U.S. DEPARTMENT OF COMMERCE

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

HYDROGRAPHIC SERVICES REVIEW PANEL

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PUBLIC MEETING

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WEDNESDAY
AUGUST 29, 2018

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The Hydrographic Services Review Panel met at the Elizabeth Peratrovich Conference Hall, 320 W. Willoughby Avenue, Juneau, Alaska, at 9:00 a.m., Joyce Miller, Chair, presiding.

HSRP MEMBERS PRESENT

JOYCE E. MILLER, HSRP Chair
EDWARD J. SAADE, HSRP Vice Chair
DR. LARRY ATKINSON
SEAN M. DUFFY, SR.
LINDSAY GEE
KIM HALL
EDWARD J. KELLY
CAROL LOCKHART
DR. DAVID MAUNE
CAPTAIN ANNE MCINTYRE
CAPTAIN (ret. USCG) ED PAGE
SUSAN SHINGLEDECKER

JULIE THOMAS

GARY THOMPSON

NON-VOTING HSRP MEMBERS

CAPT ANDY ARMSTRONG (ret. NOAA Corps), Co-Director, NOAA/University of New Hampshire Joint Hydrographic Center
JULIANA BLACKWELL, Director, National Geodetic Survey, NOS
RICH EDWING, Director, Center for Operational Oceanographic Products and Services, NOS
DR. LARRY MAYER, Co-Director, NOAA/University of New Hampshire Joint Hydrographic Center

NOAA STAFF PRESENT

REAR ADMIRAL TIM GALLAUDET, Ph.D. (ret. USN), Assistant Secretary of Commerce for Oceans and Atmosphere, and Acting Undersecretary of Commerce for Oceans and Atmosphere, NOAA
REAR ADMIRAL SHEP SMITH, HSRP Designated Federal Official; Director, Office of Coast Survey
GLENN BOLEDOVICH, Policy Director, Policy and Constituent Affairs Division, National Ocean Service
CAPTAIN RICK BRENNAN, Office of Coast Survey
ASHLEY CHAPPELL, Office of Coast Survey
VIRGINIA DENTLER, Center for Operational Oceanographic Products and Services
COLBY HARMON, Office of Coast Survey
DR. NICOLE KINSMAN, National Geodetic Survey

CAPT ELIZABETH KRETOVIC, Office of Coast Survey

LAURA REAR McLAUGHLIN, Center for Operational Oceanographic Products and Services

LYNNE MERSFELDER-LEWIS, HSRP Coordinator

NEERAJ SARAF, Office of Coast Survey

ALSO PRESENT

DR. JAMES REILLY, Director, U.S. Geological Survey

AIMEE DEVARIS, Regional Director for Alaska, U.S. Geological Survey

TRACY FULLER, National Geospatial Program, U.S. Geological Survey

KEVIN GALLAGHER, Associate Director, Core Science, U.S. Geological Survey, U.S. Department of the Interior

DAVE SAGHY, Chief, National Geospatial Program, U.S. Geological Survey

DR. MICHAEL TISCHLER, Director, National Geospatial Program, U.S. Geological Survey

BRIAN WRIGHT, National Map Liaison for Alaska, U.S. Geological Survey

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

(9:02 a.m.)

CHAIR MILLER: Good morning and welcome to the second day of the Hydrographic Services Review Panel meeting here in Juneau, Alaska. We had a great time viewing your city last night.

As is common or as is our usual practice, we are going to start off the morning by going around with the panel members and the other folks around the table here to recap and give sort of thoughts on important things we heard yesterday. And I will start off with my Vice Chair, Ed Saade.

And also please remember to say your name when you are speaking.

VICE CHAIR SAADE: Thanks, Joyce.

Well mainly, I wanted to talk about the fact that I thought the process worked really well. The contributors from the local Alaska and Juneau representatives and stakeholders were allowed to really discuss in detail and interact

with the rest of us in the question and answer process. So I thought that worked really well, and it was really very informative, and we got pretty deep dive into everything.

So from that aspect, I want to encourage us to set that format up in the future when we do these types of things.

Thanks.

MR. EDWING: So yes, good morning. I thought yesterday worked really well, as well. I think we heard a lot of good input from local stakeholders during the afternoon session in terms of areas where NOAA could make some improvements or do some things to assist them.

And then I thought in the morning with the Water Level Panel, I just thought the discussions and the partnerships that were on display there are perhaps a model that we could look to you know to emulate in other areas around the country.

MS. BLACKWELL: This is Julianna Blackwell.

From yesterday's discussion, the Stakeholder Panel sessions went extremely well. We got a lot of information. In particular, I was delighted to hear the term isostatic rebound used by so many folks, which tells me that people are geodetically aware of what is happening in local areas here in Alaska and the fact that there is an interest in making sure that we focus on the coastal region, the coastal area in that transition from water level information to terrestrial.

And so I think folks are really aware of what the needs are and I was really pleased to hear that presented to us yesterday. Thank you.

CHAIR MILLER: Lindsay.

MEMBER GEE: Yes, Lindsay Gee. Yes, I think I'd like to echo what Ed said.

I really thought the IOOS and both the stakeholder meetings were great. I really appreciate their input. And it kind of describes some of the unique issues that Alaska has but it also, I think, highlighted for us there are

similar issues we see around the country in different meetings and raise some of those things about the updates and real-time information and those sorts of things and how there are things that NOAA still need to address, I guess, in that. And that's something I think we were pleased to see that over the couple years that I've been here that they are.

And I think with Alaska to see the last frontier solutions that they have, that people just get on and do stuff. And I think that's an interesting something we can take away that maybe can assist in other areas, as well.

But yes, it was the unique issues they have and the solutions they kind of have come to so far because of the remoteness.

MEMBER HALL: Hi, it's Kim Hall and Lindsay stole my thunder.

But what I was going to say was it was interesting to hear, and I think it was from the Vitus guy, it was small changes can have kind of infinite effects.

And though this is the last frontier, their issues, perhaps much grander in scale, are not unique to the region, so echoing what Lindsay just said and what Ed Kelly eloquently said at the end of yesterday. That and while it might not be an HSRP-specific issue, obviously, we heard a lot about weather forecasts, the broadcasts being I think it was useless was the word that was used over and over again and the extraneous information that was not useful to the mariner on that.

So while it's not our issue, I think it is certainly something that should be a takeaway for our NOAA colleagues here at the meeting today.

Thank you.

MEMBER SHINGLEDECKER: Susan Shingledecker.

I was really excited to start the day working with IOOS and their group and how you know we had -- Bill and I presented to their group, and how kind of that partnership and the

collaboration has grown over the last few years.

I was especially excited to hear about their certification of the 11 regions, as I know that incorporating non-authoritative data and other authoritative data into data sets has been something we have long talked about. I was really excited to hear their progress on that issue and see the progress we've made generally, towards that aim.

The other comment I had echoes what Kim said and a discussion I had last night. The stakeholder feedback was really, really interesting and very, very valuable. And I think we've seen, in many regions where we go, you know when people have a chance to be in front of NOAA, they want to tell us about the Weather Service and how do we, how does NOAA effectively provide a mechanism for that. And I might encourage NOAA to see, if the resources are available, to find someone from the Marine weather side of the Weather Service to come and participate in some of these meetings to be able to receive that

feedback in a formal manner.

MEMBER THOMPSON: Gary Thompson. As Lindsay said, some of the things we heard yesterday we hear at all the meetings, about the unique challenges here in this area.

It was good to hear about the gauges. Gauges are very important, they play a fair role and there are different levels we heard about yesterday, from the more sophisticated to just a picture being taken. So that was real good information to hear.

Also as Kim mentioned about the weather, we in government need to make sure that when we do provide information to the citizens, it needs to be in a usable format. Just get to the point and give them the information.

But I think it was a very good meeting yesterday.

MEMBER LOCKHART: Carol Lockhart. I thought the AOOS stuff was really interesting yesterday. I really liked that pragmatic approach of having a tiered set of services and

data that made a lot of sense, especially in an area like this but it would make a lot of sense in other places, too.

The other takeaway for me yesterday was the discussion about how just collecting a little bit of data can make a big difference to a lot of people. And while that is really evident here, I think that is also the case in a lot of these places we go and visit as a panel.

And so you know square nautical miles and things like that that we tend to talk about when we talk about big picture metrics I don't think are particularly useful. I think that's being recognized by NOAA but I think -- I don't think we yet really understand the best way to replace that metric so the folks we talk to understand the usefulness of the data we're collecting. Because if it covers a small area, it can actually have a bigger impact.

MEMBER ATKINSON: Thank you. Larry Atkinson. I have to -- some of my words were already taken being towards the end of the line

here but I did note the interaction between IOOS and the Marine Exchanges, and the parts of NOAA, and the user base. Now that may be -- Alaska is huge but it seems like they have extreme issues and it maybe forces people to work together more than we might in some other parts of the U.S. I guess we just really encourage that to continue.

Since I lost a lot of my words downstream, I thought of something new. I was thinking yesterday that there were a lot of needs were expressed, especially by the fellow that runs the barge operation in western Alaska about prioritizing needs. I mean he had very specific prioritizations he needed for specific small ports and I just wondered if that was going to be done and is NOAA doing it. No answer needed right now.

MEMBER MCINTYRE: Anne McIntyre. I wanted to thank the people that set the panels up. I thought that they were very effective and that everybody clearly knew that they needed to state what their needs were. So I felt that they

were very productive from that standpoint.

And the other thing that just kind of stood out to me was any data is better than no data.

MEMBER KELLY: I'm further downstream and Larry stole what was left of my words. So I pity the guys down the stream.

I also congratulate the panels. They were very succinct. They were to the point. I think they were very well-honed.

When we view Alaska, you keep thinking of conflicting topics. One is that it is so large and there is so much that needs to be done and, on the other hand, when you listen to the panelists, you realize that a lot of Alaska is a very small town. Everybody knows each other and there is a tremendous amount of cooperation and experience already going on. And to try to exploit that and to work on that, I think certainly tiered levels of that or an acceptability is good. And to achieve that, as previously said by a few folks, I think we need

to define ways to make a little of that go a long way and to perhaps maximize the efforts of potential collaboration among the IOOS group, this panel, and NOAA, and the various segments of NOAA, including weather.

MEMBER DUFFY: I'm Sean Duffy of the Big River Coalition of Maritime Trade Association based on the Mississippi River in New Orleans. And because I'm suffering some sinus issues, I have had medications in me that make me kind of come and go. I was quiet yesterday because of that and several pointed out I was quiet. I will say that you know I remember in my thinking an old commercial that says is it live or is it Memorex. So of you remember cassette tapes, I felt like is it Sean or is it Mucinex yesterday.

So with that, I would like to bring some of my humor back to the meetings. And I did really appreciate some of the dialogue in the meeting, the way it was structured yesterday, and it is interesting for me to realize that a lot of the coast in my area is a little bit thicker than

that, and sea level rise, and the coastline is a very important issue for us.

And the one thing that I really appreciated hearing is the need for more real-time information.

Hopefully, I didn't steal anybody's ideas but with that I thank you for having me.

MEMBER MAUNE: I'm Dave Maune from Dewberry.

I really appreciate the selection of people who participated in the stakeholder session yesterday afternoon. It was a good choice of people there, the fishing community, pilot, engineer, shipbuilder, and over-the-shore energy distribution. It was a great opportunity for me to ask the question if they had participated in the 3D Nation Elevation Requirements and Benefits study and learning that none of them had.

And I applaud Ashley Chappell behind me here because within a couple of minutes, she had an email off to them sending them the link to

the questionnaire. And I hope that I was able to instill in them the need for them to give us dollar benefits because it is those dollar benefits that enable us to come up with programs to address their requirements.

So that was point number one.

Point number two, I liked the briefing by Mark Smith of Vitus Energy. And he pointed out that it is not necessary to have this gram requirement everywhere but to prioritize those little small areas. And it seems to me if we have these hundreds of villages, a hundred villages in one-mile segments is a lot easier to compile than 33,000 to 40,000 miles of bathymetric lidar. And so that helps us prioritize where I think we could address the requirements from people like that who need bathymetric data of four meters and shallower to do their job. I think that's very doable.

MEMBER THOMAS: Julie Thomas.

It was a real pleasure for me yesterday because, of course, I love this joint

meeting with the IOOS. I have realized the importance of these partnerships in the regional associations for a long time and I think many of their topics overlapped. So it was really nice having the opportunity to be together.

Yes, there was so much yesterday that I focused on, I'm trying to think what to actually -- Sean almost stole my thunder because I also focused on every single person mentioned the need for real-time observations. And one of them even said you know I have the Coast Pilot memorized so I never use it. And I thought that was a really key point because, in my own life, often these static documents you put a lot of effort into them and then they kind of sit on the shelf. And how can we make these static documents more lively with dynamic links and really keep them updated? And so that was one thing.

And the other one more comment that struck me was I think the Vitus person mentioned that even though there are so many challenges and

unique instances in Alaska, we shouldn't let that stifle us and we should still move forward in thinking how we can keep moving and going ahead and trying to address the issues.

Thanks.

MEMBER PAGE: Ed Page. Boy, it's really hard to follow all these comments. Let me see if I can find anything.

First of all, I think -- I hope no one is discouraged or NOAA folks that there is a lot of wants, and needs, and maybe complaints about certain things but they all start off with how much they use NOAA products and how important it is for them. You can't -- you know they really did all say we use your stuff, basically they said, and there is opportunities to we want more. We want more information, better delivery but they are using it.

So that's the comforting thing is that NOAA is very valuable to the Alaska maritime industry and our challenges is somewhat of a last maritime frontier, in some cases, or the last

frontier, and we don't have the same resources allocated here as we do to New York City -- no offense, Ed -- and other places.

And so I really wanted to sell for innovation, and partnerships, and application of new technologies, and different approaches, and maybe not to have the gold standard because you can't put the gold standard everywhere throughout Alaska. So you have a suite options. So maybe if you need the gold standard, anything is better than nothing, as long as it some degree of accuracy and what have you, kind of a tiered approach.

And there is also kind of triage. What are the most important areas to address? Certainly, the areas where tankers or large passenger vessels should take priority over smaller vessels that have less impact if things go wrong or less consequence, if you will. But then we also have to be mindful of the fact that if the fuel doesn't get into these communities, they are in extremis. You know they don't have

options like well, the truck will come in. No, that's not an option. There is no truck. There is no road.

So I'm really pleased that they conveyed both how much value they put in the NOAA services and that also they want more. So that, to me, is encouraging. So I hope no one is discouraged by some of the wants or some of the complaints because I saw this as opportunities.

MR. BOLEDOVICH: Glenn Boledovich. I kind of sat in for the Ocean Services for much of yesterday and having the two advisory committees together was a really great thing, and important, and I hope they do it again.

