International Ice charting Working Group

TASK TEAM 8: Mariner Training Requirement

Intermediate report to Ice Service Heads

July 2019

Preliminary results and observations from IICWG Mariner Survey 2019

Introduction

One of the outcomes of IICWG-19 was the establishment of a Task Team to work with mariner training requirements for Polar Waters, based on the input to the ice services received at the mariner training session at IICWG-19.

Based on the presentations and discussions at IICWG-19 the Task Team decided to sharpen the focus to mariner's ice information requirements and "park" the training requirements until actual mariner ice information requirements were fully understood and addressed by the ice services.

The key conclusions/questions from IICWG-19:

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 arameters? How to display analysis versus forecast? Scale versus level of (displayed) details – does this exist (at prototype level)

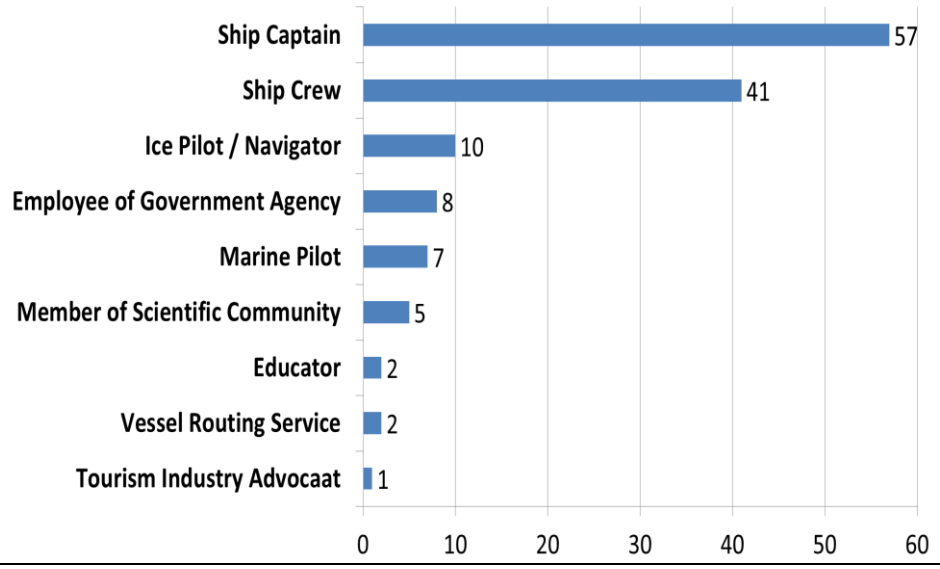
14) Ice information portals. Requirement: easy access, one stop shopping. How can Ice Logistics Portal be improved?

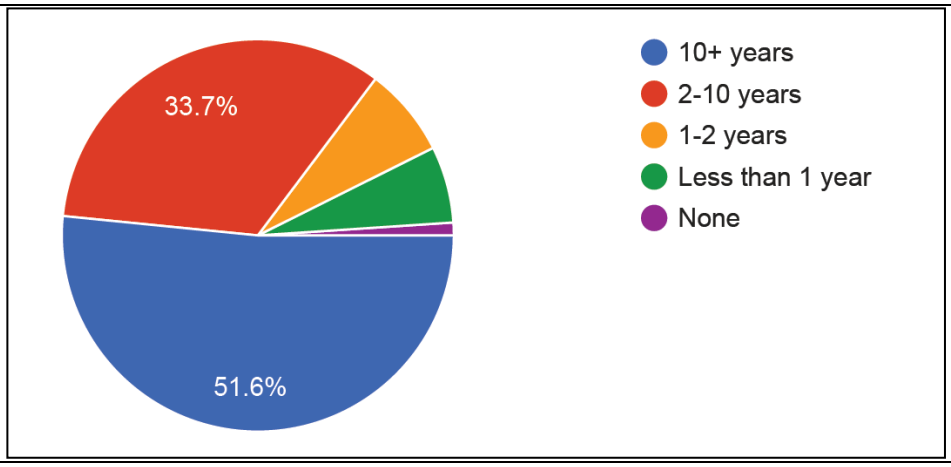
Based on this input the Task Team decided to conduct a survey among mariners operating Polar Waters for better qualitative and quantitative understanding of requirements, needs, gaps, trends, limitations of current/future products and services.

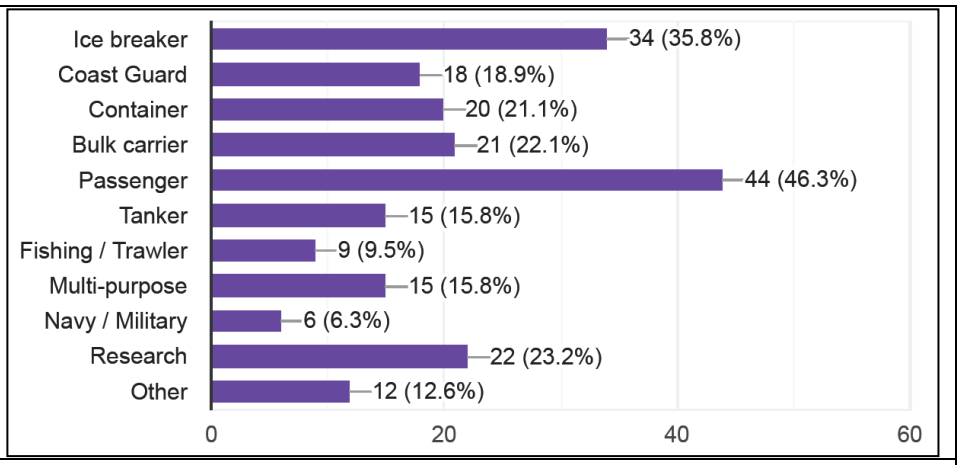
The present document is intended to provide an overview of the survey, the results and primary messages to the ice services. Mariner's Ice Information Requirements is dedicated a whole session for IICWG-20, and the idea of the current report is to give the ice services management some time to address any issues beforehand of the IICWG-20 discussions.

