U.S. DEPARTMENT OF COMMERCE

+ + + + +

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

HYDROGRAPHIC SERVICES REVIEW PANEL

+ + + + +

VIRTUAL PUBLIC MEETING

+ + + + +

THURSDAY
SEPTEMBER 24, 2020

+ + + + +

The Hydrographic Services Review Panel met via webinar at 1:00 p.m. EDT, Ed Saade, Chair, presiding.

HSRP MEMBERS PRESENT

EDWARD J. SAADE, HSRP Chair
JULIE THOMAS, HSRP Co-Chair
DR. QASSIM ABDULLAH
CAPTAIN ANUJ CHOPRA
SEAN M. DUFFY, SR.
DR. NICOLE ELKO
LINDSAY GEE
EDWARD J. KELLY
CAPTAIN ANN KINNER
DR. DAVID MAUNE
CAPTAIN ANNE MCINTYRE
CAPTAIN (ret. USCG) ED PAGE
CAPTAIN SALVATORE RASSELLO
GARY THOMPSON

NON-VOTING HSRP MEMBERS

ANDY ARMSTRONG, Co-Director, UNH-Joint Hydrographic Center
JULIANA BLACKWELL, Director, National Geodetic Survey, NOS
RICH EDWING, Director, Center for Operational Oceanographic Products and Services, NOS
LARRY MAYER, Center for Coastal and Ocean Mapping and Co-Director, UNH-Joint Hydrographic Center

NOAA LEADERSHIP PRESENT

REAR ADMIRAL SHEP SMITH, HSRP Designated Federal Official; Director, Office of Coast Survey, NOS

NOAA STAFF PRESENT

CAPTAIN RICK BRENNAN, Chief, Hydrographic Surveys Division, Office of Coast Survey
VIRGINIA DENTLER, Center for Operational Oceanographic Products and Services
LYNNE MERSFELDER-LEWIS, HSRP Coordinator

ALSO PRESENT

MARIA BURNS, Ph.D., College of Technology, University of Houston

C-O-N-T-E-N-T-S

P-R-O-C-E-E-D-I-N-G-S

12:59 p.m.

CHAIR SAADE: Hello. This is Ed Saade. I serve as the HSRP Chair. Welcome to day number 2 of our September 2020 virtual meeting. We'll jump right into it.

And we'll start off the day with a round robin of the HSRP Panel members for comments, insights continued from yesterday. And to start that off, Rear Admiral Smith, would you like to go ahead and take the floor?

(Audio interference)

MS. DENTLER: Rear Admiral Smith, we can't hear you.

RDML SMITH: I'm sorry. I was muted. I'll just thank everyone for a great first day yesterday. And as I've said a couple of times, I'm really in listen mode here. And I want to spend most of the time listening to what the Panel's thoughts are, particularly on NOMEC this morning. So, I yield back any remainder of my time.

CHAIR SAADE: Thank you, sir. Okay. So, we'll go do the round the table. And we'll do it in normal alphabetical order. I will do it at the end in reverse alphabetical order. So, Captain, why don't you go ahead first, please.

MEMBER ABDULLAH: Good morning, everyone. I agree with the Admiral. I think it was a great day yesterday. And for the strategies, I think my emphasis is for the way -- for a success in implementing the strategies, really is going to be on -- depend on how much NOAA is going to work with our federal partners, with the private academia research institution. It is very crucial to set on the table and tackle it that way.

We come up with a good recommendation from HSRP, but I think I just want to emphasize the public and private partnership, and the development of standards. Though I don't think we should take any actual practical step in the field before we all agree on the national standard, how we are going to collect data.

That's all I have. Thank you.

CHAIR SAADE: Thank you, Qassim. Next up is Captain Anuj Chopra.

MEMBER CHOPRA: Hi. Good afternoon. Good morning. Anuj Chopra here. Completely agree with Qassim, Dr. Abdullah, on his comments. I believe the NOMEC strategies -- just because of NOAA itself -- it involves many more partners in working together.

I feel there's a huge opportunity to have that public-private partnership. And as the Admiral said yesterday, focus on innovation and technology to take it forward.

Very excited about the Alaska strategy as well. I think both these initiatives are the way to go ahead, and looking forward to them.

Take a moment and wish all the mariners on this call, and who are present, today is World Maritime Day. So, wish all of you World Maritime Day. Happy World Maritime Day, and take it from there. Best wishes. Thank you.

CHAIR SAADE: Thanks, Captain. I

apologize again for any background noise. My home here is in front of the old --- so, every now and then things get loud and I have to go mute. Sean Duffy, you're up next. Sean, you may be muted. Okay. We'll --

MEMBER DUFFY: All right. I'm here. Thank you. I don't have much to say. So, appreciate Captain Chopra hitting Maritime Day. That's a big event for us. And it's great that we're all working together on the Panel today. And I appreciate being here. Thank you.

CHAIR SAADE: Thanks. Thanks a lot, Sean. Dr. Nicole Elko, you're up next, please.

MEMBER ELKO: Thanks. Good afternoon from sunny Folly Beach, South Carolina. I really enjoyed yesterday's sessions. I took a cue from Dr. Jacobs, who had his WRV surfboards behind him, and brought mine in today. I don't have a Hawaiian shirt. But that surfboard has been to Hawaii with me. So, yes, I'm really looking forward to today's discussion. Thanks.

CHAIR SAADE: Thank you, Nicole. Next

is Lindsay Gee, please.

MEMBER GEE: Hi. Good afternoon, all. Yes. I -- yesterday, to reflect everybody's comments here, and I think it was a good day. It was -- particularly I think the Alaska strategy. So much work had gone into that, that we've got -- still, I think, there's still lots to do, I think, to just round out our comments to the NOMEC. But, it's -- the strategy itself is huge, as Clary would say. I mean, he was great about it. But it does present some really big challenges. And I hope we can focus our comments on that today, to get a good recommendation out, and a paper on that. Thank you.

CHAIR SAADE: Thanks a lot, Lindsay. Ed Kelly, you're up next.

MEMBER KELLY: There we go. Everybody can hear me, I trust. Yes. I think we had a really good day yesterday. I'm kind of very excited. And I'm very pleased with what we all -- both on NOMEC and the Alaska strategy.

I think what we need to do is continue

-- from what I've been hearing, is to continue to focus our recommendations that NOAA is the lead agency that should get involved to ensure the full interagency cooperation, as well as public-private.

And that it should be NOAA as a lead agency in helping to set the standards for both the data, and the guidelines, and the procedures for all of these. And that we have to continue to underpin NOAA stressing in everything they do, the importance of both their services and products to the success of the blue economy.

So there's just a couple of -- kind of underlines the emphasis points that I think we need to be putting together as we continue to listen today, and formulate what our recommendations will be.

And it's not -- yes, it's fairly sunny from here in Bridgewater, New Jersey. Not as exciting as Hawaii, Alaska, Florida, or anyplace else. But so far so good. Thanks.

CHAIR SAADE: Thanks, Ed. Captain Ann

Kinner, please.

MS. DENTLER: You're muted, Ann.

MEMBER KINNER: No. I -- was not my fault. Thank you. Yes. I totally agree with what Ed has said, and his comments that I got emailed this morning, and Qassim's too.

And particularly the idea that somebody's got to take the lead in pulling all of these disparate things together, whether they are resources from Seabed 2030, NOMEC, whoever, pulling them all together.

We have a big job. It's an important job. And it's the old thing of, how do you eat the elephant? You do it one bite at a time. So, we start with, who's in charge? We start then with, what is the task? What's the first task? What's the next task, and so on.

But yes, somebody has to take the lead. NOAA, I would think would be perfectly positioned to do that. And again, to pull in all of these private sources as well, whether it's Lamont, or Woods Hole, or New Hampshire, or

whoever.

CHAIR SAADE: Okay. Thank you, Ann. Captain -- oh sorry, Dave Maune. You're up next.

MEMBER MAUNE: Hi. For some reason my videocam isn't working today. I don't know why. I was very pleased with the support we've received for the Alaska Coastal Mapping Strategy, for the white paper there. And I want to endorse Qassim's recommendations regarding standards for the NOMEC, and that sort of thing. That's all I have.

CHAIR SAADE: Thanks, Dave. Captain Anne McIntyre, please.

MEMBER MCINTYRE: Hi. Good morning, everybody. Nothing really to add here. I appreciate everybody's hard work on these issues, they're outside my area of expertise. I know it's been a lot of work. And I agree with the comments that everybody else has made.

CHAIR SAADE: Thanks, Anne. Captain Ed Page next. You're muted, Ed.

MEMBER PAGE: All right.

CHAIR SAADE: There you go.

MEMBER PAGE: A lot to digest yesterday. Obvious we're stepping on -- or jamming on the accelerator pedal with respect to surveying the ocean. So, a lot -- great to see so much attention now directed towards this effort, and right from the White House, and down, and throughout. So, a lot to do, exciting opportunities in the future. So, I'm glad to be a part of it.

It's -- we had some of the crew from Rainier and Juneau this week. So, I had them over to the Marine Exchange here yesterday. And then said, go out and survey. So, I pushed them out of the door, and cast off all lines, and started doing some more surveying. But anyway, we're -- pretty exciting times. I'm glad to be a part of the process. Thank you.

CHAIR SAADE: Thank you, Ed. Captain Sal Rassello.

MEMBER RASSELLO: Hi. Good afternoon. Great work yesterday. Looking forward to another

day of good work with you guys. I second Qassim's comment. And the comment regarding the importance of NOAA to lead the project.

These are probably the biggest projects that I have been involved with the Panel so far. And obviously they need good coordination and planning for the final execution and results. So, I'm looking forward for another good day today. Thank you.

CHAIR SAADE: Thank you, Sal. Julie Thomas, you're up next.

CO-CHAIR THOMAS: Right. Thanks, Ed. Well, I just have to say, I've been so impressed at how engaged the whole Panel has been, both with the Alaska mapping, and NOMEC, and also proactive in getting outside comments. And it's really great.

We've had some excellent feedback. And we're still compiling. But I hope we can work out some things today, and move forward on these. So, I appreciate the opportunity of working on this. Thank you.

CHAIR SAADE: Thanks, Julie. Gary Thompson.

MEMBER THOMPSON: Good afternoon from rainy Raleigh, North Carolina. I think yesterday was a very important meeting. A lot of team effort yesterday. We got to keep pulling. Now we're going to talk about sort of this by rule. Ed's comment about NOAA taking the lead I think is very important, public-private partnerships, and national standards.

CHAIR SAADE: Thanks, Gary. Captain Andy Armstrong.

CAPT ARMSTRONG: Yes. Hello, everyone. I also thought today -- or yesterday was an excellent day. And I think we heard some really great comments from the public input. And so, I'm looking forward to another solid day of discussions and information. Thanks.

CHAIR SAADE: Thanks, Andy. Juliana, you're up next.

MS. BLACKWELL: Greetings. Just echoing the same thing. It was a great

discussion yesterday, especially on the NOMEC and the Alaska Coastal Mapping Strategy document.

I look forward to continued discussion and input on that today, along with the other updates from the working groups. So, looking forward to the discussion. Thank you.

CHAIR SAADE: Thanks, Juliana. Rich Edwing.

MR. EDWING: Yes. Hi, everyone. Like everyone else I very much enjoyed yesterday's session. I'm very much looking forward to today's session on visibility and fog. You know, I think it's really talking about the overall system that's going to be required to help vessels safely navigate in low visibility conditions.

You know, my office helped provide observations. And we're working on helping to provide forecasts for visibility. But those are just pieces, and not the end-all by themselves. So, I want to -- effects to the overall system that will be discussed. And so, looking forward

to that. Thank you.

CHAIR SAADE: Thank you, Rich. And Dr. Larry Mayer.

DR. MAYER: I could be contrary and say that I didn't enjoy yesterday's discussion. But that wouldn't be true. Because I did. And I thought they were great.

I really like the way the Alaska study has evolved. I think there are really clear recommendations in that, which is great. I agree with everything that's been said today in summarizing the NOMEC discussion. I think the emphasis on collaboration and coordination is right on the mark, with NOAA as the lead agency. I think that's great.

I come back to what I mentioned yesterday, which is my concern for a mechanism that goes beyond interagency collaboration. There are mechanisms obviously within the Government for interagency collaboration.

But I worry that we and NOAA are going to be challenged with finding a mechanism that

will allow collaboration and coordination of activities beyond the federal agencies. And I think that's necessary. But I think it will be a interesting effort to try to find a way to do that.

CHAIR SAADE: Thanks, Larry. So, we're doing fine on schedule. And the next big item after this discussion period is going to be the next round of our public comments.

So, I'd like to ask Julie, and Qassim, and Dave, and Lindsay to make yourselves available, so we can take advantage of this time window, and go ahead and talk a little bit more on the various items related to NOMEC and Alaska.

So, I'll go ahead and start on that, and just comment to the fact that one of the key elements of this is everybody's input, as has been repeated many times. And also, the strong focus on what we're trying to do relative to advocate for, you know, public and industry involvement early on in the process.

I personally am a big advocate of

that. And I'd be glad to see that's part of the discussion. And I would encourage us to keep going down that road as much as possible.

And then, also the playback into what's been going on with COVID and the pandemic. And the realization and the success that we're seeing. We commented a number of times that NOAA got a lot of work done in these last six months in the field. And a lot of that is a credit to not just people paying attention, and being faithful, working hard, and working together, but a lot of that is embracing autonomous ways to do things, and remote ways to do things. And I firmly believe the door's wide open for us to really push hard to bring in uncrewed and -- uncrewed platforms, and autonomous methods, remote operations as much as possible, particularly in tough to get to places geographically like Alaska.

But we've proven it's tough to get anywhere in the U.S. during this pandemic. And that there's great benefits to being able to not

have to move everything around, and move people around. So, with that I'll hand it over to you, Julie, if you want to --

CO-CHAIR THOMAS: Okay.

CHAIR SAADE: -- go ahead and take the lead, and keep this conversation going. Thanks.

CO-CHAIR THOMAS: I do. I'm wondering -- I think maybe what we'll do is to take this time to -- if we have a minute here. Do we have -- let's see, the timing. Captain -- or Admiral Smith, I think we have time before the public comments to address Alaska mapping. And Dave Maune can talk a little bit about the changes.

And then we can go ahead and see if the Panel really has consensus on this to approve it. And we'll be done with the Alaska mapping then. And then we can focus the rest of the time on NOAA. So, that's what I would suggest right now.

Dave, do you want to take it from here? I know you had one more comment last night -- or a couple of comments from one person that

you've included here now, and highlighted. Do you want to take it from here?

Dave, I'm not sure we can hear you. You might be muted.

MEMBER MAUNE: Can you hear me now?

CO-CHAIR THOMAS: Yes.

MEMBER MAUNE: Okay. This yellow highlight shows one addition that was recommended by Nicole Elko. And it addresses the quality levels, in partnership with the JALBTCX partnership there. And that is non-controversial there.

You can then switch to page 9, please, the next yellow highlight. Okay. Right there, I think it was Nicole who also mentioned that these are lower cost sensors that we're talking about for the alternative sensors. So, that's a very minor thing.

You can now go to page 12. Okay. There we have -- this one came from Molly McCammon. She thought that we should mention the Hydroball buoy. And it doesn't just serve as a

datum center, but she sees it as a single beam echosounder that can do some echosounding off the coast there. This particular photograph shows it being tethered offshore. So, she recommended I add this paragraph -- which we did -- describing the Hydroball buoy. Okay. And it's being used in Canada. And AOOS is testing it for use in Alaska.

Okay then, page 13. Page 13 we had a recommendation to engage stakeholders in the process. And we've been talking about that for, all day.

Okay. Those were the comments that we got from Molly McCammon and from Nicole Elko this week. I got one other comment overnight, from Fugro's office in Alaska. And it basically referred to the Alaska Coastal Mapping Strategy needing to talk about shallow water echosounding surveys. She was referring to the strategy, not the HSRP paper. Because the HSRP paper has three pages on doing exactly that.

So, I think that is a nonissue, and

that there's no more recommended changes to this paper. Anybody has any comments they want to add? Otherwise, I think we're ready to vote on this.

CO-CHAIR THOMAS: Right. So, let me just go around to each of -- thank you, Dave, for that update. And I feel this paper is ready to be finalized.

But let's go around and ask consensus from the Panel. I'm just going to call you out each individually. If you could just say yes, no, or further comments. Ed Saade. Yes, you'll have to unmute yourself here.

MS. BLACKWELL: Julie, can I have one other minor change before we go around?

CO-CHAIR THOMAS: Of course.

MS. BLACKWELL: Yes. I sent this to Dave late. So you probably didn't get a chance to see it. But I had one very minor change that I requested on page 3, where it talks about the NSRS modernization effort.

CO-CHAIR THOMAS: Okay.

MS. BLACKWELL: And in particular it says -- or states that NGS North American-Pacific Geopotential Datum of 2022 now scheduled for release in 2024.

I'm a little hesitant to put a particular year at this point in time with the modernization effort, as I briefed out yesterday. So, I would like to say, instead of in 2024, after 2024, just so that we have a little bit more leeway. Because I'm uncertain as to the final date of the modernization roll out.

CO-CHAIR THOMAS: Sure.

MEMBER MAUNE: Okay. What page is this on again?

CO-CHAIR THOMAS: It's on page --

MS. BLACKWELL: Three.

CO-CHAIR THOMAS: -- 3, Dave. On page 3, and right before the year 2024.

MEMBER MAUNE: Okay.

CO-CHAIR THOMAS: If you want to -- and so we're just replacing the word in with after.

MEMBER MAUNE: Okay.

CO-CHAIR THOMAS: And if you could make that change then. And then go ahead and send it to Lynne and team. That would be great.

MEMBER MAUNE: Okay.

MS. BLACKWELL: Thank you.

CO-CHAIR THOMAS: Thank you, Juliana.

MS. BLACKWELL: Thank you very much.

CO-CHAIR THOMAS: Sure. Okay. Let's go around to the whole Panel then. And of course, if you have additional comments, now is your time to speak up. So, Ed Saade.

CHAIR SAADE: I wasn't ready. I'm okay. Go ahead.

CO-CHAIR THOMAS: Okay. Qassim.

MEMBER ABDULLAH: I'm fine, thank you.

CO-CHAIR THOMAS: Anuj.

MEMBER CHOPRA: I'm fine, thank you.

CO-CHAIR THOMAS: Sean.

MEMBER DUFFY: I agree with the paper, and thank Dave for all the work in getting us to this point.

CO-CHAIR THOMAS: Thank you. Nicole.

MEMBER ELKO: Okay. The low cost comment that I added, maybe we should add "low cost, proven". I don't remember exactly the terminology there. But, just wanted to make sure that was clear. Otherwise it looks great. Thanks.

CO-CHAIR THOMAS: All right. So, let's go to that page where we have low cost, so we could just catch it right now. I think it's further down.

MEMBER MAUNE: It should be on -- I think it's page 9.

CO-CHAIR THOMAS: Okay.

MEMBER MAUNE: Some of these things, the Alaska Water Level Watch, is evaluating them to determine how well they are proven. The non-vented pressure sensors and the two below it are ones that they are evaluating. I think they are in the process of proving it. And so, that's part of -- that's part of the exercise is to prove them and use them when they work out.

