

NATIONAL SCIENCE FOUNDATION (NSF)

Advisory Committee for Polar Programs (AC-OPP)

Ad Hoc Meeting, July 25, 2022

Meeting Held via Zoom

Attendance and Membership

AC-OPP Members Present:

Dr. Meredith Nettles, Lamont-Doherty Earth Observatory, Columbia University, Chair, AC-OPP
Dr. Aron L. Crowell, University of Alaska, Anchorage
Dr. Ryan E. Emanuel, Department of Forestry and Environmental Resources, North Carolina State University
Dr. Allyson Hindle, University of Nevada, Las Vegas, School of Life Sciences
Dr. Vera Kuklina, Department of Geography, George Washington University
Dr. Amy Leventer, Colgate University
Dr. Brice Loose, University of Rhode Island, Graduate School of Oceanography
Dr. Michelle Mack, Center for Ecosystem Science and Society and the Department of Biological Sciences, Northern Arizona University
Dr. Patricia Quinn, Pacific Marine Environmental Laboratory, National Oceanic and Atmospheric Administration (NOAA)
Dr. Sharon Stammerjohn, Institute of Arctic and Alpine Research, University of Colorado
Dr. Eric Steig, Earth and Space Sciences, College of the Environment, University of Washington

AC-OPP Members Not Present:

Dr. Douglas H. Bartlett, Scripps Institution of Oceanography, University of California, San Diego
Dr. Ryan E. Emanuel, Department of Forestry and Environmental Resources, North Carolina State University
Dr. Patrick Heimbach, Institute for Computational Engineering and Sciences, The University of Texas at Austin
Mr. Steve Iselin, U.S. Navy (Ret), Iselin Consulting Enterprise, LLC
Dr. Adam Marsh, School of Marine Science and Center for Bioinformatics and Computational Biology, University of Delaware

AC-OPP Subcommittee, Office of Polar Programs and other NSF staff:

Dr. Rainer Amon, Arctic Natural Sciences, OPP
Ms. Sara Eckert, Communications Specialist, OPP
Dr. Roberta Marinelli, OPP Director

Ms. Renée Crain, Research Support & Logistics Manager, OPP
Dr. Alexandra Isern, Acting Assistant Director, Directorate for Geosciences (GEO)
Mr. Timothy McGovern Program Manager Ocean Projects
Dr. Jennifer Mercer, Arctic Research Support and Logistics Manager, OPP
Mr. Mike Prince, Antarctic Research Vessel (ARV) Project Manager
Dr. Frank R. Rack, Arctic Research Support and Logistics Manager
Mr. Paul Sheppard, Executive Officer, OPP
Dr. Nancy Sung, Science Policy Advisor, OPP
Dr. David Sutherland, Program Director, Oceans and Atmospheric Science, OPP
Ms. Beverly Walker, Science Analyst, OPP
Dr. Maria Vernet, Program Director, Organisms and Ecosystems, OPP

NOTES

Monday, July 25

Welcome and Purpose

Dr. Marinelli; Dr. Nettles

Dr. Marinelli welcomed AC members and thanked the subcommittee members for today's report.

Dr. Nettles provided the purpose of this ad hoc meeting. She explained that the committee will hear the presentation and then the committee will take a vote to either accept or decline the report. If the report is accepted, then it will be submitted to the National Science Foundation. All members have submitted COI forms and have been cleared. If there are any further concerns, please let us know now. (No concerns were raised). She noted that Sharon Stammerjohn is present at this meeting and participated in an earlier phase of the ARV development process, the conceptual design review (we are now in the preliminary design review). Dr. Nettles asked if Dr. Stammerjohn had any comments to add.

Dr. Stammerjohn stated that she was on the ARV subcommittee early on. She has fully disclosed this information on her COI and has been cleared to attend.