But I think, more importantly, that both of the panels advised the programs and the fact that it was so well-demonstrated, that the underlying programs are talking to each other and coordinating. And I would hope that the advisory committees would encourage that behavior going forward, even more of it, because I thought it was a good thing.

And then Ed mentioned the gold standard and why it's the best, the NOAA has the best. It also kind of hinted that NOAA is the feds with the really high impossible standards that no one can meet. And yet the evidence again yesterday was strong that's not the case, a willingness to work with folks, to get them data, not let perfection be the enemy of good enough came across loud and clear. And again, the panel's encouraging that kind of cooperation and coordination to continue and grow in the future would be good.

CAPT ARMSTRONG: Andy Armstrong. I've got three things, I guess. First, I guess I wanted to remark about the Lieutenant Governor's remarks and how very personal and pertinent they were to what we're doing. And I certainly appreciated those very much. I was touched.

The second thing is the process. I thought it went really well, that we had time for discussion with the panelists. And then I thought that the discussions were pleasantly

frank and straightforward. Sometimes people dance around tough issues and that didn't happen yesterday.

Then the third thing that I want to point out I was making notes as people were going and I wrote weather under every single one of them. And I would point out that it's not necessarily we'd have to pass off because the next generation of electronic charting systems and navigation systems will have the capacity for real-time display of weather overlays, as well as tides and currents. So I think this is something the panel can begin to look at is how they can assist NOAA in formulating an approach to the real-time display of weather and tides and currents on our navigation products.

DR. MAYER: Larry Mayer, University of New Hampshire. And I guess I can say that I've agreed with everything that everybody has said and stop there but, never being one to just stop, I will continue a little and reiterate.

I think what most impressed me was,

again, the frankness of the panel. And again, I give credit to those who put the panel together. I think it was very well done.

It is really I think important when you hear a consensus amongst the different communities. And I think the real consensus I heard was weather and need for more real-time data. I also heard differences in the views of how it should be presented and how displayed and that presents challenges for us, too, but those are things we can work through.

And again, I agree with Andy that I think the future is bright with respect to how we can incorporate that and how it can become part of our mission with respect to electronic charting. I think that will be critical.

Clearly, the message of the breadth of Alaska and the challenges of Alaska but the focus on maybe more targeted surveys, again, how we decide that is going to be critical. But I think that helps minimize that huge challenge.

And to me something that was very

specific, and I'll address it a little later, was this idea of the importance of surveying in front of retreating glaciers. I think that's a unique challenge here but one, again, that I think we can address with new technologies.

And then I wanted to carry on Andy's statement about the Lieutenant Governor. I think it was a very poignant statement he made and I wish Andy had brought this up because I have to give credit to him for this comment. I was hoping you would say and I wonder if there is room for a different type of NOAA presence here because of the unique aspect of kind of a smaller vessel presence that might be able to serve the local communities a little better.

And that might not be a big lift in terms of great cost but something that could have real impact. And I think even to the Lieutenant Governor's story about the NOAA vessel going out and rescuing folks in an emergency, I think it can serve a number of missions. So I just wanted to throw that out.

RDML GALLAUDET: Well I am speaking -- Tim Gallaudet, by the way, Acting NOAA Administrator. I am speaking at 9:30, formally, but I'll pass on a couple of remarks quickly.

I've been visiting with my facilities in the area in Anchorage and now in Juneau. We have our weather forecast office in Anchorage and we met with some Homeland Securities officials for the State. And here we'll be meeting with you all, continuing this meeting, going to the Alaska Mapping Executive Committee meeting this afternoon, and we hit the IOOS Council meeting yesterday. So, there's a lot of great engagement.

But something I noticed is the relevance of what we do here for national and Homeland Security. And it really was brought home when I went to the Coast Guard Commandant change of command. It was interesting because so much of what he said, it was almost like a NOAA event because he talked about the President. He talked about the free flow of commerce and all

that the Coast Guard does for that. And really, it was underpinned by everything NOAA and this great panel provides, in terms of navigation support.

He talked about saving lives during hurricane and preparing for those. And again, that's work we do jointly with the Coast Guard and have a big role in. And so that was good.

And I had lunch with the commandant and here he is, by the way, Commandant Schultz, on the cover of the latest SEAPOWER magazine. Great guy and we're finding more ways to partner. One, for example, is going to be using drones, not only aerial drones. There are some limited, currently bathymetric applications but we're using surface drones now in a big way. I just got to drive a surface drone on Chesapeake Bay that had multi-beam and side-scan. And there's a whole bunch of other ways we're going to partner.

But the Coast Guard former PAC Area Commander, Admiral Midgette, he made a great statement: The U.S. is a maritime nation and

it's an arctic nation. And that's lost on a lot of people and so that's something that I think this meeting is helping reinforce and, certainly, our joint contribution to that fact and that the maritime activity is just on the rise.

I think a great example of that, it is not only the people moving closer to the coast and the Panama Canal expansion but Maersk just built this new ship called the Mumbai Maersk. Google it. It's this huge container ship and you can count just on the deck alone 24 rows that are all 24 containers across and ten containers deep. And these are the 40 equivalent units -- 40-foot equivalent units. All told, the 20-foot equivalent unit capacity is 19,000. It's incredible.

So that kind of activity, this is the work we're supporting and it's very good for our country. And I'll just leave it at that.

CHAIR MILLER: Thank you, Admiral.

I'll turn it over to Admiral Smith now.

RDML SMITH: Thank you. I guess we're skipping Nicole because she is speaking in a moment and because she wasn't here for most of yesterday, in-person, although she was listening.

There were two things that I caught that I didn't hear anyone else in their recap today, one was from the engineering firms. We heard both from ASCE and then also from Rada from Fugro about the value of our services for engineering in the ocean environment and read into that economic development. And not only does it potentially make their lives easier but, to the extent that there is already information infrastructure, it buys down risk in cost and schedule, which can be the difference between a project going forward and not.

And so these services we provide are the backbone of other types of economic development as well.

The second thing that I picked up, and I even used the dissemination a few times, from the panel is the need to package our information

into services that are relevant and accessible to the intended users. You know and I will put into that the need to improve our nautical charts for our next generation of charts. We have a lot more information than we can pass in our old form and we're leaning forward on that but there is all these new Next-Generation services that are now approved internationally, or will be in a few months, that really can revolutionize navigation and we have a real opportunity to package our information in new ways, including with weather.

And I guess I just did want to just note on the weather side that within -- when we talk about navigation services within NOAA, we include weather in that. It doesn't happen to be under the purview of this panel but when we get together and talk about improving navigation services, we have the weather people there, too. But it is noteworthy that they are not here.

Madam Chairwoman.

CHAIR MILLER: Yes, my comment on -- I forgot to give my comment so I will now.

One was the prioritization of what surveys would be most useful and beneficial. I think with not too much effort some of the big questions could be wiped out. And I think Larry Mayer's suggestion of a small NRT-type or MIST-type asset here in Alaska might be a great way to do that.

And secondly, as we hear every HSRP meeting over the last years, they need more data and they need it in a better format to -- in a more easily accessible format.

Thank you and you're going to introduce --

RDML SMITH: I will. It is my pleasure to introduce the Deputy Assistant Administrator for the National Ocean Service and my boss, Nicole LeBoeuf. She is also I guess about to officially start serving as the Acting Assistant Administrator with Dr. Callender's departure.

Nicole has been within her current capacity for about two years now and is

passionate about the people and the mission of NOS. And I am very pleased to get to serve with her and to have her here joining you today.

So, Nicole, you have some remarks for us.

MS. LeBOEUF: Yes, thank you, Admiral. Good morning, again, everyone, and thank you for the introduction. Thank you to the HSRP for having me. This is my first HSRP meeting and my first meeting where I sort of get to give two welcome remarks. Sorry I wasn't able to join you all yesterday morning but thank you for patching me in on the phone and I did hear much of the proceedings. It sounds like you all had a really good meeting and I can hear from the comments that you thought it was really productive.

I guess getting weathered out is just par for the course here in the southeast. And I remember a lot about that from living here in Juneau about a decade ago. So, it's good to be back in Juneau. I know what a sucker hole it is and we didn't even have that yesterday.

So yes, I am soon to be filling the role of Acting Assistant Administrator for the National Ocean Service. As you all know, Dr. Callender has moved on to bigger and better things and we know he is going to do great things in the State of Washington. And I know he wishes he was here to say to you all that he knows you're going to do great things, whether or not he's here in the room. He's very proud of this group.

Speaking of those who have been fantastic, I want to recognize someone who is so modest that he would not recognize himself, even his efforts to -- you may not know this -- rescue damsels in distress, but Ed Page, thank you for all you did not only to organize this meeting but to get our participants here. I appreciate that very much, very much. Someday we're going to have to rescue you, I think.

MEMBER PAGE: There you go and then you'll level --

MS. LeBOEUF: And then we'll level the

playing field, absolutely. Absolutely.

So a little bit about Alaska and the Arctic. You guys know this, surveying, charting, observations, and weather predictions and forecasts are absolutely essential, not just to the economics and the livelihoods here, but to the life and the safety. I mean Alaska is an ocean state. It's a coastal state through and through. And so much of what Alaskans rely upon is replete with NOAA products.

I was just reminded I mean even just this week, right, getting stuck in Tenakee for a day, the weather, obviously, very important to that. You know while I was there, as folks in Alaska do, my friend had the VHF radio on. There was a 40-foot vessel without power, without comms, drifting just around the bend. And they hadn't seen it in a while and so the Coast Guard was posting notices to mariners. And I thought, man, every bit of hard data right now is essential to whether or not those two folks onboard get their way back. And yes, I was

really struck by I was safe and sound because of forecasts, and data, and accuracy, and others may or may not be. And so wishing that situation positive resolve but thinking how powerful these data can be to responders and others who are on the water.

In the Arctic, the ice is receding. Things are changing rapidly. The folks that have been here for generations are seeing it and the folks that are newcomers are seeing it. We are all collecting those observations. We're seeing new routes open up. We're seeing the ice behave differently. We're seeing increased vessel traffic. And all of those changes, one on top of another, are making our products and services even more absolutely required.

We also know at NOAA that we have to be listening to the folks on the ground to tell us what they want and need. Our National Charting Plan and the Arctic Charting Plan relied on and relies on, continues to, input from stakeholders, whether it is the Cook Inlet,

Aleutian, and Arctic waterways stakeholders, the meeting we had in Anchorage. We're always going to be listening and we're always going to be asking what it is that people need.

I don't have to look far to see some of the best listeners and advocates for this program just right across the room here, Lieutenant Bart Buesseler, and Nic Kinsman, and Amy Holman are Alaska bridge-builders in so many ways and I appreciate you guys so much for being here on the ground listening and helping to convey those needs back up the chain. I just want to personally thank them. I see them sitting together. Of course they are sitting together. They are back there plotting and scheming about how they are going to do more good things.

But to that Arctic Charting Plan, 11 of our new Arctic charts are going to be coming in the next few years. And that's -- we have prioritized almost half of our National Plan around the Arctic. So we get it that things are

changing very quickly and that we need to be responsive to that.

I know you guys are going to hear from the NOS contributors to that. Our senior leaders, office directors are here, Admiral Shep Smith, Rich Edwing, and Julianna Blackwell. And I'm just so honored to be working with them and to hear about all their contributions. And as you talk to them, I know you are going to hear about all the progress they are making.

And as well, those of you who got to meet Carl Gouldman from IOOS program. He is also very attuned to the needs. It's a fantastic team.

And speaking of team work, it sounds like you guys really enjoyed the joint session with IOOS. That's good. Those kinds of Venn diagrams, you know sometimes they pop into our brains and we say why haven't we been doing that all along. But that's good and it's nice to hear that it sounds like we might be thinking about doing it again in the future.

And along those lines, I would also like to recognize and, of course, he just stepped out of the room, our USGS colleagues for joining us today. In particular, the Director James Riley is going to be with us. Is that correct? Amie Devaris, Kevin Gallagher, whose seat is right over here, as well as Dr. Michael Tischler. They are all very important to the work that we do and their staff are here with us, Tracy Fuller, Dave Saghy -- I'm sorry, I don't have a pronunciation -- and Brian Wright.

We have complementary missions at HSRP with IOOS and NOAA with USGS. And with complementarity comes a real responsibility to know what one another is up to so that we are in lockstep and so that we are working along those margins as efficiently as possible because we have limited resources and limited budgets.

And speaking of budget, so someone from headquarters comes out to the field, they have to say stuff about budget. I'm going to focus on sort of a couple of aspects. One is

that in the recent years, I think if you all are watching you will see that Congress greatly values the work that is done related to the HSRP programs at large. And we're very, very happy with that. You guys have broad support.

When that money comes to NOAA, I wanted also to convey to you that we take great pains and great pride in executing those funds well. And that may sound a little bit in the weeds but federal agencies who don't execute those dollars effectively, transparently, and down to the penny, they don't sometimes get those dollars back.

And so I want you to know that our team in NOS Headquarters is committed to spending those dollars, to not having a lot of carryover, to being transparent with the Hill, so that they know that we're spending the money as was intended. And that's how we've gained their trust and we get those dollars back.

And so that's sort of our part, part of our part in what we do to make sure that the

Hill knows that they can send us big bucks and that we will take care of that trust.

In fact, last year we executed like 99 percent to plan, just the highest across NOAA, by the way, sir. We're very proud of that. So Congress gets us money, we're going to take care of that. That's a signal that we're doing things right.

So I wanted to just also give you guys a sense of some of the changes in Headquarters. In addition to Russell's departure, we've had a few other changes in leadership. We have a new chief of staff. We have a new CFO. We are about to have a new CIO and a new Comms lead, and a new deputy CFO.

If it sounds like we've had a lot of holes in our leadership team over the last little while, we have. But we're staffing back up and we're bringing those into place and we've got really strong hires and we're happy about that.

And I would like to thank Glenn. You folks know Glenn. He's been stepping in as the

Deputy CFO as we have been filling that position and we couldn't think of anyone better. Glenn's got the beat on all kinds of stuff. So, thank you.

And the last thing on the staffing I wanted to mention is that we've -- poor guy. We've hired a guy named Mark Osler from Michael Baker International to be the vice Margaret Davidson position, so Senior Advisor for Coastal Inundation and Resilience Science and Services. And I think he's going to be fantastic. He comes from the private sector. He knows how to make things work for industry. He knows how to work the federal system, whether it's with FEMA or Army Corps of Engineers. And I have -- he's got some really great ideas about public-private partnerships and we're really, really lucky to have him.

And so I encourage the IOOS group to reach out to him and I encourage you all to reach out to him. And I hope his phone lights up because I think he's going to be great.