CO-CHAIR THOMAS: So, if you could scroll up just a little bit there, Virginia? So, we could say, consider alternative low cost sensors, yet should be finalized or under evaluation?

MEMBER MAUNE: How about when proven?

CO-CHAIR THOMAS: When proven?

MEMBER ELKO: That sounds good.

MEMBER MAUNE: Well, but consider right, the word consider --

CO-CHAIR THOMAS: Oh, okay. The word is --

(Simultaneous speaking)

MEMBER MAUNE: -- telling them they are to determine whether it can be proven or not. Maybe the word consider covers that already. If we said use alternative, then we would say, use alternative proven. Right now they are considering the alternatives, which may not yet be proven.

MEMBER ELKO: Okay. That addresses my concern. I couldn't remember exactly the

structure of that sentence. But you're right. I agree. Thank you.

MEMBER MAUNE: Okay. Thank you.

CO-CHAIR THOMAS: Okay. Thanks, Nicole. Lindsay.

MEMBER GEE: Yeah, I have no comment. It looks good. Thank you.

CO-CHAIR THOMAS: Thank you. Ed Kelly.

MEMBER KELLY: I'm good.

CO-CHAIR THOMAS: Thank you. Ann Kinner.

MEMBER KINNER: All sounds good to me.

CO-CHAIR THOMAS: Thanks. Dave Maune, you've got it. Anne McIntyre. I think you're on mute, Anne. Anne, we'll come back to you. Ed Page.

MEMBER PAGE: Good to go.

CO-CHAIR THOMAS: Okay, thanks. Sal.

MEMBER RASSELLO: I'm good. Thank you.

CO-CHAIR THOMAS: Thank you. Gary

Thompson. Are you on mute, Gary?

MEMBER THOMPSON: Yes. I'm good.

CO-CHAIR THOMAS: Okay, thank you. Anne McIntyre, are you on?

MEMBER MCINTYRE: I am. I'm good to go. Sorry, some tech issues.

CO-CHAIR THOMAS: Great.

MEMBER MCINTYRE: Thank you.

CO-CHAIR THOMAS: Sounds good. Let's just make sure that, Andy, do you have any further comments?

CAPT ARMSTRONG: No further comments. Thank you, Julie.

CO-CHAIR THOMAS: Okay. Larry.

DR. MAYER: No. I'm fine with it. Thank you.

CO-CHAIR THOMAS: Okay. Rich Edwing. Are you on mute?

MR. EDWING: There we go. Okay. Yes, I was trying to comment. Just on the page that we're showing, where we say, lower cost sensors. I would actually say lower cost systems.

Because, you know, a sensor is just one piece of a larger system that you need to deploy.

CO-CHAIR THOMAS: That's a good point.

MR. EDWING: Any sort of measurement, not just water levels. So, it's not just -- the sensors are actually relatively inexpensive no matter which one you get. It's kind of the system you build around it that elevates the cost.

MEMBER MAUNE: Okay. I will change that. I will change it to lower cost systems.

CO-CHAIR THOMAS: Great. Thank you, Dave. Juliana, any further comments?

MS. BLACKWELL: Nothing further. Thank you, Julie.

CO-CHAIR THOMAS: Shep.

RDML SMITH: Thank you, Julie. Thank you, Dave, and everyone else for a great paper.

CO-CHAIR THOMAS: Okay, great. So, I think we have consensus on this with the changes as spoken. And Dave will update this and send out a final draft then to Lynne for inclusion

with the recommendation letter to the Administrator.

Okay. So, let's move on here. What's our time schedule here? Do we still have -- we have some time, don't we?

CHAIR SAADE: Yes. You're doing fine. Don't -- I'll keep you updated.

CO-CHAIR THOMAS: Okay, great. So, let's switch over to NOMEC then. And let's start our discussion. Now, Lindsay, are you on?

MEMBER GEE: I'm on. My camera? It doesn't matter.

RDML SMITH: Julie, can I make one little comment before we get started?

CO-CHAIR THOMAS: Of course.

RDML SMITH: And then I'll really try to be quiet. And that is that, you know, where are in this, we have the strategy. We know things like we need to be inclusive, and have public-private partnerships.

What we need to do now is figure out how to do that. So, we really need advice on

how. That's where we are. And so, I -- you know, and so, you know, I think that any ideas that we come up with here could be really helpful in developing that implementation plan.

So anyway, that was one thought, you know. We hear you, the coordination, how? How should we do that coordination? Any ideas, right, taking into account the laws and that kind of thing.

How should we be thinking about tech and tech development? Do we have the right tools and structures in place? Do we need to just do more of what we're doing? Or do we need to be doing something different?

And then, same thing for, you know, for, sort of, partnerships and building capacity. How can we -- do we have the right structures in place, we just need to do more? Or do we need to have new structures and new types of partnerships? And what do those look like?

And, you know, I get -- partnership, the word partnership makes me a little twitchy.

Because it means different things to everybody. And I just know that if we did what we thought were partnerships, half of everybody would think that wasn't partnership.

And so, I think the -- like getting into the level of detail of how, or even just some examples of what success looks like, I think would be very helpful. So, that's my thoughts to sort of kick this off. And back to you, Julie.

CO-CHAIR THOMAS: Okay. Great. Thank you, Shep. Lindsay, why don't you give us an overview of the paper as it stands now.

MEMBER GEE: Yes, okay. So, let me -- I guess with those comments from Shep we're kind of trying to address some of that, I think. But not well in other places.

And so, there were a number of points that were outlined. And then I think we need to -- you know, there's more to add on to that right now.

One of the things is like supporting the mapping is the foundation of all the

eventual, you know, exploration and characterization is pretty clear.

And I think there was discussion yesterday in trying to define -- to make sure that we define any implementation, what that is, the different types of parameters that we might want to be observing from the bathymetry backscatter through sub-bottom, other oceanographic, we'll call them parameters.

That's something -- and it might not be something that's across the whole EEZ. And it may need a regional focus for different areas. Need different things. But I think it's pretty clear. We've kind of said that, you know, that is essential for forming the basis.

And how do we get there? Part of that is obviously standards folk talked about. And there is the symposium coming up. And I think again, it kind of comes back to that discussion Larry mentioned, about how we put those partnerships, or whatever we call them, in place.

But there is a mechanism for dealing

with that in a legal sense, and what, as the Admiral just mentioned. And I think that's been a key thing throughout this that is a struggle. And it's reflecting that private industry, academia, and the non-Government organizations are very keen to be involved in this.

And they want to be involved from the very beginning, and not be just providing input to be told later on when it gets developed, to be real -- have the ownership of things as they develop and go along. And I think this is that kind of all-nation kind of response, to try and do that.

So, I think that's a theme that maybe we haven't addressed in the paper. Maybe we'll get back to that in a minute, at the end, as we continue discussion. And I will ask Larry just to kind of have more comment about what he was talking about, mechanisms and that, in the end.

One of the other things that I think is -- and related to that, but I think it's worth addressing separately is, we heard from Vicki

Ferrini yesterday. And I mentioned the UNOLS vessels, and the work that's done by the UNOLS and academic research fleet, and other non-Government, I think, assets that are out there, that have provided, you know, a lot of that data into the -- into NCEI and the archives already.

But importantly I think in that is what Vicki mentioned. There was a number of programs that have been NSF funded, that are really -- address some of the issues that were there. And we should really leverage that. And that should be part of how we do it.

I mean, things like, you know, first off, getting the data out of the kind of PIs we mentioned yesterday out of their filing cabinets, and having a program to really drag them out, and a way to do that with a Rolling Deck to Repository. That's kind of important. Making sure that the data -- the ships are well calibrated, and they're going to get good data. And that was the kind of Multibeam Advisory Committee.

So, those funded efforts we should -- they're federally funded, so we should make sure of that. And that's why I think it probably should stay separate as an item in our recommendations.

One of the other areas that we talk about the data being -- we're going to be deluged with the data, and that provides great challenges that I think, again, it's really an opportunity.

And this is why I always worry about calling it a map. It's no longer a map and it hasn't been a map for a long time. And the data and systems that are now there provide the visualization and analysis, quantitative analysis really, to be able to get it to that.

But importantly, they provide it very intuitively. And that's great when you are trying to present that, not only to establish policy, to show results to those people that are funding, but also as an outreach to the public.

It's like, how do we convince all those folk in the inner part of the country that

don't have a border to the ocean, that, you know, what we're doing is -- has a benefit to them as well? And I think that's important.

So, the data that we've mentioned in there about being able to present that, using the latest systems, it's both for analysis, and getting the data -- you know, getting maximum scientific benefit from that data, but also, there's that really important key kind of outreach and -- for public and the general public, and funders, and policymakers. So, it's simply sort of simplifying that data that was difficult to do.

The other one is autonomous systems. And I agree totally with Ed. I think that was the other point. I think it's remote and autonomous systems we're seeing -- I mentioned yesterday I think a real trigger with COVID that's forced us -- like, they've been on, the research has been going. Some people have been using them. And I think that's where again private and other non-Government folk have used

it. And it's being driven by economics there, that it makes sense to do that and not have people in dangerous situations.

And you can, operating properly, save money and put -- do those operations with the nonmanned, or nonstaffed assets. But I think the COVID situation has really provided the trigger to say, yes, we can do this. And we can move forward. And it makes a lot of sense. So, hopefully we'll see that.

So that -- I think that's a summary of the points so far we've got. But I'm not sure we're addressing all of the hows. And maybe that's just a slight change in the text that we put through there in a number of those points.

But I would like to ask Larry, he raised -- since he raised it yesterday, about mechanisms that might be possible. And maybe he could kick off our brainstorming of that, if he's thought of any particular ones that he might think that, you know, from a regional, how do we coordinate and collaborate that with the non-

Government assets across all the community.

Sorry to put you, Larry, but I thought that was a good place to start. Because it could go -- it could be a longish discussion.

DR. MAYER: Yes. And I worry, I -- you know, I'm constantly thinking about it. But I have no answers. So, I worry that I'll ramble.

So I -- maybe we just start with a -- kind of a scenario where we imagine that the NOAA leadership has done a phenomenal job, and basically gotten the support from the Government from the funding perspective, in terms of what we would need to complete the NOMEC.

But the question is, how can we do it? NOAA doesn't have on its own enough assets. We're going to need to, as I said, put all hands on deck. And I keep wondering, what mechanism is there out there that you can coordinate beyond -- - that there are -- this is important, there are interagency working groups all the time. It's still very difficult. And I'm not a fed, so I only hear this by rumor. It's very difficult.

It's not impossible to commingle even funds from different agencies.

But there are things like the NOPP, the National Oceanographic Partnership Program, which doesn't truly commingle funds, but at least offers a common front for a purpose and lets different agencies contribute to that. And has what I hope is a common direction.

But I think we need to go even beyond that if we're really going to address it. Imagine a situation where, you know, just you have a huge area to survey off the east coast of the U.S., and you have whatever NOAA assets you have available.

Say, Ed Saade has a couple of assets that might be available. University of Delaware has their vessels sitting there. That might be a vessel, a small server, something that --- you know, all these things can contribute.

But how do you, you know, organize in a coordinated way provide a mechanism that would make that effort, that goes beyond federal

agencies, you know, to academia, and things like that?

You know, if you look at NASA, you know, I keep thinking, well, NASA kind of had this solved a long time ago. But NASA started as being the only player in town. So, NASA certainly has a lot of private sector involvement. NASA has lots of academic involvement, and things like that. There haven't yet been, but there will be philanthropic organizations that want to be involved.

But, you know, for all space exploration basically NASA is able to control it. And so, there's a mechanism there.

In our case though we've started all these parallel paths with federal agencies, academics, private sector, philanthropic organizations, all kind of generating their own capacity.

Now there's a desire to coordinate the activities. But that's why I was hoping, among the HSRP, with all your years of experience in

the different sectors, if anybody had some thoughts about mechanisms that could do it.

And the closest thing I can think of is NOPP. But even NOPP really doesn't have enough control to coordinate those kinds of efforts.

So let me -- I said, that was just a ramble. I haven't really thought much about a response. I was hoping that we can throw this out on the floor, and maybe Ed and Fugro, or Qassim and his experience, somebody who's seen some example of where, from a national need perspective -- and there's a national need here -- a mechanism evolved where you can really, really coordinate multisector activity.

CO-CHAIR THOMAS: Thanks, Larry. You know, why don't we go to Qassim right now. He added a lot of good comments in the document last night. And do you want to take it, Qassim?

MEMBER ABDULLAH: Yes. Thank you, Julie. I'm glad the Admiral really brought that to our attention. I agree. And we've been kind

of emphasizing the issue of -- the importance of the partnership, public, academia, and private.

The mechanism, how to do it -- you know, I was involved in a couple of national efforts, like the development of the ASPRS, mapping the -- the new one, digital. That's the only one I can mention yesterday.

That was a collection between, you know, different -- between Government and private. We came together. We put our act together. And we worked on it for three years, believe it or not. And we achieved it, and with a good success.

So, to answer that question on how, the way I envision it is to have a task force, you know, with the leadership of NOAA, and whoever they want on it from NOAA side.

And I have members of the Interagency Working Group, the IWG, for example. It doesn't have to be all Government. The important ones are going to be the Corps of Engineers, JALBTCX, and USGS. And maybe other member. But those two

need to be on the table definitely.

We need manufacturer. You know, we cannot really decide what technology when we tackle this elephant without having the manufacturer input. Because they can advise us on what can be done, and what cannot be done, and what is coming around the corner with technology.

So, I suggest to invite two manufacturer from whatever -- see the manufacturer Optech. Could be other, you know, RIEGL, or Leica, or whatever. We need two of them to sit on the table with us during that discussion.

We need data producer. Two, minimum two definitely. You know, like we have a good example, I mean, whoever doing these surveys, Fugro, Woolpert, other company, whoever. Bring two of them, the most sophisticated company. And doing acoustic, you know, sonar, and bathy, to sit on the table.

And I would have definitely academia, two or so, like -- so two research institutes or

two schools to sit with us. And we'll have software, data processing development, and management, you know. That's important, you know. Because not only processing the data. How are we going to handle this data? How are we going to serve it? Now we are going on the cloud.

So, if we form a task force on a voluntary base --- I mean, we're not going to pay anybody. This is all volunteer. I know it is hard to, you know, to steer that herd.

But I think with NOAA experience now, and people will love to have -- it's prestigious to be on NOAA's team, you know. So, believe it or not, if you think it is hard, people will rush us -- particularly from the private industry -- to serve NOAA, and NOAA causes.

And I bring example of with NGS. I mean, I still attribute that success of the transition to the new datum and Juliana team. They started seven, eight years ago. They do the industry workshop.

They invited us -- all of us to sit there, you know. And for two days, or whatever, you know, where we discuss the software development company, Trimble, their Esri, their -- all of them, you know. And the data provide a surveyor. We all put our act together. And we share our vision with NGS, how we want to see it.

And so, that was -- everybody felt ownership. That's why there's no criticism, like I mentioned to Juliana yesterday. She should not feel bad about we cannot reach the goal in 2022, for example. Those things happen. We have a bigger plan. We're marching towards it.

And that's how I see, I think this important thing, to be launched that way. Task force represented of all the stakeholders. And we can apply that. That's my suggestion, Julie.

CO-CHAIR THOMAS: So, Ed Kelly.

MEMBER KELLY: Yes. Qassim, I agree with everything you're saying. And flipping back to what the Admiral had requested, I would posit that NOAA already has access to an existing

structured network that reaches out and works with public and private organizations, including academia.

In fact, perhaps almost too much academia.

And I would say that that's through the IOOS network. We have regional associations. And I know several of us even here on this Panel are senior members of those regional associations.

I'm a Vice Chair of the Mid-Atlantic. I know Julie is very involved. I know Ed Page is up in Alaska. A lot of us are active in that. And that's an opportunity.

The IOOS Regional Associations incorporate academia as well as industry -- private industry that comes to us. And the goals there are very similar toward --- leading toward a NOMEC or other situation.

The win-win capability for this is that that is already established and funded. And it is voluntarily being worked on by academia and

private interests.

To pull in more active involvement in the RAs for IOOS, if -- I would put forth that if NOAA were to structure and appoint IOOS and the RAs as these network coordinators that we're looking for, that would help to pull in more private industry and all academia, because no one would want to be left out of the formulation of this type of work.

The structure exists. It's already paid for. It's active. And it's functioning. Why not use it? I have a very personal thing on this.

I think NOAA has grossly underutilized the capacity and the talent that exists in this national IOOS network, including exactly what we're looking for, the inclusion of private industry and academia to work on establishing standards.

And through the IOOS organization these tasks could be broken up among the various regions for either specialty pursuits, or for

things that are unique to certain regions.

So, you know, we're looking for ways to gather information, structure it, and reach out to the private and academic side. And it already exists. It's just not being adequately used.

CO-CHAIR THOMAS: Thanks, Ed, for bringing that up. Yes. There's also -- I use the Joint Institutes. We actually work a lot with industry on fed contracts at Scripps. So, I think that there are some mechanisms here.

But let's go ahead. I wanted to call on Ed Saade too. Because Ed Saade, along with Lindsay and Qassim, has done a lot of work on this NOMEC paper. So, Ed, do you want to give us your comments here too before we get too much further?

CHAIR SAADE: Sure. Thanks. Thanks a lot, Julie. So, following out on Ed Kelly's response to Shep's request. It's an endless string of examples of successful public-private partnerships already.

He already mentioned IOOS. I think we do a terrible job of broadcasting the transfer of technology aspect of everything that we do, all the types of things that can be brought to the table, between NOAA and its partners in the Federal Government, that will ultimately make it into industry, and literally bring in hundreds of millions of dollars of activity, because NOAA took the time and the effort to develop these things properly and accurately, and be able to then turn them loose, and let creative people go find ways to make money with them.

I think Seabed 2030, and now Decade of the Ocean, is another example. There's all different parts of U.S. industries and Government activity that's already coordinating with Seabed 2030. And that's all about partnerships. And at its core it's what is needed.

What could be more of a partnership if people are looking for free data from industry and others? And they'll be spending money on the data as well. The ability to -- for NOAA to have

giant databases that we can all contribute data to, that's an ongoing successful partnership.

The partnership with --- between industry and UNH, and other universities. I look at HSRP as a partnership, personally.

And then the other example is NOAA's ability to advocate for autonomous vehicles, for instance. And really encouraging the contractors to bring out new technology related to uncrewed surface vehicles, and other uncrewed items that are going to be rolling out.

When NOAA takes the time to advocate for that, and encourage the industry to bring those to the table, by definition that's a partnership. Because it's new technology. It's new capability to have the potential for a profound impact on the future of the way we do things. And everybody wins.

And I would say, don't stop there. There's all kinds of other autonomous systems out there that NOAA can in particular say, you know, bring it on.

We -- our company bid on a job up in Canada that was -- actually stated, this will only be done with an autonomous system, with an uncrewed system. I mean, you can go -- the ability to demand that now is acceptable.

So, we can push the limits of that, which by definition again increases the whole private sector into really racing out to do things.

And going back to Qassim's point about bringing the instrument manufacturers right to the table and getting them involved up front, I think that's a really important point.

Because they're dying to know where industry's going, where Government's going. Where is the need? Where are the data density needs? Where is the accuracy needs? What's more important, data collection time, or resolution?

