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

 APRIL 4, 2018

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The Hydrographic Services Review Panel met at the Atton Brickell Hotel, 1500 SW 1st Ave, Miami, Florida, at 8:30 a.m., Joyce Miller, Chair, presiding.

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

CAPTAIN SALVATORE RASSELLO

JULIE THOMAS

GARY THOMPSON

NON-VOTING MEMBERS

ANDY ARMSTRONG, 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

STAFF PRESENT

REAR ADMIRAL SHEP SMITH, HSRP Designated

Federal Official; Director, Office of

Coast Survey

DR. W. RUSSELL CALLENDER, Assistant

Administrator, NOS

MIKE ASLAKSEN, Chief, Remote Sensing

Division, NGS, NOS

GLENN BOLEDOVICH, Policy Director, NOS PCAD

CAPTAIN RICK BRENNAN, Chief, Hydrographic

Surveys Division

VIRGINIA DENTLER, NOS

REAR ADMIRAL NANCY HANN, NOAA OMAO\*

CAPT ELIZABETH KRETOVIC, Deputy Hydrographer, OCS

RACHEL MEDLEY, Chief, Customer Affairs Branch

LYNNE MERSFELDER-LEWIS, HSRP Coordinator

JIM RICE, NOS PCAD

DENIS RIORDAN, NGS

KYLE WARD, OCS

ALSO PRESENT

CAPTAIN LADONN ALLEN, Prevention Chief,

Marine Transportation System Recovery

Unit, U.S. Coast Guard, District 7

JENNIFER BLANCO, Office of Congressman Mario

Diaz-Balart (FL - 25th District)

BRIAN BRODEHL, Chief, Surveying and Mapping

Branch, Jacksonville District, U.S.

Army Corps of Engineers

STEVE DETWILER, FPEM, Emergency Management

Planner (Recovery and Public-Private

Partnership), Miami-Dade Fire Rescue

Department, Florida

CAPT SAM STEPHENSON, J.D., President,

Florida Harbor Pilots Association

TERRY THORNTON, Senior Vice President, Port

Operations, Guest Care and

International Carnival, Carnival

Cruise Lines

CHRISTOPHER VAUGHAN, Geospatial Information

Officer, Federal Emergency Management Agency

\*participating by telephone

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

(1:40 p.m.)

CHAIR MILLER: Good morning. I'm Joyce Miller, Chair of the Hydrographic Services Review Panel. I both call to order, and welcome all to the Panel's spring meeting. It's great to be here in Miami, Florida.

Yesterday we had the pleasure of attending the dedication of the new PORTS system at your impressive Port Miami facility. As the members, we will be doing a member introduction a bit later. And we'll be commenting on that meeting.

My thanks to the Panel Members, and especially the NOAA staff for putting together a robust program. Our program includes presentations by our federal partners and NOAA leadership, and presentations from spokesperson representing local and regional organizations.

We are very pleased that Congressional staffer from the Honorable Diaz-Balart, Jennifer Blanco, is here. And we welcome you. Would you please stand.

With us are three new members who were sworn in yesterday by Russell Callender. The new members are Ed Page, yes, stand or hold up your hand, Julie Thomas, and Sean Duffy.

We, let's see, we will do our best to stay on schedule, yet recognize all who wish to speak. There will be formal times allotted for the public comments each day. Generally, that's just before the lunch hour.

We look forward to making the most of our time together, as we have much to discuss and do over the next two days.

The goals, and outcomes, and deliverables for this meeting are the following. We have two issue papers that we've been working on. One is updated, and one is a new paper.

The updated one is about the NOAA Hydrographic Survey Fleet: A Critical National Asset. And the second one is Marine and Geospatial Data Infrastructure is Vital to the U.S. Economy.

A second priority is to discuss a proposal from the NOAA Science Advisory Board for a joint product, with reference to technology for improvement to the national economy.

And we also are discussing a possible white paper on hydrographic licensure, and a letter we received from the National Society of Professional Surveyors to develop a recommendation letter for the NOAA Administrator.

And we will also, as is our general practice, after each meeting, within a month we provide a letter to the Administrator, who in this case will be Acting Administrator Tim Gallaudet. With that, we include a synopsis of the meeting, and any new products we have, such as the white papers.

And lastly we will provide, we will discuss and provide suggestions for our next meeting, which is scheduled for Juneau, Alaska.

I'd like to introduce Rear Admiral Shep Smith, our Designated Federal Officer, and Director of NOAA's Office of Coast Survey. During his 24 year NOAA career he has advanced the state of art of hydrography and cartography, and commanded several NOAA vessels.

