and South Atlantic. I presented a few areas where the model just didn't work well with actual iceberg drift, and Gaston did as well. And so I think there are areas that we can coalesce and select a few key case studies. In so doing, I think we will be able to identify areas where the environmental drivers perhaps were not as accurate as they should be. The purpose of it would be to communicate to modelers and others what our problems are and what our gaps are. We also had talked about incorporating model evaluation metrics. Proposed as new Task Team 13 – Iceberg Modelling Case Studies.
2. Continue to evaluate the Python version of the North American Ice Service iceberg model.
  - Agreed to continue as internal work – not a task team
3. Apply model output to enhance existing products or to develop new ones.
  - Addressed in new task teams 14 and 15

### ***8.1.3 Task Team 3 – e-Navigation (Jürgen Holfort)***

This task was the subject of Session 3 so little additional discussion took place. The project objectives have been partially met:

- This work is intended to promote and facilitate the presentation of ice chart information on the ECDIS on board of ships. NOT COMPLETE
- A prerequisite is to keep the S411 format up to date, incorporating also new features. - COMPLETE
- Assist the producers of ECDIS so they can easily incorporate the format into their systems. NOT COMPLETE
- Continue making S411 ice charts readily available and develop the ability to produce charts in S411 format at every ice service issuing ice charts. COMPLETE

**Decision:** Task 3 e-Navigation is considered complete. On-going maintenance to keep the S-411 ice charts available on the Ice Logistics Portal will be done internally at BSH. The team identified two areas where follow-on work is needed.

1. Explore other means, besides ECDIS, of getting relevant ice information onto the bridge of ships and into shore-side planning operations. An important consideration in this endeavour will be integration of ice with weather and wave information – to see how an integrated set of environmental information can be packaged and delivered to vessels.
2. Investigate how forecast sea ice and iceberg model output can be communicated to mariners. Again, integration with other environmental information is important. The notion



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of risk-based products is also embodied in this concept and careful coordination will be needed to avoid duplication of effort.

No decision was taken at the meeting on how to move forward on these ideas. Discussion is ongoing to make a proposal at the first Co-Chairs Coordination meeting.

#### ***8.1.4 Task Team 4 – Uncertainty (Sean Helfrich)***

Sean presented the report attached as [Appendix J](#). The projects objectives were partially met:

- Develop mechanisms to quantify the uncertainty in ice charts and convey that information to users – COMPLETE
  - Mechanism is documented in the PowerPoint presentation by Sean Helfrich “*A Proposed Method for Ice Chart Uncertainty Estimations*”
  - In the process, the team developed a standard for transformation of ice charts to NetCDF format to quantify the uncertainty assessment
- Provide a path for utility of ice charts into ice model assimilation – COMPLETE
  - As documented in the a/n presentation
- Communicate confidence metrics for navigators regarding unknowns about ice charting data. – NOT COMPLETE

Decision: Task 4 Uncertainty is considered complete. A new task (Task Team 12 – Uncertainty-2) is proposed to follow up this work.

#### ***8.1.5 Task Team 5 – Ice Analyst / Forecaster Competencies***

This task was not discussed as it was completed at IICWG-XX. It is noted here for completeness.

#### ***8.1.6 Task Team 6 – Regional Climate Centre Contributions (Scott Weese / Jan Lieser)***

Task Objectives:

- Collaboration on 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.
- Share client needs for seasonal forecast products
- Ensure coordination with SIPN and SIPN-South on seasonal outlooks
- Encourage attendance of task team members in RCC Climate Forums

All of these objectives were achieved for the Arctic RCC.



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**Decision:** The Arctic RCC is well-established and the contributions to the seasonal forecasts by Northern Hemisphere ice services is regularized as an on-going operational activity. This task is considered COMPLETE for the Arctic.

The Antarctic RCC is in its formative stages. A concept note for it has been endorsed by the EC-PHORS Management Group. Approval is expected by the WMO Executive Council early in 2021. Until the AntrRCC actually gets going, there is little that the IICWG can do. Once it does start up, the IICWG should offer assistance to bring the ice services together to contribute to the products, as was done in the Arctic.

A new Task Team will not be created at this time. Jan Lieser offered to keep a watch on developments in the Antarctic RCC and alert the IICWG when it is things start to happen. A task team may be initiated at that time.

#### ***8.1.7 Task Team 7 – Arctic Council Interaction***

This task was not discussed but is included for completeness. At IICWG-XX, it was decided that the objectives are not really suited to a task. The networking and relationship-building with the Arctic Council was taken as on-going action by the Co-chairs.