They don't -- they're just guessing, unless they're getting really good quality input from the Government agencies like NOAA, or from industry. Does that help?

CO-CHAIR THOMAS: Yes, thanks, Ed. Okay, so I can tell a few of you have requests in the chat, so Dave Maune and then Anuj. So, Dave, let's go with you first. Are you on mute?

MEMBER MAUNE: Can you hear me now?

CO-CHAIR THOMAS: Yes.

MEMBER MAUNE: Okay. I have a couple of the lessons learned from how USGS does cost sharing with other people. In 2012, USGS did the National Enhanced Elevation Assessment. It was an assessment from federal and state agencies and private industry around the United States. They collected 602 mission-critical activities and got these various customers to identify what their uses and benefits were from topographic data in various quality levels.

That led to the USGS' 3D Elevation Program to collect Lidar nationwide in the United States. But USGS doesn't have enough money to pay for that. So what they have is a BAA process in which different clients say here is a project that we need to collect the Lidar data of our

state, our project areas. And if you pay 50 percent, we'll pay the other 50 percent of it.

And so USGS awards a lot of contracts, and they basically double their capabilities in many areas by soliciting cross-sharing from other people.

Now, that NEEA study from USGS is followed by NOAA's ongoing 3D Nation Elevation Requirements and Benefits Study. In that 3D Nation study, we are looking not just at inland topography, but we're looking at inland bathymetry, near-shore bathymetry, and off-shore bathymetry.

And we have over 1,000 mission-critical activities in which different people say if I get such and such bathy data, I will realize so many million dollars in benefits. And then NOAA will do a benefit cost analysis to determine what implementation scenario will provide the highest return on investment.

And that is another vehicle that if you can demonstrate a good return on investment,

you can get other people to contribute funds to that. But NOAA has to have a way to accept funds like USGS does. I don't know if NOAA has that mechanism or not. But USGS has a mechanism for collecting funds from others who are willing to donate to the KITTI.

And then lastly, you know that we just finished mapping of Alaska. We had an Alaska mapping roundtable in Washington, D.C. in which the Office of Management and Budget and 22 federal agencies were collected. And we gave briefings to them on the importance of IFSAR mapping of Alaska. And we got priorities from OMB, and different Senators and Congressmen, and different --- and 20-something federal agencies, to give priority to the mapping of Alaska.

When all is said and done, the IFSAR mapping of Alaska was just completed, and USGS paid 54 percent, and these other people paid 46 percent of it. So the USGS has some mechanism for getting other people to contribute funding so that USGS executes a program that benefits a lot

of people other than USGS.

So those are the main points I wanted to make to see if NOAA has a mechanism for accepting funds from other people.

CO-CHAIR THOMAS: Okay, thanks, Dave. And I know it's all about the color of the money coming out of appropriations. But there are ways that I think we can brainstorm and put some comments into this paper.

Anuj, why don't you go ahead. And then we'll actually go around all of the members. I think we have time. If we don't finish, then we'll finish up after public comment in the next session. But, Anuj, go ahead.

MEMBER CHOPRA: Thank you so much. Thank you, Julie. So my thought was that the NOMEC strategy is a step change in our space. It's impacting the full maritime domain. It's not just in isolation. It covers right across. And as mentioned, it's interagency, and at the same time, we want NOAA to lead it.

So in that space, how do we get the

public-private word out? My only involvement in that was when MTSA came out. And there were so many town halls which were held. You know, there was a reach-out to industry associations, stakeholders, educational institutions, which made a huge amount of difference where that embracing happened.

Today, we have so much happening on the outer continental shelf. All these stakeholders have a dollar stake in this. So they would comment, other agencies would comment.

On the technology side, I would say there are organic and inorganic ways. Organic is already in that space. They can do innovation. But I believe it's worth looking at inorganic space like incubators. We have technology incubators out there where there is opportunity in that space.

Just as an example, where modeling is concerned, using big data and --- which has been used, there are some new strategies available. And some educational institutions are doing some

amazing work in it. So I think there's some exploring there.

I would like to second the idea of Qassim when he mentioned that there needs to be a task force which has got an independent structure, as this is very important for our nation going forward, how these assets are used. So we need that structure with resources as an independent task force to take this forward. That's what I have to say. Thank you.

CO-CHAIR THOMAS: Thanks, Anuj. Okay, these are great comments. And I'm hoping that they are helpful to Admiral Smith and his team.

Let's just go around one by one and take a minute here, and hit everyone. Ed Saade, do you have anything else to comment on this right now?

CHAIR SAADE: No, I'm fine. And I do want to thank everybody for picking this up and running with it. The input from the rest of the team, and the broadness of the ideas was really great, and I appreciate it. Good job.

CO-CHAIR THOMAS: Okay. Qassim?

MEMBER ABDULLAH: Fine, thank you, Julie. I would like to thank Ed on his leadership again on the drafting of the first draft, and what everybody recommended and enrich that document to make it much better. Thank you.

CO-CHAIR THOMAS: Right. So the idea is, we are not actually going to probably edit this document right now. What we're going to do is collect ideas and get some key suggestions down, and then we will be sending this out.

And hopefully, we were going to turn this around within the next few weeks so that it's really useful with the timing. But let's, okay, let's continue. Anuj, do you have anything further?

MEMBER CHOPRA: No, thank you so much. Thank you.

CO-CHAIR THOMAS: Sean?

MEMBER DUFFY: Nothing to add technically, Julia. I would like to come back to a point that was made yesterday. It's great news

to see these efforts included and generated through a presidential directive. And as we move forward, that's critical. We've got to strike while the iron's hot a lot of times. Thank you.

CO-CHAIR THOMAS: Great. Thank you. Nicole? You're probably on mute.

MEMBER ELKO: There we go. Yes, so I was just jotting down some notes kind of about process to try to try to address the how question. And I don't know how deep we want to go into that, but I think a lot of good suggestions were made.

You know, it almost sounded like, do we put out a call to sort of do another project? But then in the past, we just sort of pull in existing data and, you know, populate a database. Or do we sort of go out and collect all new data?

And there's probably a nice process that could start out with an interagency task force and flow through some regional teams that could then, you know, go through that process of using the data standards, put out a call, and see

where the gaps are, and then work together to develop scopes of work, you know, federal agency X can do this, Y can do this. We need to contract that one out.

So I don't know how deep Admiral Smith wants us to go into a process like that, but I'd be happy to help draft something if desired.

CO-CHAIR THOMAS: I think my feeling is that the more we can actually go into the weeds with this, as far as these suggestions, and get them down in writing also, but it's great to have them in the public comment here, that that will be helpful. But we'll get to him at the end here. Let's go around the Panel

Okay. Thanks, Nicole. Lindsay, anything further right now?

MEMBER GEE: No. I think those comments and where we're at with the paper, and Dave, well, everybody that contributed to the Alaska paper, we've got a lot of work to do, I think, in a short time to make sure we can get something useful into this, into the

recommendations for implementation and strategy, so lots of work to do. But, you know, I don't have any more to add right now.

CO-CHAIR THOMAS: Okay. Ed Kelly, I know you've spoken up about IOOS. Now do you have further comments?

MEMBER KELLY: No, I'm good, Julie. But I do think that IOOS is an existing structure that needs to be more utilized than it is right now.

CO-CHAIR THOMAS: Right. They definitely do have the mechanism for these private/public partnerships. Ann?

MEMBER KINNER: Yes, this is something I sent out in an email a couple of weeks ago when we were talking about this before. Because we've got, in the NOMEC document we've got five goals with metrics. And it's like building a building. How do you start?

Well, the first thing you do is, and this is the way I put it, start with designation of a project manager and delineation of specific

actions for each of the five NOMEC goals.

That project manager then takes the responsibility for pulling in IOOS, pulling in whatever agencies and so on, and beginning to generate a list of steps to be followed to eat the elephant.

You've got to start somewhere, and you can talk all day long about how many agencies there are. But somebody has to actually start and say, okay, this is a list, this is what they can do, this is what their resources can provide. This will duplicate if those guys do that.

And that has to start with some single entity. As I say, call it a project manager or whatever, but you have to take that first step. We know the agencies are out there, we know that the resources are out there. Somebody needs to begin to make a list.

CO-CHAIR THOMAS: Okay, good point. And Dave Maune, anything further here?

MEMBER MAUNE: Okay. Whether or not it goes in the NOMEC paper, I would like to know

from NOAA, hey, if they have a mechanism for accepting cost-sharing funds from other people. Because I think we're going to need to find alternative ways to come up with the additional money. And USGS has found a way to do it, and I hope that NOAA can find a way to do it as well.

CO-CHAIR THOMAS: Okay. We'll let our NOAA folks comment on that in a minute. Anne McIntyre? I think you're on mute. Are you there?

Okay, how about Ed Page? We'll come back to Anne.

MEMBER PAGE: I agree with Ed Kelly's comments about IOOS and capabilities. We've demonstrated it up here around the country as far as force multiplier, leveraging resources, getting things done with less money, amortizing costs, all of those things.

And I've known several public-private partnerships. The VTS and LA-Long Beach was an establishment of the state Coast Guard and the maritime industry. I have the same thing up here

in Alaska.

So, you know, you're providing services that benefit a lot of the stakeholders, the maritime industry, but other parties. And I think when you leverage and get other people onboard they're all seeing a need for the information and willing to throw in and contribute to a successful outcome.

So I think this whole idea of public-private partnership is right. It gets a lot of attention these days. It's recognized that government can't do it all, but it's okay to borrow the maritime industry.

I think you can get that word out to request for information to Dennis Bryant's newsletter, to the other maritime logs, as far as the challenge that NOAA has and inviting the maritime industry, work with them and find the best solution. So a lot of good information, and I think it's a huge task. But I also think it's doable.

And part of it ought to, I think we

talked just briefly about now the Coast Guard's partnering with NOAA to facilitate PORTS dissemination as an example of partnership between agencies that has really leveraged NOAA's need to get things done through using Coast Guard resources.

So again, I think it's doable. I'm not disheartened by the enormity of the task. Thank you.

CO-CHAIR THOMAS: Great. Thanks, Ed. Sal, what are your thoughts?

MEMBER RASSELLO: Yes. I think that another important stakeholder in supporting of these projects could the Department of Energy, and specifically the Office of Energy Efficiency. You know, in mapping the ocean, they make charts of the floor, or the water column, or also the elements, the way that the currents, the waves can produce energy.

And therefore, I think they could be important stakeholders in the project in supporting the blue economy which eventually will

improve the economy and preserve the ocean at the same time.

CO-CHAIR THOMAS: Okay, thanks. Good thoughts. Gary?

MEMBER THOMPSON: All my points have been covered, so no additional comments.

CO-CHAIR THOMAS: Okay, thank you. Let's see, we'll go to Andy.

CAPT ARMSTRONG: Yes. Thanks, Julie. So this is sort of an odd comment, but Bullet Number 4 says the majority of deep water mapping coverage in the U.S. EEZ comes from academic organizations. That may be true, but that doesn't strike me as something that's actually documented.

And I would, you know, either -- I'd suggest that we confirm that or take a look at rewording that if we're not sure of it. Because that's a big bullet. And if it turns out it's not right, I think we might be a little embarrassed.

CO-CHAIR THOMAS: Okay. Thanks for

bringing that up. We can follow-up on that one. Anything else you have?

CAPT ARMSTRONG: No. No, I think the thrust of the paper is great. I think we do have some work to do on organization and wordsmithing to get everybody together. But all in all, I think it's certainly on the right track.

CO-CHAIR THOMAS: All right. Larry?

DR. MAYER: Yes. I'm glad Andy brought up that point about the academic line. I thought it was strange in a sense. And I don't know if it's true or not. It may be true, but I suspect it may not be particularly in the U.S. EEZ. I think there, you know, a lot of the academic mapping went beyond the EEZ. So I think we have to be careful about that.

And I'm not sure that, as a separate point, really adds to the document. You know, I think we talk about the need for collaboration and cooperation, but recognizing that point is going to emphasize the need for collaboration and cooperation. I don't think having that as a

separate bullet is an appropriate thing. But again, that's in the weeds, in the details. I'm very happy.

CO-CHAIR THOMAS: That's okay. I want to address that right now. Because actually, between Qassim and Lindsay it's now combined with Number 3. You say comment and sense, it was sent out. And I don't know, Lindsay, do you want to make a comment on that particular input?

MEMBER GEE: No. Yeah, I think it is something we can check there. And we should be able to that pretty easily, I think, for the number of ship tracks probably within the -- and I'm not sure that that number hasn't been calculated for the kind of EEZ deep water mapping to work out what that percentage is.

But yeah, maybe that's just an example that we could include inputs on. I think it's going back either way. We've had the discussion that it's sometimes part of that partnership sometimes, isn't it? I thought it was better being separate, but maybe not.

It was more to demonstrate, I think, the programs that have been federally funded that supported the approaches to say there's been a lot of work there that should be leveraged in this program. So whether it's an example or not, I think it's important to highlight it either way.

DR. MAYER: I agree.

CO-CHAIR THOMAS: Right. And maybe we could just reword it, like you said, where there's a lot of work that we should leverage here rather than making a definite statement that they really collected more data. So we might reword that a little bit.

Let's go to Rich Edwing.

MR. EDWING: I really have nothing to add. It looks great to me.

CO-CHAIR THOMAS: Okay. Thank you. Juliana?

MS. BLACKWELL: I think Dave brought up a great point about the Department of Interior's geospatial products and services

contract. I just want to, I think that does definitely deserve us looking into, to determine if there are opportunities to utilize something like that if it's through Department of Interior or through our acquisitions and grants office.

I will just also mention that, you know, different departments have different authorities and protocols. So I think we should look at it both ways. And I'm sure that there's a lot more details that we have behind the scenes that we can pull out and see about opportunity. So thanks, Dave, for bringing that up.

CO-CHAIR THOMAS: Okay. And before I go further, I think Andy has another comment.

CAPT ARMSTRONG: Well, I just wanted to add that NOAA does have authority to accept money from outside organizations, to accept funds. You know, it all has to get legal and administrative scrutiny, but the basic underlying authority is there.

CO-CHAIR THOMAS: Great. Nice to know. Okay. Let's go to Shep.

CHAIR SAADE: Sure. Let me just say, Shep, we only have about three minutes.

RDML SMITH: Okay. I'll make it quick. And I won't try to comment on everything. There was a lot of great stuff out there. But Andy covered and Juliana covered our authority, as they said. We have the underlying authority. And in fact, in my intro brief, I gave those examples of us using other federal money for mapping.

I wanted, just a couple of thoughts, one is the idea of a task force. If we talk to our lawyers about it, say that we want to start a task force, they're going to say you need to start a federal advisory committee.

So I think what you're recommending is that we form a different federal advisory committee to advise NOAA on ocean mapping or that we have a federal advisory committee that sits above the agency level. But those are pretty tough.

So anyway, I think it's an interesting

suggestion. We do have some, you know, we do have some authorities like that. But I'm trying to figure out how it's different than what we already have in this structure for engaging with all of the outside sectors.

CO-CHAIR THOMAS: Shep? Could I just interrupt for a second.

RDML SMITH: Yes.

CO-CHAIR THOMAS: We're going to come back to this discussion, so we don't need ---

RDML SMITH: Okay.

CO-CHAIR THOMAS: -- like, we're going to wrap it up right now. We could start with you when we come back to it after our next --

RDML SMITH: Okay.

CO-CHAIR THOMAS: -- if you'd like.

RDML SMITH: Okay. I think that's great. I think it's important to have an opportunity for the public comments as well.

CO-CHAIR THOMAS: I do too. So why don't we go back over to Ed now. Because I really want to hear some of your feedback and

comments. And then I have a couple of comments too. So let's break right here on this discussion with NOMEC and turn it back over to you, Ed.

CHAIR SAADE: Okay. Thanks a lot, Julie, that was a great job and obviously a lot more really meaningful dialogue and ideas that came in.

So I'll kind of do a double hand-off here and hand it back to Shep, as he's going to take the lead on moderating today's public comment period. So, Shep, I'm not sure if you want to say anything in the one minute you have before we open up the line?

RDML SMITH: No. I just, for those that are joining us today that were not here yesterday, we had a very full public comment period yesterday. We had a dozen or so written comments that I summarized. And then we invited a few folks to give a short summary of their own comments, a couple of minutes apiece. And that worked out pretty well.

We'd like to do the same thing today. I think we have about six comments that have come in. And I think we will have an opportunity, there's one of them that the commenter will not be able to speak to. And I agreed to read the comment into the record. But otherwise, I think we will just recognize all of them to make their own points.

So without further ado, first on the list is Rada Khadijinova from Fugro in Anchorage, Alaska. Rada, are you on the line?

MS. KHADIJINOVA: Yes, I am.

RDML SMITH: Hi, welcome.

MS. KHADIJINOVA: Yes, thank you. And a big shout-out to two Eds on the Panel, Ed Saade, my boss, and Ed Page, my Alaska associate. And it's great to see many familiar faces that I met in Juneau just a couple of years ago.

My comment is twofold. Fugro's been performing project work in Alaska since the '70s, and we know firsthand the geospatial data deficiencies that exist in our state,

particularly on the coast where activities of public, commercial, recreational, and indigenous users intersect.

That's why Fugro's been advocating for creation of an Alaska coastal mapping program for the last eight years. And we are encouraged to see the great progress since the issuance of the presidential memorandum last November and the good work HSRP has been doing in refining the implementation of the Alaska coastal mapping program.

So my comment is on the original Alaska coastal mapping program that initially is focusing on the areas that can be mapped only with airborne and satellite technologies. And this is a great first step in the right direction.

But areas where airborne and satellite methods are unfeasible or inefficient due to water clarity, shallow water acoustic sensors, of course, would have to be used. And this type of work mirrors NOAA's OCS hydrographic surveys and

could amount to two-thirds of the state, by the current predictions.

So since the Alaska Coastal Mapping Strategy does not yet account for these big chunks of coastline, which exactly fall under the national mapping strategy, there is a danger that this effort could end up being managed by two separate mapping programs.

So from our perspective, that is not the most efficient approach. And certainly the clarity of water can change spatially and temporally, so it's difficult to predict where these remote sensing technologies would work as intended.

So we believe that highly integrated and flexible approach that combines both remote sensing and the shallow water bathymetric sensing technologies is the most efficient and cost effective program rather than two separately executed programs.

And I had an opportunity this morning to see a preview of the HSRP's recommendations.

So they are quite along the same lines as this comment.

And the second, I echo, the second point is the integration of private sector, particularly during the development of the implementation strategy and particularly contributions in the cutting-edge proven technology.

Certainly Fugro is already mapping coastlines around the state. And we have developed and are using project cutting edge technologies in the realm of communication centers, platforms, processing, and so forth, so fully leveraging these innovations and these resources.

We also believe we are engaged and involved during the formulation of the implementation plan and not just during the comments on the plan. So thank you for the opportunity.

RDML SMITH: I was still unmuted. Thank you, Rada, for your great comments, and

also thank you for calling out our Eds. We're very proud of all of our Eds on the HSRP. And occasionally we get asked, you know, how many Eds is enough? And we haven't discovered that limit yet.

(Laughter.)