ARV Science Advisory Sub-Committee of the OPP Advisory Committee

Dr. Amy Leventer

I really do appreciate the time that you're taking to listen to this initial report from our Subcommittee so yeah thanks for from all of us on the subcommittee We appreciate the ability to have an outline of what our charges and also to highlight what we've done so far.:

- Purpose
 - our primary objective is to provide advice on the design from top to bottom of the proposed new Antarctic research vessel.
- Sub-Committee Working Paradigm

- The way that we work we meet the one hour zoom calls and our schedule is dependent on our workload and that workload is focused on the timing of the design reviews, of which there are four.
- During the time that we're looking at a lot of the materials we meet every week and then between those times, for example, once we turned in our first report, then we meet every couple of weeks.
- We post all our meeting notes on an NSF SharePoint site
- We have a shared Google Doc on which we document all of our working documents and everything is archived there we don't delete anything we just keep working from the top and up.

Dr. Leventer is the sole presenter at this ad hoc meeting.

Dr. Leventer stated the task in brief, is really to help with the design of the replacement for the NB Palmer which you can see, on the left and simply stated as compared to the ARV. This ship will be bigger with space for more scientists and crew, with greater lab space with longer endurance and much more powerful ice breaking capabilities. Most importantly, we are working to maximize the capabilities of a ship that can access the more remote and icier parts of the Antarctic margin; we want to be able to conduct science in areas that we haven't been able to access previously and to conduct operations during the more difficult times of year. When talking to other scientists, they it is time to tackle the more challenging science, which requires a much more capable vessel and with that more capable vessel we anticipate much greater demands for both multi use and interdisciplinary science use, and this has been key as we work through the design of the ship lots of built-in flexibility for shared to use. We are trying to anticipate new technological advancements so we want to be as prepared as possible for a ship that can accommodate innovations and technology, for example, working with much more sophisticated AUVs in the water and new UAVs in the air.

	Sikuliaq	Nathaniel B. Palmer	ARV	
Length	261 ft	309 ft	345 ft	Bigger
Sci/Tech Berthing	26	45	55	More scientists
Total Lab Space	2,200 sq ft	3,805 sq ft	4,497 sq ft	More lab space
Working Deck Space	4,000 sq ft	4,054 sq ft	7,197 sq ft	More deck space
Endurance	45 days	75 days	90 days	Longer endurance

Dr. Leventer continued that the mission of our Subcommittee is to provide advice related to the ARV project and to serve as a formal conduit between our community and this project—we all have this common goal of building an incredible science platform. To achieve this, the SC has reached out on a one-to-one basis with questions and concerns, and we welcomed feedback from community members. We maintain a list of our contacts on our shared site so that we all know who we've been speaking with we incorporate their comments into our documents. In addition, a

subset of our committee participated in the Interim Design Reviews (IDR)—from the contractor end—we had the first one April 27, 2022; where we sat and listened, then provide summaries to our subcommittee for review.

Bruce Applegate, Alice Doyle, Amy Leventer, Tim McGovern, and Mike Prince will participate at our next IDR on August 16, 2022.

The subcommittee's primary job so far has been to listen to read interview design documents and then to provide consensus input to NSF through the OPP AC on a quarterly basis. The document that the OPP AC have in hand right now is our first IDR report in which we focused on the three major elements:

- General arrangements
- Habitability and green ships
- Cyberinfrastructure and satellite communications
- A set of miscellaneous comments

We relied on our own shipboard experiences and also those from our colleagues and tried to focus on future science demands. Next will be the highlights of each section.

We spent most of our time working with the general arrangements design which is maps of each of the decks and those spell out the location and sizes of all the different spaces on the ship both interior and exterior. Our approach was very back to the basics—we reevaluated how every space on the ship would be used on the workflow patterns among these different spaces among labs, the Baltic room, and exterior deck spaces. Our goal here was to try to maximize a combination of flexibility and efficiency; and also to anticipate future technology, for example, greater demand for and sophistication of unmanned vehicles, flow through technology to be integrated into the uncontaminated sea water system. We wanted to look ahead and try to anticipate how things might change in the future. Our main findings for general arrangements revolved around rearranging labs basis and sizes, how they're connected to each other, and also noticing some missing lab spaces, for example, the microscope and auto cell rooms and some others like that.

Here is a list of some of the highlights of the general arrangements—we looked at every single space.