Admiral Smith's full biography is in your meeting materials. And for the sake of time we include all our speaker bios in the meeting materials, so that we can just have a brief introduction, and not go into detail.

Admiral Smith, it is an honor to have you with us. Can you please share any opening remarks, and provide meeting details and logistics? Thank you.

RDML SMITH: Thank you, Joyce. A couple of logistical details. Emergency exits are basically any of these four, out through the lobby. The restrooms, many of you probably have found them already, are also off the lobby.

There are designated public comment periods. I really hope that we have some audience, remote and in person comments during that period. And we'll be sure to leave some time for that, so that it's not rushed.

There's also, there are also email. And there's a chat function on the webinar, if you're more comfortable using that.

The HSRP Members, of course, this is your meeting. And you should feel free and encouraged to interrupt and ask question at any time.

We're honored with the robust group of experts that we have assembled here for our panel today. And have a similar panel tomorrow. I'll wait until we, until the panel is ready to introduce them.

But I do want to recognize some of the subject matter experts that we brought with us from NOAA, for those of you that don't know them.

We have, we will introduce the, my co-directors from National Geodetic Survey, and CO-OPS. And we'll be hearing from them this morning.

But in addition, from NGS, Mike Aslaksen, the Chief of the Remote Sensing Division is here. Mike. Denis Riordan, the Florida Geodetic Advisor is here. From CO-OPS, Chris Paternostro, who was here, the speaker at the PORTS dedication yesterday, and is in charge of that program.

And Courtney Berry is here. There's Courtney, also from CO-OPS. From Coast Survey we have Captain Liz Kretovic, Captain Rick Brennan, Captain Jim Crocker. So this is, sorry, I should be giving positions as we go.

Kyle Ward, who's our local navigation manager. Rachel Medley, who oversees the navigation manager program more generally. Lynne Mersfelder-Lewis, who is the main staff point of contact, and leader for getting this group together twice a year. Thank you, Lynne.

Nikki Nobisi, sorry, who also has just joined Coast Survey, and will be in, providing help for this as well. From NOS we have Jim Rice, Keeley Belva, there's Keeley, Glenn Boledovich, and Rachel Keylon. Rachel's over here.

So, I encourage you to, as I will, to lean on the subject matter experts in the room when we get to something technical.

I also, but before we do the HSRP Members we've not introduced our VIP here in the room, my boss, Dr. Russell Callender, who is the Director of the National Ocean Service, and has lots of other titles besides that. But that's the simplest version. Welcome, Dr. Callender. Madame Chairman.

CHAIR MILLER: Yes. Okay. We're going to have the HSRP Members and others around the table introduce themselves. And for the sake of time they're going to provide comments on the meeting we held yesterday.

And so, I will provide sort of a high level overview of what we heard yesterday at the Port of Miami. For those who weren't there, we met with a group of local experts from the Coast Guard, the pilots, the Miami River, very impressive presentations. And so, I'll try to just briefly summarize what we heard yesterday.

Port Miami is the number one cruise ship hub in the country. It has over a million TEUs. For those who don't know, TEUs is the twenty equivalent units, which means the number of 20 foot containers that are brought in.

Over a million TEUs per year in shipping. The port can now accommodate ships that carry 14,000 TEUs. The controlling depth is 51 feet. The channel has been deepened and widened. A tunnel was built. And rail access was increased. And this was all completed in 2016, 2017.

The main thing I heard was growth. The Port of Miami is growing, has grown, and will continue to grow by leaps and bounds. There are extensive plans for expansion, especially on the cruise ship side.

Container growth is limited by available land. There are plans to go forward to again widen and deepen the channel into the harbor.

The main threat in the area is tropical weather. Port closures and openings are critical for the cruise ship industry, particularly because they have to coordinate with airlines, hotels, food suppliers, and so forth.

The cruise ship industry, and other marine concerns want to be included in planning activities, or at least get information as quickly as possible, in order to make decisions. Better communication is needed during emergencies.

Getting ports opened after the storms is a very high priority. The area needs immediate access to survey capabilities after storms. And we heard some possible solutions. Of course, there is the Navigation Response Teams from NOAA. There was a suggestion to outfit pilot boats with the sensors necessary. But there are other possibilities locally.

Our PORTS installation of three current meters on the buoys was needed because the Gulf Stream flows past the mouth of a harbor at up to six knots. The outermost currents are affected by the Gulf Stream. And the currents at the two inner buoys are affected by tides. We had requests for current meters both three miles further out, and in the harbor itself.