RDML SMITH: So thank you for your comments. Next, we have Irv Leveson, a consultant and economist. Irv, are you there?

MR. LEVESON: I'm here.

RDML SMITH: Welcome, Irv, and go right ahead.

MR. LEVESON: Okay. Several points, and I submitted written comments earlier. And I just typed in some more, so you have a record of it.

One point I want to make is that everybody agrees that NOAA's strength is the long view. But there's always a concern about funding. And we may be as little as six months away from a national infrastructure bill.

And I think there's additional work

that needs to be done to make clear how the early phases of such a program could be defined and how they might fit into such a bill in order to move quickly on the funding. So that's one major issue.

Now, one thing I suggest is that, and it may not be the only way to do it, is to have a kind of a plan to make plan that fits in between these documents and a detailed plan.

The second point is I emphasize the importance of fixing the responsibilities, and that was covered very well so far today.

Then I wanted to emphasize the fact that any work in the early phases, and it could be done through an accelerated funding mechanism, could be sold as bringing the long term benefits to the environment closer in time so that, for those who think the emphasis should be on long-term benefits, rather than more immediate or practical ones at the moment, they can be seen as something that helps what they want to do as well.

Then in terms of technology, I think the point was rightly made that most of the learning about what's coming down the line will come from industry. But there also are agencies and other governments that have similar issues, even though we may have the critical mass and be farther along in many respects.

And we have a lot of mechanisms for interaction, so I'd like to see that explicitly mentioned that we can use those mechanisms to try and learn what they know about what technologies are coming or what works currently. That's it.

RDML SMITH: All right, thank you. I appreciate you taking the time to put together such thoughtful comments. And I also appreciate your really well thought through written comments which we will incorporate into the public record. So thank you very much.

Next is Alice Doyle, the deputy executive secretary from UNOLS. Alice, are you there?

MS. DOYLE: I am here. Can you hear

me?

RDML SMITH: Loud and clear. Go right ahead.

MS. DOYLE: First, it's been super interesting to listen and hear. And I appreciate being able to do that. And thank you for allowing me to comment here. As you mentioned, I'm Alice Doyle. And I work with the UNOLS office. And we are an organization which helps facilitate the U.S. academic research fleet.

We wanted to point out some of these comments, I think, have been made, so I'm kind of pressing the point again. But the U.S. government agencies have invested significant funding into the fleet's instrumentation and technical support, making them very capable for mapping and characterization.

Additionally, as Vicki pointed out yesterday, there have been further initiatives specific to data management and data quality. These initiatives, like R2R and MAC, have significantly increased the quality and the

quantity of data that has gone into the national data repositories.

And the fleet is managed within a proven framework, right. We manage fleet-wide all of these vessels, everything is put onto the table. And so I could see where there could be some integrations here with this initiative.

And it has been pointed out, the implementation of this sort of initiative is going to take significant coordination. And we hope to work with those involved to find the synergies where our fleet can help.

This could be on the data side with, and we plan to participate with the SOMP. And then also, even on the mapping and characterization side, little things like moving our tracklines if we're going to a certain area, helping and finding areas where we can fill in, or also with taking advantage if one of our vessels is in a certain area.

So thanks again, and feel free to reach out if there are any questions.

RDML SMITH: All right, thank you very much, Alice, appreciate it. And I'm so glad that you all are so plugged in to, you know, both the NOMEC council but also the SOMP which is, it's just a really important near-term effort to start to get some of that standardization done. So thank you, and thank you for your comments today, and for participating.

Next up we have Kyle Goodrich, president and founder of TCarta Marine, LLC. Go ahead, Kyle.

MR. GOODRICH: Hello, can you hear me, Admiral?

RDML SMITH: Loud and clear.

MR. GOODRICH: Is my mic on? Okay. Thank you very much for the opportunity to read our comments. And I really appreciated listening on the discussion yesterday and today. And I know you, but for those who I have not met, I am president and founder of TCarta.

And TCarta Marine is a 15-person small business based in Denver, Colorado, specializing

in marine remote sensing and satellite-derived bathymetry, and awardee of a Phase II National Science Foundation Small Business Innovation Research grant, and are seen as global innovators in the satellite-derived bathymetry field.

We're a woman-owned small business, HUBZone certified, and on several U.S. government IDIQ geoservices contracts as a subcontractor. Yet we somehow still have an utter struggle with working with the U.S. government at times.

And at times we've had an easier time working with the British and international governments, not necessarily due to the contractual vehicles but largely due to the U.S. government's less-than-pragmatic approach when it comes to utilization of our satellite-based technologies and often relegating our products to a research product or the bottom of the priority pile.

And so from TCarta's experience, the messaging and partnering with small businesses and fostering industry partnerships is stated at

this very high level, but we're not necessarily seeing it at the ground level where we're trying to push our innovative technologies through to a capability.

TCarta invested considerably in the technology development, and building business relationships with bioimagery suppliers, and countless hours fording into U.S. government agencies with these nascent technologies as a small business over the past five years.

We have made a lot of inroads and gained technical approval at NOAA, and NGA, and the U.S. Navy, and on many levels we see and hear of a tremendous need for our products and utilization of our capabilities.

Yet in each of these cases, we encounter obstacles that often take months or even years to overcome, including lack of access to these entities, government entities who will not engage with TCarta, or point to other agencies as the true gatekeepers of this technology to unlock the commercial potential.

Now, since 2008, I'm sorry, 2018, the National Science Foundation has awarded TCarta nearly a million dollars in grant funding to pursue these hydrographic technologies. We've had international governments and hydrographic organizations take up these technologies to use them in their charting operations.

The whole while we're waiting on these various U.S. agencies to evaluate our data and work through the legacy in-house technologies or perspectives on these technologies.

And meanwhile, the commercial high resolution satellite industry providers, which are vital to the success of this technology, are the last to continue to support this satellite bathymetry, if the U.S. government continues to be slow in adopting this technology and seeing that larger need of using satellites to map the sea floor.

We've developed a proven workload in past experience as required to do this work at scale, and we can contribute to the national

bathymetric surveying effort and complete vast areas of essential coverage.

There's no COVID in space, so we're fully operational, and satellites are still collecting imagery. And so TCarta can contribute significantly to the national bathymetry mapping effort while other technologies are idle.

And I'm sitting here right in front of the NOAA nautical chart that has satellite bathymetry published on it in 2012. And the map has been a target in the eyes of TCarta to, you know, to be a supplier for satellite derived imagery for NOAA's operations.

And by the way, I had pictured this having data on the map should provide the pathway for commercial entities to follow those specifications and regulations to provide this technology to help NOAA.

So the technology of satellite derived bathymetry has evolved by several orders of magnitude since 2012. And yet NOAA's acceptance and implementation of the technology from

commercial providers has not progressed.

And so from our view, in order to foster small business relationships, government has to work faster to meet the pace of the technology that small businesses are developing and the operational cadence of small businesses that, by our nature, we have to be nimble and quick to deliver a final product for a client.

And government researchers should be focused on how to work with these solutions, not to prevent them through indecision and inaction. Those are my comments, and thank you very much for your time.

RDML SMITH: Thank you, Kyle. I appreciate you joining us. And thanks for your comments and for the written version as well.

So next, we have Jessica Podoski from the Army Corps of Engineers. Go ahead, Jessica.

MS. PODOSKI: Hello, thanks for the opportunity to comment. Aloha, this is Jessica Podoski from the U.S. Army Corps of Engineers, Honolulu District. I'm sorry that we're not

hosting you here in Honolulu, but hope to see you all here next year.

RDML SMITH: As are we.

MS. PODOSKI: I wanted to bring --

(Laughter.)

MS. PODOSKI: I wanted to bring to the Panel's attention a specific data collection need in the U.S. Territory of American Samoa. Bathymetry data has recently been collected by NOAA in other U.S. territories in Guam and CNMI. And we're very much looking forward to getting that information. But none has been collected in American Samoa.

This is a need for many reasons, one of which is that subsidence from recent earthquakes has caused the island to experience extreme sea level rise, many times the global average. And we think that this is causing increased coastal inundation.

So bathymetry data such as lidar, airborne lidar, specifically would work well here because of the clear water and shallow waters.

And it would help to evaluate that sea level rise vulnerability that they're experiencing.

And this is a heavy lift in terms of logistics and cost. But perhaps this is an opportunity for the Corps of Engineer and NOAA to collaborate on that cost or implementation.

Thanks for the opportunity to comment.

RDML SMITH: Thank you, Jessica. It sounds like a big problem. And I will be sure that our operations folks become aware of that requirement and get in touch with you. Thank you, Jessica.

MS. PODOSKI: Thank you.

RDML SMITH: Next, also from Hawaii, is Joyce Miller. Go ahead, Joyce.

MS. MERSFELDER-LEWIS: Joyce, you're muted.

RDML SMITH: Yes, Joyce, you're still muted.

DR. MILLER: Okay, is that good? Hello?

RDML SMITH: Loud and clear, Joyce.

Go ahead.

DR. MILLER: Okay. Yes, also from Hawaii, Island of Oahu. I kind of feel like the corporate memory --

(Audio interference.)

MS. MERSFELDER-LEWIS: Joyce, you're muted again.

DR. MILLER: Okay. I kind of feel like the corporate memory here, having been involved with IOCM since 2002, and with the HSRP starting in, I think, 2011, I believe. At any rate, one comment was that the HSRP, I believe, in one of our letters about five or six years ago, asked about interagency funding. And if indeed action has been taken on that, that's very good news.

Secondly, my first comment was I sent in two documents dating back to 2011 and 2012. And some of the Panel members said they could find no records of mapping standards. I sent the documents to Lynne Mersfelder-Lewis. They are titled NOAA IOCM Seafloor Mapping Standards 2.0.

And those are on the internet.

And I also sent in Use of External Source Data for Nautical Charting Policy, Version 4. I pulled it off my computer, basically, from that time period. So please don't reinvent those wheels, particularly for deep water mapping where technology really has not changed much recently. We've been following those standards for years.

And the third comment is on the statement about academia funding research. At least here in the Pacific, in the last decade, most of the funding for mapping, inside the U.S. EEZ as well as outside, has come from private organizations such the Schmidt Ocean Institute and others. There's been several, particularly in the northwest Hawaiian Islands.

Schmidt, using the Falkor, provided millions of dollars worth of funding to map up in the northwestern Hawaiian Islands, 70 days of free ship time about four years ago.

So that, and the other major chunk has come through UNH from the Department of State for

the extended coastal mapping. So the statement about academic funding inside the U.S. EEZ, I would agree, is probably not accurate.

And I'll be sending in comments once I've read the draft paper on the comments about NOMEC. I'll send comments to Lynne. Thank you.

RDML SMITH: Thank you, Joyce, appreciate your comments. Next up, we have Guy Noll. Go ahead, Guy.

MR. NOLL: Hi, thank you for allowing me to speak about the Geospatial Data Act of 2018 and the value that is inherent in leveraging that, I think, by the HSRP for this NOMEC requirement.

One example I wanted to point out to the Panel is that the GDA mandates inventory and assessment of geospatial data assets as part of an annual budget submission. And that this should address long standing issues about the evaluation of geospatial data and the associated infrastructure in each agency.

So this may be a way for the HSRP to

stress the need for the NCEI integration, for instance, but also highlight the need for sharing that information to others. And that could be a public-private partnership experience.

You know, Esri has their living atlas, there are other mechanisms as well, and academic as well as non-academic sharing should be encouraged. That's all, thank you.

RDML SMITH: Thank you, Guy, appreciate you flagging that. I think that's an important piece of the policy puzzle that we need to be putting together. And that's the first time it's been raised. So thank you.

Okay, now we have two comments from folks who are not available to read them, to make their own statements. The first is from Denis Hains, and he had two comments.

The first is, if it's not being clarified in writing in the presidential memorandum on NOMEC yet, it should be stressed and written down officially that NOAA-NOS has the lead role and the accountability for funds

distribution and the delivery of outcomes and outputs of the whole NOMEC program through U.S. federal agencies and departments.

And the second comment is that, it's important to make sure that capacity-building strategy be developed through means such as crowdsourced bathymetry and by transfer of traditional knowledge taking place with aboriginal communities of the Alaska coast and remote communities everywhere in the U.S. to mobilize and engage all and in strategic alliances.

Thank you, Denis, for raising particularly the role of the indigenous communities, but I think the larger point is even more broadly available, as we get closer to the coast, that the locals know a whole lot about the waterways that could inform our work. So I appreciate you adding those into the public record.

And the second comment is from Jeff Douglas. Jeff is the founder and CEO of

Mythos-AI, artificial intelligence. Let's see, the comment is, the founders of Mythos-AI have managed autonomous surface vehicle, ASV, programs and the self-driving car autonomy development for Uber, Lyft, and Argo-AI, which is Ford and Volkswagon.

Mythos-AI's developers apply state of the art self-driving car technology to create a robust scale of autonomous solutions for the maritime sector. At Mythos-AI, we are developing a next-generation autonomy framework we believe will revolutionize the hydrographic industry by enabling the adoption of advanced machine learning and true automation in the sector.

Our ambition is to create the first autonomy framework vertically integrated from the ground up focused on hydrography and coastal survey. We are confident that our technology will solve many of the challenges associated with the hydrographic workflow.

Our plan is to use this technology to gather and provide data more efficiently than

current technologies allow. Given this business model, the government is one of our largest customers.

As a tech startup, we find it difficult to obtain and leverage government funding in the hydrographic technologies and services space. The contracting process is burdensome and can span over several months.

We could partner with research institutions, but in that we may have to share some of our IP. It would be very helpful for tech startups developing neighboring technologies in this space to have efficient access to funding.

So thank you, Jeff. Jeff Douglas and John Houston provided that for Mythos-AI.

So I'm checking my notes here. Do we have another comment as well from ---

MS. MERSFELDER-LEWIS: Yes, Shep, you have one more comment from Eric Fischer if he wants to speak. I don't know if he does or not. Otherwise you could just summarize it. I put it

in your annotated agenda.

RDML SMITH: Okay. Eric, are you there? I don't hear anything so far.

MS. STODDARD: Just one moment.

RDML SMITH: Okay. You got him up, okay. Thank you, Jill.

Eric is on his way, I'm assured.

MS. STODDARD: I believe Eric is there. There we go.

RDML SMITH: Hi, Eric. Go ahead.

MR. FISCHER: Hey. I wasn't sure if this got touched on earlier. Would you envision some type of kind of a joint chiefs of staff kind of a scenario with organizations and leadership from the top, but also including folks like from the Navy? I think there could be value in coordinating with different military and intelligence needs that are going on at the same time?

RDML SMITH: Yeah. Well, I'll comment really quickly. Because I think we didn't cover this in very much detail. Although it's buried

in the NOMEC strategy that they're at the beginning of an inter-government, a cross-government interagency governance structure being setup.

And it does include representatives from, there's a lot of Navies it turns out, from ONR, and the sort of operational side, and then there's the more security side. And they're all represented.

And in addition, there's a coordinating function that's operating on the classified side that will coordinate these activities with the National Security needs of the nation.

MR. FISCHER: Excellent.

RDML SMITH: I'm happy to give you a little more detail if you'd like it some other time.

So I've added what I see for public comments. Thank you all for some excellent public comments. And with that, I'll turn the floor back to our Chairman, Mr. Saade.

CHAIR SAADE: Thanks, Shep. Thanks to everyone that took the time to provide public comments and get engaged. We really appreciate that. And we consider it a big success during the HSRP when there's a lot of feedback and interaction.

With that, I now am going to introduce Captain Brennan and Captain Chopra who will give us an update from the Technical Working Group activity. So if the two of you can pop up and turn on your mics, we'll hand it over to the two of you to take the lead. Thank you.

CAPT BRENNAN: Hi, good afternoon. Can everyone hear me?

MS. MERSFELDER-LEWIS: You're good.

CAPT BRENNAN: This afternoon, we're going to be talking about a billion dollar problem. And that's just a billion dollar problem as we see it in the Port of Houston-Galveston.

And so I think the panelists that you're going to hear this afternoon, and Maria

will explain that very well, and I'm excited for you all to hear what she has to say. I've had a chance to preview that, and I think you'll find it very interesting.

I know NOAA stands by to assist in this situation, not just in the Port of Houston-Galveston but, you know, as an issue, fog as an issue across the country. Because I think, as you'll see, it does have a significant impact.

So as Rich Edwing said earlier today, you know, we are in, you know, we are actively working on the observations required to assist with fog, the predictions of that through the probability of visibility models that are currently being created at the National Weather Service, all of our various charting products and water-level information.

And so I think we are standing by to bring the full force and weight of NOAA's maritime data enterprise to this problem. So without any further ado, I'll pass the mic on that. And I appreciate the opportunity to sit on

this panel.

MEMBER CHOPRA: Thank you, Captain Brennan. Good afternoon to all of you. I hope all of you and your teams and families are doing well in these COVID times.

I would like to especially thank a very big thank you to Lindsay, to Qassim, to Captain Brennan, and many other members of the HSRP for the comprehensive technology workshop group meeting where we have carried out robust discussion on the marine traffic interruptions for our ports and commerce caused by restricted visibility, specifically fog, in the winter months, especially in Texas ports. And like Captain Brennan said, we were looking at Houston-Galveston in specifics.

We looked at commercial and economic impacts to understand the scope of the problem. We also reached out to other major ports as to how they were successfully dealing with the fog issue without causing a serious interruption to the cargo flows by using precision navigation and

technology.

To better understand the impact caused by port closures due to fog, and specifically the economic impact, it is indeed my privilege and pleasure to introduce Professor Maria Burns from the University of Houston to share her thoughts and findings.

I understand her bios already available to all of you. Thank you, Maria, very grateful if you can come on with your presentation.

MS. MERSFELDER-LEWIS: You guys, Maria is self-muted. So if she could unmute herself, and we sent her a webcam request.

MS. BURNS: Thank you very much, everyone. First of all, I feel grateful to be invited in your amazing media and NOAA's annual event. I really appreciate this. I was hoping to be able to be a part of the solution in this billion-dollar problem.

So we're going to talk about the Houston-Galveston area and the challenges of

restricted visibility. Again, I would like to thank each one of you on the committee.

I would just mention that the impact of fog in the maritime industry, everything that we're going to say here can be applied in many other fog-related ports in the country and the world.

In this presentation, I will estimate the financial and commercial losses across the logistics network and underline the need for new fog sensors. So we're talking about fog and visibility detectors of a new generation.

And we can move on to the next slide, please. Thank you. So the ports of Rotterdam and Hamburg are among the leading ports, some of the many leading ports globally. And as you can see, they combine very intricate configurations. And at the same time, they suffer from fog.

So what they've done proactively, they have adopted new fog sensors. They have transformed their shipping and logistics operations. As a result, they have minimized

delay-driven costs which include operational, capital costs, the growth within the region in general.

And we can go on to the next slide telling us that everything that they have implemented, we might need to consider, because we are having a problem. Houston, we have a problem.

So the Houston-Galveston region expands through 52 miles. Just the Port of Houston comprises 25 miles and 200 terminals. It experiences closures for over 22 full days every year, and we have noted that the number, you know, close to 22, like it can be 20, 23, but pretty much there is a consistency for the past few years.