So I'm going to say a little bit about the new administration priorities but I'm going to mostly defer to Admiral Gallaudet. He's here to speak to you today and I think you've probably already noticed he's a champion for NOAA and for hydrographic services and ocean observations but I want to give you a couple of examples.

So he eagerly attended the Miami Ports dedication earlier this year. And him being here, I think, is significant. But in addition to that, he has moderated a Panel on the Blue Economy for the Senate Oceans Caucus and he testified before the Senate Commerce Ocean Subcommittee on the Blue Economy. And as he would tell you, but I'm going to steal his thunder, he's all in.

He is all in and so we are very excited to have him here. He has been flanked by folks like Dave Kennedy, who also testified before the House on Arctic issues and the committee chair, I'm going to read the quote, said it the best hearing they've ever had on the

Arctic. So we are really proud of that.

We also were reminded in that session of the need for availability of deep water ports, accurate navigational tools, and communications in the Arctic and we heard that.

I have also testified before a Senate Subcommittee on the Digital Coast. And at the end of the testimony, Senator Sullivan said what are we doing about Alaska, and the Arctic, and mapping. And I was very proud to be able to tell him about the Arctic Mapping Plan and the priorities we have set. And he seemed quite satisfied with that.

So he is asking. We are answering. And I think that's all good.

So we appreciate all of your expertise. We appreciate your time and your collaboration.

And Kevin and Jim, you were out of the room but I want to thank you all for being here. Thank you for coming. We are pleased to have you.

The Arctic is rapidly changing and we are going to have rapidly change with it.

So with that, I think -- do I turn it to Shep or do I just turn over to Admiral Timothy Gallaudet, our Acting NOAA Administrator?

RDML GALLAUDET: Great. Well done there, Nicole.

Well good day, everybody. And I want to welcome Dr. Jim Reilly and his team, I look forward to the AMEC --

DR. REILLY: Thank you.

RDML GALLAUDET: -- this afternoon. And then actually, a great thing about Jim, you know we had a good meeting the other day and we are finding ways to increase our integration and cooperation. And he has been -- he has dove in submersibles for the Navy, I believe, and he has also performed three shuttle missions. So he has covered a lot of territory. I think he knows -- and with his Ph.D. in geology, certainly a true expert on this field. So great to have you here.

DR. REILLY: Thank you, sir.

RDML GALLAUDET: So a couple things that I learned in Miami when I attended the first meeting that I'd been to for the HSRP, how critical your role is in supporting NOAA's hydrographic program. And so I just wanted to acknowledge that up front.

And I won't repeat any of the things I said there but I had a few things. First off, I want to recognize the three members I think whose terms are expiring soon. And that's Joyce Miller -- I can't believe it. Say it's not so that you're leaving us.

CHAIR MILLER: I am.

RDML GALLAUDET: Well you know, thank you for your contributions. And we have a history kind of together and I oversaw the Naval Oceanographic Office at time and she has contributed significantly to them all being trained for that team down there. So, thank you for your service.

Susan Shingledecker, we're compadres here because the Chesapeake -- I mean you're the

-- I mean Chesapeake Conservancy, right? Yes, so she takes care of my front yard. I'm not kidding. We live right on the western shore of the Chesapeake. So I thank you for that as a property owner. But thank you for your contributions, too.

And then Carol Lockhart, Carol, I haven't had a chance to ask you but one of your distinctions was winning the Lieutenant Commander Peter Johnson Best Practices Award. Can you tell us about that?

MEMBER LOCKHART: Yes, that's kind of a mouthful, isn't it? We made some software that took data from the Hawkeye II, which is an older bathymetric light air system, and increased the processing time. So we basically improved the processing time by 75 percent. So we removed a bunch of the do-overs that were happening multiple times in the process.

RDML GALLAUDET: That's terrific.

MEMBER LOCKHART: Yes, so that's what that was for.

RDML GALLAUDET: Well good. And as the president of Geomatics Data Solutions, yes, you are one of those great examples of the private sector moving out. And we really want to support the growth of private sector or the private hydrographic enterprise, if you will. And we leverage that heavily and contract a fair amount, I think you're all aware of, for hydrographic services. So every important and we'd love to see that grow as part of our American Blue Economy.

And so some of the other examples about what NOAA is doing for the Blue Economy, I'll kind of tee off with the President's proclamation in June. You know he announced June as National Oceans Month. And I think you all might of seen the proclamation but just to really kind of high home with it and reinforce it, let me read to you from some of his text.

To advance America's economic, security, and environmental interest, it is also critical that we explore, map, and inventory our

nation's waters and pursue advanced observational technologies and forecasting capabilities. By exploring, developing, and conserving the ocean resources of our great nation, we will augment our economic competitiveness, enhance our national security, and ensure American prosperity.

I mean there you go, the President has just given us free license to continue what we're doing and essentially grow it. So I could not be -- you know you thought I was excited in Miami. Now I have this to stand on and this is great. So I just couldn't be more happier.

And then you know also the National Ocean Policy, the President issued that executive order. And so that has the same type of language of making data more accessible like hydrographic and bathymetric data. And that's an important part of the National Ocean Policy. And again, I'm just thrilled to have that in place that we can sort of use as our license to run and go forth.

So let's see here, a couple other things. I think I'm really excited about the National Charting Plan and the Arctic Charting Plan under that. And in fact, one great example of that is Shep has plans with Coast Survey to improve the charts in the Etolin Strait. And this is that area just south of Norton Sound and it's in-between Nunivak -- Nunivak, right? Yes, that island. And ships and tugs are using that often as sort of a safe passage because it creates a nice leave when the weather gets pretty bad, which is most of the time up here, as you saw and are witness to, Nicole.

But that's just a great example of how -- you know currently, I believe, you could fact-check me here, the scale is one to 1.5 million. It's like note even a really navigable chart. And our goal is to get it to one to 80,000, correct?

PARTICIPANT: Yes, sir.

RDML GALLAUDET: Yes, that's just a terrific example, a very much-needed advance in

our charting that will help the Blue Economy in Alaska.

And then there's a number of other things. I am fortunate I will be able to basically save my breath because what I had planned to talk about was covered yesterday so expertly by Rich Edwing and it was water levels and all our work there with tide gauges. So that's great contributions to the Alaskan part of the American Blue Economy.

And then I'll just say that we have a great presence in Alaska with our Weather Forecast Office represented by Don Moore. He gave an expert presentation yesterday.

We also have Amy Holman, who is our regional coordinator. And Amy has just been a fantastic host, highlighting to me all that we have going on here.

And then I haven't mentioned yet Nic Kinsman but it's good to see you here. And you're also performing great work for us. Thank you.

And then I think we also have Lieutenant Bart Buesseler. Bart, I haven't met you yet but thank you for serving here, a NOAA Corps officer.

And all doing great things and providing NOAA data and services that are, again, helping the Blue Economy in Alaska Senator Sullivan, as I testified at the committee that Nicole spoke about, is very keenly aware of and supportive of.

So I want to thank our partners, Ed Page, Captain Ed Page, good to have you here and I'm looking forward to joining you at the Marine Exchange, the Alaska Marine Exchange. That's going to be a treat. I'm excited for that. Maybe something else on Saturday, I think, too?

MEMBER PAGE: Yes, sir.

RDML GALLAUDET: All right. And then I will re-acknowledge our AMEC partnership that we will reinforce this afternoon.

So I'm happy to take any questions about our contributions to the National Blue

Economy or anything else you think is relevant to the HSRP. Thank you.

PARTICIPANT: We weren't very good at clapping yesterday.

RDML GALLAUDET: I know. That beats Senator Murkowski. How about that? He's a good friend.

So any questions?

MEMBER PAGE: I'll just make a comment here. You mentioned this Mumbai Maersk vessel and, of course, the Blue Economy, and what have you. And I'm always amazed. I mean the impact of that -- I think sometimes when we talk about 18,000 TEUs or whatever, it's kind of lost.

But if you take those containers and put them on the dock, end for end, it's 75 miles of containers. So if you think of the value of that cargo. And the cargo going to LA-Long Beach each year, if you just took those containers off the ships and just lined them up, they would go around the globe three times.

So when you talk about Blue Economy,

it's pretty phenomenal when you think in that context of a traffic jam with containers going around the world a couple times. And of course the Blue Economy, clearly Alaska, if maritime stays as it is, with the fisheries, we wouldn't be producing 12 percent of the world's zinc if we didn't have a way to get it out. And there's no roads, so that's all by ships going above the Arctic Circle up through Red Dog Mine and pulling out.

Certainly everyone knows the oil from the TAPS, and the passenger vessels, and that was part of the reason for the restaurant last night was to look down and so oh, my goodness, look at those huge ships in that small port type of thing. And that's more people in the whole town several times over.

So I think this Blue Economy thing I think is a great way of kind of recognizing the import. We sometimes kid about how the people just think that the elves come in at night and put all the food on the shelves in the stores and

what have you but it's not the elves. In most of the cases, it's the Blue Economy and right here you can see that.

And when we have an opportunity to see the Marine Exchange, we're going to be able to show you the actual traffic right now going to Alaska and up and down the west coast, and what have you.

So I love this concept of the Blue Economy because it goes one step beyond safety and environmental protection, which are very important but another thing is it's very vital to our economy. And so I'm glad to see that kind of more attention to realize that this is many other benefits than just safety and environmental protection but economic well-being for our State, for the country, for the nation.

That's my two cents, just to reinforce that comment.

RDML GALLAUDET: Hey, thanks very much. That's good to hear.

You know you touched on something

that's important and I had shared with the group in Miami the vignette about our Precision Navigation Survey in the Port of Long Beach and how much money that is. You know four-foot deep or draft. It is money, as you said.

You know and I want to reinforce something here, too, that the importance of precision navigation charting in U.S. seaports, a fundamental element of it is what NGS with Juliana Blackwell and that is the vertical datum part of it, which was address yesterday, too, and I don't want to neglect to mention that.

So we're looking forward to -- actually, I will mention one thing that the IOOS committee touched on yesterday and that was communication and outreach and getting Americans in the Heartland to understand the importance of the work of this body, for example, and the Blue Economy because, as you say, anybody who wants to buy something off a shelf in the middle of the U.S., it's coming through a U.S. seaport and so it's important.

MEMBER PAGE: Can I add one more thing? Since I was captain of the Port of LA-Long Beach at one point in my career, and what we call underkeel clearance issues, can you imagine if a tanker did run aground at LA-Long Beach and this economic engine of three and a half times around the world, three times around the world containers suddenly comes all-stop.

And so that's a very negative impact on the Blue Economy of a marine casualty. So that's the importance of that. Not so much for -- to me, I think of this a different way. I'm thinking we're preventing a marine casualty that shuts down the port. We're thinking about getting bigger ships but both of those are important.

But the biggest consequence is if we shut down that port, people around the country feel that and New York will feel that. Sorry, Ed, because stuff gets sent out of New York. And now you can go and I'll shut up the rest of the day.

MEMBER THOMAS: Oh, no, we don't like you to shut up, Ed.

I just have to -- I feel like I want to just put my two words in, too, since we're talking about Blue Economy and precision map because I had a little bit of this discussion with Nicole last night but what I get really excited about it is is that we all know the individuality of different ports but it's also the partnerships that that brings in because NOAA has been a key player in all of the underkeel clearance but we have had such local, state, and federal, and particularly the Corps in this instance in Long Beach. And they are kind of working a different angle, the Corps is, but I get involved in some of those conversations, too, and they have been talking about the dredging.

And I got a call from the Port of Long Beach the other day saying what can we do to assure that this underkeel clearance continues. And I got a call from Andeavor yesterday saying, Julie, we want to put this into perpetuity; what

do we do as far as making sure it will survive.

So I think that NOAA is such a key player in it and different line. I mean it is the NGS CO-OPS and Coast Survey but it is also NCEP NOAA. It is also NWS NOAA. It is NOAA in the big picture but it is also bringing in all these partnerships that, to me, makes it work.

RDML GALLAUDET: That's great. Thank you, Julie.

And absolutely, that is a big part of our prior -- executing our priorities going forward is increasing our partnerships in the interagency as called out in the National Ocean Policy, as well as with the private sector and academia, as called out in the National Ocean Policy. So I couldn't agree more.

MEMBER THOMAS: And it is getting the trust from industry to make sure that it goes forward. And I feel like that's a big component that sometimes is overlooked.

RDML GALLAUDET: Absolutely. Sure. You know I think and maybe Shep can elaborate but

I think we're moving the ball down the field there, especially with the Corps. I think we've just started -- you know the Corps is now surveying for us now, actually not just with their echosounders, right, they have multi-beam now.

RDML SMITH: Yes, sir. So I'll cover this a little bit more in my talk later but we are sort of formalizing some agreements and smoothing out some data transfer issues, so that we can get the full resolution and the full value from their surveys.

RDML GALLAUDET: That's great.

MEMBER THOMAS: Great.

VICE CHAIR SAADE: So first of all, thanks for coming but as you know, we send you summary after every meeting and there is other interactions with the HSRP and yourself. I was just wondering if you have any guidance, or recommendations, or expectations that you could share with us relative to the HSRP.

RDML GALLAUDET: Oh, I really -- not

in -- that's a great question, Ed.

Nothing in addition to what you're already doing. But as I advised IOOS Committee yesterday in the discussion on metrics, we have articulated to priorities at NOAA, this weather and water priority you heard me talk about in Miami, getting to the number one weather model which supports safe navigation in a big way, as well as the Blue Economy priority.

And so as you develop recommendations in your summary of the report, just be mindful of those and if you could make sure you sort of clearly address how the work of this body supports those priorities.

MEMBER SHINGLEDECKER: I had a question. When it comes to the Blue Economy, I mean obviously ports and commercial shipping is the big giant, but I think I was put on the panel to keep the small boats and recreation at the forefront of the mind of NOAA in terms of the volume of users out there.

I think, as you know but some panel

members may not know, that the Bureau of Economic Analysis earlier this year released statistics on the quantification of the value of the outdoor recreation economy and showed that it was growing faster than GDP as a whole and it was a larger player than people initially thought.

It might be interesting to note that they are I believe now working on evaluation of the ocean economy as a whole, which will be very interesting.

But I was wondering, Admiral, if you could just share a few thoughts on where NOAA is prioritizing or what your actions are for promoting recreation and tourism as it relates to NOAA's missions.

RDML GALLAUDET: That's great, Susan, thank you. In fact, a lot of people are asking me what is NOAA's Blue Economy Initiative. And it's fairly tight. You know it is four big kind of pillars, if you will, under it. It's maritime transportation that this panel addresses so expertly. It is fisheries and aquacultures

producing the seafood trade deficit. It is mapping and characterization and exploration, which is very exciting to me.