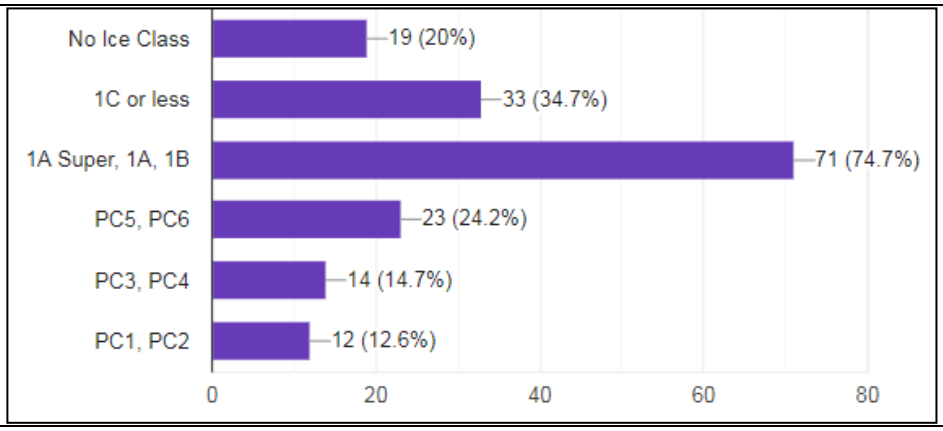
In the following we walk through the survey questions, results and potential impact for the ice services. All initial comments provided by the Task Team are also included.

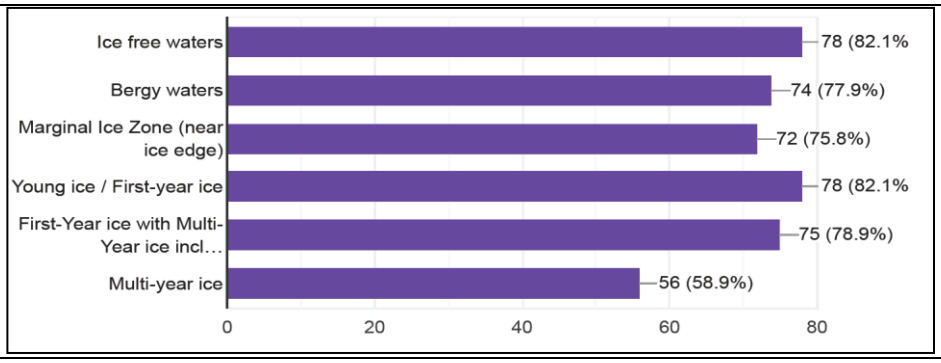
At the end of the document some broader comments/summaries of specific topic are included. Finally the overall messages from the marine community are presented, followed by some questions to the ice services heads. These questions are expected to kick off the IICWG-XX discussions.

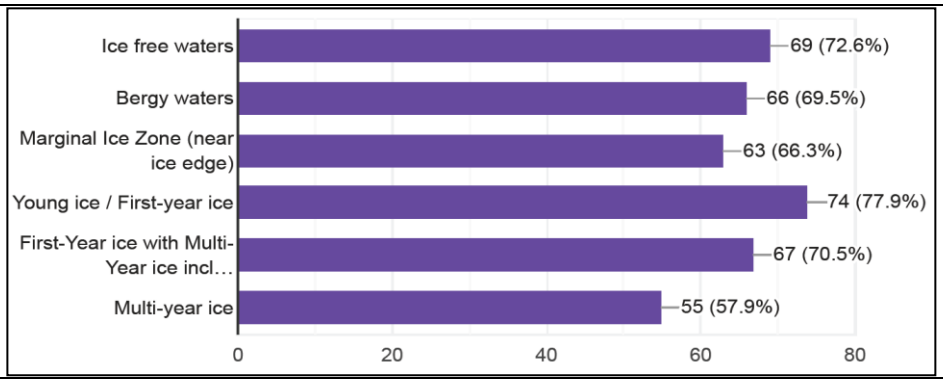
1. In what employment capacity have you served in or near ice-covered waters?	
TASK TEAM comment: Duke: There is quite a possible overlap from the capacity categories Keld: solid capacity response level	

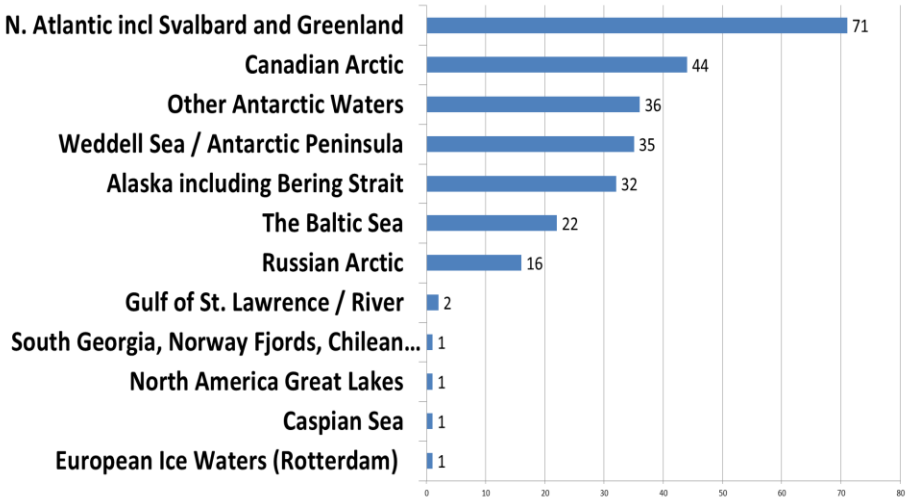
2. How many years of navigation experience do you have in or near ice-covered waters?	
TASK TEAM comment: Duke: Good to see the vast majority of respondents have considerable experience, the greatest over 10 years Keld: solid capacity response level, ice services should listen to this for shaping future services and production	

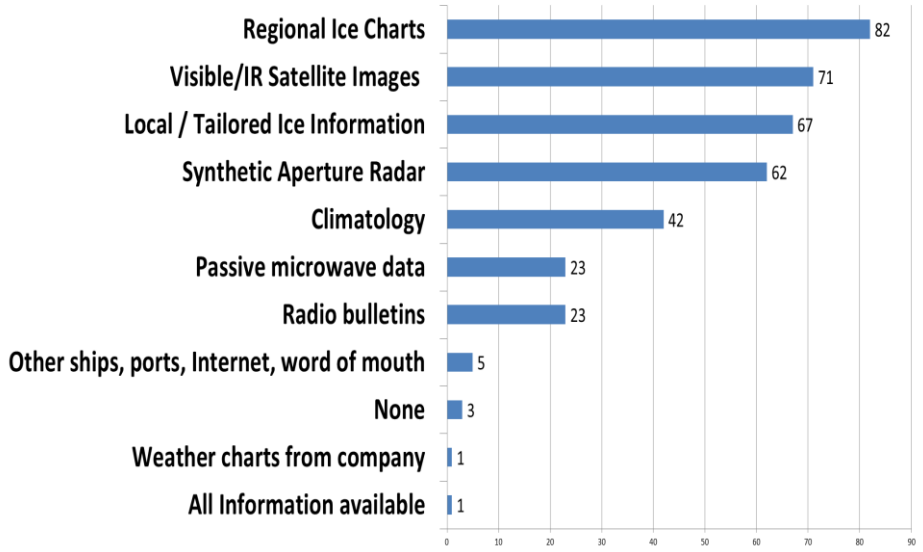
3. What type(s) of vessel have you served on in or near ice-covered waters?	
TASK TEAM comment: Duke: Not surprised by the break down here Keld: broad representation of vessel categories in survey	