- Computer/Mapping/Electronics Lab
- Back Deck Staging Bay
- 50-meter Jumbo Piston core
- UAV Hangar and Deck
- Marine mammal observation space
- Vans (20)

Again, we did get a lot of community/colleague input from this end of things, especially as we look to places where our knowledge might be more limited. I would also like to bring up that several members of the community have spoken to me regarding the absence of two features that were in the 2019 report—a helicopter deck and hangar and a moon pool. These features are not in the current design. I imagine that this may become a wider discussion, but I wanted to put that out there.

Section two of our report focuses on habitability and green ship operations in terms of habitability we focused on health and safety, recognizing that we're going to have more people on board—55. Science and science tech, and these missions will be longer (90 days endurance), and so we really wanted to look at extra attention to comfortable living conditions.

At the top of all our lists is the need to minimize the potential for health problems related to easily transmittable diseases like COVID-19. We paid special attention to the HVAC and ventilation systems, the ability to isolate people and the ease of assisting people who are in isolation. And as part of that we also looked at the location of the hospital how it would be accessed and how large it should be.

In terms of comfort, we addressed a whole range of issues, including the number of single occupancy staterooms. And quiet living and working quarters, wi-fi connectivity, common off-hour spaces, gyms, etc. All those things, you can see the details in our report.

In terms of green ship design, we looked at two primary elements: hull design and capability for periods of zero emissions operations, through the use of battery banks.

We recognize the hull design is critical for a whole list of reasons I list them here ice breaking capabilities, sea-keeping in rough waters, acoustically quiet conditions for marine geophysics, and fuel efficiency. There is a lot of reasons that we need to think very carefully about hull design. I do not have the expertise to evaluate decisions that are made on hull design, I think, Tim McGovern and Mike Prince would be better equipped to answer those questions specific to the tank tests that have been ongoing, and we've heard they have been really informative should you have questions.

The second element of green ship design that we looked at is battery operations conditions.

The ship design includes the battery bank to run the ship for periods of zero emissions, and this can be important when scientists are collecting samples that require no emissions, for example, some atmospheric sampling and times when acoustically quiet operations are needed, perhaps some mammal work.

We tried to gather data from scientists on what kinds of science, would be needed for these kinds of operations (How long? How often? Ship speed?), but we also want to point out that fuel efficiencies can be gained from having batteries assist with engine load management, so we have sort of a dual purpose of these battery operations conditions.

We understand that this driver is continuing to be looked at and from our end and we continue to talk with members of the community to get more information to help with these decisions.

Section three of our report focused on Cyberinfrastructure and Satellite Communications. We really need to anticipate the space and resource needs in the decades ahead considering advances in technology. Questions about this are probably answered best by subcommittee member Bruce Applegate who is on this call.

As you can see, the list of our primary recommendations here and the directive is very clear: think ahead, plan for the future, involve sea-going experts.

In terms of satellite communications, the recommendations that you see listed are very similar to those for cyberinfrastructure. In both cases, it will be very difficult to engineer this hardware into the ship after the fact, and so we have to look forward, as we do that, in terms of space and location. In the case of, say, satellite communications to be thinking about the kinds of satellites that will become available and so again a forward looking focus is needed to anticipate these future demands.

Finally in Section four we compiled a list of miscellaneous comments; no detail was too small, and we didn't want to overlook anything that any of us considered to be an issue based on previous work aboard ships—we didn't want it to fall off the radar so it may come across as some things are very picky or how are they connected to one another. We wanted to document everything that we could think about and we organized them by interior versus exterior spaces, so the main deck labs and then the back deck and other exterior spaces.

As you can see, they are diverse and cover a whole range of details, elements of ship design that really matter. And so, these are all listed here, and these kinds of questions will continue to be a background for our discussions as we tackle the big picture.