And also, it is outdoor recreation and tourism. And that number is $375 billion of the contributions of outdoor recreation and tourism to the economy. It's big and it's growing faster than other sectors. It's exciting. And NOAA, of course, contributes to that in such a significant way.

You know across the coast our Weather Service is supporting safe tourism and recreation. Actually, I would say every lineup. But I think our sanctuaries are some of the best examples. We have 13 of them, the National Marine Sanctuaries under the National Ocean Service -- thank you, Nicole -- and those bring in $8 billion of activity every year and they are great examples of -- each one is adapted to the local community and their interests. And they are great examples of multi-use.

I was just -- and anyone who is

interested, I will show you a great photo. I sent this to Jim. I dove on the Thunder Bay National Marine Sanctuary ship wrecks, a few of them, two weeks ago. And this is a great example. This is a little town called Alpena, Michigan that had nothing. And the sanctuary there has just brought a lively local economy, which is growing. And they also, they are the tourist -- they are the recreation and technical diving community the world over. And so they bring a lot of money into this small town. It's really growing.

But they also accommodate the multi-uses of the area. There is an Air Force base that has a combat search and rescue aircraft, the HH-60 Pave Hawks, and they use the Sanctuary, this little box in it, as a live-fire training range. Who would have thunk? And they work with the Sanctuary, so they minimize the impact and it's in the area that doesn't affect the wrecks and, for the most part, the marine life in the area.

And that's just a really good example. And of course, any base is really contributing much to the Blue Economy. So you set me off here, Susan. I mean there's a big part of it.

And for recreational boating, which of course you have a great interest in, you know that is another one where you are kind of close to my heart because I have a 19-foot Bayliner and I'm on the Bay as much as I can be, supporting that local Chesapeake economy.

So thanks. I hope that answers your question.

CHAIR MILLER: Any other questions?

Okay, we're running a little bit ahead of schedule for a change. I believe, Admiral Gallaudet, you are going to introduce Kevin Gallagher.

RDML GALLAUDET: Okay. All right, so yes, I have the great pleasure here to introduce Kevin Gallagher. He is at the U.S. Geological Survey.

And a couple of interesting things

about Kevin: First off, your title is longer than mine. He is, and I will say it, you are the Geological and Topographic Mapping, Geological and Geophysical Data Preservation, Biological Information, and Science Informatics Programs Director. Is that right? Is that it?

Okay, but I was keen on the fact that you were the Chief Information Officer of USGS, correct? And that's a tall order for sure. I appreciate that but your master's degree in information systems is really what suits you perfectly for your job.

And I want to applaud your work. You were formally working for the U.S. Naval Research Lab. Is that correct?

MR. GALLAGHER: That's correct.

RDML GALLAUDET: Yes, that's great. So thank you for your service there.

So well, anyway, please join me in welcoming Kevin Gallagher.

MR. GALLAGHER: Thank you so much and thank you for finding some space for us in your

Hydrographic Services Review Panel. It is great to share some time with you all.

And just before I get started I want to say to you, Tim, I have a lot of great friends here at NOAA from Nicole, who I just recently started to work with back at the Wye River, to Juliana Blackwell, and Ashley Chappell, and Nicole Kinsman, and Mike Aslaksen, and Tony LeVoi. We are very much partnered on issues like 3DEP, GRAV-D, the National Hydrography Dataset, a new vision that we have for 3D Nation and I find all these people consummate professionals, world-class expertise, consistently collaborative and it is a true honor and a privilege to work with them and to have an opportunity to be here today.

In fact, we are so enamored with NOAA personnel that sometimes we poach a few employees for USGS. So Aimee Devaris here, our Regional Director from Alaska is one of our success stories.

But just to show we're not willing to poach from just NOAA, Dr. Mike Tischler here we

stole from the Army Geospatial Center.

So on the break, I'll have my card and we'll talk about workforce strategies at USGS, for anyone who is interested.

RDML GALLAUDET: So Kevin, one of my agenda items on the meeting this afternoon is giving you a taste of your own medicine.

MR. GALLAGHER: Okay. So thank you. I'm going to really spend a brief time to talk about the Alaska Mapping Executive Committee and I'm going to have to do this at about 10,000 feet but, hopefully, we'll have time on the last slide to really talk about some opportunities that may come out of this for us to work really closely with HSRP and with other parts of NOAA to really take us to the next step.

So let me start with a little back of background. So back in 2008, which is really not that long ago, when you think about it, a decade ago, if you were looking at Alaska in terms of topographic mapping, there was about a 60-meter resolution elevation grid and that was created in

the 1960s and it was done with stereo pair imagery. And we now know, through the recent data that we've collected, that it was very much error-prone. There were some ridge lines off as much as 900 meters and some of the mountains were off horizontally as much as a half a mile.

And there's a lot of reasons for that that go into the technology that was used in the time back in the '60s, almost continuous cloud cover in Alaska, very difficult terrain, tough to operate in. But the topographic map that was derived from that elevation data was one inch to a mile. It was also created in the '50s through the '80s.

And there were a lot of proponents in Alaska that were really supporting this idea of bringing Alaska mapping into the modern age. Among them was Ted Stevens, by the way, who ironically died in an aviation accident. And it was recognized that aviation was one of the key applications that really needed some high resolution data.

So I don't know if any of you ever know or met Nick Mastrodicasa. He worked for the Department of Transportation of the State of Alaska at the time. He was fond of saying that Mars was better mapped than Alaska, which it certainly was back then.

So back then, there was a real keen interest within the State. They actually had an Alaska Statewide Digital Mapping Initiative that was sponsored by the State. And actually we have Dave Maune, Dr. Dave Maune, here from Dewberry who was, back then, an author of a key document that looked at the various technologies that were out there available at that time and suggested an IfSAR, an interferometric synthetic aperture radar technology in large part, because it did penetrate the cloud cover and it resulted in three distinct datasets where the terrain would be mapped, the surface would be mapped, as well as an optical resonance image. And those three datasets, together, would address a lot of the applications needed in Alaska.

So that was kind of a founding document, if you will, for a lot of the mapping that would take place over the next decade.

The other key thing that happened in 2011 was the entire Alaska delegation in Washington sent a letter to the Office of Management and Budget in Washington, D.C. really urging the OMB to step up leadership. And it was widely recognized that a lot of Alaska had federal lands in it from the Forest Service through the Parks Service, BLM, et cetera and that the federal government could play a larger role in this.

And this, really was the impetus behind holding a roundtable in 2012 in Washington, D.C., 21 different federal agencies, multiple state agencies, a lot of representation from the Hill. We even had a Coast Guard helicopter pilot who gave testimony of being lost in a cloud deck in Alaska and what that kind of was like.

And the most significant outcome of

that meeting, other than of call to action to really try to move progress forward in Alaska was the creation of this Alaska Mapping Executive Committee. And we will be meeting this afternoon and we owe a big thank you to the leadership and commitment here of both Tim and Jim Reilly, now, who are going to co-chair this group for us.

The Alaska Mapping Executive Committee meeting was formed out of this roundtable and ever since 2012 has met at least twice, sometimes more often, a year to cooperate and collaborate on mapping Alaska.

So some of the objectives early on of the committee, there were five different geospatial themes, if you will, that were identified as essential to update the mapping in Alaska and those were elevation, hydrography, transportation, shoreline, and GRAV-D, GRAV-D being the project to update the vertical datum and that's a project that's actually nationwide but to definitely advance that in Alaska.

And there is one theme that is missing

here and that's imagery because the State, at that time, was well on its way toward at least a once over coverage of the State with imagery through the SPOT program.

And so this committee has been working ever since then and every meeting, just like this afternoon's meeting, starts, it begins with a status of those different themes. For every one of those themes we have a metric in terms of completion and we work across this collaborative to try to fund those efforts.

So just a real quick look of what the current August status looks like. The elevation theme using, as I mentioned, the IfSAR, is at 98 percent of the coverage of the State. We really have, in terms of flown area, we have 98 percent of the State and the other 2 percent represents some areas out of the Aleutians and some islands that need to be picked up still.

Hydrography, as you would imagine, follows the elevation. You need the good, improved elevation data to really improve the

hydrography. So we're seeing that now come along and it's at 20 percent.

The transportation, which was led by Alaska DOT is at 100 percent complete but maintenance is ongoing there.

GRAV-D, being led by NOAA, is at 78.4 percent, and the Alaska shoreline update is at 48.5 percent for coastal mapping.

So these are the five themes that over the last say six, seven years, have really been the focus of the committee.

So just recently with the impending completion of some of these data themes, the Alaska Mapping Executive Committee chose to update the charter and that happened in March of 2018 and it broadened the charter a bit and allowed for the possibility of other themes to come in as priorities and be tracked. And so an imagery update, coastal zone mapping, bathymetric mapping, targeted lidar acquisitions, as well as enhanced hydrography, geologic mapping in support of issues like critical minerals, and the

President's Executive Order on Critical Minerals, geophysical surveys, and land classifications are all now within scope of the mapping charter and the collaborative that we have up and functioning.

So we'll be meeting this afternoon. It will actually be a three-hour meeting to go over the status of all those in much greater detail but this is the last slide here for me. And I just wanted to open up the floor here for discussion of some possible interests and connections between AMEC and HSRP.

One of the things that we've been collaborating with Juliana and her team at NOAA on is this 3D Nation Survey. So 3D Nation is a vision that goes beyond the work that we're doing now that imagines a future in which there is a national seamless elevation dataset from the sea floor all the way through the treetops to include inland bathymetry and doing that all at high resolution. And so that study, much like the NEA Study or the STMI Study that was done in Alaska,

is being led by Dewberry and we're doing surveys of lots of different stakeholders and, in that process, trying to gather requirements not only to see what kind of datasets would be needed but what the benefit, in terms of return on investment, those datasets would provide.

So I think there is a lot of opportunity to get some input from some of the HSRP interests and get them involved in that 3D Nation Survey.

The other thing that is happening, of course, is now we have a lot of this data available. So all this data is being uplifted into the public domain, this data that we've been collecting all this time and we're now serving it through a number of different portals. And there is a number of applications, as you can see, listed on this slide from Native Alaskan village relocation to shoreline erosion, to all kinds of natural hazards and resource management, wildlife implications where this data is incredibly useful.

And so I can imagine pilots or a number of maybe smaller case studies or partnerships where this data could be used to underpin any of those applications.

Of course, we continue to collect the topographic data and I think that our future focus right now is going to support things like, as I mentioned, inland bathymetry and nearshore mapping.

In fact, we also have a parallel program that we are operating for the Lower 48, called 3DEP, which is the three-Dimensional Elevation Program and the instrument that we collect elevation data there is lidar. And so even though we do have a once-over of the entire State of Alaska of IfSAR, we are targeting an even higher resolution, lidar, for those places that are of interest, either for development reasons or for environmentally-sensitive areas.

And so we can direct 3DEP broad agency announcement proposals or we can work in partnership with NOAA and HSRP on any kind of

specific areas of focus that is desired for some of those applications, as well.

So there is a number of opportunities here from utilizing the data we've already collected to maybe partnering on some other opportunities near shore, near coast. And we'd love to hear from you all as to your thoughts on any of that and certainly, we'd love to hear from NOAA as well.

And with that, I will close and say thank you very much for the opportunity to speak with you all this morning and I look forward to continued discussion.

CHAIR MILLER: Okay, are there questions from the panel or comments?

Dave.

MEMBER MAUNE: Dave Maune from Dewberry.

Thank you, Kevin, for taking the leadership role on the 3D Nation. Am I correct that was your idea?

MR. GALLAGHER: Well, I think it was

a collaborative idea that came from this collaboration with NOAA.

MEMBER MAUNE: Well I think it's absolutely wonderful because I generally think of USGS worrying about the topo side and NOAA worrying about the bathy side and here was a vision to merge the two and to have a seamless elevation, high resolution elevation dataset from the tops of the mountains to the depths of the oceans, to include the inland bathymetry. And that's to be commended to be thinking about the big picture, not just your little piece of the pie here -- well, it's a big piece but you did a great job in merging those.

I also wondered if you'd care to comment on the production of U.S. topo maps now of Alaska.

MR. GALLAGHER: Yes, sure. Thank you very much for that. And we'll have a slide this afternoon that actually goes into that status but yes, of course, these base layers were incredibly important and they support a number of

applications. But the primary application from a USGS perspective was the opportunity for us to update the topographic maps for Alaska.

And so we've been -- there's about 11,700 of these maps at a scale of one to 25,000. So if you divide up the State into these cells for one to 25,000 scale mapping, which is consistent with the rest of the country, there's somewhere in the neighborhood of a little less than 12,000 of those.

We're right at about 60 percent of the State now. So we are following up the collection of the dataset where we have it with the generation of new USGS topographic maps at a scale of one to 25,000. Many of them are available now. And of course we call it our U.S. digital topo product, it is no longer a paper product that you go buy. Of course, you can print it and it feels like the old product, it looks like the old product but it's all available digitally through the National Map and I would encourage folks to Google USGS National Map if

you are interested in that data. And those maps can be downloaded to your mobile device, to your desktop, it can be printed. They are in a GeoPDF format, so layers can be turned on and off. And it's a rather useful product that we get a lot of demand for and we get millions of downloads a month nationally. We're now producing that product for Alaska and we're about 60 percent covered in the state.

MEMBER MAUNE: Thank you.

MR. GALLAGHER: Thanks for the question.

VICE CHAIR SAADE: Hi, Ed Saade with HSRP.

So thanks for all this. I just think we should go on the record as HSRP to say that we completely support this idea of moving right through shoreline boundary that always seemed to be some kind of arbitrary differentiator between what everybody was trying to do.

And just as Admiral Smith had good success relative to getting HSRP -- sorry -- to

getting NOAA charting and Army Corps of Engineers mapping in sync with each other in the marine environment, I think this, in the same spirit, this is the perfect opportunity to do the same thing between NOAA and the USGS.

So whatever we can do to help push this along, I'm all for it. So thanks.

MR. GALLAGHER: Great. Thanks for that endorsement.

CHAIR MILLER: You said something -- we've heard a lot about communications in Alaska. And in your talk you mentioned that there were a variety of products available on a variety of websites.

MR. GALLAGHER: Yes.

CHAIR MILLER: And I think one of the challenges is getting those various datas. I come from the bathymetry side and everybody wanted to host their own bathymetry because they got credit for it. But how do you deal with the multiple websites for different kinds of information?

MR. GALLAGHER: Right, right. How much time do you have? Just kidding.

No, this is a really important issue and thank you for the question.

So we are always going to point you to the National Map, the USGS. That's our portal for our mapping data. And I mentioned multiple portals because the State Geological Survey, and Steve Masterman will be joining us later, but they also serve some of the datasets but not all. They serve the elevation dataset out of there.