#### ***8.1.8 Task Team 8 – Maritime Training Center Engagement (Keld Qvistgaard)***

The task was the subject of Session 2 earlier in the week. Keld reviewed the objectives of the task team as follows:

- List of Marine Training Centers providing Ice Navigation/Polar Waters modules. COMPLETE
- List of identified challenges and potential areas for collaboration. COMPLETE
- List of areas for continued/focused/enhanced collaboration between ice services and marine training centers. COMPLETE
- Present work/findings at IICWG-21, discussion session to address issues among ice services COMPLETE

**Decision:** With the production and presentation of a comprehensive Report to Ice Service Heads, this task is considered complete. The team identified a need to continue the engagement with marine training centres with high level objectives of: awareness and promotion; and feedback and interaction. IICWG-XXI decided to continue Task Team 8 into a phase two under Keld Qvistgaard's leadership.

Keld identified a number of areas where he thinks that the Task Team can do more: visit the training centers; provide some test data and maybe participate in lectures; let the Marine training centers visit the ice centers; and focus on what role we, as ice services, actually can play in the future, but do it in the real world. There is significant interest from several of the former task team members to continue, so Keld proposed to contact the entire old task team to see who is available to continuing on to the next phase in this work as well as inviting new members to the team.



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### ***8.1.9 Task Team 9 – Value Chain Management (Søren Olufsen)***

Søren reported on the results of Task Team 9 as follows. Task Team 9 were asked to establish a best practice for the management of the value chain of the ice services. Especially, in the coordination between the research community and the Operational Services. The reason for this is that technology has moved. In the old days, the information was ice charts which were sent out by facsimile. The ice service was at the end of that value chain and controlled the output. Today, many actors have entered the value chain such as satellite data providers, independent research institutions, and commercial service providers, and they can all easily publish ice information. It's important to note that the financial input takes place at multiple stages in the value chain and thus creates an understandable desire and need to publish information directly from those same steps. So today, no single actor can manage the value chain. This means that the end user, the mariner or anyone else using ice information, is not at the end of the well-organized knowledge chain, but in the value web with limited access to information on the quality of the different information offerings. So, the Task Team showed that ice services should establish an authoritative, exhaustive, coordinated, well balanced and scientifically sound portfolio of products. The ice services, and in this context it should be understood in general terms, should each establish their portfolio of products which they feel they can approve. This includes the status of the products, whether they are experimental, operational, or whatever, and probably also the quality and timeliness of those products. This portfolio may not only include its own data. It could include third party data, for example, ice charts from partner services, data from intergovernmental agencies, from satellite data suppliers, research products, products from sandbox sections of the website of the service. The important issue is that someone must take responsibility for the portfolio. The Task Team sees that the ice services are a natural step in which to insert this management of the public product portfolio. But that task also implies the responsibility to coordinate with all states in the value chain through formalized procedures. Typically, this will be meetings. And remember that when your entity, Institute, or agency publishes information with your logo, you have the liability for that product. So, in short, the task is to establish an authoritative product portfolio, make someone responsible for it, and manage it. The Task Team does not see the work continuing at a general level. The natural next step would be to ask the ice service heads to report back on the product status at the next IICWG meeting.

The Task Team report is attached as [Appendix K](#).

Decision	This task is considered complete. It is now up to individual ice services to adopt the recommendations of the Task Team and develop a product portfolio.
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### ***8.1.10 Task Team 10 – Data Assimilation and Sea Ice Modelling Group Engagement (Dean Flett / Lars-Anders Breivik)***

This task has been deferred to 2021 because of the pandemic. It was not discussed further at IICWG XXI.



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#### ***8.1.11 Task Team 11 – Ice Analyst Workshop – (Patrick Eriksson)***

This task has been deferred to 2021 because of the pandemic. It was not discussed further at IICWG XXI.

### ***8.2 New Task Teams***

The secretariat drafted a long list of the ideas for new tasks that had been raised during the meeting. The list is attached as [Appendix L](#). Based on the earlier task presentations and discussion, as well as the list, three new task teams were adopted.