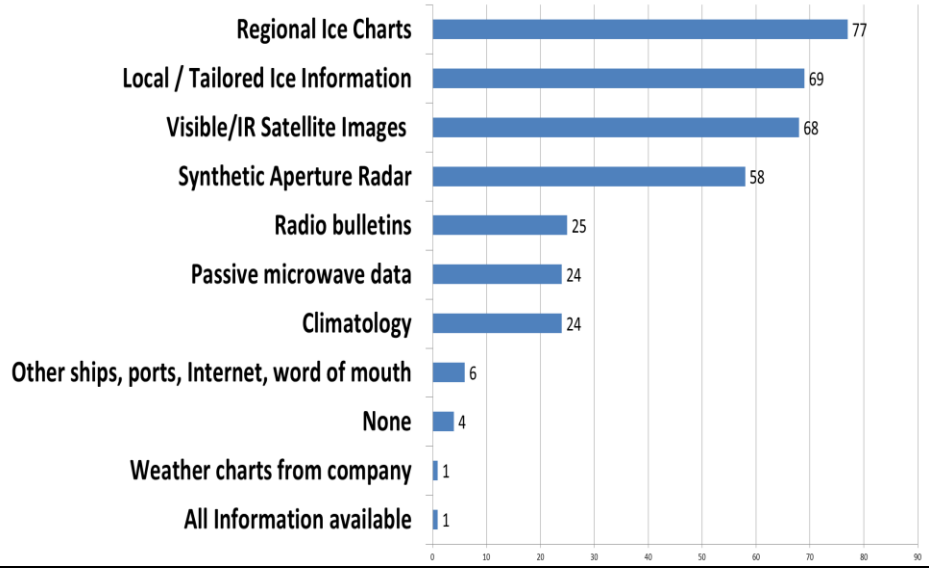
4. What is the vessel ice classes (equivalents to to the Swedish-Finnish ice classes) you served on in or near ice-covered waters? (select all that apply)	
TASK TEAM comment:	

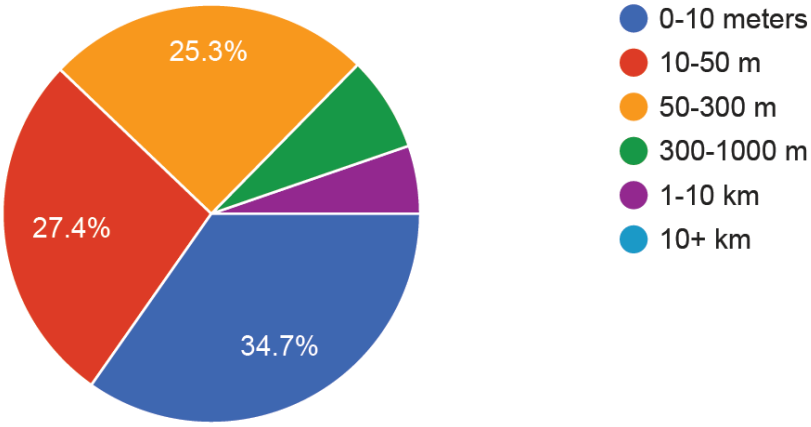
5. In what ice regime(s) do you have navigation experience? (select all that apply)	
TASK TEAM comment:	

6. What ice regime(s) do you expect to or would like to navigate within in the future? (select all that apply)	
TASK TEAM comment: Keld: no major changes expected in navigation in the various global ice regimes	

7. What geographical region(s) do you navigate in and use ice information? (select all that apply)	
TASK TEAM comment: Duke: I suspect this reflect the large number of passenger vessel responses, active in the North Altantic/Svalbard/Greenland Keld: Responses can be considered valid globally. Any ice service can count on the mariner feedback	

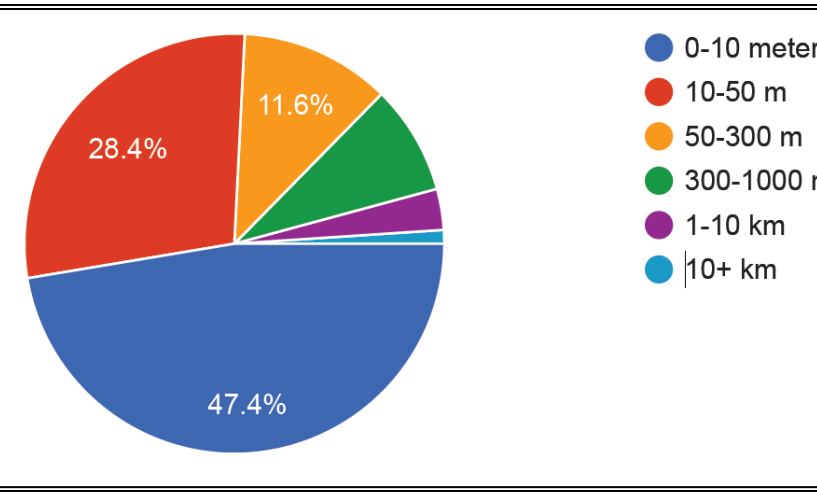
8. Which categories of ice information do use for route planning and risk assessment? (select all that apply)	
TASK TEAM comment: Duke: No surprise, priority SAR, local tailored, regional Keld: Passive microwave number probably related to lack of SAR coverage in Antarctica	

9. Which categories of ice information do you use for navigation? (select all that apply)	
TASK TEAM comment: Duke: Only surprise here is the high % for climatology, but perhaps understandable. I thought perhaps intially this may have been misinterpretation of climatology vs meteorology. Primary needs of Visible/IR, SAR, Regional Ice Charts and Local Tailored is no surprise Keld: Passive microwave number probably related to lack of SAR coverage in Antarctica	

10. What is the acceptable minimum size of any ice (iceberg, ridge, floe, lead…) you need information about?	

TASK TEAM comment:
Duke: ”Noting acceptable minimum size … reflects the need to be made aware of even small resolution ice targets as dangerous to shipping. This is even more important in more open water conditions where smaller floes can still give one a big wallop”