And then Esri, I think we're all familiar with Esri, they came along and saw hey, that looks like a pretty valuable dataset. So they basically scraped it from USGS and then they serve it out of their ArcGIS platform.

On one hand, I appreciate that because it's yet another distribution channel for the data. So our goal is to uplift this content into the public domain and to get it as easily accessible as possible.

So if somebody is really familiar with

using ArcGIS, for example, and they have an ArcGIS app, the fact that Esri has offered to service it essentially at no charge from their cloud, that's useful.

It can be -- at times, it can create confusion, especially on the Hill when they find industry has a dataset and say why isn't industry doing this. And you say well, it was funded by the federal government. It was uplifted in the public domain and now it's they're just serving it. So, it can be confusing and I certainly sympathize with the end user who doesn't know exactly where to work.

There has been a number of efforts to try to consolidate some of that. I don't know if you're familiar with the national -- the Federal Geospatial Platform and some of the efforts that came out of the Federal Geographic Data Committee. One of the commitments that we've made through the AMEC is that all of the data that we're collecting and distributing will be easily found and made accessible through the

Federal Geospatial Platform as well. So that's another way in which you can find the metadata and the pointers to these web services that we're providing.

It's a big challenging issue and I don't know that there is a silver bullet out there.

CHAIR MILLER: Thank you. Are there other questions?

Glenn.

MR. BOLEDOVICH: Kevin, I work for NOS Headquarters. I'm not a member of the panel and I'm also not a scientist. Actually, I'm a lawyer. That's another matter.

I was wondering, you used the word hydrography in a way that this panel, when we talk about hydrography, I think of bathymetry --

MR. GALLAGHER: Yes.

MR. BOLEDOVICH: -- and surveys for the ocean bottom for charting.

MR. GALLAGHER: Yes.

MR. BOLEDOVICH: And you used the same

term but clearly you meant something different by it. Could you help us non-scientists understand that?

MR. GALLAGHER: So thank you so much for calling that for my attention because that is one of the things that I meant to clarify. I do often have that question asked in this setting.

So hydrography, to us, is the bathymetry of the inland waterways. So this is incredibly important for things like the National Water Model, which is something that NOAA Weather Service is working on. And so if you want to understand flooding, you have to understand geothermology of river beds.

And so our National Hydrography Dataset is inland bathymetry, lakes, rivers, streams, catchments, things like that. Your hydrography is the bathymetric sea floor. And one of the ideas, of course, behind 3D Nation is that we kind of lose that distinction and we recognize that elevation is elevation, whether it is terrestrial or whether it is bathymetric.

So is that helpful, a helpful distinction?

MR. BOLEDOVICH: Very. Thank you.

MR. GALLAGHER: One comment that I will make about it is there is a really powerful vision around the Inland National Hydrography Dataset, the surface water of the nation. The fact that we have digitized it means that it is essentially a network. And so it's very similar to a road network. It all connects. So we know that water flows downhill. So it starts at the top of the basin and it flows downhill.

So because we understand that, as we have this enhanced elevation data, we can now get a very high resolution surface water dataset. So all creeks and streams, down to the farm scale or the neighborhood scale can be mapped. Once that network is created, you can link any object to that network.

So for example, a stream gauge, a bridge crossing, a public water intake supply, a water sample that was taken out of a stream, any

kind of data that has a geolocation on it can be linked to the network. So we have another, separate vision that involves what we call the internet of water and basically being able to tie all these observations together around the surface water network that, ultimately, all that water ends up in the oceans, right?

And so there's a lot of analytics there that I think from a coastal standpoint you'd be very interested in. So if you understand the whole hydrologic regime of that basin, you understand things like as you get ocean inundation, what does the fresh water side do to magnify that. If you have contaminant distribution, what concentrations is it when it reaches the ocean? Those kinds of questions can be examined when all this dataset is consistent and in one format.

And I think Julie had a question.

MEMBER THOMAS: I do, thank you. And actually that question was really interesting to me. Even more pertinent, my quick question to

you is on your last bullet up there, where you do talk about coastal mapping projects in the Lower 48 States.

I'm Southern California. Our last lidar was 2014. We get all of that. We get contaminants from the LA River coming out. We have lagoons, a lot of pollution, a lot of mixing in our lagoons affecting the ecosystems. That shoreline boundary is always very important, along with a lot of erosion.

So I'm wondering how we get on the list for one of your coastal mapping projects.

MR. GALLAGHER: You know so thank you for that question. I'm not kidding you. I think it was -- Michael, remind me -- I think it was two weeks ago, maybe three weeks ago, we were on the telephone with the State Geologist of California.

MEMBER THOMAS: Okay.

MR. GALLAGHER: And we were talking about how you put together a statewide lidar program. So there are number of states who have

been really progressive; State of Alaska is one, North Carolina is another one. So we were sharing a lot of the lessons learned from some of those states and we are literally in the process of discussing with the State of California.

So let's talk afterwards.

MEMBER THOMAS: And by the way, I work closely with Patrick Bernard in Santa Cruz Office the USGS and we're always scheming about how to get another lidar out there.

MR. GALLAGHER: Great. Great. Great.

We have folks in California that are right now working on that issue. So let's talk afterwards.

MEMBER THOMAS: Okay.

CHAIR MILLER: This is a comment and something from our Water Level Panel. In Hawaii you know we've had the sea level rise models and Waikiki is going to drown. About five years ago a hydrologist, in the sense of groundwater, realized that sea level rise was going to have a drastic effect on our -- we have a lens under the

islands that provides groundwater. And in terms of flooding, we were going to get flooded not only from the ocean but from the groundwater coming up.

MR. GALLAGHER: Oh, okay.

CHAIR MILLER: And it was something that really had not been considered up until that time and it's just something in terms of sea level rise that I think needs to have a component.

Have you done that type of thing in Alaska and so forth?

MR. GALLAGHER: Yes, we have not. We sometimes bring up the groundwater issue. We know it's a big issue.

To really understand the groundwater, you need to understand the geology. So what are those units? How fractured are they? Do they have aquitards in them? How quickly do they recharge? That's going to vary based on the geology.

And so in a different part of -- of

course, science systems in my mission, there is a Geologic Mapping Program and we use things like gravity measurements, resistivity, and other kinds of ways to try to penetrate the ground to really understand the geology that is there. That's a much more challenging process because it takes often, I don't want to call it a guessing game but you have to be very knowledgeable of geology and then you get much less data and information from maybe some well holes that have been drilled, some geophysics that are done, and then there is a lot of almost being a detective and saying if this is the unit here, it's likely to be the same unit over there.

And so we really need a much higher resolution of geologic mapping to really start to understand those aquifers and how they play in the mix. In some cases out west, we see surface water drying up because folks are drilling deeper and deeper wells and so the wells are really, in that case, the groundwater is drawing water away from the surface.

And of course, it works the other way as well. When you have a lot of precipitation, that groundwater can come up and actually become a flowing stream.

And so you're exactly right. It's a very complicated issue. It's different in different parts of the country. And a challenge there is having enough information about the subsurface geology to really do it right.

CHAIR MILLER: We have reserved about 15 minutes for a discussion on approaches and opportunities for AMEC and NOAA ocean and coastal mapping coordination. Thoughts on that, perhaps, Admiral or --

RDML SMITH: On how to structure the discussion?

CHAIR MILLER: Yes.

RDML SMITH: I think we've started that discussion already. Perhaps -- we have not heard from Ashley and maybe Ashley would like to lead off this next section.

MS. CHAPPELL: Let's see. I wasn't

anticipating jumping into this part of the discussion. So Ashley Chappell, for the reporter.

As I said at breakfast, when I briefly introduced the topic of Alaska Mapping Executive Committee and Kevin's talk, as Juliana, as Nicole, and Amy, and I, and Bart as well, we're all thinking about how to coordinate on mapping in the State of Alaska. My role, as Integrated Ocean and Coastal Mapping Coordinator, I want to work with any existing structures that are working for Alaska. And I think AMEC is working and I think the Alaska Geospatial Council is working.

So as the HSRP thinks about what NOAA should be doing in Alaska, I mean clearly I think we should be working within these existing structures. I mean you've heard a great success story, as I said this morning, about IfSAR and our hope, and I think Admiral Gallaudet, as we bring coastal into the equation is that we can see that same sort of demonstration on the

coastal side, so that same approach of tackling a problem by sort of biting away at it like was done with the IfSAR.

So that's really why I encouraged the inclusion of Kevin on the agenda to bring this issue in front of you and let you know what's happening up there in the State.

CHAIR MILLER: Kevin, are there things you think, from your standpoint, that where NOAA could -- you know where we could work better with you in moving the mapping forward?

MR. GALLAGHER: I mean I think we've been working really closely already, which is useful. In terms of where we could go together, as I put on that slide that I threw up there, I think there are a number of applications that really demonstrate the value of this information.

And to me, these things are very complex. The State of Alaska is very large. And I think the most successful aspect of what we've been doing is that it's a partnership approach. And so I'm sure -- I feel confident that there

are applications out there that if we work together on them, we would show the value of what we're doing demonstrated on some critical applications and then continue to grow support for what we're doing.

So I think -- I don't know if I'm saying that clearly enough but maybe a couple of targeted pilots, where we have, for example, all the data on the terrestrial side of the basin and the watershed piece. You all have updated coastal mapping information. We understand some of the dynamics of the ocean side and we're doing an application that ties all that together in demonstrating its value. To me, that would be -- that would grow support for the kinds of data that we're collecting and help us to fill in the gaps.

So that's one potential idea that I would just throw out there.

MS. CHAPPELL: Just to add to go with that, some of the things we've been doing in Alaska, as you heard yesterday, we've had two

coastal mapping summits up here, most recently a very successful one where -- how many participants? We had over a hundred people joining to talk about their mapping needs in Alaska. So we've had that kind of coordination and the encouragement there, too, was to work within existing processes.

I think AMEC, as a partnership between federal and state agencies, not all of whom acquire mapping data themselves but all of whom use it in some way, it's a great way to coordinate on getting that data and then getting it into products that are useful to everyone.

So a couple of the things that we would be proposing, perhaps starting at the technical level to AMEC, from the NOAA perspective, and we can talk about this more later, would be this starting on a coastal prioritization, for example, running a prioritization exercise in the State of Alaska, like we've done in other places very successfully in Washington and Florida -- that one is ongoing

-- and in other places.

So prioritizing what is needed at the coast, relative to both nearshore and terrestrial I think is the key starting point. And Rick Brennan was talking about that, probably more in the deeper ocean perspective but that can also be factored in.

So you know this idea of getting started on collecting and turning the data in the coastal zone into products that are useful, I think AMEC is well-positioned to help with that.

MR. GALLAGHER: I love that idea. If we have a sense of the priority, then we can absolutely direct the resources that we have towards those.

RDML GALLAUDET: I just wanted to address something or to give you kind of an interesting fact.

I went to the WFO in Anchorage so in terms our partnering. And we have several hydrologists you know at the weather forecast offices around the country and I got to meet two

of them Monday. And they do just terrific work in terms of water level forecasting. And so that's information we work together on and we'll talk more later today.

But they have a very intrepid existence. So they, you know during the breakup, I think it is called, during the spring, as all the ice starts to melt and they fly over these rivers and try to help forecast when that occurs and it's pretty zesty. And they also get on the water in the summer. So they're really a terrific bunch.

DR. REILLY: I can add one other thing to that, too, Tim. Yesterday, we were in Fairbanks and we were talking with some of our USGS folks and sort of along these same lines where we could overlap NOAA and USGS efforts.

And we were talking about the Mendenhall Glacier and how it, during the spring, the melt goes into the Suicide Basin, which is the base of the Suicide Glacier. That forms usually an ice dam, behind which the water can

rise several hundred feet, which was kind of an amazing picture to watch as it was going on.

One of the topics that they touched on was the potential for that catastrophic outflow because it will, eventually, reach a stability point where it literally lifts the ice dam and then efflux out of the basin, comes down the river. And that is, of course, local to here that people would care about that and it's a pretty big effect.

So where we get involved, of course, is in the flow piece, the streamflow piece. But the other piece that we talked about was the weather piece and that was putting the rainfall, a peak rain event over the top of one of these efflux events, one of the flood discharges out from the ice dams, and what that would mean, the potentials for that.

That was a perfect example of where the close, continuing cooperation between NOAA and the USGS is of interest not only to us at the federal level but also at the state and local

level, particularly, and also to folks like FEMA. So it covers a lot of bases and those are all the things that we want to foster and that is actually one of the great things that Tim and I have kicked off already are discussions about that, about these type of things.

But there is a lot of those things, when you dig into it just a little bit and that was just one example we ran across yesterday.

RDML SMITH: Yes, we had a great discussion yesterday morning about the challenges of water level measurement, coastal water level measurement in Alaska. And one of the effects that that has on the hydrographic program, the Coastal Hydrographic Program is that that is a piece of sort of foundational geospatial infrastructure that we need in order to even do surveys or to use anybody else's data because the charts and our traditional user base are tidal datum-based products, it is a fundamental limitation in our ability to use an ellipsoid or geoid-based coastal flight. We still can't pull

a mean lower low water or a high water line off of that.

So this is a bit of a plug for VDatum for Alaska, which really takes all of the datum information, pulls it together, and gives us those separation models that we need to do these larger collaborative mapping efforts. And I don't think it was clearly expressed that that was the interim deliverable of all of that water level datum work but it is something we really appreciate in the Lower-48 and find ourselves really hamstrung not being able to use up here.

VICE CHAIR SAADE: And I'd like to add from the commercial side or industrial side of it. We did a project in Nikiski a few years back for what was called AKLNG, which is right, an LNG plant that's right along the coastline and then merging all the datasets between the terrestrial work and the offshore survey work, the hydrography and everything else.

So when those things, when there isn't a baseline that's already generated from these

two agencies getting together and getting everything right, you have to invent it on the spot.

And what we're seeing along the east coast now with the growth of the offshore wind farm market is the data products, especially through Ashley's dataset that is maintained and everybody dumps their data in there, it is literally hundreds of thousands of dollars that we save in planning stages because the data is already existing and a lot of these problems are already solved because in that particular place, the agencies have gotten together and shared the data.

So the return for the taxpayer on all this stuff, to me, is really enormous when you solve these problems, get it set up, and somebody decides to go build some type of structure.

MR. GALLAGHER: Maybe you'd like to talk to Dave about the 3D Nation Survey. That sounds like some good information that we need to get captured.

VICE CHAIR SAADE: I took the test. It only took me three days to finish it.

MR. GALLAGHER: Yes, thank you for that.

And this gentleman down here.

CAPT ARMSTRONG: Yes, Andy Armstrong from the Joint Hydrographic Center in New Hampshire.