#### ***8.2.1 Task Team 12 – Uncertainty-2***

This task follows on from the work completed in Task Team 4,

Task Team Co-Leads: Sean Helfrich / Nick Hughes

Team Members: (TBC) Colleen Wilmington (NIC), Helen Beggs (BOM), Angela Chang (CIS), Lars-Anders Breivik (MetNorway), Thomas Lavergne (MetNorway)

Task Objectives:

- Conduct an uncertainty RMSD evaluation of ice concentrations; document the process and the results.
- Establish a high-resolution ice concentrations dataset for ice services to use for their own uncertainty evaluations; and,
- Work with modelers to evaluate the utility of the ice charts RMSD mentioned in item 1) and report the findings.

#### ***8.2.2 Task Team 13 - Iceberg Model Case Studies***

This task follows on from the work of Task Team 2.

Task Team Lead: Mick Hicks

Team Members: Gastón López, Ashok Pandey, Jan Lieser, Neal Young, Hai Tran, Doug Leonard, Alex Hamel, Nick Hughes, Dave Hebert, Julia Crout, Philippe Lamontagne, Marc de Vos

Task Objectives:

- Document lessons learned through case studies, both in the North and South Atlantic, to identify situations where the iceberg model did not work well
- Identify areas where the environmental drivers were not as accurate as they should be.
- Communicate to modelers and others what the model problems are and what the gaps are.
- Investigate model evaluation metrics that could be used to quantify model performance



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#### ***8.2.3 Task Team 14 – Southern Ocean Limit of Known Ice (SOLOKI)***

Task Team Lead: Jan Lieser

Team Members: Chris Readinger, Penny Wagner, Alvaro Scardilli, Andrew Fleming

Summary of Task:

Icebergs are a known hazard in the Southern Ocean. Currently there is limited information to support maritime operators regarding the presence of icebergs or their projected movements around Antarctica and sub-polar waters. The SOLOKI project will investigate how better information can be made available for the whole Southern Ocean.

There is a growing need for improved sea ice and iceberg information for the Southern Ocean. The number of vessels in the Southern Ocean is expected to grow which increases the exposure to this hazard. There is also an expectation the risk will increase due to growing numbers of icebergs due to increased melting of the Antarctic ice sheet. The recently approved IMO Polar Code makes it mandatory that all vessels receive accurate and timely information on sea ice and iceberg conditions.

Sea-ice information for the Southern Oceans is provided by a number of national ice and weather centres. Collectively they can be represented by the International Ice Charting Working Group. Pursuing SOLOKI as a collective effort will bring together existing knowledge of ice information for the Southern Ocean, expertise in providing similar information from the northern hemisphere and the opportunity to share resources.

#### Objectives

The initial concept for SOLOKI is to use a combination of iceberg observations from satellite radar (SAR) imagery and iceberg trajectory forecast models to predict iceberg occurrence. SAR coverage for the Southern Ocean is repeated approximately every 3 - 5 days. Trajectories of detected icebergs forecasted for approximately 5 days will ensure current information during gaps in SAR coverage. Periodic validation will provide an ongoing quality assessment. The SOLOKI product will be made openly available and distributed through existing channels such as the Southern Ocean ice services and web services including Polar View.

We will ensure adequate metrics are recorded to provide numbers of users per month. Regular surveys of selected users and industry organisations (e.g. IAATO, COMNAP) will provide further feedback on adoption and success of SOLOKI.

#### Critical Success Factors

In addition to establishing the necessary workflow and QA procedures, two key factors are critical.

1. Adequate repeat coverage of accessible satellite SAR imagery for the defined area north of the Southern Ocean sea-ice edge.
2. Operational iceberg trajectory forecasts and associated ocean/atmosphere forcing parameters.

In addition, independent data for validation/QA will be required.



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### ***8.3 New Task Team Ideas***

There was considerable discussion throughout the meeting about risk-based ice information products. Basically, products that could communicate a certain level of risk in an area or along a route due to ice hazards. An edited transcript of the Friday discussion on the topic is attached as [Appendix M](#). We could not come to agreement on definitive new tasks during the meeting so several individuals agreed to meet separately to define new tasks dealing with risk. As a preliminary measure, two potential task teams were identified as below.

#### ***8.3.1 Task Team 14 – Iceberg Hazard Product***

Task Team Lead: Mike Hicks (initially)

Team Members: Keld Qvistgaard, Nick Hughes, Alejandro de la Maza, Ashok Pandey, David Arthurs, Scott Weese, Richard Hall, Pascale Bourbonnais

Summary of Task:

Develop the prototype IIP iceberg density product into an operational product standardized across ice services.

Mike is to assemble a team to further develop this task with defined objectives and milestones.