Just understand what is at stake here during those 22 days. We are evaluating the role of Texas and the U.S. Gulf region in terms of economic growth. But we have heavy traffic as well, and many berths.

First of all, maritime contributes to

seven percent of our regional GDP with two million transportation jobs across the country. At the same time, over 90 percent of the U.S. energy comes from the U.S. Gulf. And Houston, Texas, Galveston, are very close to (audio interference). We are the U.S. Gulf, you know, a big chunk of it.

And of course, we have many millions of jobs that are at jeopardy every time there is no corrective action or stance when it comes to the fog. This is a common problem when we talk to industry professionals and, of course, other entities, dominant entities. Because fog-related delays are very tough to explain to our customers, let's say the industry people.

When they're expecting their cargo, and the cargo has a five-day delay, we have to consider the entire logistics network from raw materials, so semiprocessed goods, to refineries, whatever the cargo is, value-added stages of the supply chain, finally the distribution, the warehousing systems. So five days of idleness or

five days of delay are making a big difference.

Another particularity, especially in this region, is that fog doesn't just last for one day and then it goes. Typically we have three days in a row, five days in a row. And we can google that, and it's very easy to see all those front page news.

And we can move on the next slide, please. So basically, the newspapers, the media talk about this financially, about the ship channel and the problems. But the articles we've seen so far just focus on the ship side, like how much has been lost on behalf of the ship owners.

If we consider the client of the ship owners, the higher logistics network, this amount is vast. And you can just see the whole supply chain network right here.

And we can move on to the next slide. You can see many of the different layers or dimensions of the fog disruptions and the impact. So we're talking about safety problems, the ship collisions.

And I have to quote Captain Anuj Chopra, you know, like we're waiting for an accident to happen. Environmental pollution, we can't even imagine what would happen if there was one major accident within 52-mile channel. That would be very damaging.

And we have to consider the economic losses. Thinking of Galveston, the cruise ships, just consider the many thousands of people that are navigating. You know, they are taking their vacations. Those mega cruise ships can have 10,000 people at a time, 7,000 people at a time. So the impact is vast. Because in the past, we had people stranded at the Port of Galveston.

And then the social impact, we have to mention coronavirus. We know that a lot of the supply chain pertains to urgent items. And these items cannot wait. It's a life or death issue, medical supplies, first aid, and so on. Plus tourism, of course. Lockdown is not out of the equation yet, so we don't know what will happen.

And we can move on to the next slide,

please. So these are just some pictures to illustrate what we're trying to see here, any kind of collision, any kind of, you know, people stranded. We see thousands of container boxes being stopped at ports.

And finally, let us consider the trucking industry, all of these trucks being stuck on bridges, making a U-turn, creating havoc within the city. We have seen this again and again.

And we can move on. So this slide in particular, and the next two, very short and sweet, pertain to U.S. Coast Guard primary data. And it's referenced underneath. So this is from U.S. Coast Guard VTSA. And this data pertains to 2019.

The previous years are pretty comparable. We don't have huge fluctuations. And the yellow boxes very simply mention the megaships, the first, the top box, and the bottom box pertains to barges. So this is how we have classified them.

The interesting thing is because barges, sometimes they don't have cargo, sometimes these are pilot ships, sometimes they're empty. Sometimes they are OSV ships, offshore support vessels for the offshore industry. It's very difficult at this point to bring a dollar value to the losses. So what you're going to see, ladies and gentlemen, is just the megaships.

And we can move on to the next slide. So here we can see basically that from 2015 onward every single month, the synchronicity or the fluctuation, year after year, month after month, don't deviate too much. So in our estimation, we can't be very much off, because we see the numbers every single year when it comes to the traffic at the port, you know, Houston-Galveston area.

Next please. Right, and so we see all the risks within port limits for dredging operations, incidents, and so on. What I have highlighted here in yellow is fog. It is by far

the prevailing challenge, this is what is interesting, every month. Oh.

And here, basically we're just doing the math, very simple based on the U.S. Coast Guard VTS information. You can see on the top left the daily traffic, the ocean-going vessels. We have, as an average, 135 ships every single calendar day. And of course, on the high side, 212.

But when it comes to smaller ships, and again we don't even have that information, the number is very high, more than 500, close to 700 ships every single day.

And then when it comes to the full day we are, as a median number, the average number, it's close to 22, so you would agree. And for the past years it's been pretty much like that.

And we can move on. This is the essence of the situation. Basically, we can see that for a single ship, according to a number of previous researches, some of these research projects I have undertaken, but many other

colleagues, including the Texas A&M University, they agree, we all agree that the median loss per vessel per day is $1 million.

However, according to Texas A&M, the number goes even higher, high values because some of these cargos are very expensive. And of course, we expand through the supply chain. So we're talking about $4 million per day, per ship. This number is just so impressive, for a day, okay.

And then if we multiply this, and I have to make an acknowledgment here, although I work with big data analytics and, you know, our studio Python, like, I could have created some impressive algorithms. I chose to make it simple, because just simple mathematics for everyone to have no doubt about the root cause of the matter.

For one day the impact of fog, we're talking about the entire fleet kind of stuck, stranded within port limits, $135 million, this is the, you know, a very average number. But

then when we have more ships, then this number goes up. And of course, the high values that expand throughout the supply chain can reach up to $848 million, approximately, for a single day.

Then we move on, we multiply this by the 22 days that we are impacted every single year. And you see this number, again, it's an exorbitant number, very simple mathematics. We can't go wrong. We go into almost $3 billion as an average loss for our region. And the maximum, and we don't wish this to happen, could be up to $18.5 billion for that year, for those 22 days.

And we move on. This is the final slide, ladies and gentlemen, this is just the observation. How come we didn't know this yet? How come, you know, the front page news don't talk about it. This is because companies don't take pride when they lose money. It doesn't sound good for the client, for the public image, so they don't talk about this.

And then, of course, the losses don't affect just the Port of Houston, just one ship-

owning company. It is all of these companies that are having a very bad year or a very bad, you know, fog year.

And at the same time, we have to take into consideration the counter parties, according the acts of God, weather conditions, a lot of this is actually covered by the insurance plans. So nobody talks about it. But this is the reality, ladies and gentlemen. Thank you very much for having me.

MEMBER CHOPRA: Thank you, Maria. Thank you very much. I really appreciate your bringing to light the numbers and the research which you've done on this. And I'm a Houstonian, and I just wanted to say the idea was not that you want to put Houston on the front, this was just as an example of one port, which is impacted, a major port in the United States, which is impacted.

There are other ports as well, which face this impact and if we look at the collective economic impact for the region, it does -- the

numbers are astounding, and this is the reason we feel that this needs to be brought to your attention.

Needless to say, fog occurs in various parts of the world and they have found a way to work in fog, to keep their supply chain working. So maybe it's time for us to relook at this issue and explore avenues. How we can get our economy working during those fog days.

With that in mind, I'd really to invite Dr. Qassim Abdullah on the technology side and look forward to his comments. Thank you.

MEMBER ABDULLAH: Thank you very much, Anuj. What a beautiful introduction Dr. Burns put me in and made my life easier to prove it to you that the problem, the seriousness of the problem absolutely.

And if I see my slide, please? Thank you.

And we'll talk about this problem, the problem of restricted visibility during inclement weather, fog especially. You know, what does it

mean to us? I don't -- next slide, please?

MEMBER CHOPRA: I think we've lost the slides. I'm guessing, yes, there they are.

MEMBER ABDULLAH: Oh, here they --

MEMBER CHOPRA: Back again.

MEMBER ABDULLAH: Got them back.

MEMBER CHOPRA: Thank you.

MEMBER ABDULLAH: Next one, please. Thank you.

So the statement of problem like Anuj and Dr. Burns stated that, you know, that the problem of the fog. We've been dealing with a port closure and you saw the impact, the economical impact, when you talk about billions of the dollars, four million per ship, we have 200 average a day. Just a big one, and so on.

But when we look at what can we do about it? I think we are in a better position than any time, you know, to alleviate this problem and provide the technology that will help the pilot to navigate their ships in the channel with minimal risk.

There is risk in anything we do, you know? So if nobody going to assign a 100 percent solution, but if we go to the 99, 98th percent, I think we are there.

Next slide, please?

So our example, our role model in this, in this jetliner. Jetliner, I mean look up here. What do you think the pilots see when they go through this cloud at night and things like that?

Nothing. I mean they merely rely on instrument navigation, definitely. I mean, they might take over on the last few seconds before touchdown, but a lot of the flight nowadays even in good weather, they do it with the instruments here.

Next slide, please?

So the aircraft navigation, it is always foggy up there. I mean, like the fog we experience at airports. It is always there. We are in the middle of a cloud.

So they utilize a few navigation

systems to help guide the flight from point A to B. And this navigation system could consist of a Global Positioning System, GPS, and that's the main, primary navigation source nowadays for the jetliner, Inertial Reference Systems, radio aids, you know, with our VORs, DMEs, ADFs. They're different technology for beacons they have in the airport.

But the combination of it, just for redundancy, for the safety if one fail, you can rely on the other sensor or technology.

So the pilots really don't get lost very often, right? I mean, nobody will fly if we hear about the pilot lost their way because of fog or cloud or the rain or something like that.

And that's the philosophy when I build in this capability to overcome this problem of the fog in ports.

Next slide, please?

The other example is autonomous and connected vehicles. We are way into it now, people expect them in three years. We going to

see level five car, the driving of the road or a trucks platooning going on their freeway. And I believe it, I'm involved with it very heavily and I think it's coming. You see it's now in your new car. You going to have level three. I mean, with this, you know, all these technologies they implemented in a $30-$40,000 car.

But we know it is capable. We know probably navigating a ship in the port could be much easier than the task of navigating a car in a downtown area situation with construction going on on the road and things like that.

The next slide, please?

So we know there is a technology can -- or can enable us to do that. To give an aid to the pilot, who has an instrument next to him if he can't see visibly with his eyes, naked eyes, he can look at the screen and he or she can see where they are and where are things around them. How far they are, you know?

And next slide, please?

So the good example is Rotterdam, Dr.

Burns mentioned it and that's one of the most advanced ports in the world and is the largest one in Europe. And look what this manager says, this will be the next man on the moon for the Port of Rotterdam.

And that's what they're counting on. The autonomous navigation of the port and moving things around too, you know?

And happens to be this port -- Netherlands has the port infrastructure in the world. That's what a witness according to the World Economic Forum and the Global Competitiveness Report 2016 and 2017.

And now in the last few years, even better. So no wonder, I mean, Rotterdam can do it because they are very progressive in their thinking and their updated infrastructure and sensors and so on.

Next slide, please.

So here all we're really, the thinking is very simple about it. You know, how can you bring the Google of your car, Google Maps, into

a ship?

So there, is there -- if the pilot can see his way/her way through the fog, the screen will show him where they are, how far things are around, and we are very sophisticated in GIS now, the 3D modeling very accurate. You talk about lidar accurate to a few centimeters, positional or horizontal and vertical, bathymetric as well a better quality.

And we have great 3D GIS infrastructure of any port now. We just need to update it more frequently.

Next slide, please.

And that's what you see, the bathymetric we talking about in the last, yesterday and today. The mapping with the sounding, we might be sounding in the port because of sometime the water is murky and turbid; the bathymetric lidar maybe doesn't work, but we need the combination of the two to give the pilots that look. You know, there's no telling horizontal of where you are. We need to

or he need or she need to navigate the canal or that port channel from the depths too.

Next slide, please.

So those are technology we are proposing for this solution to happen, which is a real time kinematic GPS/GNSS. This is no brainer, I mean, we use it every day in our business and thanks to NGS and NOAA for providing all these CORS station and Juliana talked about the Foundation CORS. That's what we going to need in the ports.

Most the ports they have it, what if they don't have it, we're going to need to install and we have a receiver as well as dual frequency receiver on the ship, for example, could be multiple of them, depending on the size of these tankers for example.

Inertial Reference System for small boats is optional, but for bigger boats, when you talk about four billion dollar a day lost? I mean, put in a system costs 10, 20,000 is not a big deal at all.

Radar and cameras and again, for small boats probably will be hard to implement. But for these big ships, radar, they're all equipped I'm sure, with radar and cameras.

And port high definition infrastructure map is a 3D GIS database. Almost all maps, all ports have that but now we moving to the Smart City, the smart infrastructure. If it's not developed, we can develop it overnight. This is very easy to do.

And port bathymetric map between the Corps and NOAA, I think they have done good job on dredging and bathy and acoustic surveying, survey of there, we might need to do it just more frequent if we're going to do the solution.

And we need application software from technology, whether Google, whether Garmin, we need an app, we need a screen, and that's all it takes. There's nothing really out of the reach of our capability. It's very simple approach and it can be done to save the economy those billions of dollars.

What Dr. Burns showed is one port. Look at, think about all other ports. You know, when you put all these together. We can do that NOMEC strategy with that savings if we do that.

Thank you very much and that's all I have.

MEMBER CHOPRA: Thank you, Qassim. I think that was a very comprehensive view of the technology capabilities which exists and which may be harnessed and that's something for all of us to explore after the economic view.

I'd like to invite comments from Captain Brennan and all the rest of the HSRP on the presentations and any discussion you would like to lead this forward.

Captain Brennan, would you like to comment anything on the two presentations or any comments as you started this panel?

CAPT BRENNAN: Sorry, I think Lynne and I had been hitting the mute/unmute, mute/unmute button.

So first, I guess the only thing I

would like to say is just to thank Dr. Burns for her presentation. I think it was very compelling and that was the question that I think everybody had coming into this problem was what was the magnitude of the problem.

And I think when we look just at the Port of Houston, it's very clear what the magnitude of the problem is and it's not hard to extrapolate out to the rest of the nation.

So I would think it's best that we pass the baton and let the other members comment on this and I think that's what we're here for. Not to hear me on that.

So, Lynne, I will let you pass it around to our other members.

MEMBER CHOPRA: Thank you, Captain Brennan. Thank you for this, for your comments. We can go around the room and ask the rest of the HSRP members. To our Chairperson Ed, would you have any comments?

CHAIR SAADE: Let's go ahead and continue on with everybody then, Anuj. I don't

have any comments myself. But I think it's a good idea to go ahead and pulse everybody and maybe come back to me.

MEMBER CHOPRA: Thank you, sir. Thank you so much. Julie, would you like to add a few comments?

CO-CHAIR THOMAS: Yes. Can you hear me? Yes, I think I'm unmuted.

That was a great presentation from all three of you and I really appreciate it. I've seen this in action in San Francisco. I guess on the West coast is our port that has a lot for me and Anne McIntyre can chime in here too.

I have, I mean it all makes sense to me. This concern, I'm sure Ann Kinner will speak up about the small boats too. Like, how do you control small boats in the harbor? You want to make sure that they have some type of transmitter on them or something that will get picked up.

So that would just be one comment which I know everyone has thought about. And my other comment is I am interested in the one

million dollar per vessel. Not because I question it, and I don't know how proprietary this is.

I would love to know what goes into that figure only because we've done it for the Port of Long Beach a few times and I'm always interested in how far down the supply chain do you actually count.

It becomes very blurry to me at some point. So that would be my only item of interest and I don't know if, though Anuj or whatever, if we could actually get a breakout of that. Just out of personal interest.

But I understand if it's not available. That's all I have to say. Thank you.

DR. BURNS: Thank you. Oh, go ahead. Sorry.

MEMBER CHOPRA: Absolutely, Maria, please go ahead.

DR. BURNS: Thank you. So there was breakdown and there is a study actually. After September 11, when the Port of New York-New

Jersey closed down, and based on that I added some other components across the supply chain.

So what happens is we have port use, this is one component. The second component has to do with reservations for warehousing systems, distribution centers, trucks, and other multimodal transportation areas, and options that are on a standby basis until that cargo becomes available.

So we also have some clients that are purchasing something in advance and they're waiting for their cargo and what, you know, things like, wholesalers, retailers, sometimes we have mass cancellations and things like that.

I have the details, you know, a couple of my books actually have a breakdown, but I can provide it to you as well.

CO-CHAIR THOMAS: Oh, that would be great. I would be really interested in that. Thanks so much. Appreciated.

DR. BURNS: Thank you.

MEMBER CHOPRA: Thank you so much,

Maria. I think that explains it so well. So I had the privilege of working in the petroleum industry in the Houston corridor for about 25-plus years and I've seen the numbers, actual numbers on the loss of export from a terminal.

So I would treat a BERG maybe exporting from Houston as an energy -- as a hotel room. That if that night, if one night a hotel room is empty, that is economic loss to that hotel. That can never be recovered. It's exactly the same when we convert it to a port.

That capacity to export that time period because of that loss. That is the one which we are talking about, which plays in this space.

And I completely agree with the numbers of one to four million depending on the value of the cargo, which is there and I'm sure we share that at a later time.

CO-CHAIR THOMAS: Thanks, Anuj.

MEMBER CHOPRA: I was going to call out Captain Ann Kinner. Ann, would you like to?

Appreciate your comments?

MEMBER KINNER: Yeah. Am I -- okay, I think I'm connected.

My concern of course, is small vessels. That's my main connection and there are lots of them and a lot of them, well, we don't have AIS. They may have a GPS system that is sort of working maybe they don't. Even a lot of the smaller ones don't have radar.

And personally, I wouldn't, at this point I wouldn't have a boat that did not have both radar and AIS, but I know that they're not cheap. Even inexpensive systems are sometimes beyond the reach of a small boat operator.

And I know from my own personal experience in San Diego, when the fog comes in, you can't see anything.

And it's a combination of issues. One is knowing that the fog is out there, the other is knowing who is in the fog, and being able to communicate what they are doing.

And I've come in and out of San Diego

in a pea soup and believe me, when they gave me AIS, I felt like I had been given the magic wand, because on my radar, I could see someone. On my AIS now I know who they are, how big they are, how fast they're going, and whether we're going to get acquainted.

The challenge is going to be, and particularly in a port like San Diego, which does have a fair chunk of fog, even though we don't have the heavy commercial traffic that LA-Long Beach has, we do have some pretty intense fog.

And I can relate to the airlines because I have had to sit in the airport in San Francisco waiting to find out if they were going to open San Diego so I could go home one night.

It's an issue. It has a big impact on the little guys who, frankly, they go fishing whether they can see where they're going or not and that's part of the problem is how do you get this kind of information and this kind of tool to those kinds of boaters?

I think it's something like 60,000

boats in the Port of San Diego, small craft.

Not that everybody's out there and doing anything, but at any given day, there are a lot of boats out there and particularly maneuvering around the entrance coming into San Diego Bay.

So it's, yeah, technology is a part of the problem, cost is going to be a big issue too.

MEMBER CHOPRA: Oh, absolutely. I think that's very well brought out, Captain Kinner, and I would say it's the Ports of Rotterdam, Hamburg, Antwerp, the English Channel are where, which is very fog-borne for a significant part of the year.

Did also have similar issues and maybe we can learn as to what technology's bringing, like Qassim mentioned, and what other practices others are doing so that explore the opportunity if there is a solution, while not sacrificing safety in this picture. That would be my thought.

But invite, Captain McIntyre?

MEMBER MCINTYRE: Hey, I think I'm unmuted. Can everybody hear me?

CO-CHAIR THOMAS: Yeah.