Finally, we couldn't address every element completely, so we ended our first review with the to do list of items that require additional investigation and discussion:

- **Vans:** uncertain about how these will be arranged on the decks and in the hold, and how easily they can be accessed and used.
- **Foremast:** details regarding size and weight of anticipated instruments to be mounted on the mast on a project basis 50-meter Jumbo Piston core
- **Battery Banks:** more information about kinds of science that would benefit, amount of time / battery operation conditions, ship's speed for activity, and how often (i.e., daily? weekly?)
- **Conference/lounge/library spaces:** plans include 0-1 deck lounge/conference room, 0-2 deck science library, and 0-3 deck conference room. We have re-visited intended use of these spaces - meetings, quiet workspace, telepresence/video connections, and lounge space

Since we wrote our report, we did spend a session looking in much more detail at the use of common areas and will include that discussion in our next report.

So, clearly, we have a lot of work ahead of us. We have done the IDR #1 review and the IDR #2 deliverables were added to our SharePoint site just last week, and these have been prioritized high, medium and low priority. We will begin the review of these tomorrow, so we'll be meeting weekly probably until we are able to deliver our next subcommittee report.

Our plan is to deliver that report to the OPP AC by September 8, 2022, so that we won't have to have call for an ad hoc meeting. This will give the AC a week to look it over before the OPP

Advisory Committee meeting, which I think is scheduled for September 15-16, 2022. This was a brief review of what we've done so far, I didn't want to talk about too many details, since you all have that information in the report.

I appreciate your attention and I'm happy to turn the discussion to Tim, who has a few more comments.

Dr. Nettles thanked Dr. Leventer for her presentation and asked Mr. McGovern to introduce himself before making his comments.

Mr. McGovern introduced himself as the Ocean Project Manager in the Office of Polar Program in the Infrastructure and Logistics section and is also the ARV Program Manager. Mr. McGovern stated that he has been working on this project, along with many others, since he first came to NSF in 2010. He just wanted to thank Amy and all of the subcommittee members for their hard work and their continued hard work as we dive into the next round of design materials. We started easy with them with just a few documents for them to review, but as Amy mentioned this latest round includes fifty some odd documents, some have more impact on science and some less, but it takes a lot to sift through this material to discuss the pros and cons of the different arrangements. The subcommittee has taken the tasking very seriously and it's tremendously helpful to us.

Mr. McGovern also wanted to share that due to the feedback we received from the advisory committee, we have established a series of ARV web pages that hopefully will provide a lot of useful information and insight into this project, including some frequently asked questions, science mission requirements, design elements, etc. There is also a mechanism for the science community and the public to submit questions or feedback to the GEO ARV team. So we view this website as a living document that will be updated and evolve as the ARV evolve. The ARV pages can be found at our www.future.usap.gov site, and I will post that—Bev has already posted it. I encourage everybody to check it out, and let us know what you think Thank you.

Dr. Nettles thanked Tim for his comments and encouraged everybody to take a look at that website, which just went live. It has a lot of information on it, including the list of everybody who is serving on the subcommittee. It also has links to all of the available public documents related to this process with the ARV so far, including the long 2019 report that has been mentioned a few times. It also has documents following on that report, including things like communications back and forth about design choices it has some great tables showing where we are in the process. And it does have information related as well to some of the topics that have come up in prioritization here, including some documents about the hull deck and the moon pool. Keeping track of where things are going, please let people know about the site, so they can see where we are in the process, and also have yet one more way that they can provide input and feedback to the process.

Discussion

Dr. Nettles opened the floor for discussion and stated that she is sure there are several questions and comments that people may have. In a way we have two categories of items that has come up a few times here, in previous meetings well as well as the decision and that is the elimination of

the helicopter deck and the moon pool so that's one set of things that we can discuss but also would like to focus on what is in the report that has been presented to us by the SC, which is a very detailed look at design items, so far, so we probably need to address both of those items. Let's start viewing questions and comments that folks might have on the actual report that was presented to us, both in writing and then by Dr. Leventer's presentation. Please go ahead and use your raise hand.

If you have a question or a comment that you'd like to make related to your expertise, or that of your colleagues, or just questions that you have, you can ask about that too.

Dr. Nettles called on Brice Loose who raised his hand to ask a question.