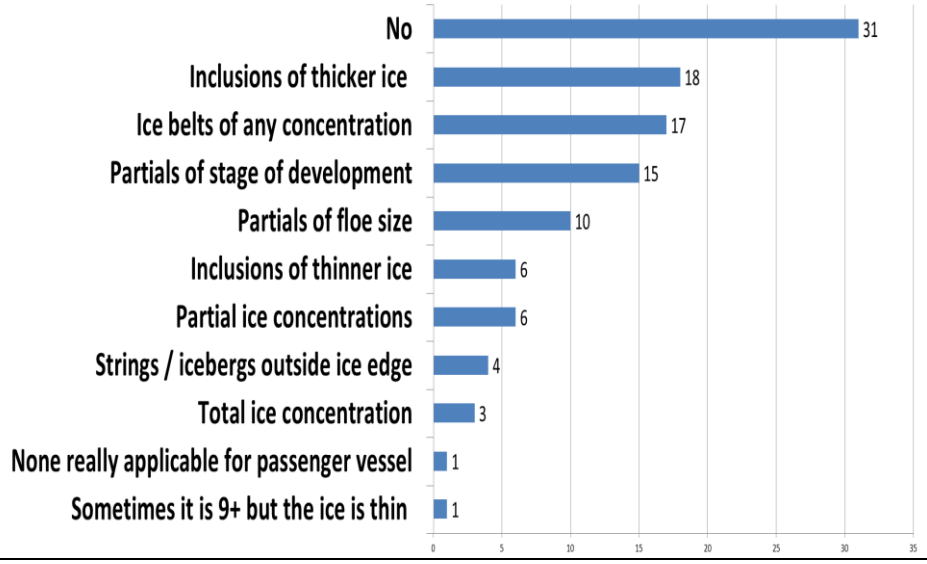
Keld: any resolution coarser than 300m should not be used in routine ice charting serving navigation

11. What is the optimal minimum size of any ice (iceberg, ridge, floe, lead…) you need information about?	

TASK TEAM comment:
Duke: As above, nothing the high preference for the smalles 47.4% 0-10m; then 28.4% for 20-50m

Keld: mariners want to see details that damages ships and to be avoided. 75 pct. want resolution of 50 m or better

12. Are there any ice parameters currently on regional ice charts that you don't need? (select all that apply)

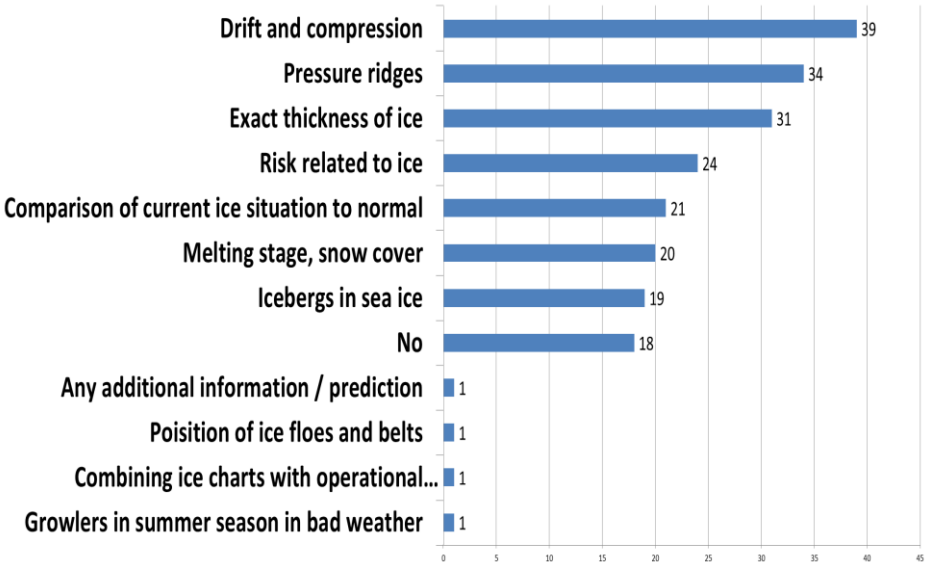


TASK TEAM comment:
34 respondents indicated “No” (36%); many comments similar to “Any information is needed“
3 responses indicated total ice concentration is not needed – “Not really applicable for passenger vessel with low to no ice class“
Other Comments:
“partials of stage of development; partials of floe size“
“Sometimes (concentration) is 9+ but the ice is thin and new. The information might be omitted until the ice has a certain thickness“

John F: all of the “No’s” in the comments should be gathered into one rank for comparison

Keld: message: don’t take out any ice parameters from current production

13. Are there ice parameters you are missing in ice products? (select all that apply)



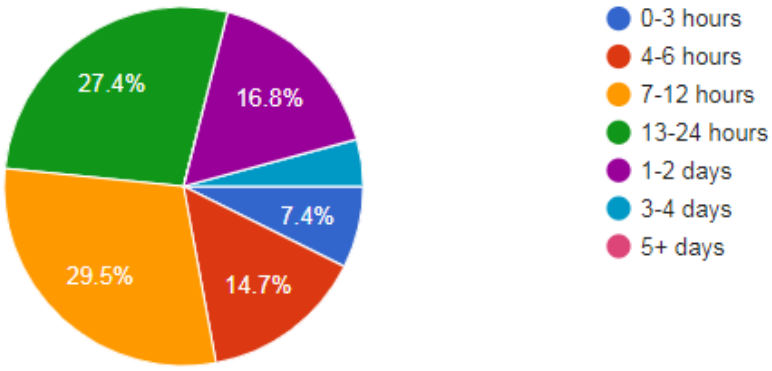
TASK TEAM comment:

18 respondents said “No” (18%) or variants of “would not be opposed to any additional information”
Specific comments:
“Clear satellite images … as long as they are real time.”
“Combining Ice charts with Operational Assessments.”
“Only if information is validated and correct”
“Daily ice charts of nearby area as well as ice charts/info for area of expected voyage, to maintain situational awareness”

John F: the parameters that mariners want but don’t get – drift and compression stands out with ridges and ice thickness close behind

Keld: to be considered how ice services work with this and how to present it, separate (scalable) layer?

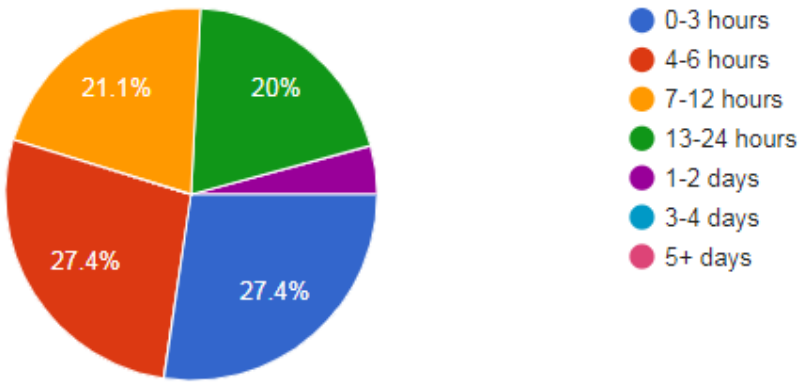
14. What is the acceptable level of ice product timeliness?