MEMBER MCINTYRE: Yeah, you know thank you for that. It's interesting. I'm going to echo a little of what the other Ann just said. It's, you know, having been a working pilot for 23 years, my concern is that, technologically I kind of see how it works, like in a closed system, but when you have like an open system, again with all types of boats, traffic coming from different directions, particularly in the United States where there is not such a structured kind of port authority within the other ports, but there's a lot of coordination that would have to occur to make this type of navigation a reality.

You know, there is a lot of variability in the quality of commercial ship, in the quality of the crews, in the quality of the equipment and, you know, again academically, I see how it works. Practically, I see it as being

difficult.

And, you know, just generally, and I know that you have and if you're working with this I think it's a super important to be involving stakeholder pilot groups on this issue.

MEMBER CHOPRA: Absolutely, Captain Anne and our initial discussions were based on to find out what capability we have and whether there is a technology solution and then invite partners and stakeholders and say hey, this is what we've laid out and leave it to them.

But let's get some more comments. Captain Sal. I know you're an interested party. You understand Galveston very well. Very interested in your comments.

MEMBER RASSELLO: Yes. How long do I have? I've been a cruise ship captain porting Galveston for 18 years and Baltimore and New York and every port here poses a challenge. But they do respond in different ways. And I think that the problem goes a little bit beyond the technology available.

The ships navigate in fog since post the Second World War with the radar in the communication with the UHF.

So the problem comes now with the coordination and I think that Captain Anne touched a point. For a pilot to feel comfortable to use the technology, assuming that he knows how to use the technology available, it is important to have a backup of coordination from the VTS and from the Port Authority to make sure that all the traffic is under control.

The issue we have in Galveston was not matter of much of technology, it was matter of I would say decision making by one person to close the port, which wasn't part of at that time.

And now things have been changed a little bit. So based on what? Based on is he comfortable to navigate in fog or not getting enough of technology in the hand? All because of there is a non-control of traffic. So it's the coordination of all these entities and the technology is very important to -- I'm talking

about the precise navigation.

Rotterdam, I've been there. Amsterdam, been there. They're the different port, there the port is prepared to accept a ship in fog. Therefore, they coordinate the traffic, they send out warnings for small craft so they should not go out through the fog and everything is set in place to make the operation safer.

Therefore, a solution we hear, technology. We brought this issues in the Panel three or four years and still I am glad that we are still talking about. There are technology like Dr. Qassim listed, there is a lot of stuff on the market to make sure that the person can see through the fog.

And now, it's just a matter of moving some way, somewhere and I think it's on the Mississippi and Sean can confirm, but we solved the problem with fog.

But the river was closed with the fog ten years ago. Now we haven't been closed anymore for cruise ships, especially at -- and

going back on the loss, economical loss, I want to back up, Dr. Burns on the numbers she gave us.

Thank you very much, but I can confirm that the one cruise ship lost more than a million dollars a day standing outside the port.

Because of the exponential loss is not just all of the people losing flights or losing daily activities. It's economical loss was at the airport, at the transportation, a complex -- it's not just the cruise line. It was a big problem and big test that management faced with thousands of people complaining of why the port is closed.

I have a lot more to say but --

MS. MERSFELDER-LEWIS: I'm sorry. You guys only have about five more minutes, at the most and there are --

MEMBER RASSELLO: I know.

MS. MERSFELDER-LEWIS: And Lindsay Gee also asked to speak.

MEMBER RASSELLO: Yeah, yeah. I finish.

MEMBER CHOPRA: Thank you so much Captain Sal. I know that came from the heart and you're actual experience. Lindsay as chair, appreciate your comments.

MEMBER GEE: Yeah, thanks very much. And again, I have to apologize again for not being around when you guys were developing this and thank you to Dr. Burns for that presentation.

I think when we started this, I think from the last session talking about restricted visibility, we knew that the discussion would go beyond just the technology and that's something that not for this discussion to deal with.

I think, unfortunately, it is something to be dealt with, but I think what we wanted to concentrate on, I appreciate Qassim's presentation, is, one, to look at the technology that is available and then what can be done about those recreational boaters.

And again, I think it's what Ann -- I'll take Ann's saying before about, you know, it's a big elephant and we got to take just those

little bites and do what we can, I think, as it goes.

And technology is always a way of solution. It is part of the solution, it's not the full solution, it's part of the solution here and one of the reasons I think by doing this workshop was also to say, okay, technology's is going to be part of the solution down the track and what do we see that NOAA has to have available to support that.

And that's a key, that's as the HSRP, I think that's our role to say, hey the technology's coming, it's going to help solve the problem and we want to make sure that NOAA has all of the technology that's necessary to support that.

So that's partly, you know, the bathy source, to be able to update that, to produce those models that Qassim was showing. It's the PORTS system and extensions of the PORTS system. Where did it work, where doesn't it work, how do you expand it and those sorts of things.

So I think that would my general comment and the thrust of where we started with why the Technology Group was taking this on in the beginning. And yes, we acknowledge all of those other issues, but our focus was trying to stay on where's that little bit that technology can help and what does NOAA have to do to be ready to have that technology to support it? Thanks.

MEMBER CHOPRA: Thank you. Lindsay. I know we have, we are on a break time.

CHAIR SAADE: Okay. I'm going to go ahead and jump in, if you don't mind. Thank you. So thanks everyone. Really great to see this. Actually --

MS. MERSFELDER-LEWIS: Hey, Ed --

CHAIR SAADE: Ashley --

MS. MERSFELDER-LEWIS: Hey, Ed, can we let Ed Kelly to go ahead and make his comment because it will be very brief?

CHAIR SAADE: Okay, Ed Kelly. Only because he's an Ed.

MEMBER KELLY: Okay.

CHAIR SAADE: It's only because he's an Ed.

MEMBER KELLY: There we go. Hey, three Ed's is even better than two.

So yeah, a couple of comments. I'm looking forward to seeing the numbers. In my prior life I was CEO of the number 12 container carrier in the world porting North America and if I had ships with a million dollars' worth of I'd be astounded.

I know there's a lot of economic dropdown. The other thing is I never made it past my Second Mates Certificate, so I defer to all of the captains in the group, but I think the key thing here is question where technology will lead and that the actual practice will have to follow.

The reality is fog is only an issue in close proximity areas, namely inside ports and that's where there is the most cross-traffic small vessels, nonprofessional mariners involved,

and that's where the risk factors come in.

So I think, you know, the technology is certainly doable. Technology will lead practice. We've seen that over and over.

You know 20 years ago nobody would've thought that we'd be operating the way we do right now with cellphones and computer technology.

So I am positive there'll be a technological solution to this. But the question will have to be, it'll have to be demonstrated to be safe to people like the International Maritime Organization, to the U.S. Coast Guard, to all of the governing places because, you know, I'm pretty sure that Captain Anne McIntyre would agree, right now, I would not risk my pilot's license by completely relying on technology. There'd be too many risk factors involved.

So I think it's a very positive thing, the technology is outpacing the practice and I think the focus on this has to be how to make the industry be willing to rely on the actual

technology itself.

Because you only get to make a mistake once when you're operating a large tanker and you pollute the entire area.

CHAIR SAADE: Great stuff, Ed. Thanks. We have plenty of time for other comments, you know, before the end of the day. So if we need to come back on this, it's great to see the energy on it.

We're going to take a break now and be back at 3:45, 15 minutes before the hour, depending on which time zone you're on. And see you soon. Thanks.

(Whereupon, the above-entitled matter when off the record at 3:32 p.m. and resumed at 3:46 p.m.)

CHAIR SAADE: The bell. I heard the bell. Okay. Welcome back everyone. That will be our last break for the day. I'm going to hand it over to Julie here in just a moment.

Just as a reminder, we've got about 45 minutes to talk about all types of HSRP

priorities and issue papers and the working groups and then we'll slide right from that into the wrap-up session and the roundtable with closing remarks.

So over to you, Julie. Thanks and you're in control.

CO-CHAIR THOMAS: Okay, thanks so much Ed. So I think we want to just get a closing remark from Qassim. I know that on the fog section he just had one response there that he wanted to make.

So Qassim, if you're there, please feel free to go ahead.

MEMBER ABDULLAH: Yeah, all right thank you.

Julie, yeah, probably I need to respond to Anne's concern about the technology.

We totally agree. We don't think that the closure is going to be interviews and be thrown on the ports to implement. This is going to take some legislation or regulation changes.

I figure it's going to be to the

priority of closing the port totally versus maybe regulating on a small fisherman, for example.

Do I prefer tanker, I mean, this going to be what's going to weigh. Is it 10 billion dollar industry or $10,000 industry?

So it's going to take some regulation, definitely. And of technology, I mean I just want to bring to that attention of everybody there. The FAA now implemented what we call remote ID on the drones. You know, I mean we're talking about drones like thousand dollars.

So this technology is getting very, very, low expense, very cheap. So Garmin, like all the small aircraft cannot fly without a Garmin system. We just said it could be a thousand dollar something. So the technology is there.

I think it's going to come to the regulation. How are we going to regulate the small boats to be equipped with these, with a Garmin with a transport or the transponder is very small, cheap, very cheap like the drones and

that was put on the drones.

So that's all my comment on that, on the fog.

CO-CHAIR THOMAS: Thank you Qassim. I think we'll come back, if we have any time at the end of the day we can always come back and discuss this more. But that was a great session, so I appreciate it. Thanks to you and Anuj for putting that together.

MEMBER ABDULLAH: Thank you.

CO-CHAIR THOMAS: Let's move on then. Ed Page, you should -- wait a second. Okay, you have a few minutes here to update us on the Arctic.

MEMBER PAGE: Okay. Good. Okay, well there's still ice in the Arctic and so we still have maritime issues to address.

So basically we're just going to do a quick, I'm just going to do a quick update that kind of follows up with our HSRP policy paper or document on the Arctic that we generated about two years ago now, I think.

And we updated that from a previous version and the key thing is it's still relevant. And the things we outlined as far as things to be taking action on, there has been action undertaken.

So I think it's relevant and I'm just talk real briefly what's, so what is happening at the Arctic and just go through the slides.

Virginia, do you do that or do I do this?

Next slide. Do I do that?

CO-CHAIR THOMAS: No, they will control it for you, Ed.

MEMBER PAGE: Okay, so anyway the traffic is not going spanning that significantly up in the Arctic as it is in the Russian side. The type you are seeing, you are seeing tankers -- these are pictures of tankers and that's all the activity in three months near Utqiagvik or Barrow, the very top of the Arctic in the Beaufort Sea.

You can that the black is just tanker

lightering operations, transfer of a larger tanker to a smaller tanker. Those heavy lift ships go to Tuktoyaktuk, which is Canada, which is far west of the Northwest Passage.

You see small landing craft and you see, you know, lots of tug boats with barges. So the traffic's not that significant.

You're going to see some erratic traffic because the ice conditions where they're trying avoid the ice, so the standard route sometimes you expect to see are changed because the ice impediment and that's an issue for us as NOAA and National Weather Service. We expect to get any information on ice conditions and of course Polar Code weighs into that also.

So but anyway, that's just gives you a brief example of the traffic, and see which is not that great. But it's increasing and the idea of being prepared so when there's additional traffic in the future that we do it safely and don't impact the fragile environment of the Arctic.

Next Slide.

There are some plans to increase Arctic operations here. Shell is going to come back again. I realize they had a rough shot at it the last time. They spent billions and billions and billions on offshore development plans going back to '85, I think it was.

When I was up there near Navarin Basin and a whole bunch of off-shore rigs and platforms and ships that were exploring the Chukchi Sea for oil and they came back 20 some odd years later and then of course, because of marine casualty, the whole thing went dry.

Billions of dollars that were shut, all that effort shut down and so that, to me, highlights the importance of having safe maritime operations and of course NOAA plays a role of providing information to help ensure safe maritime operations.

But Shell is coming back but not at the far off-shore. They're staying closer to shore this time, not as ambitious effort, but

they do have plans to come back to the Arctic and start producing oil again.

So that leads to some more maritime activity obviously.

Next slide.

There's also a project underway right now for producing LNG, which there is a lot of LNG up there in the North Slope but to bring it to market the talk has been building another pipeline, which is somewhere in the neighborhood of about 50, 60 billion dollar project and 10 to 15 years out.

Nothings moved on that because of the enormity of the cost, et cetera. But now they're saying let's just do a look-look. Case in point, up there on the North Slope and then have the ships take the LNG to international markets.

So that's moving along it'll be a couple of years but it doesn't, it is an indication of increased maritime activity and different types of maritime activity in the future.

Next slide.

All right, so the Qilak and some of the issues with that happen to be with subsistence activities, they're trying to make sure they do it right so they're not interfering with indigenous communities as far as hunting whales or other subsistence activities.

And that ensuring they have areas that have been warning to keep the vessels out of it and so that's an issue that also NOAA weighs in on.

Next slide.

And the people that are making some noise about it or concerns, raising concerns, Alaska Eskimo Whaling Commission and other parties. And they're basically saying this is our water, we've been operating for years. Now that ships are coming through, how to make sure that we don't get run over.

And so next slide.

We've been exploring issues as far as portable AIS units and we talked about this a

minute ago about the problem with recreational boats being in the way of ships.

Well, we've actually been demonstrating, and that's my kayak on the left, I sacrificed it on a sunny day. Instead of staying in the office where I want to be, I went out in my kayak to test out this technology, sacrificed this for the team, took it for the team.

But you can see that little portable AIS is actually powered by a USB power device from a power drill, no less.

But we've gotten more sophisticated than that subsequently, but nevertheless, it tracked my kayak fine and we've been able to put it in a Pelican case and say, you put this in your boat, you can see where you are.

You can see where other vessels are, excuse me, wirelessly because it goes to your iPhone and my iPhone display shows other vessels and then also other vessels will see you, and the Coast Guard will see you, and they can put up dynamic marine protected areas around your

whaling activities and notify the vessels through AIS AtoNs of your presence and vessels can avoid you.

So this will be like a dynamic Coast Pilot, but right now the Coast Pilot talks about whalers being out, that they should call a local community on the telephone to see if they're out there that day.

Well, this is a better way to get information out than that. So using technology.

Next slide.

Also the Coast Guard now is exploring a Port Access Route Study, they've done so for the Bering Strait beforehand. So it's evaluating traffic and trying to figure out the best routes or corridors, if you will. So that is going to lead to areas to avoid, traffic lanes, et cetera.

Once again, NOAA gets involved in that because any traffic lanes, the surveying needs to be well done to ensure that we're not sending them into the area where's there's unsurveyed waters or poorly surveyed waters or outdated

surveyed waters.

So that's a process that's going on and I think it's next September is when it's supposed to have all the public comment and it'll move further on.

Next slide.

And that will lead to traffic separation, seen as possibly two-way routes, recommended routes, tracks, deep water routes, routing systems, you name it. Not sure because it hasn't been done yet, but again, those are things that impact NOAA on the charting and other services, ports, et cetera.

Next slide.

Are we running out of slides? I think, hopefully.

Just more on the same, as far as the different things that may come out of this Port Access Route, which overlap with NOAA once again.

Next slide after that.

And the last thing, before I mentioned just this mapping of the Arctic Ocean that UNH is involved

in international effort to increase the charting and mapping and surveying of the Arctic and so there's an international effort, a kumbaya I guess you would call it.

Anyway, it went from 6.7 percent to like a 20 percent of the Arctic waters mapping, Arctic Ocean.

I think the goal is 2030 to have this done, but you know, eventually everyone's anticipating that the Arctic will be significantly more traffic as you can save thousands and thousands of miles by going across the Arctic versus going around through the canals, et cetera. The Suez Canal or Panama Canal, et cetera.

This was just press-released about this as far as the ambitious effort. So we're getting a lot of attention about mapping and charting as we've even discussed earlier in this meeting.

So you kind of monopolized the conversation these days. I apologize, but not

profusely.

Next slide.

And that's it. That's all and that's our effort up in Alaska. That's called social distancing and how we handle social distancing in Alaska is to keep more than 6 feet away from whales. Sorry.

CO-CHAIR THOMAS: At its best. Okay, thank you Ed. We appreciate it. We appreciate the update on this important area. We've gotten lot of attention to Alaska and through the Arctic on this meeting, so it's been great. Okay, thanks Ed.

MEMBER PAGE: Yep.

CO-CHAIR THOMAS: Okay. So I want to just say that we have one-half hour left to do a lot of work.

I think we need to talk about NOMEC again. I know we owe Shep time here, we cut him off from his comment and then we'd like to go around.

I wanted to just summarize a little

bit myself on what we've heard with NOMEC and then we'll see how much time.

But we do want to leave the last 15 minutes or so, maybe ten minutes to, with Sean, talk about recommendation. He's been getting a lot of good ideas and then we'd love to touch base about the priority matrix. So let's see how far we get.

So, Shep, could you, are you there to be on so that you can just finish up your comments on NOMEC from before?

RDML SMITH: Sure, can you hear me?

CO-CHAIR THOMAS: We can hear you, we can't -- there we are. Good.

RDML SMITH: So I didn't have -- I just really thought it was a very thoughtful discussion. There's a lot of you know little, you know each of those big ideas that I took a couple of pages of notes of big ideas.

You know, need some working out and if any of them were easy, we would've already done it. Right? Just like the fog issue.

Right, if that was an easy problem, we would've solved it already. It's worth billions of dollars.

So anyway, I think my comments on NOMEC for just is to really thank you for your thoughtful comments and there's a lot of things that we need to follow up internal to Coast Survey and also a lot of things that I think can really inform the larger national strategy as well.

You know, specifically on the -- I still keep coming back to this taskforce thing. It sounds as though you think we need a different federal advisory committee. And that all we need to figure out a structure that's not a federal advisory committee because federal advisory committee's wouldn't be good at this.

And that is why, you know, I kind of keep getting stuck on that because whenever we try to set up something like this it would be, this is really why I talked about at the beginning of the whole meeting, is our lawyers

will tells that if you want to have public input like that you need to do it in a structured way and that structured way is defined by law in the Federal Advisory Committee Act.

And so, you know, there are -- clearly we dance around it sometimes, but, you know, for something formal and high-level like this, we need to figure out what that structure looks like.

Obviously, within the government, we can coordinate in ways that are not but for the public comment and public engagement and government policy part that isn't flexible, that where the Federal Advisory Committee law is.

So anyway, I ask you to give a little bit of thought to that and if we have to have a federal, you know, if a federal advisory committee is relevant, is a relevant part of this coordination, I think that HSRP should ask itself whether the HSRP wants to have any of that role or whether we should do it through the Ocean Exploration Advisory Board or come up with a

different mechanism entirely.

So I understand what it is that we're trying to do with this taskforce, but we do have this structure defined by law for how to do these types of things.

So and I would also be happy if somebody can tell me I'm wrong and that we don't, we can do something like you suggest that is not subject to FACA somehow. But my understanding is it would be.

So anyway that's sort of been my biggest comment and I just want to thank you all for your thoughtful work and I look forward to your recommendations.

CO-CHAIR THOMAS: Right. Okay, thanks Shep. I know Anne you have a comment? You know, before we go there, just in the essence of time, I want to just summarize what I've heard because we need to make sure these are in the public comment and in this document.

So them I'm going to go around to everybody and just ping you and see where I've

captured it wrong or what other ideas you have.