Dr. Loose thanked Dr. Neettles for the floor. Thanked Dr. Leventer and Mr. McGovern for the report. It is really interesting and kind of cool to see the details emerge as the product comes together. This is not an area I know anything about but I am curious about more detail on the battery bank. I think I read that it is currently designed to ship hoteling space going for like an hour?, If I understood correctly, in the recommendation, the subcommittee was trying to get that up between 6 and 24 hours or something like that-is it big enough? On the deck plan I couldn't find it so, is it so big that it shows up or at that footprint? I'm just curious to know where the battery would be placed, and if there are concerns about that from the standpoint of fire? Then my bigger more operations related questions are can you elaborate on the efficiencies that can be gained from using partially battery power for propulsion—I'm not sure if I fully understand that angle and then, what are the headwind or what are the difficulties with trying to increase the battery storage to six hours of operations or longer?

Mr. McGovern stated he can answer Dr. Loose's first and third question and he will ask Dr. Prince to answer the second one. Mr. McGovern said the batteries are below deck just after the engine room; we are reserving space for them right now because we know the technology is going to be evolving between now and the time the ship funded would be built so we're reserving the space and accessibility. But we are also concerned about the length of time that we could actually run the ship using batteries. I think we all agree that an hour is probably not enough, but it really depends on what you want to be doing in that timeframe, so we don't envision breaking four and a half feet of ice on batteries.

The goal, then, is to figure out what do we need? Do we just need to be going a couple of knots ahead in open seas, in which case, maybe we can get 6- or 8- or 12-hours running batteries. That's the sort of analysis that we're continuing as the technology is improving. As far as the headwinds that we're facing, the challenges we face is the endurance requirements of this ship of 90 days means that we have got a ton of fuel in the ship and so finding sufficient space for all the fuel and the batteries is one of our biggest challenges facing and size of the vessel and trying to keep it from growing too big of a ship for us to operate is one of the biggest challenges on all elements. Mr. McGovern asks Dr. Prince to elaborate on how the batteries help with the propulsion.

Dr. Mike Prince: I am a part-time IPA Project Manager to assist Tim and company on this project. The primary thing that the batteries give you is when you have a peak load or some

lesser load shaving; so if you're going along on, say, one or two generators and then all of a sudden, you fire up a piece of equipment or something and you need an increase low for just a brief period of time, this is when the batteries kick in and give you that low, without having to start up another generator. Or like with hybrid tugs and you use the batteries, to give them a boost of power immediately until you get more generators online, so it just allows you more efficient utilization of your generators; you're not constantly having a start and stop a generator just because you have a very short peak load. That's the primary thing that they help with.

Mr. McGovern: That can contribute to reducing the wear and tear and expanding the life of the engine that also goes to lowering our operational costs. Did that the answer your questions, Brice?

Dr. Brice Loose: Yes. Thanks Tim, appreciate it.

Dr. Mike Prince NSF/OPP: The only other thing I would say is that they are looking at sort of a containerized battery solutions, so you can pull them out, and change them more easily.

Dr. Brice Loose: here's a dumb follow up question just because I'm still unmuted: Can you, like an electric car, could you just use the batteries like a ballast and save space that way?

Dr. Mike Prince NSF/OPP: Well, they would be permanent ballast below deck. And the other thing is that the batteries allow you to do at least until they're fully charged is you can run your generators closer to the most efficient load. The batteries allow you to put the excess load into the batteries, at least.

Dr. Meredith Nettles: I'm going to say here that this shows the truth of the statement that if you start talking about batteries, you could go on essentially forever. So I appreciate those clarifications, thank you very much and Brice, if that has sufficiently address your concern for now, I am going to appreciate the deep expertise we have here and then suggest that we move forward, because I know that we will keep talking about batteries as long as time is available.

Dr. Meredith Nettles: Okay Brice. Okay great! Thank you. Sharon has her hand up and we've got a question in the Q and A from Ted Scambos and I also want to briefly mentioned that I noticed that Alex Isern is on the call as well, so thanks Alex for joining us on the call. Sharon, do you want to go ahead?