TASK TEAM comment:
52% want 12 hours or less

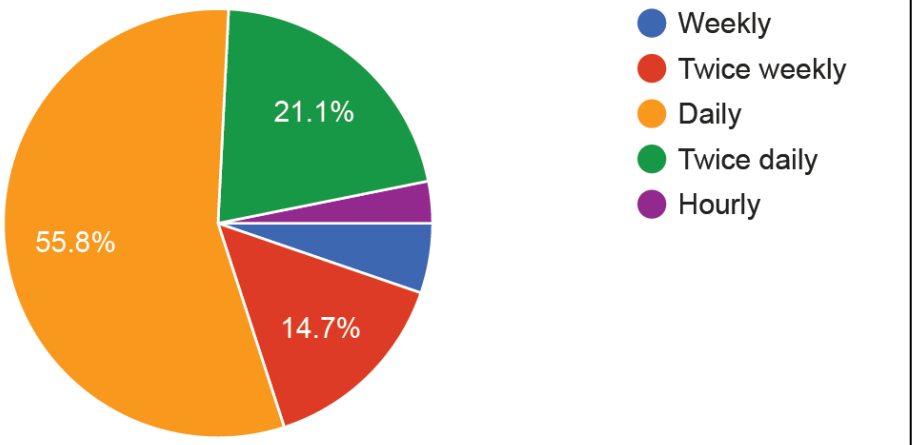
Duke: Not surprised, almost 30% want in at least 7-12hrs, 28% 13-24”

Keld: ice is dynamic and only for a few hours the ice charts reflect actual conditions in very dynamic areas. Towards automated production, not analyzed imagery shipped to mariners and/or short-term high resolution forecasts?

15. What is the optimal level of ice product timeliness?	

TASK TEAM comment:
56% say 6 hours or less
76% say 12 hours or less

Duke: Again, when things are dynamic, the more frequent to better. BIG Point is that the huge need for timeliness WITHIN 24 hours. ANY later in all but the most static situations is virtually irrelevant

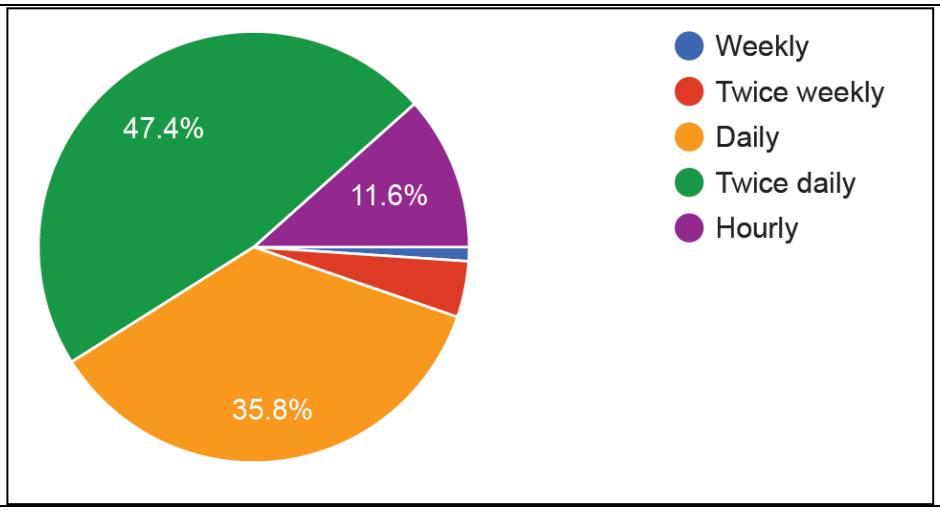
16. What is the acceptable ice information update frequency for your needs?	

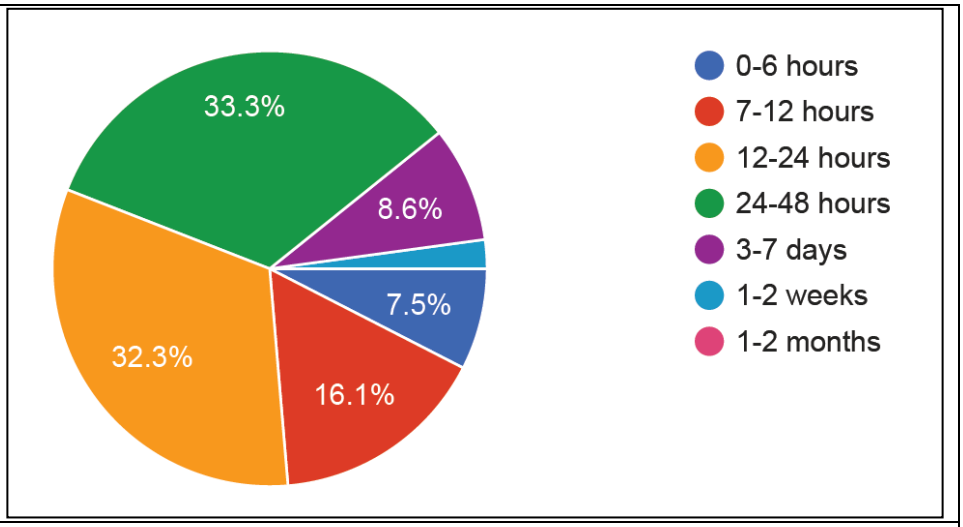
TASK TEAM comment:
80% want at least daily updates

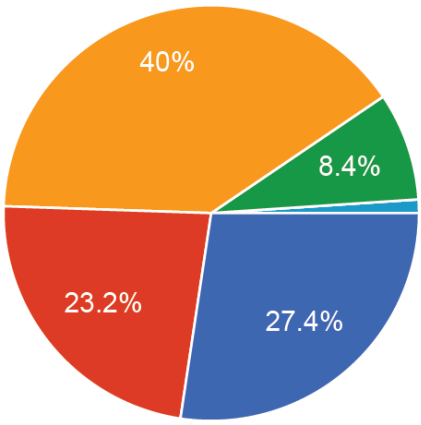
Duke: Obviously daily updates are totally required during active shipping season, and in some situations twice daily