I noticed on one of your slides a picture that said Alaska coastal sea floor. And so what I'm wondering is in your programs you might have a need for information that could be part of our hydrographic surveys offshore, for example, bottom character, or backscatter, things like this. If that's a topic that is covered in your discussions here, I think we would like to be able to help, if that is possible.

MR. GALLAGHER: Okay, excellent.

Do you want to comment, Juliana?

MS. BLACKWELL: This is Juliana. I mean I think that that's one of the things that we want to talk about with the AMEC members is

how can we work together on these types of things and at what depth, what are the applications. How can NOAA help with some of these solutions and NOAA and partners help with some of these areas.

And so I think it's a great opportunity to have the discussions that will be this afternoon.

MR. GALLAGHER: Okay.

MS. CHAPPELL: Ashley Chappell. When it comes to existing data, I think both NOAA and USGS, with the extended continental shelf work and the work that is out of Aimee Devaris' shop on earthquake an tsunami, there have been some great assessments of existing data so that we are not recollecting over data that, relatively recently has been collected, including the UNCLOS very deep areas.

And happily, that's led to some great recent partnerships on the Rainier and Fairweather. Most recently, the survey around Queen Charlotte Fault, which benefits both the

Seabed 2030 work that we are interested in and folks from Aimee's group, Peter Haeussler -- did I say that right -- and Danny Brothers' projects on earthquake, and tsunami, and the geology there.

So that's been a great successful partnership most recently with joint surveying. And I think they were thrilled by the data that they were getting on the Fairweather and we were thrilled by collecting data that we needed, too.

And then going through the process of developing the project, there was a very extensive effort not to collect redundant data but go to the areas where we had no data.

So to your point, Andy, about finding that data, I'm not going to criticize the USGS because they are not alone, but it does take some effort to dig out that older data and we're working on that, too. We haven't fully succeeded but we are finding it.

CAPT ARMSTRONG: Yes, of course I was thinking mainly of making sure that we had the

USGS requirements in mind when we did our surveys, not just the areas that have been done but the kind of data that would useful beyond charting.

MS. CHAPPELL: Definitely. And actually, Rick Brennan could probably comment on what we're learning about USGS requirements and how we might factor them into our own projects and vice-versa.

I don't know, Rick, if you want to -- or if I answered that question.

RDML SMITH: I think, sitting at the table, for the formality of it, I need to invite Rick as a subject matter expert to comment on that.

Thank you, Rick.

CAPT BRENNAN: So we've had a number of ongoing collaborations this year with USGS. We have one underway right now off the coast of California on the Cal DIG Project, which is particularly interesting. It is interesting because it is a joint project being done with

USGS, where they have actually brought some of their own equipment onboard. They have brought a seismic gear onboard and we are conducting joint seismic and multi-beam operations at the same time.

We were able to partner for the environmental compliance portions of that, which were not insignificant and required a significant amount of collaboration between our two environmental compliance officers within each of our programs to get that done because, clearly, the multi-beam operates at a different frequency than the seismic gear and they have different requirements environmentally to get that clearance but we were able to do that.

And so that cruise is currently underway right now onboard the Rainier but we also had, as Ashley said, the Queen Charlotte Fault Survey earlier. I know last year we had done a similar survey in the area to map the mud volcanoes. And so there has been a growing level of collaboration. And thanks to Ashley on that,

we have been able to complete an MOU that has allowed us to work a little bit more effortlessly across the two agencies. So that has been incredibly helpful.

I think it has been interesting for each of us. I think we've gone into it with a very strong spirit of collaboration. That said, there has always been where the two cultures intersect, there are always differences like who are these people with the uniforms driving the ships around here and what are they doing.

But I think on the positive side, they were also really thrilled because when they got onboard, there was a strong culture of commitment to the data and a scientific commitment. And so all of them, you know the minute the USGS scientists walked onboard, were asked could you please give us a tech talk in one of the evenings after data acquisition to tell us about the projects you are doing and what it is that you're looking for. And so they had very lively discussions about that. And so they said, it was

funny that we never get those kind of requests when we walk onto a charter boat.

So that has been really encouraging and exciting for both of our science teams that are embarked on our vessels. So we found that to be very helpful.

CHAIR MILLER: Thank you. Thank you, everyone, for very good presentations.

And it is now 10:48, so it's break time. Please be back by five after 11:00. Thank you.

(Whereupon, the above-entitled matter went off the record at 10:49 a.m. and resumed at 11:09 a.m.)

CHAIR MILLER: Okay, I have an announcement. The sun is shining in Juneau. Press release.

In this session, we are going to have updates from Dr. Larry Mayer and Captain Andy Armstrong, Juliana Blackwell, and Rear Admiral Shep Smith about ongoing activities.

Andy -- or Larry, are you beginning?

DR. MAYER: Yes.

CHAIR MILLER: Okay.

DR. MAYER: Okay, thank you. What I'm going to do is update you on the status of our activities at the Joint Hydrographic Center with the autonomous surface vessels. And I think a couple of years ago, we talked about the beginning of this effort. And the focus of our effort is really from a research perspective. I know NOAA has been working very nicely with TerraSond doing some ASV work, lots of ASV work up here but we're really focusing on a research end of it, really trying to get an organic capability for NOAA, in terms of the use of autonomous surface vessels for hydrography and really trying to understand the constraints on that, just how well they can increase the efficiency, how well can it really, in a NOAA context, reduce manpower but from the real research end of it, really look at how autonomous these vehicles really are. Right now, they are not really autonomous. For the most part, they

are piloted vessels and we want to really see if we can push those limits, look at the data quality and, overall, just understand how far this is going to help us.

I think we are all very convinced that autonomous surface vessels will be a tremendous aid to us in the future.

We have a suite of vessels at our disposal at the center. We are really quite fortunate. We have a number of industrial partners who have provided us with some of the smaller vessels that we use to basically develop algorithms. And we have one kind of really workhorse vessel, an ASV limited C-Worker 4. It's the four-meter version of the vessel that TerraSond has been using the 5-meter version out here. But again, this is more of a co-development with ASV where we have been kind of playing around with different algorithms and different procedures.

The smaller vessels I say we mostly use just as a test platform for trying out new

algorithms, control algorithms, things like that. It's very easy to use, put in the water. And I'm starting to think about some of the things we heard over the last couple of days that there may be -- I used to dismiss these little small vehicles as useful tools but I think in this environment, there may be some very, very useful applications of them.

And so the workhorse for us has been this four-meter vessel with, I should point out, some design modifications we made because we work in an environment which has lots of lobster pots. We replaced the propeller-driven system with a jet drive and we have a large electronic keel that can lower down where we can put any sonar system and get it well below the wave action.

We took delivery of that in about September of 2016 and really started to put it through its paces, integrated with multi-beam and a motion sensor system -- I don't know what I'm interfering with here but that's okay -- and to the point that we were quite confident that we

were collecting really high quality hydrographic quality data, which we were, and then started to really learn lessons.

And one of the important lessons we learned is that one of the great constraints is telemetry because we are in this piloted mode. And we started to understand the limits of telemetry and we're looking now at a new system next year, a Konigsberg system, that will hopefully get us beyond the kind of seven-eight kilometer ranges we've been getting to ranges like 40 or 50 kilometers. And we are hoping that will be a great leap in terms of our ability.

We also learned that there were real issues in terms of the stability of the system. And by making little modifications, like putting skeggs on it, we have been able to really improve its track record.

We have a wonderful team working on this. I had their names up on the first slide and I should have mentioned it but particularly Val Schmidt, the lead engineer, has been

wonderful in basically documenting the lessons learned, getting them back to ASV, to the company, and sharing them with all of our colleagues, which is tremendously advancing.

What we learned. The first real kind of test by fire in terms of launch and deployment from a larger mother ship was on Bob Ballard's Nautilus last November or last summer. And so we had to modify this system for a single point lift and we learned a lot of lessons doing that but we are quite successful in now having a very easy launch and recovery system. And as I get to the recent work we've done on the Fairweather, this proved to be very, very, very helpful.

The most important lesson I certainly learned in these early operations, and this was the eye-opener to me in yesterday's discussion is that what the vessel really was great for was what I call close quarter surveying in hazardous areas.

We were able to work -- we were working on the Channel Islands in areas with

steep cliffs. We were looking low stands of sea level down there. But we were able to just work right up against a cliff, which I don't think something that a manned vessel would really comfortably do. And I started thinking about the glacial retreat and the glacial fronts and that this would be an ideal tool for getting in there, particularly with respect to a glacier front, where you are worried about calving and things like that.

So this really resonated. And I should say I just -- I shouldn't say yesterday -- submitted a proposal to NSF to try to bring this vehicle up to Greenland and actually map in front of tidewater glacier faces. So hopefully, we will have some experiences with that, too.

But we can get literally right up to the cliff face. This is bathymetry. You're actually looking in caves there. That's why the bathymetry seems to wrap up where there are caves we are looking in and the backscatter. And really, if you can imagine that being a glacier

front as opposed to a cliff face, really quite a wonderful capability.

Finally, we have been trying very hard and I have to -- is Rick back there? Through great cooperation from Rick Brennan and NOAA, we have been able to get the vessel up to the Fairweather. We were hoping to get all the way to Barrow this year or -- what is the new name for Barrow? Utqiagvik. We only were able to get as far as Point Hope but next year we hope we can go even further and address a number of issues of bathymetry up there. But here was our real first test of trying to see how this could fit into a NOAA operation.

And I also have to complement the Coast Guard in Kodiak, who were tremendously helpful in terms of loading and offloading. It really was a great collaborative effort.

Mid-May, Matson Lines came and pulled up to our high bay. The vehicle went off, went by train across country, and then on a vessel up to Kodiak, offloaded there, and then on to the

Fairweather. And again, wonderful cooperation from the Fairweather crew.

And then again, lessons learned about launch and recovery and we were quite successful in terms of launch and recovery from the single point lift from the Fairweather. Of course, calm seas are a help but we think up to about three or four-foot seas. It was certainly quite capable.

We put it into action. It was a very small window of time we had but it certainly was operated mostly in the piloted mode and some relatively autonomous mode, in terms of pre-planned missions but it was worked right into the survey plan of the day for the Fairweather, given assignments, and just operated with other launches out there as they were running their missions.

One of the other lessons that I think was really important to us in terms of the efficiency is that while the launches came in for the evening, we were able to turn around the ASV very, very quickly within a half hour, we deploy

it, and have it survey all night, download the data.

And so while the Fairweather itself was doing its evening surveying, the ASV was able to continue to survey in the evening also. And I think there is a place where we see, again, a real potential gain of efficiency.

Data quality was very good. These are centimetric scale ripples that we were able to map with the system. So we are quite pleased with that.

And where we started to do our own kind of stuff, our research on the things was in terms advancements in the mission planner. We have our own mission planner with quite precise navigation for the vehicle. And with the precise navigation for the Fairweather, we were able to do things like basically bring the ASV right next to the ship strictly using the navigations systems and the point that we could position it right next to the ship for recovery. So if we were really foggy and couldn't see, we can still

recover the vessel.

In terms of the overall conclusions, and these are conclusions really that the ship's company came up with, not just our folks, we found that a single operator could manage, we thought from the load put on operating just a single vessel, easily operate two vessels at a time. So one operator operating two vessels. They could be operated around the clock without a problem.

The conclusion was that with overnight operations, it would be probably best to have the ship at anchor, although I think we can move on from that, too.

The most interesting thing to me is that the data, the extra data collected, so it was about, in this case, about 25 percent more data coming in all the time, put no strain, and this is a real credit to the processing pipeline onboard the vessel, the extra data put no strain on the processing stream on the Fairweather and, well, a simple thing that the operator station

was easy to accommodate.

Where we are going from this now is in further development, kind of the research end of things, the software we want to develop is a much more sophisticated planning tool that we really can go beyond what is delivered with the vehicle. And we are at that point already but going even further.

We, particularly with our operations on the cliff faces, saw how important it is. We were watching how the operators were kind of looking at the radar, looking at the lidar -- we have a lidar system -- also looking at the video and trying to fuse all that information. And to us, that's a wonderful visualization challenge in terms of fusing of all this information, even incorporating the sonar information for the mission purpose, whatever it might be. And so we have a research direction, a Ph.D. student working on that.

We have another effort, which is trying to make a nautical chart aware ASV, so it

really understands the ENC, understands the hazards out there and can plan its missions based on that. And we've had success with that already. And even more importantly, reactive vessel avoidance where, indeed, it starts interpreting what is around it and starts behaving so we can really start moving towards a truly, truly autonomous system.

The final thing I want to say is that we are not just -- we are looking at all options and we are not just looking at this C-Worker ASV. In September and, again, another collaboration with NOAA, we are taking delivery of something called an iXblue DriX This is a much larger vehicle. It is about eight meters long. It is purpose-built for hydrographic surveying with a drop keel and a fancy sonar, much higher speed, much longer endurance. And so we will start exploring with this vehicle and see what its options are. And already there are issues -- not issues -- there are activities going on in terms of modifying some of the launches -- some of the

NOAA vessels so that they can accommodate this sort of vessel. And hopefully we will have that -- we will take delivery in September and I think, Rick, by maybe early next year, we will have the first deployment. So I think March we are scheduled for the first deployments on a NOAA vessel.

And I think that is where I would like to end and I'll turn it over to Andy to talk about the extended continental shelf mapping work.

CAPT ARMSTRONG: Thanks, Larry.

So this is another one of the missions of the Joint Hydrographic Center is to carry out for the extended continental shelf program, which is a partnership between the State, NOAA, and USGS to do mapping in support of the U.S. extension of the continental shelf beyond 200 miles.

And so this year we had a requirement for some mapping in the Gulf of Alaska and it turned out that both Larry and I were not going

to be able to go. So we turned to the Queen of Multi-beam, Joyce Miller, to lead the cruise for us. So this is a little bit of a tribute to Joyce here.

So this cruise started in Hawaii and ended up in Seattle. And you can see there that the work was up in the Gulf of Alaska. So we actually had quite a significant accomplishment, 28,799 square nautical miles of survey, also sub-bottom profiling, continuous gravity measurements, and continuous acoustic current profiling along the way. So and that ship in the picture there is R/V Kilo Moana operated by the University of Hawaii.

Here is Joyce and the team. We put together a really diverse team from UNH, from University of Hawaii, from College of Charleston, and from Memorial University in Saint John's, Newfoundland -- and I don't know how Joyce managed to pick that spot for her to be in the picture between these two giant guys -- and also University of Southern Mississippi. So quite a

diverse group of surveyors and students on this mission. And Joyce did a great job of bringing them all together to do the work.