Dr. Sharon Stammerjohn: Yes. I just really want to thank Amy and the subcommittee first and Tim for just seeing this project to this point. It's a lot of work, and I really appreciate all the effort that's been involved and where we are in this process it's very exciting. I guess my question is more about the process. So here we are, we're reviewing the report and we're going to vote at the end of this hour. Does that mean that it's still possible to question features that are not currently part of the ship design? I mean we're talking about some adjustments based on this current review like workflow which I thought was an excellent analysis and I think it really speaks to how valuable it is to have community input, especially for those who are seagoing and I'm a little concerned that there's some voices that aren't present. You know in this process, although I see that it's becoming very transparent and so I'm encouraged, but I'm not quite clear,

like how this is going to evolve? and what is possible? what can we modify as we go forward?
Thanks.

Dr. Meredith Nettles: Thanks Sharon for bringing that up, and I think the process is complicated. About this specific meeting, I will say that what we're evaluating here is the report that's presented by the subcommittee and accepting that report does not preclude other discussions or discussion of process, and so on, I think that what we're evaluating in terms of the subcommittee report is, do we think that the subcommittee is looking at important issues, does the report provide valuable input that we want to transmit to NSF because the only way NSF actually gets the input that's in the report is, if we accept the report and transmit it to NSF so, to that extent I'll say I personally think the analysis and the report is very useful and, should from my perspective be transmitted but each of you will make your own decision when we vote on that. I think there is an additional question that you're raising about the overall process and modes of feedback and I will ask Roberta to address that if she would do so.

Dr. Roberta Marinelli: Okay sorry I was reading the questions in the chat and my mind was over there, could you repeat, but I think I know what the general question is.

Dr. Meredith Nettles: The general question is overall process where you are getting this report, which is at a specific stage in the formal process. Sharon is raising the issue of to what extent can things still be changed? We have some broader concerns, particularly I think about features that are no longer part of the design and to what extent does the process include scope for reconsidering those items?

Roberta Marinelli: I'll just make a couple of statements and indicate that we are looking at our ocean portfolio recognizing that ocean in the Southern Ocean is really unique in the sense that it looks not only oceanographic processes, but also ocean ice interactions ocean continental margin interactions etc, etc. And that the ship that goes forward has to be to some extent capable of operating in this very unique environment. For all of the features that are designed into it, I know that there is a significant desire to build a vessel of different features. I will defer, to only a small extent, the explanation of which features were included versus not to Tim and Mike only because some of the design decisions were made on the basis of prior use of certain features and our ability to support them going forward. That said, I would like to emphasize that there are several emerging technologies that are providing a very different suite of capabilities. That we envision is being supported by this vessel, should it be built, and that in order to get to that point where we have that vessel, we also need to be able to justify the cost of the vessel to the National Science Board and cost control is a huge part of what we have to consider going forward if we design, something that, I would say, satisfies most of the wishes that the entire community has we might still be in a design process of three or four years ago simply because the boat is priced out of what we can actually do. So, there are costs constraints, but there is also a horizon for new technologies, including new oversight drilling and related capabilities that we seek to explore. Having said all that, knowing that there is a need to explore what these other options are and to explore our approach towards Southern Ocean oceanography as I described it earlier, we are working with the National Academy of Sciences both the polar research Board and the earth sciences group and the ocean studies board to hold one or more workshops and to develop a consensus study over what our approach to Southern Ocean oceanography should be in the

future. To that, as another forum in which will be able to get interested parties together to talk about the capabilities that we need recognizing that all those capabilities may not best be incorporating into one vessel but might be incorporated through different technologies or through partnerships with other organizations, so there are other opportunities but we're looking at this, with an eye toward what the Community is developing independently and also to what we can accomplish through international partnership. Sorry that was a very long response but we do have a number of things going on and opportunities to do forward thinking about oceanography that don't just include this vessel, but it includes a much broader approach of the tools that we need to address processes that involve ocean interactions that I described earlier.