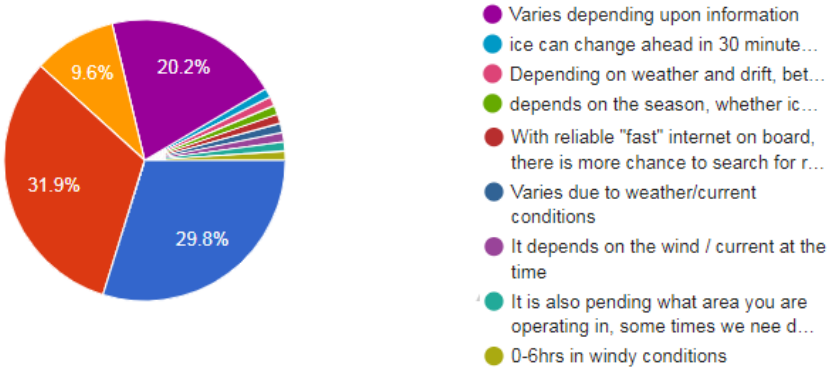
Keld: daily provision is key. In certain dynamic regions higher update frequency needed

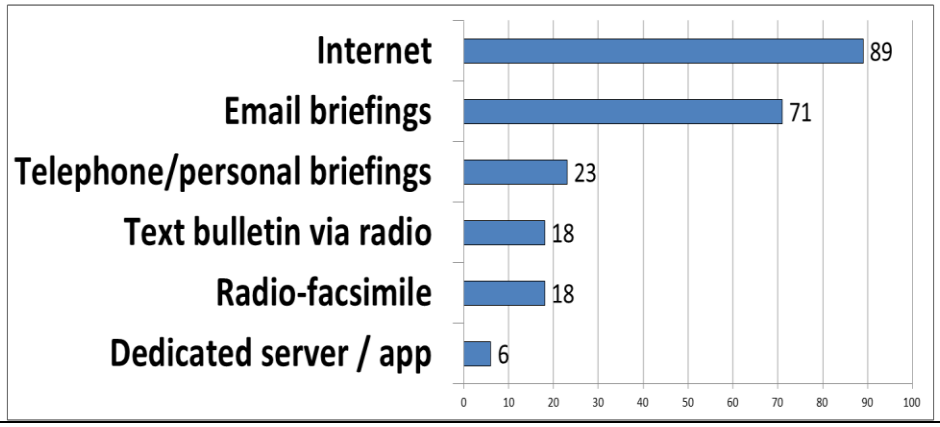
Specific comments:
Twice daily is good for bulk carrier; scientific voyage would require more ice/wx data more often
Ice information to be as fresh as possible. Forecast for next 24 hrs essential for planning.

17. What is the optimal ice information update frequency for your needs?	
TASK TEAM comment: 95% say at least daily	

18. Which ice forecasting time scale is most critical for you on open seas?	
TASK TEAM comment: Keld: ice services should focus primarily on short term forecasting of ice	

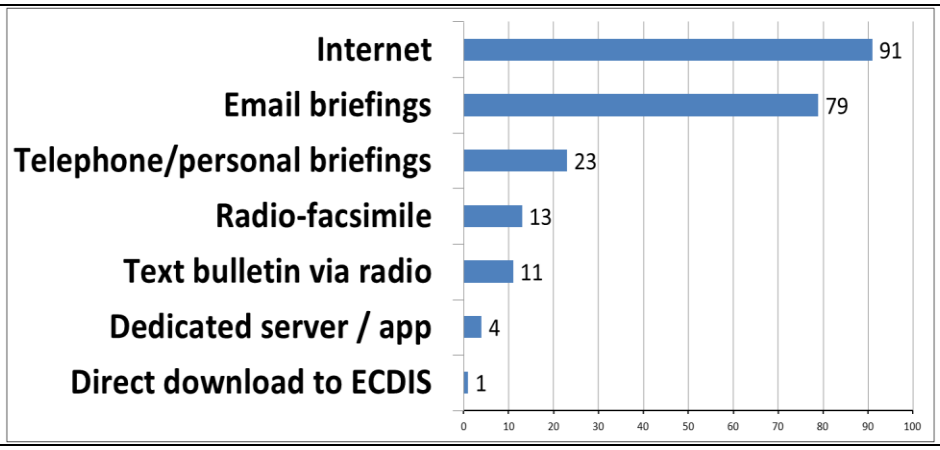
19. Which ice forecasting time scale most critical for you in ice, near ice, near shore?	
TASK TEAM comment: Keld: ice services should focus primarily on short term forecasting of ice	

20. How long after the date/time of a product do you consider the information valid (in hours)?	
TASK TEAM comment: Keld: linked to 13) and 14) Specific comments: “Depends on the season … whether ice conditions are dynamic or static” “Varies due to weather/current conditions” - several “Also depend on what area you are operating in, sometimes we need more often updated charts” “Need a shorter information period of ice movements when wind force increases e.g. 0-6 hrs in windy conditions “Ice can change ahead in 30 minutes - dangerous!” “With reliable "fast" internet on board, there is more chance to search for relevant … ice charts, satellite images.	

21. How do you receive ice information? (select all that apply)	

TASK TEAM comment:
Duke: internet site and email briefings are the two predominant. The first depends on availability of acceptable broadband connectivity. As I have said quiet often, such availability is NOT universal, and this is apparent by the high percentage of demand for email briefings (which would include imagery, charts etc) packaged and compressed as required

Dedicated server / apps include:
Drift and Noise
EnfoTec/Fednav
IceNav
Facebook
Direct delivery via own systems

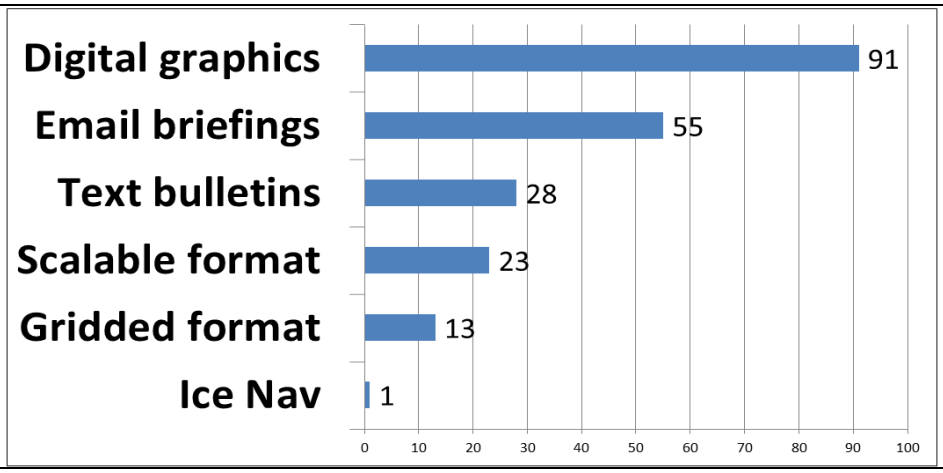
22. How would you like to receive ice information in the future? (select all that apply)	

TASK TEAM comment:
John F: basically mariners don't want to see any changes in the way the receive ice information?