But I've heard that NOAA should be the lead on this. I've heard that it would be good for the appropriations, the color of money, if we would have the flexibility to take advantage of some of the existing mechanisms through federal agency and partnership, such as IOOS, there's the Joint Institute.

I know at Scripps, I run through CDIP, which here the Army Corps is the lead but we do it through the Cooperative Studies Unit, CSU. We do not have a separate FACA.

I would tend to say my opinion is not to suggest having a second FACA, because of the overhead and expense for that. But if the appropriations allow the discretionary funding, NOAA could take more advantage of vessels of opportunity.

And then I guess, the one last thing that I don't know if we really covered, and maybe if somebody has a comment on this, but are the U.S. ships really, vessels really prepared? Do

they have the technology for this project or, it has been expressed that foreign flagged ships are better prepared.

So we just want to make sure that it would be interesting to enjoy your comments here as far as the capacity of the U.S. ships for the mapping.

Okay, I'm going to go around and ping everybody as last comments here on this. And we will be sending around a revised document for a NOMEC. So Ed Saade?

CHAIR SAADE: Sure. Let's start with the last first. I think it would be short-sighted to be worried about ships when, certainly within ten years and most likely within five years we're going to have a lot of autonomous platforms doing this type of data collection.

Getting hung up on the flag of the ship is a non-issue in my mind, unless we're just worried about tomorrow. And I don't think that where we should go, the whole point of this is to talk about the next ten years.

CO-CHAIR THOMAS: Great. Okay. Anything else to add?

CHAIR SAADE: No, I think it's, you know, let's let the group keeps going.

There's a lot of topics in here somebody commented to me, you know it'd be nice if we could close this out. But let's say that it's the biggest thing going because geographically, the rest of it all, there's a lot of really good opinions here and their saying all of them are valid at one level or another.

So my main recommendation is let's not cut this off for time, let's cut if off when we got it right.

CO-CHAIR THOMAS: All right. Thank you. Qassim? Are you on, Qassim? All right. Let's go to Anuj, come back to Qassim. Maybe we need to unmute here.

MEMBER CHOPRA: Okay. Thank you. No comments for this. Thank you, please go ahead. I'm completely aligned with the NOMEC strategy at this time. Thank you so much.

CO-CHAIR THOMAS: Thank you. Sean?

MEMBER DUFFY: Nothing to add. I was just unmuted. So nothing to add. I'll just follow the guidance of the Panel members who are better able to speak on this.

CO-CHAIR THOMAS: Okay. Nicole? Are you unmuted?

MEMBER ELKO: Yes, can you hear me?

CO-CHAIR THOMAS: Yes, we can now.

MEMBER ELKO: Okay. Only comment is that we, I do have some experience in working with interagency groups that are able to engage stakeholders and academia as well as federal agencies that aren't FACAs, and I know we don't have time to go into that right now but I'd be happy to contribute that to the contents of the paper if desired.

CO-CHAIR THOMAS: That would be great. Okay. Yeah, if you could follow-up with me on that that would be great. Okay, Lindsay?

MEMBER GEE: Yeah, it's interesting. I think what the Admiral just said is, like, yeah

there is that. Is there a way to do it without a task force, without another FACA or the legislation to do that? If there isn't and it came down to it, I guess the question would be well, could we kind of get people from the various FACA.

He mentioned OEAB and HSRP, well, maybe it's both contributing to that and maybe there's other FACAs that could be, that are related, that could be done as well.

I mean, I was interested about IOOS and I won't dwell on it here, but that sounds really interesting and I don't know the structure of how IOOS works well.

I know we've worked with some of the members on that, but I was really interested in that because from a regional perspective, it was really interesting, I think, to hear Jessica, I didn't get a last name, from Honolulu Corps of Engineers --

CO-CHAIR THOMAS: Podoski.

MEMBER GEE: Podoski, okay and that

was really interesting and as a comment about how these things get coordinated kind of backwards. This was a check that we were on last year out in American Samoa with the National Marine -- and it's related to what Joyce said as well.

We were on a project with National Marine Sanctuaries and partnered with CCOM and it was the Ocean Exploration Trust. And they had they're autonomous boat down in doing, preparing for some work we did together and it was funded by the National Marine Sanctuaries.

And in Pago Pago Harbor, they did some setup and tests and actually it has been surveyed recently. There was some work that Joyce had done on the reef around there and we did some of that work as well with ASV. And just to close that out, it was also submitted to the external source data at Coast Survey.

So it kind of happened but this is where I think we're saying those kind of happenings need to be, kind of, people need to know how to do that and then it gets done.

So I guess that was the comment about how do we make that and take Shep's point and how do those kind of things just always happen and people know about it in advance and it goes forward.

Yeah, I look forward to the work we've got to do, I guess in getting this strategy and the comment on the strategy through. Thanks, and that's all.

CO-CHAIR THOMAS: Great. Ed Kelly?

MEMBER KELLY: Yeah, I also, I don't think we need to have another, you know, FAC. I think, once again, I throw it back to IOOS. And I think, you know, we are in a position with IOOS, with the various Regional Associations, that that could probably bring the right number and the type of persons to the table for individual and then building it up under the IOOS platform.

I don't believe HSRP is the place to do this. I don't think we have the depth and breadth of participation and I would certainly,

you know, I think our papers are great, the ideas are great, the implementation for further development I would recommend goes through the IOOS network.

CO-CHAIR THOMAS: Thank you. Ann Kinner? Are you muted? You're muted. Muted. Still muted.

MEMBER KINNER: Okay, it says I'm unmuted now. On page roman numeral III of the NOMEC document there is at the bottom half almost 50 names in an existing task force and I would think that out of that existing task force, of which NOAA is co-chair and also is executive secretary.

You've got people already there, NOAA leading, and I would think that that could be the beginning step for creating what you call it a working group or whatever of that task force. Somebody's already put a task force in place, so it's not like you have to create a new one.

Why not take advantage of something's that's been called out in the document itself and

then, as I said, put together a working group of whoever it needs to be to get this thing started.

CO-CHAIR THOMAS: Okay, good comment. Have anything else?

RDML SMITH: Can I ask a clarifying question? What was the list was that the -- is that the list of the IWG-OCM or what is the list of?

CO-CHAIR THOMAS: It's on the screen Shep. It's UNOLS, MAC, R2R. Do you see it there on the screen? In caps? Before the bottom, yep.

RDML SMITH: Yeah, so I don't --

MEMBER GEE: No, Ann was talking about the strategy document itself. I think the listing --

CO-CHAIR THOMAS: Right.

MEMBER GEE: -- is the people that were in the task force and but they're all, again, all government people. I think whether you could establish a nongovernment working group with them I think was the question.

CO-CHAIR THOMAS: Okay. Right.

Right, so it's how to get nongovernment people into this working group here.

Okay, let's move on. Dave Maune?

MEMBER MANUE: I'm interested in seeing what autonomous surface vessels are going to be doing. I'm impressed to see what NOAA is doing on the North Slope with the Saildrone fleet.

They can deploy dozens of these Saildrones, all operated from central control, and go out there for weeks at a time and start mowing the lawn in a systematic manner, could be a single beam or multibeam.

So I see great potential from that technology for addressing the needs for mapping the EEZ. That's my major comment.

CO-CHAIR THOMAS: Great, thank you. Anne McIntyre?

MEMBER MCINTYRE: Yeah, nothing to add. Nothing to add just thanks everybody for the work on this, it's a huge project and I appreciate everybody's time.

CO-CHAIR THOMAS: Okay, thank you. Ed Page? You're muted.

MEMBER PAGE: Now I'm not. I'll just explore maybe the Committee on the Marine Transportation System as an interagency group that basically should be, have some concerns and issues to support a NOMEC and have tentacles and all kinds of connections with the private industry and the other agencies.

Helen Brohl talked to us briefly the other day and obviously they support what we're doing. That's the only thing I'm thinking of when we talk about -- I think we do without another advisory committee.

I think there's other mechanisms, ways of -- or a task force whatever to address these issues in that forum and CMTS can be part of that solution perhaps. And that, everything sounds great, thank you.

CO-CHAIR THOMAS: Okay, good thank you. Gary?

MEMBER THOMPSON: I'll go back on

Lindsay's comment about the Federal Advisory Committee. I serve on the PNT Advisory Committee and we have a lot of discussion about land-based autonomous vehicles, so I think that committee could provide some input to this committee on GPS technology and position.

CO-CHAIR THOMAS: Okay. I think what would be really good is if you could capture some of these comments particularly the ones that haven't been mentioned, or I didn't read back.

You could capture them and send them in to us, Lindsay and Qassim and myself, maybe. And let's try to -- we'll finalize the document here now.

MEMBER ABDULLAH: Julie, I didn't have a chance. I will get --

CO-CHAIR THOMAS: Oh, yes. And I was going to come back to you. Yes.

MEMBER ABDULLAH: Okay, thank you. Thank you.

CO-CHAIR THOMAS: You're the last one here I didn't catch.

Go ahead.

MEMBER ABDULLAH: Yes, I mean just to respond to Admiral Shep about, you know, mechanism. Whatever we do, we need the team of doers, definitely. This is -- we need to keep it away from bureaucracy and bring agency. We need people who can roll their sleeves and do that tour. You know, they could be executives. They could be technical, but we need -- whatever you call it, I don't want to be stuck with the names or -- I know that you are limited within the regulation, and you ask whether HSRP cover that.

I think if we don't find anyway within NOAA capability to form an active dynamic team to help the execution of this strategy, I think HSRP should take responsibility over it but form a team within that just to go around the regulation.

You know, I mean, there is -- not necessarily all can be done by the HSRP member, but we can oversee a new working group where we bring all these private, academia, government,

federal into it. I mean, I just to -- as a suggestion.

For funding, you know, we're looking at whether there is funding, you know, protocol or more though, for NOAA to take over money to execute.

I think we should encourage the other way too. I mean, NOAA to support several program or some other agency where they have more capability or availability. We need to consider that, instead just not bring in money but also giving them money to task somebody else to do it.

That's really what I have on it. Otherwise, I think it's great -- we can keep it growing if there's no -- and I agree with Ed, we shouldn't rush it. This is a huge thing, sort of initiation. We should take our time to think it over if we're not ready. Thank you.

CO-CHAIR THOMAS: Thanks, Qassim and then, Sal, I do need to catch you here too.

MEMBER RASSELLO: Hi. Like my comment before, I think the -- besides the of the

seafloor and the depth of the mapping and current penetration, I think it's actually, now, using the energy of the water to produce electricity like the wind farms or wave farms like they have in the Netherlands, and along the coast of U.K. as well.

I think that's a good driver to take interest of stakeholders into the project.

CO-CHAIR THOMAS: All right. Okay. Let's go to Andy. Are you there, Andy?

CAPT ARMSTRONG: Yes.

CO-CHAIR THOMAS: Okay. Great. Thanks.

CAPT ARMSTRONG: Double-punching buttons, sorry.

CO-CHAIR THOMAS: Yes.

CAPT ARMSTRONG: Yes, so I have, I mean, I wasn't going to raise this, but you said that you'd like to finish up this document and so that prompted me to make a remark.

And Number 5 is actually up on the screen there now. There's a sentence in there

that said these updated methods are hampered by outdated slow-moving regulatory framework. That's just an invitation for us to go down a rabbit hole with the people who read this and if we just took that sentence out, I think we'd be better off because we'll be -- somebody will say well, what framework? Or what do we need to do? So, just a suggestion, and I don't think that's a helpful.

It may be true, but I don't think it'll be helpful in this case.

CO-CHAIR THOMAS: All right. Thank you. Anything else?

CAPT ARMSTRONG: No, no thanks.

CO-CHAIR THOMAS: Larry?

DR. MAYER: Yes, I think we got some great discussions. But I think we're really getting -- beginning to focus on critical issues we're going to face in trying to implement NOMEC.

I come back to Lindsay's story about what happen in American Samoa. And I think one of the keys is to see if you can turn a situation

like that which kind of happened by chance, that people were able to get some critical mapping in a very remote area, even if it wasn't remote, and make it happen by design.

And I think that's the key from these mechanisms that can explore all the potential assets when used efficiently and effectively.

And, so, I'm very intrigued. I don't know much about how IOOS works if that, you know, kind of on the regional organization basis might be a mechanism or what Nicole has in mind in terms of experiences that she's had. But I think we should really explore those and see if we can maybe help NOAA in trying to identify a mechanism that really can go beyond, just even in our agency, collaboration but using multiple sectors.

CO-CHAIR THOMAS: Okay, thank you. Okay, let's go to Juliana.

MS. BLACKWELL: I don't have any comments, Julie. Thank you.

CO-CHAIR THOMAS: All right. Rich?

MR. EDWING: Yes, I don't really have

any comments either, Julie. You know, we're really in a, primarily, in a support role in this effort so.

It's been a great discussion by the HSRP and Shep and Juliana. I've gotten a lot of valuable input from you guys. So, appreciate that.

CO-CHAIR THOMAS: And, okay, thanks, Rich. And Shep?

RDML SMITH: Thank you. Thank you, all. No, I don't have any additional comments. I look forward to the final version.

CO-CHAIR THOMAS: Okay. Great. All right. So, in the interest of time, and we're going to stop the discussion with this. And, Sean, I'm going to turn it over to you to talk about some of the recommendations that have come in for the Letter to the Administrator.

MEMBER DUFFY: All right. Well, thank you, Julie.

So I'm going to do this. And something I say a lot in my normal job is, while

waterways management is a team sport and it's very true here today, sometimes I'll add that my TEAM acronym is together everyone achieves more. So, when we go through this, I'll hit some of high points of the comments that I've captured so far but then I'm going to go around the Panel.

So, there was several comments about recognizing, acknowledging Congressman Don Young. And, I think, that's, you know, hit a lot.

There's, of course, a lot of discussion about the NOMEC's strategy and the Alaska Coastal Mapping Strategy, and one including making either a recommendation to approve it. I think we've covered that today, so I will adjust that later.

A comment that we heard a couple of times was about Saildrone mapping of the Artic.

Lots of discussion about interagency partnership, public-private partnership, so again, that teamwork kind of logic flows through a lot of it.

And a lot of discussion that NOAA

should be one of the leading agencies in this. And I won't say lead, but that's what was say.

Connections here are related to blue economy, economic prosperity, promoting maritime commerce, protecting the environment and ecological resources.

Compliments came in on PORTS sensor information being broadcast over AIS, something that's been being worked on for a long time.

Standardization, back to NOMEC's standards, nearshore/deep ocean type discussions, consider requirements and potential benefits of high resolution, nearshore bathymetry for storm surge, run-off, run-up inundation, 3D currents, coastal resilience studies.

Other than that, there were a lot of different comments about COVID-19 and, you know, adapting to the present system.

Looking at, you know, again, being on a webinar and not in person and how industry has responded in a lot of different ways, outside-the-box thinking.

With that, that's the majority of the comments I received. But I really would like to go around and, I'm going to just say it, I'll start off a list I have of alphabetical order going backwards. So, I will put Gary Thompson on the spot and, Gary, if you would hit anything that I didn't mention or that you would like to make clear.

And, again, this will be used for helping put in that recommendation letter in a format where everybody will be able to comment. And we'll work through as you all are familiar with the editing process to make sure we have a final product that represents everybody.

So, Gary Thompson, you there?

MEMBER THOMPSON: Yes. Yes, can you hear me?

MEMBER DUFFY: Yes, sir.

MEMBER THOMPSON: All right. Since I've been on the HSRP seems like, almost every meeting I hear about small boats and technology to help them determine their position at low

cost.

So I think that be something that NOAA or our group needs to take a look at. There's technology out there, low-cost technology that can probably be utilized for this and may be already being used. But I think that would be an area of some research looking at to help with the small boats and their position especially in port areas.

MEMBER DUFFY: All right, Gary, I thank you. Next up's you, Julie.

CO-CHAIR THOMAS: You called out everything I sent into you, so I'm good. Thank you.

MEMBER DUFFY: All right. Thank you. Captain Sal?

MEMBER RASSELLO: Sean, I think you covered everything. I don't have any further comment. Thank you.

MEMBER DUFFY: Thank you, Captain. Captain "Be Like Ed" Page?

MEMBER PAGE: Yes. I think that with

the precision navigation happening, I think we should mention we're making progress on many of the factors that come into facilitating, you know, efficient marine transportation, but, I think, we should say we're moving in the right direction and that we've got a better appreciation of the financial impacts, rippling impact from adverse, impacts of the economy when Mother Nature or particular other conditions can interfere and that we can mitigate those adverse impacts by some of the tools that NOAA can provide to the precision navigation.

I think that pretty good story about Houston and that small area and impacts. And I realized many other factors, variables that come into play as was brought up, this whole small boat issue, but that can be addressed -- there's better ways of addressing that.

But you have to put all the pieces together: type of vessel's a factor, there's the size of the channel, and other wind conditions and current conditions, et cetera, et cetera.

But the better the information the mariners have the more likely they can proceed even with those other factors in play. So I think that, maybe, we want to mention that to some extent. Okay, that's all I got.

MEMBER DUFFY: Thank you, Ed. Captain Anne McIntyre?

MEMBER MCINTYRE: Hey, nothing to add. I thank you.

MEMBER DUFFY: Thank you. Dave Maune?

MEMBER MAUNE: Hi. I will be anxious to see how NOAA reacts to the Alaska Coastal Mapping Strategy comments that we provided.

We have several dozen recommendations in there, and I hope they are practical recommendations that can be implemented rather than something that just sounds like a good idea that may be impractical for some reason.

So I'll be anxious to find out if our recommendations are beneficial or not. Otherwise, you've covered all my topics. Thank you.

MEMBER DUFFY: All right. Thank you, Dave. Ann Kinner?

MEMBER KINNER: Yes, I just want to echo what Gary Thompson said because, again, small craft are my focus.

And I know what they're willing to do, whether they can afford it or not. I know what they would like to do, let's put it that way.

And I think there's going to have to be some mechanism to -- whether, I don't know what it is, communication of some sort to let them know if things are going into this electronic whatever-you-want-to-call-it dealing in restricted visibility, which isn't just fog by the way.

The little guys just don't know, they don't know what they don't know. They don't know what they don't have.

And I can see some issues if the big ships are all equipped, but they haven't stopped to talk to the little guys, the 26-foot center console fishing boat or the 30-foot sailboat who

has no electronics on board.

I think that's going to be an issue that we've got to be looking at the little guys too.

MEMBER DUFFY: All right. Well, thank you. Ed Kelly?

MEMBER KELLY: Yes. Ann, I hate to say it, but we can't face the world on the people that are least equipped to live in it.

So I think it has to be, across the United States, a significant effort to upgrade the capability of smaller boats and the people who operate them.

There are still some states, you know, New York and others included, that still don't even require a license to operate motorized craft. So, you know, that's my comment on small boats.

But I think overall, Sean, you've done a great job in capturing the big hit points, and I think I've got nothing else to add to that.

MEMBER DUFFY: Thank you. Lindsay,

you're up next.

MEMBER GEE: Yes. Thanks, Sean. I think we're beating it to death, that NOMEC's a huge challenge, and it's bigger than our normal HSRP responsibilities.

And when I commented to Shep yesterday about we didn't want him to move away from the shallow water, and he said, well, sometimes you get a money with a note.