Dr. Meredith Nettles: Thank you, Roberta. I'm going to note, I see Aaron's hand up and we know that we do have very engaged participants. Ted Scambos put questions in the QandA and since he is on the attendee side of the meeting and I'm going to mention just a couple of the things that he's listed there. In case there's a quick response we can provide now and otherwise what I'm going to say is everything that's getting written in the QandA is going to be incorporated in input that the SC is seeing right now and I'm sure can address. One thing that Ted raises is the 90 day endurance and how strong a requirement that is for a variety of reasons, but, including past trade offs and the fact that some people simply cannot be on a ship for 90 days at a time, and that may be especially true for younger people. And then there are some questions also related to the ways that UAVs may or may not accommodate the needs that we might use helicopters for otherwise and then there are a variety of things related to other aspects of the report and comparisons to other nations, but I think the main one here, I think, is, I just want to highlight those first couple of questions so that they are acknowledged and Amy or others, whether you want to provide a brief response to that, and then we'll consider this input passed on to your group.

Dr. Amy Leventer: I can. I know we have only a short time and I guess the thing that caught my attention was what I saw first—the question from chat about the 90 day endurance and what I'll say is that's not that every research cruise has to be 90 days, we want to have the capability of having 90 days, this doesn't preclude other kinds of shorter research cruises we have any combination of things like Twaites that last a really long time or a couple of the long cruises I've been on the east Antarctic Margin, which is 60 days. But you certainly can still have much shorter cruises to do those other kinds of things. The 90 days I think part of the reason we looked at that as especially I mean, from my point of view so I'm just speaking from my own experience. If we want to do some of the things in the more remote parts of the East Antarctic margin, the transit distances are much longer, you know even going from Hobart to the Sabrina coast that's a 10 day transit each way so there you've already had almost three weeks just sailing and then you want to have the time to get into say the plenty of like at the Totten that might take time to get in and once you get there, you want to stay there, so you can do your work, so we wanted to facilitate the ability to have those 90 days and I was a member, for the committee that wrote the 2019 report, and that was one of our considerations for those long cruises.

Dr. Meredith Nettles: Thank you Amy. We will make sure that other comments in the QandA are also captured and move forward, I think, Sara, you can help us with that correct? Let's take a quick comment from Aron and then we do need to move forward. With a little bit of deliberation on the acceptance of the report and then also planning for future discussions. Aron Please go ahead.

Dr. Aron Crowell: Yes, thanks. This is just a quick question about ship safety and rescue noting the ship will be operating in very hazardous conditions, both in heavy ice for long periods of time and on open ocean. What assets, do you have for rescuing crew under bad conditions?— Brice mentioned fire. And or individuals who might have to be medevacked off the ship? I don't know what assets, you have in place for that kind of thing, but certainly something that seems to be of concern and was not addressed in the report.

Mr. Tim McGovern (he/him): That's a good point. So you're absolutely right, though, on the ship do venture far far away from the nearest medevac. Anybody who deployed to the Antarctic, as you likely know has to go through a physical qualification so there's a higher level of physical preparedness of every individual. We also consider risk and proximity to medical evacuation facilities whenever we conducted crew. You know, there are stations scattered around the continent, and we look, we look at the assets that might be in those areas should we need to do a medical evacuation. But we also provide emergency medical technicians on the ship which is a step above what medical capabilities are provided on most of the academic research vessel, simply because we are so far removed. To operate in these regions, one of the new things that came about in 2016 was the polar code so shifts that operate in these more extended icy regions have to meet more stringent requirements for safety of the vessel and the personnel aboard, so it is something that's definitely factored in, and considered as we're designing the ship. But like many other operators in this region, there are times, where we're going to be operating and if we need to a medevac, we could be a week or two or three away from help, so in that case we've got telemedicine capabilities on the ship and we'd be looking to continue that sort of capability.