So this is the area surveyed in 2018. And you can see, then, that it matches together with an area previously done in 2005. You know Alaska is a big place and you look at this area compared to Alaska, this is a big piece of sea floor that has been mapped as part of this project. So we're quite proud of that accomplishment.

Then here is a little better view of it, up close. And we've put a poster on the wall back there in the back that you can look at at your leisure. As you see, this survey brings out a lot of detail about the sea floor and it will help us make the decision as to whether there is potentially extended continental shelf in this area.

In fact, this mission was actually -- the requirements were set by our colleagues in USGS. So they identified where we needed the

data, where they wanted sub-bottom profile lines, in particular, and so we set up the cruise to meet those requirements. And from what we've heard, they are quite pleased with the data. So we are happy for that interagency cooperation.

Thanks.

CHAIR MILLER: The first thing Admiral Smith asked me is are there holidays on those seamounts. Those of us who do the surveying understand that question. There are but there is existing data there. It is in a very old format and we weren't able to download it or read it on the ship. But it is a problem with doing these synthesis efforts is trying to pull in the old data and if you can't read the formats, you need some real expertise to get that going.

At any rate, so no, there are no holidays on the seamounts.

CAPT ARMSTRONG: So that is a bonus having that other data. And in fairness to Joyce, Joyce -- well you know I don't believe I'm going to have quite enough time to get all this

done. And in the ECS Program Office we said well, as much as we would really like to map the tops of those seamounts, we have a limited amount of time and the other parts of the sea floor are more important, so we're going to have to pass on those.

But Joyce has managed to find some other data that we might be able to use to fill that in.

CHAIR MILLER: Okay, the next speaker is Juliana Blackwell and she will give us an update on NGS operations over the past six months.

MS. BLACKWELL: Great.

So the presentation today is more on focusing on the enhancing our access to GPS-based heights here in Alaska. So I'm going to focus on a few different areas.

But let me first start out with the requisite slide here and talking about the mission of the National Geodetic Survey. So as we continue to fulfill our mission to provide --

maintain and provide the access to the National Spatial Reference System, we have realized and I've updated the panel a number of times on our modernization efforts, the main goal of the NSRS modernization is to fully utilize the advances that we have made in geodicity and the use of technology to help better provide quick, and easy, and accurate access to the National Spatial Reference System using things such as unmanned geodetic control stations or CORS that we call active stations but really are about stations that you set up and you leave running for as long as possible, years, and years, and years versus having on-the-ground survey marks where you have to actually physically occupy those stations.

So we are looking towards more of making things available through active control stations and improving the models that are necessary so that you can use GPS and other satellite systems to do updated positioning, not only for latitude and longitude but to get the types of heights that are relative to mean sea

level.

So here in Alaska, nice pictures of lots of greenspace here. And there's a little thing I'm going to zoom in on here, which is having control in remote, unstable, and difficult areas to get to, unless you have a helicopter, and using that information to tie other datasets back to the same starting point so that when you have additional data, once it's all compiled, it is all matching up on top of each other and you can clearly integrate different types of datasets. So the Geodetic Control is a critical component of things, not only what we're talking about here but, as we were talking about, IfSAR datasets and lidar datasets, it is really important to have those things aligned and be done to the accuracy standards that are required for the project that is being made.

So this slide is just to remind folks of what we have, probably still currently, let alone before GPS was really being used for surveying purposes. Here is a map of what was a

vertical control network, the leveling network here in Alaska. As you can see, there is not a whole lot to it. It certainly doesn't look like this in the Lower-48. And the age of this data, ranging from 1943 through 1996, also means that the likelihood of that data still -- those marks still being there or having accurate information on it is highly unlikely.

This is very labor-intensive to do work like this and, obviously, we didn't get very far in Alaska because it is just hard to piece things together when you can't get there from here without a plane, or a boat, or not at all.

So abandoning the leveling aspect of how we provide accurate heights, I'm going to focus my talk here on four different activities that are underway in NGS and my partner offices here about the things that we're doing to make GPS heights, make that accessible to places like Alaska and to the rest of the United States. And if you can do it here, you can probably do it in other places, too.

So first of all, I'm going to start with mentioning the first area. Again, this is something I've mentioned before at HSRP but I wanted to give a little bit of an update on what's happening with the establishment of our Foundation CORS Network.

Let me just pause for a second and say establishing an backbone of stations that is part of the broader CORS, Continuously Operating Reference Station Network, is important so that we have something that is ultra-stable, that is managed by NGS with some federal partners, working with NSF, and also working with NASA, and the FAA to have this backbone of stations that is the best possible geodetic framework for the National Spatial Reference System.

It will be in conjunction with the partnered network of the 2000 stations that we have that are currently operating and, again, these are unmanned stations. These are collecting data 24/7 and providing us geodetic control as well as information about what is

changing over time. And the data from those stations are all coming in to NGS and that information is being processed every night. It is also being made publicly available and is being used by surveying community, and scientists, and lots and lots of other folks to do additional surveying and geospatial work.

But the Foundation CORS Network, again, this is relatively at the beginning phase of NGS establishing these sites, is something that is going to be done to International GNSS Service Standards. So some of it will also contribute to the international community and support the United Nations' mandated international efforts that are underway in global geospatial information management.

Here in Alaska, the plan is to establish five Foundation CORS at the proximity that are located here on the map. And I don't have time to go into a lot of detail but we do expect to be able to fully cover the State of Alaska with the range that we've established for

Foundation CORS as well as supplement it will partner-operated CORS throughout the State.

The second area I'm going to focus, and you've heard me talk about this at each and every HSRP meeting since we've started this program, is the fact that we've accomplished 100 percent of mainland Alaska with the end of this field season in 2018 collecting the airborne gravity data that is critical for the update for the vertical in Alaska. The data that was just completed will be added to the existing data set.

So right now, mainland is 100 percent. The Aleutians are in the plan to be flown in either 2020 or 2021, depending in aircraft availability and funding availability but we are planning to do the entire State. And what this will end up supporting is an improved geoid model, which I am going to talk about here in a minute, which is going to bridge that gap with GPS and getting true elevations relative to mean sea level.

This dataset will be something that we

will be able to use for the final creation of the Geoid 2022, which help us in the NSRS modernization efforts and achieving GPS-enabled heights, not only for Alaska but for the entire U.S. and our territories.

The data from the GRAV-D project is then used to create these geoid models. And again, I don't have time to go into the details of the dataset and I know you don't want to hear about that again but it is important to note what we are seeing from the data collections and the fact that when we develop an experimental geoid model, this is giving users an opportunity to see what the magnitude of change is going to be in their local area using these experimental geoid models so they can better prepare for the changes in height information or accurate heights that will be coming in the 2022 time frame.

Here in Alaska, when we take the GRAV-D data and apply it to and include it in an experimental geoid model, we are seeing these pockets of change in heights from anywhere from

plus 46.4 centimeters to a negative 43.2 centimeters. So not quite a meter but close to it range in difference, depending on where you are, high and low in different places in Alaska. So it's very localized. And having the GRAV-D data is filling in a lot of the gaps where we really don't have high enough resolution to give that accurate data so that we can make the geoid models as accurate as they can be for Alaska.

The data that was collected this field season will be included in the next experimental geoid model. This is something that NGS is updating every year and putting all the available data into so that folks will have the opportunity to use the experimental geoid in 2019 to see what all the changes are in the southwestern part of Alaska.

Okay, without getting too technical with this slide, my goal is to just get an appreciation for what happens when you have GPS, you get a height out of it, and what you need to apply in order to get to a height that is

meaningful to a orthometric height, a height that is meaningful and related to a mean sea level.

So let me start with the top portion here in green. When I talk about a geoid model, it is illustrating both the ellipsoid height, which is the black line. You get a height out of your GPS. And it tells you basically how far off you are from the mathematical model.

In order to make that relevant to where you are land-wise, relative to zero elevation, you have to have a geoid model to make that connection. And while there are geoid models that exist now, they are not accurate enough for the types of heights and the accuracy level that is necessary at the center meter level. And once we have completed our GRAV-D, once we have completed our datum modernization efforts, we expect to be able to provide accurate GPS-enabled heights for most parts of the country to one or two centimeters accuracy level. And having that geodetic control as accurate as possible is critical for everyone else who is

going to build datasets on top of that.

So that is the top part is the geoid, providing the GPS-based access to orthometric heights and the fact that that geoid model is a critical component to that.

The blue side is talking about what happens tying tidal datum information, water level stations to land. And how do you do that in local areas? And what is necessary? And that basically is a different model called topography of sea surface, where you can also get an ellipsoid height out of GPS but what does that mean and how do you take that information and tie it to and connect it to datasets that are terrestrial based.

So I want to talk about the wet side a little bit. I'm not going to go into this too much because Rich had this map up yesterday, basically showing where there is tidal water level information and where there is not.

And focusing on the fact that here in southeast Alaska, you have a lot more density and

a lot more opportunity there to work with a dataset and try to make improvements to that area first, so we can come up with a TSS model and start using that for some of our tools.

The one thing that Rich I don't think highlighted yesterday but I will in the sense that while there are water level stations here, there are many that are not tied to the National Spatial Reference System. So we are missing that component of connecting the water level datums to the terrestrial or geodetic datums and having that connection is really critical to making an accurate model.

There has been a lot of effort underway with NGS CO-OPS, the state, and other volunteers, to try to make those connections available so that when we do start trying to get a VDatum model for Alaska, we'll have as much -- we'll have good data on both sides, the wet and dry side to make that model as accurate as possible.

Let's see here. So the topography of

the sea surface, this is a quick example here of using an area where there is a greater density of stations like here in southeast Alaska. We can start looking at other ways and explore opportunities for improving the TSS model by blending things such as satellite altimetry data, along with the NOAA water level observations.

In this exploration, we are also using the experimental geoid model. So I know it may not mean much but these are the types of things that we're trying to do with the datasets that we have available and looking at the new technology that we have, the GRAV-D, et cetera, and trying to look for ways that we can provide the VDatum for Alaska, which is something that we currently do not have.

So just to back up for a second and talk about VDatum, VDatum is a tool that allows all different types of datums to be transformed from one to another and you need to have a stepped process so that you can do this.

The top area, and I won't go into

detail, shows kind of like how we're currently doing it. There is a lot of different bits and pieces to it. It's very time-consuming to make all those connections and having up-to-date data is really critical to driving the accuracy of making the transformations work well.

What we're trying to do is work on, in this case in the southeast Alaska, the bottom area here of using what we currently have with ellipsoid heights using an experimental geoid model and being able to have an updated TSS model to provide that connection to all the local sea level datums that are available. So there is a lot of effort and ideas underway of how we can do this better here in Alaska.

We've talked about VDatum, again, at other HSRP meetings but there is continuous work being done by our three offices, Coast Survey, CO-OPS, and NGS to look at not only what we have done in other areas but ways that we can improve those models and the technologies that we can use. This is just a shout out to the VDatum tool

and the page, the webpage information where you can find out more.

The other thing that I will just add is we continue to update that. Version 3.9 was released earlier this month and for those of you who are more versed on the geodetic side, the information and the transformations that are here in VDatum are identical to the NGS Coordinate Conversation and Transformation Tool. So while we have two different tools that people use, the guts of it are the same and they should give you the same answer, if you are looking at the geodetic -- from a geodetic perspective.

Just very quickly, you know we are still looking at ways that we can do feature enhancements to VDatum. This is one of the areas that is primed for an opportunity to take GPS campaigns on benchmarks and use coastal altimetry data and combine that with other long wave signals and produce some sort of long wave altimetry data, we're calling it Version 2.

So we are continuing to explore ways

that we can provide this. I know that there is also work being done with academic institutions to help us explore different ways that we can improve the VDatum tool and looking at datasets that are available, even if it's not how we've done it in the past. Maybe there is some newer and better way that we can make this happen.

So lastly, I just wanted to mention a couple of technical reports that are out and available for those who are hungry for more information about what we're doing with the modernization efforts through 2022. Parts 1 and Part 2 that talk about geometric, horizontal, and the geopotential or the vertical components are already out and available on our web page.

We are working on Part 3 of our blueprint and that is also expected to be available in the next year or so and I'll let you know when that's out.

Also, I know that this was talked about at one of the work group meetings this past summer, we are doing an update to our NGS

Strategic Plan. It's not a total revamp. It's really taking the existing ten-year plan that we had, doing a check-in at the five-year midpoint, and making some track changes a little bit of course changes in what we're doing.

But overall, our goals are staying the same. We've just got some updated objectives that we have in our ten-year plan. I originally thought that it would be ready to talk more about here at the HSRP but we've got a little bit of a gap here with a writer-editor. And so we didn't want to get that out until we had cleaned it up a little bit more. But when that is available, I'll certainly share that with the HSRP for folks to take a look at and see if they have any questions or comments for that.

And with that, that concludes my update. Thank you very much. And I think we're skipping questions for now.

CHAIR MILLER: Thank you, Juliana.

Admiral Smith will now give his updates on the Office of Coast Survey.

RDML SMITH: I'm going to stand up to keep myself energized.

All right, I'm going to do just a subset of the updates because we have a few more technical presentations from some of our folks tomorrow that will cover the heart of a lot of things we're doing for Alaska.

I will talk a little bit about the stakeholder engagement we've been doing in the last few months, how we're thinking about data gaps in hydrography in the sea floor mapping, sources of bathymetric data and some innovative approaches we are taking there, and then a preview of the things we're going to see tomorrow.

I won't go through all these but Bart Buesseler, and Matt Forney, and I did a week-long trip through Anchorage and Nome and met with both our survey contractors, a lot of western Alaska navigation interests, Port of Alaska, et cetera, as well as some interagency partners that were there, both the Parks Service, and BOEM, et

cetera, and then also we had a few meetings here on Monday getting it firsthand, firsthand stories to go with how we think about this programmatically.

So let me talk about the status of surveys in Alaska. This is the traditional way that we've looked at this, which is just sort of boxes that we put around everything we call a survey and then we color code them by sort of era, usually technology eras. So to say that it is un-surveyed, it really depends on when you ask that question because even things that I did when I was an ensign are now in the lower category. And so you know and we have to be really careful not to reset the bar every time we can do things better back to zero, otherwise, we'll never get done. So we have to sort of acknowledge and think about the data that we have and how applicable it is to the real needs that we hear from our stakeholders.

Another way to look at it, which is really inspired by the Seabed 2030 way of

thinking about what's been mapped is to take a simple bin of all U.S. waters, 100 meters on a side and just count how many soundings we have in our databases since 1960. We did cut it off at 1960, which is about the era of electronic navigation. So every sounding that we are confidently navigated and where it falls on the earth.