#### ***8.3.2 Task Team 16 – Sea Ice Hazard Product***

Task Team Leads: Scott Weese / Kevin Berberich

Team Members: Keld Qvistgaard, Nick Hughes, Jürgen Holfort, Ashok Pandey, David Arthurs, Richard Hall, Pascale Bourbonnais

Summary of Task:

Develop a sea ice hazard prototype product in consultation with mariners. The product will incorporate model forecast output so the hazard can be characterized in time. Eventually, a product standard must be developed so the product can be replicated across many ice services.

Scott and Kevin are to assemble a team to further develop this task with defined objectives and milestones.

### ***8.4 Relationship with WMO***

John Parker briefed the Group on the status of the WMO restructuring, reducing its Technical Commissions from eight to two now that JCOMM has been disbanded. John is vice-chair of the Steering Committee on Marine Meteorology and Oceanography (SCMMO) established under the Services Technical Commission. Tom Cuff from the U.S. is chair and You Sung-Hyup from Korea is a second vice-chair. SCMMO is now just working with the Secretariat on establishing the expert teams. There will be a reduced number of expert teams from the past. We're still working on terms of reference and on membership. That conversation will continue this fall. COVID has slowed everything down. There's no official comment on where the Expert Team on Sea Ice (ETSI) is going to end up but sea ice will be a part of the expert team structure, whether it's an independent



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expert team or an expert team task. Moving forward, the World-Wide Met Ocean Information and Warning System (WWMIAWS) has been recognized as a subcommittee. It's unique within this new structure that's being formed. Because of its operational nature, to ensure both marine weather and sea ice information get out in the METAREAs, it was felt it needed to continue as an entity. By this time next year, we'll have the solid structure in place and I'll be happy to brief on it then.

### 8.5 IICWG-XXII

Alvaro Scardilli invited the IICWG to convene September 20-24, 2021 in Buenos Aires. Since the meeting had already been planned for Buenos Aires this year, logistics are already well coordinated. We will have the same Organizing Committee and their main task will be agenda management.



### 8.6 Co-Chairs Closing Remarks

Russ White:

Thanks, very much. This meeting was shaping up and looking really good at the point at which we had to make the decision to cancel. I think we did make the right decision. In retrospect, looking at what's happening around the world, we made the decision that we had to. And I think the pivot that was made by the organizing team to come up with this meeting in the format that we've had it was absolutely excellent. There are obvious limitations to this format. We haven't had those corridor conversations and we haven't been out for drinks in the evening. We'll have to leave that to next year.

In closing, I really want to thank everybody for their participation. I think we've made an incredibly good use of the limited time we've had together. We've had some really rich conversations and we've already got some solid actions moving forward for next year. I think there are positive upsides to this format. Seeing the number of participants that we've had from all of our organizations around the world is a real positive. As we move forward thinking about Buenos Aires next year, we need to think how we can include this kind of a component. Even if some of us are going to be face to face in Buenos Aires, how we can include a virtual component so that we can have a greater level of participation in the meeting? That's a really positive outcome from this. So I really want to thank everyone for this time. It's certainly been a busy week for all of us. I think we're going to have to follow up on a number of the issues that we haven't been able to complete and perhaps shift our mode of operation. So we've already identified one call that we're going to bring together to have a more detailed longer conversation that we can manage in a two hour format. We might find there are other areas that we need to identify where we also need to do that. I want to thank John for all his work. And Shannon and Jennifer, you have really done a fantastic job of keeping things moving. I will pass the last word over to Marianne to close us out for this year.

Marianne Thyrring:



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Thank you very much, Russ. I would also like to thank everybody who has participated and that's a lot of people. In fact, I want to send a special thanks to the Task Team Champions. I think our Task Team Champions have shown that when you do what you are meant to do, you really are able, together with all the good colleagues, to deliver good results. I think the organization that we have right now is really good and we should stick to it. I also like to thank the panelists for all the interventions and discussions we have had. That has been very interesting and it has been developing our collaboration and also our ambitions. I must say I'm really impressed every time John is able to make long, long lists of all our ambitions. But of course, that's what keeps us driving this wheel forward. Like Russ said, I would like to thank John in particular, for all the efforts you've done to make this virtual conference possible at all. If there were any troubles, it was just because of the internet, not because of the organization. So, thank you so much. And thank you to Shannon and Jennifer for helping us so much.

I'm really looking forward to 2021. I have great faith that we are going to see Alvaro and his crew in Argentina. So, I just want to thank you so much for a nice week under these particular circumstances. I wish you all the best for next year and and take care because it's very difficult for all of us. Thank you.

*End*