Well, I think, what we should look for in here is a positive comment as we should use the leverage what's in the NOMEC strategy to say, well, you know, any funding that comes for that shallow area really should be accelerated because not only is it the general NOMEC, wanting to map the ocean, you know, map the seabed, it has specifically for the task they have for marine navigation and support. And, I think, we shouldn't lose sight of that. Thanks.

MEMBER DUFFY: Thank you, Lindsay. Dr. Elko, you're up.

MEMBER ELKO: Thank you. Two things.

The concept of NOAA leading and then the concept of interagency collaboration.

I think that it might be nice to put those under one bullet or in the same paragraph or however you're structuring it.

So, you know, we recommend NOAA leads while, you know, still encouraging and facilitating interagency collaboration.

And, then, just my other comment is that I think that we should put a big thank you in there that Dr. Jacob attended the meetings and was so engaged. And NOAA senior staff, you know, let's really play that up and encourage them to continue doing that in the future.

MEMBER DUFFY: Well said, thank you. So, I will just keep going down the list and come back at the end if there's time on my points. So, Captain Anuj?

MEMBER CHOPRA: Oh, thank you, Sean. All I wanted is already there. Thank you so much. You've covered it. Thank you for the opportunity.

MEMBER DUFFY: Thank you. Qassim Abdullah, sorry.

MEMBER ABDULLAH: Thank you, Sean. I just want to -- I think you hinted to it, but I really want to emphasize that standardization.

I really want to push the development of a national standard for coastal mapping and hydrographic survey.

The statement, the lady who came earlier on the comment and mentioned about that existing standard. She is right.

There is a document called a standard, I went to it. It's a three and a quarter pages. Two pages is a table, and you read inside it's telling you this is guideline.

The standard is not a guideline. This is a confusion, you know, people dealing with this issue.

Protocol they call best practices, a project specification, we have a lot of them. None of them come to the level of national standard, and as that what I want NOAA to please

listen to that.

There is so many things around. None of them is a standard and especially the lady claim there is a standard. We should do whatever about it. It is totally false. It wasn't a standard, it's a guideline, a one-page text, and the rest are table. Thank you.

MEMBER DUFFY: Thank you, Qassim. So, that's the Panel members I've gone to. The Directors now starting with Dr. Mayer?

DR. MAYER: I'm good, Sean. I think you've got this.

MEMBER DUFFY: All right. Thank you, I appreciate that. Mr. Edwing, are you available?

MR. EDWING: I am here. And, Sean, on your long list, you have a very comprehensive list. But do you have anything in there about the fog discussion that went on today?

MEMBER DUFFY: No one, and I will tell you that's a good point. I didn't mention it, but a lot of what happened today is still kind of

like being processed. But it will be incorporated into the draft that we will post for everybody to comment on. But very good catch.

MR. EDWING: Yes. No, well, I agree, and I think the discussion today, while it answered a few questions, probably raised a lot more that still need to be explored but just giving past HSRP emphasis on the topic, you might just want to acknowledge that somehow.

MEMBER DUFFY: Very good point. Thank you. Okay, Ms. Blackwell, are you available?

MS. BLACKWELL: I'm here, and I want to say I support the recommendation that you all have already identified.

I don't know if you want to say anything related to the delay of the NSRS modernization. I don't think it's necessary, but if you had thoughts on that that you wanted to include, that would be welcome feedback. Thank you.

MEMBER DUFFY: Yes, ma'am. I appreciate that. Captain Andy Armstrong?

CAPT ARMSTRONG: Yes, thank you, nothing to add. Sean, a really nice job on rounding all of this stuff up and running this comments process. So, thanks for that.

MEMBER DUFFY: Okay. Well, I appreciate that. And that's a good segue because I'll say something about the fog.

I want to be kind of, I'll say polite and not careful, but I think this is a great effort. And I think -- I look forward to having some discussions with some of the members later on.

And fog's a really tricky issue. I mean, on Mississippi River, we have almost 260 miles of a ship channel. So sometimes when you have fog in one area and not in another and depending on where it is, it could impact the whole channel, or it may only impact a very limited number.

But looking at the small boats, that's a real issue. The Sportsman's Paradise in the lower Mississippi River in that delta, we have a

lot of fishing boats, a lot of hunters, a lot of different craft transiting across a very busy ship channel.

But with that, I'll just leave it that, again, we will have a draft set up where everybody can comment. And we'll whittle away on getting everything right. Hopefully, pretty quickly for these comments back to Dr. Jacobs.

And I appreciate everybody's support and comments. Thank you.

CO-CHAIR THOMAS: Sean, I'm not sure we got Shep's comment.

MEMBER DUFFY: You know, you are right. And I will say Admiral, you are not on my list, sir.

(Laughter)

But I should know better, so thank you, Julie.

CO-CHAIR THOMAS: It's okay.

RDML SMITH: Thanks. I do have just a couple of thoughts.

And one is that, you know, with the

more we talk about the NOMEC, I keep remembering that we have for about 20 years had a structure in place to coordinate ocean mapping. The, you know, IOCM program authorized by OCMIA.

And that there already is quite a bit of established precedent for a lot of the things that we're asking for at a larger scale.

I think the thing that's different is that was about coordinating activities to avoid duplication and finding synergies, as opposed to a structure to run a big program that where we might expect to have increase in resources.

So a lot of those pieces are the same but the fact that there might be money has changed everybody's calculus about how to engage with this program.

So, for instance, the IOCM, IWG-OCM group that Ashley is involved with is hosting the Standard Ocean Mapping Protocols Forum with full public synchronization, speakers, everything, in just a couple of weeks. And it is exactly the type of forum that I think you all were

describing.

Now, it didn't stall, it's not a -- it doesn't nest under a larger structure, but it's similarly inclusive with officers and stuff that are from other sectors. But I think it is illustrative of some opportunity that we already have.

And that, similarly, the IOCM has sponsored regional workshops for gathering priorities regionally. And we'll -- it's obviously a little bit awkward to do that right now with COVID, but I know that they're working on coming up with a model of doing that, even in just this way.

But I think we're working within existing structures. And I think if we're looking at the opportunity to enhance our existing structures and programs in addition to a consideration of whether we need something larger and grander.

And that big change of having money is a big game changer for sure.

And then second is just, you know, boy, Qassim, I would love to have the same sort of standards control over mapping that my peers around the world have.

You need to get a permit in most parts of the world to do any mapping and you need to do it to the standard and you must provide the data to the hydrographic office.

We don't have any of those authorities. And, you know, this is freewheeling 'Murica here, right? So, we don't like lots of government rules.

But if that's what we're talking about, we have probably, you know, 50 models around the world of exactly how to put a standard in place that requires a, you know, kind of a set way of doing things.

And, so, I think it's certainly worth considering. As you might imagine, everybody's in favor of a standard as long as everybody does it my way.

Soon as we start saying, well it's got

to meet hydrographic office standards then the Fisheries' people will complain that they got to put tides and sound speed into their system and, you know, et cetera, et cetera. And, so, we have -- we tried in the past, and we've gotten a lot of pushback.

Now, that's not to say that we shouldn't try again, and the moment is different now. And, maybe, the time is right to make another tilt at that windmill. So, I really appreciate you reminding us of the value of that.

And, so, I will stop my comments there. But thank you, all, for a great discussion.

CO-CHAIR THOMAS: Okay. So, Sean, maybe, I'll pick it up from here.

And, actually, Ed, I know that we're at the time -- overtime for this particular session.

You know we could we -- but we haven't had a chance to look at is a priorities matrix. But we could dedicate -- excuse me, what is it --

the next P&E session to really go through the priorities matrix because it will set the topics for the next meeting. I don't know, Lynne, Ed, what do you think?

CHAIR SAADE: I think that's fine because we are coming up against the wall.

MS. MERSFELDER-LEWIS: I would just show it because I think everybody just went through what would have normally been your closing comments. You just had them. So you have a little time.

CO-CHAIR THOMAS: Show the priorities matrix?

MS. MERSFELDER-LEWIS: Okay. And I would just ask do any of the members have things that are giving them heartburn that they want to see discussed or talked about?

I know Qassim wants to discuss what you guys have an issue paper. Are people interested in talking, one, about standards?

And they're might be other things as well. And I think Nicole Elko might want to talk

more about that nearshore bathymetry or, you know, whatever those things are.

I don't want to speak for anybody or not speak for somebody and miss something. But if you guys had something burning that you want on the record now is the time.

CHAIR SAADE: Okay, so let's do this, Julie. We've only got 15 minutes, and I think we can put the priority matrix up. And in the meantime, go quickly through this.

There's been a couple of emails running around with ideas on other topics to cover. But we haven't done those bi-monthly or once every few months meetings that are designed to do a little bit of background and are open to the public and people can -- can at least get the ball rolling on some of these new ideas.

That sort of, since Dr. Jacobs brought it up yesterday, about coastal mapping and all the reasons to do that. Of course, we want to follow-up on that, but that needs its own background technical clarification for

everybody's benefit.

And, then, we can go down that road. But if anybody wants to throw something on the table right now for meetings that are coming up that we can organized and have a discussion and do some technical deep-dive on that then let's get that out on the table right now.

CO-CHAIR THOMAS: All right. Let me just say that I do have Qassim's email, so we don't have to do that one again. And, yes, but go ahead then. If you want to go around or if you want to ask people.

CHAIR SAADE: Dr. Nicole, do you have -- do you want to, at least, voice your ideas, so we can capture it and come back to it?

MEMBER ELKO: I actually am not sure what Lynne was referring to, so I'll pass for now.

CHAIR SAADE: Okay, then. And that side too because we communicate enough on the side.

I really liked the, you know, I

personally would like to follow-up on Dr. Jacob's ideas and then some of the things that were bantered around this morning as we were communicating with each other.

Between Ed Number 1 and what Qassim was saying, we have another list that would be very good to have some more deep-dive backgrounds in it, you know.

I kind of missed the fact that we haven't been doing any of those technical presentations on the sides because I think they're very beneficial and I think they're easy. And in the environment that were in right now with everybody, it's easy to dial in and get involved, we can probably do a lot more of that.

So, I guess my recommendation is to have some more technical presentations in the interim between these public, formal public meetings.

Shep, if you want to say anything else, you know, we got a bit of a gap, and everybody's kind of coming to the end here,

energy-wise and everything else.

RDML SMITH: Yes. Sean was either muttering under his breath or muted.

(Laughter)

CHAIR SAADE: Take your pick.

RDML SMITH: Sean, did you want to say what you were going to say?

CO-CHAIR THOMAS: Muted.

CHAIR SAADE: And, Ed Kelly, is that an old comment or did you already --

MEMBER DUFFY: Ed, yes, so, I appreciate that and was indeed muted.

So, I'd like to just talk real quick about the partnership, I think that gets back to the interagency. And I think even looking at the AIS over -- the PORTS system over AIS is part of, maybe, combining those two under interagency. Now, I'll leave it at that.

CHAIR SAADE: Okay.

CO-CHAIR THOMAS: Sean, I know that you wanted to -- so this brings up a discussion that we had going forward.

You were thinking, maybe, the HSRP could talk about sensor partnerships, different agencies having different resolutions or formats for sensors, et cetera.

MEMBER DUFFY: So, I don't know if that's even ready for a topic. I would like to bring it up later.

I'm kind of like looking at something and it falls under that category or umbrella of interagency cooperation.

But I do plan to, I think, go like to the Planning and Engagement Committee with that as just an idea, see what other members think and if they're willing to support that. And, then, there will be definitely a connection to the tech folks.

So I'll leave that for a later date, but I think the partnership combining those types of things kind of takes a couple items and kind of focuses them on what we've talked about with interagency efforts.

CO-CHAIR THOMAS: Great. Okay, there

is an interagency on our priority's list, so we can expand that if needed.

MEMBER ABDULLAH: Julie, may I add, maybe, kind of add in a comment in regard to this please.

CO-CHAIR THOMAS: Sure.

MEMBER ABDULLAH: And, I think, is it -- might be as useful for our future meeting, whether this biannual or the regular meeting, to dedicate time, maybe 45 minutes, an hour, for technology showcase, for example, where we bring technology manufacturer.

I know Larry's doing a great job. Larry, you're doing on -- briefing us on what you're doing.

But it's nice to have the manufacturer to come and brief us on the latest technology. And that's session also can be dedicated to bring other interagency members like Corps of Engineers, JALBTCX, to brief us on what they doing, you know, to complement NOAA activity, you know.

I mean it will be good for us just to see what's going on outside NOAA, you know, for us as HSRP. That's just a suggestion.

CHAIR SAADE: No, that's a good suggestion, and we do it. Historically, we've done it a lot. I mean, maybe, we kind of drifted away from it. Probably directly related to the fact that our meetings are only four hours long now. And we don't have a morning session and a lunch session, and we used to push it to about three days of eight-hour days.

But part of it is the schedule, Qassim, to fully support the idea, we'll work on future agenda.

MEMBER ABDULLAH: But, Ed, we don't have to really to do it for this big meeting, for example. We can schedule a virtual one, you know, in between, you know.

CHAIR SAADE: Right. And we've done before, and we invite the public just to have a topic on the level of interest relative to technology.

MEMBER ABDULLAH: Yes. That's good for everybody, yes. Thank you.

CO-CHAIR THOMAS: It's been asked -- both Ed Kelly and Gary Thompson want to make a comment.

MEMBER KELLY: Yes, Ed Kelly here. You know, this is my eighth year, and this is probably my last public meeting.

So I just -- while I've got the public record, I'd just like to go on record in saying it's been a great run. I've been tremendously amazed and gratified by the great work done by the NOAA leadership and staff.

And over the years, I've consistently found all the HSRP members to be dedicated, extremely skilled in their fields, and a real pleasure to work with.

So, just a thank you to everyone. It's been a tremendous experience to me. And I just want to also be on record that NOAA still owes me a trip to Hawaii.

And the second part is that PORTS

should be federally funded. And I hope somebody out there, I see Sean shaking his head, and I hope a few others will be in the same way along there. When I was hearing about how the Navy was getting PORTS, that means the federal -- if the Navy is paying, the federal government is paying and that puts my port at a competitive disadvantage because of things like that.

But enough about that, I hope someone will shake up the obstruction and carry that forward.

But thanks to everybody involved, and it's been a real pleasure. Thank you all.

CHAIR SAADE: Thanks, Ed.

MS. MERSFELDER-LEWIS: This is Lynne. This is Lynne. I just have to jump in and say, Ed, you're retiring too early. You have another year.

MEMBER KELLY: Oh really.

(Simultaneous speaking)

CHAIR SAADE: Nice try, Ed. Nice try.

MS. MERSFELDER-LEWIS: I'm sorry. You

have to push us hard to get there before December 31st.

CHAIR SAADE: There's no early outs on the HSRP.

MS. MERSFELDER-LEWIS: Yes, that's exactly. We're keeping you for another year. And Sal Rassello's, the same.

MEMBER KELLY: Okay. My mistake.

CHAIR SAADE: We're going to record that speech, so you can use it in a year.

MEMBER PAGE: Too many Eds.

(Simultaneous speaking)

MEMBER KELLY: My beard will be quite good by that time.

RDML SMITH: He was just trying to figure out how to get that full federal funding for PORTS into the discussion when it wasn't on the agenda, you know.

MEMBER DUFFY: Full federal funding floats all boats.

CO-CHAIR THOMAS: And, Gary --

MEMBER THOMPSON: So, one of the

topics I would like to see at our future meetings is about GNSS reflectometry. I can't even say it this afternoon. I think it has potential. We could see a lot of use here on our coast for measuring water elevations. So, I know there's been some research done on it.

But I'd like to see the next presentation on that and possibly more research.

CHAIR SAADE: Good. Okay. If there's no other comments or required topics that we need to cover, Julie, anything else from your perspective?

CO-CHAIR THOMAS: NO, I marked down a couple things to add a line to the priorities list.

And I think we really need to go through this and clean it up. Some of this stuff is pretty old. And it's not that the topics, per se, but the comments for the topics are pretty outdated. But, amazingly enough, a lot of the topics are still relevant.

So I think I'll take a first pass, go

through and try to clean it up and send it out. And, maybe, we can take some time during the next P&E meeting to really discuss it because we want to get topics for the next meeting is the point of this. And it's a good tool to get them in the priorities list so that we can then focus on them during the next meeting.

CHAIR SAADE: So then the next meeting is late March or early April, correct?

MS. MERSFELDER-LEWIS: Yes, I was muted. I'm still laughing about Ed Kelly trying to get off too early. Yes.

And, Ed Kelly, I hope we all see each other before you leave, and we can all like have a, you know, a glass of soda or water together, so.

MEMBER KELLY: Absolutely, I'm looking forward to it.

MS. MERSFELDER-LEWIS: That's correct. Maybe even Hawaii. So, Ed, yes.

We'll come up with dates soon. And one thing you guys plan is -- I mean you have

five more minutes, and we really can't hold the transcriptionist over.

So if you could weigh in those two half-days about what we did okay, I'd welcome feedback. It doesn't have to be right now. It can be anytime.

MEMBER KELLY: Okay, Lynne.

MS. MERSFELDER-LEWIS: Because, I -- sorry. If you haven't already turned in your timesheet, please turn in your time.

MEMBER KELLY: How about our travel vouchers?

MEMBER MAUNE: I want to thank Lynne in Virginia and all their staff for putting this together. I think you did a wonderful job.

CO-CHAIR THOMAS: Yes. I think we all clapped at that one.

CHAIR SAADE: Yes. I agree.

MS. MERSFELDER-LEWIS: I want to thank specifically, Amanda Phelps, Christine Burns, Virginia Dentler, Jill Stoddard, you guys was the amazing, best moderator I've ever seen behind the

scenes. And Galen, who you know already, and David Barglow did a hundred million updates on the website for us. So, thanks to everybody.

CO-CHAIR THOMAS: Thank you. And also to the Directors. I think --

MS. MERSFELDER-LEWIS: Sorry, and Christine Burns.

CO-CHAIR THOMAS: Okay. I was just going to say, I know the Directors have spent a lot of time, too, reading through our different notes, so I really appreciate it all. And to Ed Saade.

MS. MERSFELDER-LEWIS: Maybe still for the next working group meeting, we can go into a lot more detail on that and on, you know, wish lists for speakers --

CO-CHAIR THOMAS: Lynne, you're dropping --

CHAIR SAADE: Okay. I'm going to go ahead and end the meeting and thank everyone.

This has already been noted, but I thought the meeting on a technical level was

seamless. It was really, really excellent. Really easy with the exception of all of us that forget to unmute, but that's a technical deficiency as human. And we'll figure that one out one of these days.

So with that, I want tell everybody, stay safe. Stay healthy. We'll look for you out on the web. Let's keep the energy going because we are really doing some great things and tackling some incredibly big issues that are really, really meaningful.

So, have a good evening and afternoon, and everyone take care.

(Whereupon, the above-entitled matter went off the record at 4:58 p.m.)

J

Q

U

C E R T I F I C A T E

This is to certify that the foregoing transcript

In the matter of: Hydrographic Services Review Panel

Before: US DOC/NOAA

Date: 09-24-20

Place: teleconference

was duly recorded and accurately transcribed under my direction; further, that said transcript is a true and accurate record of the proceedings.

Neal R Gross

Court Reporter