Keld: numbers for text bulletins and facsimilie are decreasing

Specific comments:
Direct download on ECDIS
Must be an automatic upload of ice charts onto ECDIS for immediate use on bridge
Key is automatic upload to the ship or account, so that the ship always has the most current ice chart, without having to search

23. Which ice information formats do you use/receive?

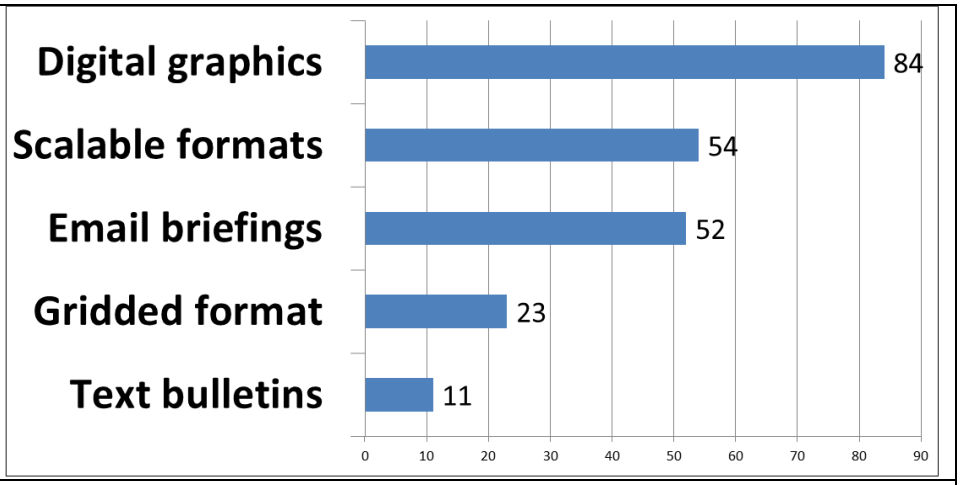


TASK TEAM comment:
John F: show a fairly significant desire to shift away from text bulletins towards scalable graphics

Duke: indicates a clear desire for digital products, then email briefings followed by scalable and gridded formats. As ECDIS and Ice Navigation software gains in availability at sea, this will increase in demand.

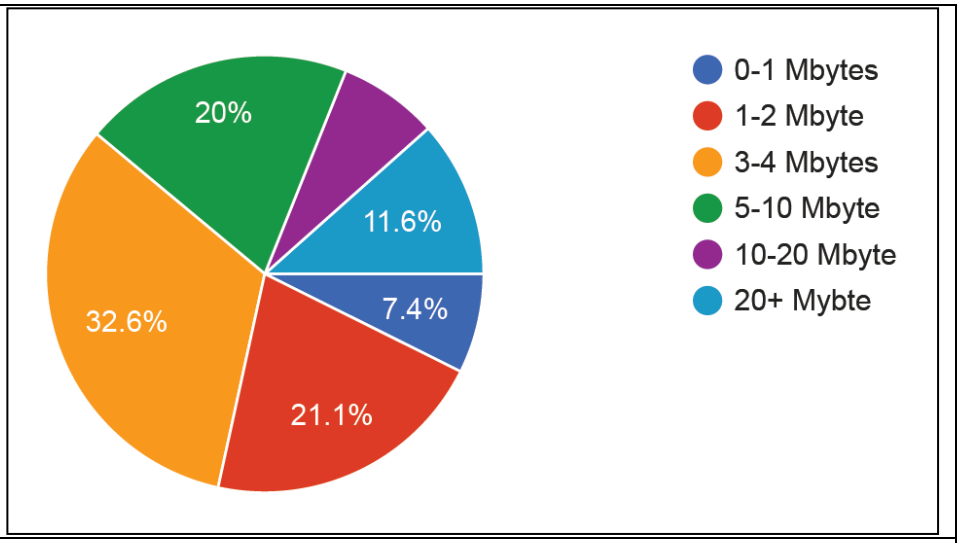
Specific comments:
GeoPDF
Important that the ice image is georeferenced so that we can load it into our software and keep an up to date vessel position on it and use it to pick accurate waypoints
geo referencing the charts so they can be used with programs (software)
Most of the parameters should be included in digital ice products

24. Which ice information formats would you like to use in the future?



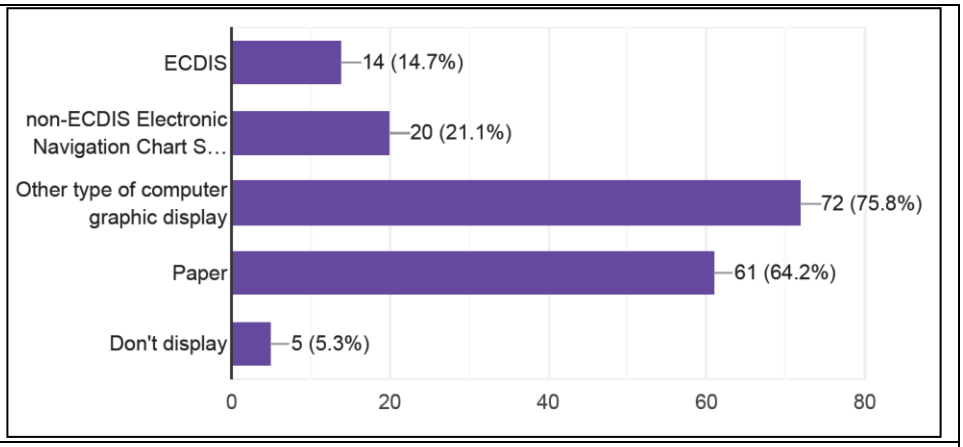
TASK TEAM comment:
Significant desire for scalable formats

Keld: maintain current format and distribution, increase focus on scalable formats

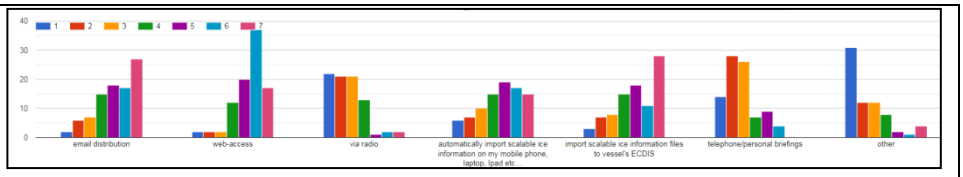
25. What is the maximum file size you can receive?	