Dr. Meredith Nettles: Thank you Aaron and Tim. We are at six minutes before the hour, so what I would like to do is move forward with taking a vote on the report that has been presented to us today by the subcommittee. This topic is absolutely going to be a significant portion of our discussion at our September 15 and 16 AC meeting, and we look forward to a second report from the subcommittee there. I think that we will also be communicating in the meantime between them about the various opportunities for continued feedback into the ship process, as well as the overall capabilities for supporting Antarctic research. I don't want to dismiss the concerns that are coming up about the elimination of helly deck and the moon pool; I think that they're competing with wanting to get a ship built versus not having a ship at all concerns versus the legitimate science concerns about what you can't do if you don't have those features, and so I think we need to continue that discussion as well.

Voting

Dr. Meredith Nettles: What I'd like to do right now is to refocus on the report that's presented to us and ask the Committee to consider whether we, as an AC would like to accept that report from the subcommittee and whether we would like to transmit it further to NSF. I believe we are supposed to do that as two separate votes so just to avoid any confusion we're going to do it that way. Voice votes don't work very well on zoom so what I will ask you to do, if you are on the committee, please have your video turned on and then, to raise your hand and keep it up there until I have a chance to actually see your hand.

Dr. Meredith Nettles: So, if you are on the AC and are in favor of accepting the report that the subcommittee has provided us, could you please raise your hand and keep it up there for a little while.

Dr. Meredith Nettles: Okay. And I've got to go around my zoom screen here to find you also just bear with me getting there getting there. Okay. You can put your hands down.

Dr. Meredith Nettles: If you are not in favor of accepting the report, would you please raise your hand.

Dr. Sharon Stammerjohn: I still have a question about that, and I put it in the chat but it's unclear to me whether I can just voice my suggestion and that would be part of the SC review process. If so, then I'm fine with accepting the report, but if this is the time and place to be suggesting this recommendation so that's where I'm on the fence I don't

Dr. Meredith Nettles: Sharon, let me clarify. Okay, so your question was whether, in addition to advocating other solutions, we could also recommend reassessment of the costs involved if certain features were to be added back, I think that we can make a statement like that. It doesn't need to be part of accepting this report or not accepting the report because the way to get this feedback that is in the report to NSF is to accept this report and pass it on. It does not preclude other activity by the AC or members of AC.

Dr. Sharon Stammerjohn: Thank you.

Dr. Meredith Nettles: Okay, so do you want--

Dr. Sharon Stammerjohn: Yes, I will raise my hand with accepting the report. I think the processes are a good process as long as we can keep the dialogue open.

Dr. Meredith Nettles: Okay, and then that captures everybody. I'm sorry that we have to ask you to do this a second time; we have accepted the report. With a unanimous vote of the AC members who are present and now we need to vote as to whether we can transmit it to NSF.

Dr. Meredith Nettles: I'll admit I don't understand why this is a separate step but let's just do it, so if you think that, since we have the report, we should transmit it to NSF, could you please raise your hand again okay 123456789 all right, thank you very much appreciate that. So we will transmit the report officially to NSF for their consideration, and I think that what we need to do is also to continue to address the concerns that have been raised by Sharon and others.

Dr. Meredith Nettles: type or put that all insurance that she just brought it up right now in this meeting, but clearly. We do need to have a bit more discussion about how to address the concerns about the elimination of the helly deck and the mo0n pool. And so I think that I will touch base with Roberta and figure out the best way that we can incorporate that kind of discussion into a AC process or elsewhere.

Dr. Meredith Nettles: Thank you all very much for participating today. I know it's not easy during the summertime and appreciate you being here and we'll let you go back to whatever else you need to be doing, I will just give Roberta the opportunity to make any closing comments. fish.

Roberta Marinelli: First, I want to thank everyone, again as Meredith already has, for their participation and thank the committee for the work on the report and also to let folks know for those of you who are raising questions about the design, we certainly hear you and understand why you have concerns. Our focuses on what it is that we need to do certain science and not necessarily everything being accomplished by a vessel and a more robust discussion about the tools and trade offs is in the future. So thank you again for being here and for raising your concerns and you know, the door is always open for conversation I want to underscore that wholeheartedly.

Dr. Meredith Nettles: Right, thank you, Roberta and thanks again to everybody, and we will be in communication soon. Make sure you have that September 15 and 16 meeting on your calendars alright have a good afternoon.