So in this diagram, the pinks are where there is one sounding. The darker purple is where there is more than one sounding in those 100-meter bins. So you can see right away that the type of work that we have been doing, and this is true around the coasts, is that we have -- right along the coast, the Navigation Hydrographic Program has been doing the shallow water work that is of immediate concern for navigation interests. And then you can see some of the extended continental shelf work being done in the deeper water.

So I like to use this diagram because it makes really clear the sort of nonsensical

question about what percentage is mapped. Because you take the one survey that Joyce did earlier this summer and that's more than we've done the rest of the century in Alaska. It's just the wrong question and yet it doesn't have the same impact for navigation, particularly, if you didn't get the tops of the shoals.

So this is -- you can see some sign of the Bering Strait PARS, where traffic has been -- where our survey work has been focused on getting track line data in the Bering Strait PARS and a little bit of the support for up and over. But I think what is surprising to most people looking at this is how much data is in the far north and that really has been, again, the extended continental shelf work in the Arctic on the Healy that has been run out of the University of New Hampshire.

So this is a big challenge and Alaska is a really good example of how we need to take innovative and flexible approaches to meeting this challenge. We can't use the same standards

and expectations that we use in the approaches to New York in the same -- in the Bering Sea. We'll just never get there and we could never -- we could not even come close to justifying the cost of it, based on the societal value that we could produce.

So we're starting with where we have problems and you all heard a lot of them yesterday with glacier faces. We have community landings. We need good surveys in harbors where ships are anchoring, passages, where they are constrained, and where they can go. Harbors of refuge may be not even formally designated but just where you might go behind an island if you get into trouble or if it starts to blow and the designated fairways. So any place where we're steering traffic, like the Bering Strait PARS, we should be focused there. And there are some additional passages like that between the ATBAs down in the Aleutians, where a lot of the trans-Pacific traffic goes.

But one of the -- so you know so start

with the problem, then look to see what data is already available. Our policy in Coast Survey is that we use the best available data. So we look at what's out there. If we have a problem and there's some data that is not as good as we could do it but it probably scratches the itch well enough that we should worry about something else first. And so we'll incorporate other people's on the chart. We've been developing relationships with other agencies and with those doing engineering work and pipeline, and cable route work in Alaska to get that data. And in a lot of cases, it confirms what we know. In some cases, it helps directly in charting.

And then Dr. Sullivan used to say that, you know and this is actually out of the HSRP meeting, last HSRP meeting in Alaska, said we should just have every echosounder running in the Arctic logging its data, and we'll start with that, and then see what we can do. And so we're working in that direction.

About five years ago we started in

partnership with the IHO but supported by and hosted by NOAA a crowd source bathymetry database, which is hosted at NCEI in Boulder, and supported from Coast Survey and NGA to allow really easily users of a navigation system already connected to GPS and already connected to an echosounder to simply log that track line data and send it in.

Okay, well that's a start but it's not tide corrected and there are some other limitations. But with enough statistics and, eventually, with a tide model, we should be able to make better use of this. But even though this is really only a year old, where we've had the integration with the nav systems, you can see how many, and this is a few months old, I can see that there is more data that we have already, certainly there are a lot of users in the southeast and that vessel going across to Kodiak is the Fairweather and actually we have the track line all the way up to Point Hope.

We're also using -- here we go --

we're using AIS data, clearly, to focus on where the traffic is and particularly out in the Aleutians, all those passes, and starting to get an idea up in the Arctic. And you can see the community resupply efforts happening up in western and northern Alaska very clearly.

So you know we can't start -- we can't survey the whole Arctic. What do we do first? Clearly, it's current use. So we are identifying where people are currently going now and making sure that they are safe doing what they're doing. And the AIS and our stakeholder engagement are really important for that.

In addition to crowd sourcing, we are also looking at satellite-derived bathymetry and there is a couple of different techniques which are promising. Again, it's not quite the same as a survey but with the number of satellite -- the amount of satellite imagery that's being collected now, the usual, the older limitations about finding a daylight -- a photo in Alaska that has daylight, and no clouds, and no ice,

your chances are going up that you'll find one eventually. And so we can start to look at taking a first look at a problem with satellite data, rather than first look with a very expensive ship or a contract.

Some of you have probably caught this but a ship went aground in the Canadian Arctic just less than a week ago with a hundred and some tourists and researchers aboard, including some URI folks. And it was the story will yet come out about the background, and where it grounded, and what information they had, and why they were doing what they were doing but it's really this happens every few years and each example gives us some new insight and potentially some new ways of trying to avoid some of these incidents going forward.

We heard a lot yesterday about the Sawyer Glaciers and I just wanted to report how responsive Coast Survey is. We now have those surveys of the glaciers. We actually didn't do them between yesterday and today. We had already

done them earlier in the year. But this is three-quarters of a mile and a mile for these two glaciers that we surveyed into what is really new water.

And we had a good conversation with the Coast Guard a few days ago and really agreed which was exactly what the panel suggested, about ten-year refresh is needed for these tide water glaciers. And we're establishing a list of them and then what can be a steady ongoing, clear requirement.

I did say that I was going to talk a little bit about the Army Corps channels, which has been an ongoing topic that we've discussed here at the HSRP a few times and there's really two parts to this. One is survey coordination. We don't want Army Corps boats and NOAA boats driving back and forth on the same lines doing the same work.

And then the second part of the problem is dissemination of that information to the public so that there is a clear authoritative

version of what the channel condition is and NOAA and the Army Corps are not telling different versions of the same story or using different data in different products.

So these are both gnarly problems. I'll start on the survey side. The typical Army Corps Channel Condition Survey are single-beam surveys with something like hundred foot line spacing going up the channel or as much as a kilometer going up the Mississippi. And so those are done every you know could be as much as every day in Southwest Pass or once a year. But they are really designed for channel maintenance. They are to monitor sedimentation so that they know when to dredge.

What is in-between those lines, they are not really designed to be navigation surveys that would detect everything that could be an obstruction for a passing ship. So they are different. It's a different purpose. It is a different reason. It's not really a question of just them doing it our way and we wouldn't have a

problem because it's probably five to ten times as expensive to do a multi-beam survey than a single-beam survey in shallow water with those types of line spacing. And so these are really complementary efforts.

But we are working, I will give two examples, with the Army Corps districts. So we're working at the Headquarters level, all the way from you know I was talking to Assistant Secretary R. D. James about it last week on the Mississippi River; I have talked to the Chief of Engineers; Major General Spellman is the new general in charge of civil works. So everybody at that level is aware of this issue and that we're working on it at the sort of next level policy, you know the sort of Army Corps policy, Tony Niles and other folks that do sort of navigation survey policy for the Corps. We're working very closely with our survey folks.

And then we're working also at the districts. Those of you that know the Army Corps know the districts are a little bit of a

different animal. They have quite a bit of autonomy from Headquarters and a lot of different ways of doing things.

So two examples on the districts. Philadelphia District does have a lot of multi-beam. They are the district that had the Athos I with the giant oil spill a decade or two ago. And they are very concerned about this issue of small objects in the channel being a hazard to navigation. And so they do multi-beam surveys quite frequently but they didn't have a way of either giving us that information that it's for resolution or explaining how they did it well enough for us to be confident that we could say that it was an object detection survey and, therefore, give it the rating on the chart that that justifies.

So we have now evaluated their data and their procedures and have come to an agreement with them on how to classify that data. And so we've now given it a CATZOC A rating, which is now on the chart and is growing

increasingly required for the underwriters of big shipping companies to approve a route or approve a passage into a port.

The second example I want to give is in the lower Mississippi River. NOAA has charting responsibility from Baton Rouge to the Gulf. The Army Corps does a whole lot of work in there as well maintaining it. And so we have complementary needs for high resolution information for bank stabilization and navigation.

The Army Corps does surveys, multi-beam surveys about every ten years. That's not really frequent enough for navigation purposes. And so we've -- and there's a lot of other issues with the terminal locations, et cetera. So we've commissioned a survey that we've been doing under contract. David Evans and Associates are doing it. It's a big project to survey the whole river and we are going to do it out of sequence with the Army Corps. So they will do it every ten years, we will do it every ten years. It will

get done every five years and we will have a coordinated -- we'll get better information more frequently to each other and to the public.

So later on this week, I guess tomorrow, we have a number of other presentations from Coast Survey. Rick is going to talk about the Ocean Mapping Plan. Liz Kretovic is going to talk about precision navigation, where we are on that. Neeraj Saraf is going to talk about our autonomous systems program. Colby Harmon is going to talk about rescheming, particularly in Alaska, the chart rescheming. And then Ashley is going to talk about the 3D National Elevation Requirements and Benefits Study.

So those are all the things I'm not talking about because we already have them on the agenda. And with that, I will close.

Are there any questions?

CHAIR MILLER: Thank you, Admiral Smith.

We are right now scheduled for public comment and we need to have that sort of in a

timely manner.

I would encourage folks perhaps after lunch we will have time for questions but many of us will be in the lunchroom together or you could ask questions.

So first of all, officially, are there any public comments from either the audience here or from the webinar?

How did I know, Jon? Yes, Jon.

MR. DASLER: Jon Dasler, David Evans and Associates, former HSRP Member.

On Juliana's presentation, the VDatum model, we've seen quite often where the models don't extend far enough inshore. Shorelines change and you know as those models get developed, it is really important to push those inland, especially on the Mississippi, they expanded it further to capture all the mobile mapping laser scanning so we can convert all that. So it's something definitely to consider with changing shorelines for VDatum.

And then I know Admiral Smith is well

aware of this and just to bring this up to the panel, is that a multi-beam survey isn't a multi-beam survey and some of the districts are doing multi-beam but it's not object detection. Again, they are doing multi-beam to see the shoals but the way they collect the data and process the data, it's not object detection. So it's something to be aware of.

CHAIR MILLER: Thank you, John. Other comments?

Lynne, are there any comments from the webinar?

Okay. So we have extra time. We have ten minutes. Are there any questions from the audience to the panel, either Larry and Andy, Juliana, or Admiral Smith?

Okay, panel, are there questions, comments? I will start off with one.

There were a couple of things that I would have said I would hope to have seen after many, many discussions and coming to understand the object detection problem and the Army Corps

surveys. And I, personally, am so happy to see progress being made on that front, even though it is not exactly where we would like it to be totally, but I guess baby steps are good.

So other comments? Silence?

Okay, Julie

MEMBER THOMAS: This is really just a comment question but I was interested in the ASV vehicles that we saw, and I think tomorrow that we are also having another talk about autonomous, because I am curious as far as where Saildrone fits in this whole arena. I know NOAA has put a few efforts, Saildrone shows up at Scripps very often, you know we get a lot of kind of exposure to it. So I am just curious about it.

DR. MAYER: I can comment from the research side of things and then turn it over to folks at NOAA to comment from the NOAA perspective.

Certainly, NOAA has been working very closely with Saildrone in the Bering Sea and it has mostly been fisheries-oriented with the small

Saildrones. But they have had a fisheries echosounder on each of those vessels and it has collected a lot of I think very useful bathymetric information.

It is something that our lab was certainly working very closely with Saildrone actually on a much larger version, a 72-foot version that can carry a deep-water multi-beam. So the concept of Saildrone is one that is really being embraced, at least from both the research side and I think NOAA, in action, is embracing it, too. So I think it has a bright future there.

MEMBER THOMAS: And that's good. I was wondering if it was complementary, or competitive, or how that all fit into the whole scheme of things. So I'm glad to hear that. Thank you.

MEMBER PAGE: I could just say that I keep on hearing that our waters are only four percent, meaning the National Standards, which sounds like mission impossible. So it's really

encouraging to see all these innovative approaches that are being taken with technology, and crowd sourcing, and partnerships, and NOAA vessels, a whole suite of things, that we are not just doing it historically the same way we've done it in the past.

So it's really very interesting how you are addressing this issue, and prioritizing, and vetting, and seeing what is really important, what is priorities and triage, all of it. So I think it's all very encouraging because if you just say four percent, you go we've been this long in existence and we've got four percent, we're never going to live that long. But the approaches you are taking are very encouraging.

RDML SMITH: Yes, I think that I forgot one of my best fun facts, which you just reminded me of, and that is if you take all of the unmapped parts of U.S. waters and draw a dividing line at a thousand meters, two-thirds of the area that is unmapped is deeper than a thousand meters -- two-thirds but that represents

one percent of the effort. And probably one percent of the value, too, I would argue because there is so much value in the shallow water work. There are exceptions, of course, particularly for sovereignty issues and minerals, and there is a few other things out there.

But I did kind of want to make the point that there is that deep water. So we could get two-thirds done. We could go from -- next year we could probably put all our resources in this and make a huge dent in that four percent. We could get to 15 percent, 25 percent, everybody would great and happy. And none of the people that sat up here would be happy at all. We wouldn't get a single thank you note for that.

MEMBER DUFFY: Joyce.

CHAIR MILLER: Lindsay.

MEMBER GEE: Yes, it's a question for Juliana. It's kind of in the weeds a bit but you mentioned the CORS stations and the partner network and I see there is kind of you have a guideline to how you become a partner. I mean

that's not at the same level as your foundation stations. To be a partner there is kind of -- is it analogous to what we were talking about with the water level and with Rich about having like the base inland stations at a set level? Would that be compare those to your foundation CORS and then the other partner ones could be at a lower level? Is this a two-tier, three kind of level?

MS. BLACKWELL: I'd say, in general, the answer to that is yes. Right now we have in existence the CORS Partner Network but we're trying to make even a higher level connection with the international community, which means we have some additional requirements to tie to other geodetic-observing systems besides GPS GNSS.

So maybe the analogy is GLOSS, from a water level station, GLOS stations, foundation CORS, NWLON, CORS, or something along those lines. But there is a -- this is not exactly perfect but you do have the right concept that we're trying to do a tiered approach.

The CORS requirements, as they stand

now, are the same for everybody, whether it is an NGS-owned station or federally, state, whatever, the same requirements. But what we're trying to do is make even tighter geodetic connections that are required or requested by the international community so that our foundation CORS stations would then be accepted by the international GNSS service and so that those would be the starting points for everything else within the United States from a geodetic control perspective.

So it would be the best of the best stations that we could possibly establish. The goal is to have 36 stations across the United States and our territories that would service the needs from a geodetic -- a highly stable geodetic perspective.

Does that answer your question?

MEMBER GEE: Yes.

MS. BLACKWELL: Okay.

CHAIR MILLER: Great. Thank you all for questions. We're going to break for lunch.

So the audience is aware, this

afternoon is an AMEC meeting. It is by invitation only.

We will reconvene tomorrow morning, the HSRP, at nine o'clock in this room. Thank you.

(Whereupon, the above-entitled matter went off the record at 12:13 p.m.)

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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: DOC/NOAA

Date: 08-29-18

Place: Juneau, AK

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