TASK TEAM comment:
Duke: Note max size is generally 3-4mb and that computer or graphic screen remains the most used display format followed by paper

61% say 4 MB or less

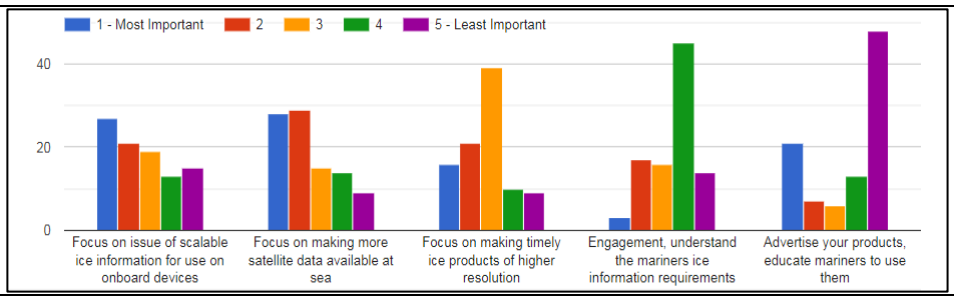
26. How do you display the ice information that you receive? (select all that apply)	

TASK TEAM comment:

27. Please rank how you would like to access and use ice information in your daily life? (1.. least preferred, ..., 7 most preferred)	

TASK TEAM comment:
Email, ECDIS import, web access are the most preferred

Radio, telephone/personal briefings are the least preferred

28. Rank the actions below in order of criticality - what should the ice services focus on next? (1 - most important to 5 - least important)	

TASK TEAM comment:
Satellite data, scalable ice information, timely products most important

Advertising, marine engagement least important

Duke: Scalable ice information and more satellite imagery are the two greatest need for development

Specific comments from mariners:

Ice chart Access

Specific suggestions:

- Digitize (ice information), increase asap update speed - to possible live streaming of sat info for advanced ice navigators!

- Access to real time websites from a ship sailing on Polar Waters is very important to obtain the latest ice images/charts & local government info-ie- location of nearest icebreaker(s). As Master or Ice Navigator, you always want more information on your current situation to make the best (safest) decisions for your vessel. Also, it is quite useful to keep the ice charts/info flowing to the ship if she is making repeat voyages during the summer months to the same area, again- this is to maintain situational awareness so there are no surprises!

- Products available in ECDIS format are essential.

- Prefer SIGRID-3 charts with iceberg data, pressure and drift data to cover the Arctic region including Beaufort Sea, Northern Sea Route shipping corridors. I am currently using SIGRID-3 charts for East & West Arctic which is very useful indeed.

- There are challenges converting between Mercator and polar stereographic formats. Utilizing a non-standard navigation suite to upload ice imagery (SAR); no means to integrate with ECDIS.

Other Information

There were a few suggestions for other types of ice information:

- Webcam at critical positions

- More ice information in areas with high current, where ice is drifting a longer distance in a short time.

But one respondent has a different idea:

- As an official, I would not give too much information to merchant vessels trading in the Baltic Sea. This is because of the large amount of vessels. The system is built to serve all vessels with limited Icebreaker capacity. Routes through the ice covered areas are given by the authorities and if the vessels start to navigate elsewhere, the traffic flow will slow down - due to lack of assistance capacity. In other Arctic areas, the situation is different and all possible info is good to give.

Communications

- "The current problem for clients operating in many jurisdictions is the lack of connectivity in order to receive the much needed ice information. Recommend more focus on delivery of products to these areas, such as the Canadian Arctic (e.g. above latitude 68 degrees North)"

- "… radio facsimile updated twice daily at set times is simple but effective. It automatically catches updated charts, does not need an internet connection, nor requires a person to go away from his work to access (especially important when the ship is in vicinity, or in ice covered, waters. … an afternoon and evening fax time for the auto timer on board is simple and efficient. Next would be … access (to) your national website (but) could not from ship. The third way is for our charter ice info service (to include it in the) late afternoon daily round-up of ice and weather info. We access up to date Canadian ice charts by checking on line if we have reception and we suspect a new chart is due. - if we can spare the time to look."

- Vessel operates at high-latitude well outside of cell range. Almost all ice information is received over internet sites & ftp from NIC. Internet connectivity (primary means of obtaining ice imagery) is lost at +74N. Secondary communications is through Iridium, but has delays and sporadic reception. Images contracted (from private supplier) are 12-24+ hours in latency. Useful for strategic/long-term planning (e.g. let's go 50 NM in this general direction), but not useful for tactical, real-time transits (e.g. there is an open lead 2 NM to the east)

- High-lat connectivity is degraded. Need better satellite coverage/band with.

Analysis, interpretation of survey result and messages to the ice services

The survey results can be analyzed in many ways and from many perspectives. It is highly recommended that the individual ice service representative make their own assessment for potential implementation in operations or in development programs.

The Task Team has identified a number of key messages to the ice services from the Mariner Survey

1) Know your user base
2) interact with your user base
3) Ice services to the marine community must be characterized by being relevant, accurate, reliable, actual and accessible. This is more important than ever.
4) The mariner requirements trend goes towards better resolution and frequent updates and ability to see hazardous ice (scale: 100-200m or less, sub-daily updates for certain regions)
5) Satellite data must have necessary resolution for ice charting. Kilometer scale resolution should be avoided for ice analysis to navigational applications.
6) Tailored ice information for certain dynamic or critical locations is important.
7) Ice information as a risk product is important
8) Local/regional high resolution forecast products for next 24-48 hours are essential for safe/efficient navigation in/near ice.
9) Improved access to scalable ice information including ingestion to onboard systems, keep graphical formats for other displays.
10) Extended access to automated / annotated satellite quicklooks for particular/critical areas. The need for mariner training on image analysis is not surveyed.

The individual topics may be formulated as **questions to the ice service heads**. The Task Team would like the ice service heads to address the following questions for the IICWG-XX discussions:

1) Do you have workplan/strategy (high level or detailed) to address the mariner messages?"
   If yes, please share some details with IICWG. If no, what is preventing? Decision, resources, low priority?

2) Do you plan to change your ice service focus on one or more of the topics/messages over the next few years to address mariner's ice information requirements?"

3) Do you think the mariners expect too much (free of charge)?

4) Where do you see the potential/need for international collaboration to address the mariner's ice information requirements?