They could, the pilots could, and the cruise industry could also use some more weather sensors in particular spots, particularly where they come out of the lee of a high rise.

The depth and width of the ships entering the harbor are critical. And they are increasing. This is something we have heard throughout the entire country. The squat of ships is increased as speed increases. And ships entering up to six knots, due to the Gulf Stream.

Another thing we heard about, which was quite new to me, was about the Miami River, which is five and a half miles long. And in looking at the charts there wasn't a sounding on that chart. So, they need better charts.

It's a very mixed use, with marinas, boat yards, tugs, residences, condos, and restaurants. Growth is anticipated. For instance, there's a planned mega-yacht marina.

Bridges are very important in Miami River. Something that very much struck me was, no power, no bridge openings, which if anybody's traveled the ICW, that's major. And there's also, and rafted boats are a big concern in the Miami River, leading to sinkings during storms.

There are limited safe harbors for small boats. Recreational boats also are a major factor in Miami. Diving, fishing, sailing, and the snow birds, all make for a very busy recreational boating scene.

Some mega-yacht growth is anticipated here in Miami. The ICW runs through Miami. And we had a request for more, quicker access to surveys on the ICW.

Okay. That's the synopsis of the meeting. And I will now ask our Panel Members to introduce themselves briefly. And then add to these comments, or mention whatever struck them most forcefully about the meeting. Ed, would you begin?

MEMBER SAADE: Good morning. My name's Ed Saade. I'm the President of Fugro USA. So, the one thing that stuck me yesterday was when the Admiral was addressing us the Acting Administrative Lead of NOAA.

He got into details about the fact that the U.S. should be the leader in terms of mapping, particularly in the deep ocean parts of our own extended continental shelves. But generally supporting the idea of mapping in deep water globally. And I think that's a really, I support that idea completely. And I'd like to see us discuss that a little bit more in detail. Thanks.

MS. BLACKWELL: Good morning. I'm Juliana Blackwell, the Director of the National Geodetic Survey. And the one comment I had from yesterday's panel was, the last speaker that was presenting on the private sector use, and collection and integration of multibeam data for recreational boaters and diving purposes.

It was interesting to hear about the way that the company is looking and utilizing data that's been previously collected, and adding to it, and developing new products based on it. I know there are a number of questions related to the accuracy, and just the scientific aspects of it.

But the concept of being able to take data that's publicly available, and develop new applications for it by the private sector I thought was really a great thing to hear about.

And it was one of the areas that, and that produce specifically was one that I was not aware of. So, that was a nice takeaway from yesterday's panel. Thank you.

CAPT ARMSTRONG: Good morning. I'm Andrew Armstrong. I'm the NOAA Co-Director of the NOAA-University of New Hampshire Joint Hydrographic Center. I'm a non-voting member on the panel.

I think yesterday I was particularly impressed by the energy that's apparent in the South Florida navigation community. And the real wide range of navigational activities that are going on here, all the way from the container ships and the cruise ships, to the mega-yachts and the smaller charter and local passenger vessel activities. So, I think it's quite a busy place. And I think NOAA's services are an important factor in everything that happens here.

DR. MAYER: Thank you. I'm Larry Mayer. I'm the UNH Co-Director of the UNH Joint Hydrographic Center, and also a non-voting member here.

I guess I was struck immediately by the enthusiasm of our new Acting Administrator. And I think what's so important is his, both experience and recognition of the importance of hydrographic services. So, I think we're going to be well served here. This community will be well served with this Acting Administrator at least.

It was also clear, I agree with Andy, that the dynamic nature of this port. And I think they recognize the relevance of NOAA hydrographic information. But as always, that can be enhanced. And I think we'll have discussions about that.

I think as Joyce pointed out to me, the part that was most interesting was the real critical need for response after something like a storm. And making sure that the port is clear. And I think again this will be issues of discussion that we'll have.

MEMBER HALL: Hi. I'm Kim Hall. I'm the principal and founder of Brizo Maritime Consulting, which is a woman-owned small business that focuses on nautical operations and maritime security.

I just wanted to clarify. I think Joyce did a great job of giving us a good summary of what happened. But I think sometimes we get a little bit of what we heard and what we need to make sure we recognize as well.

So, while better communication is certainly always a good thing, I think that there needs to be some reasonable perspective on what happens after a storm.

And I think the Coast Guard Captain that gave us a presentation on how the Captain of the Port operates, I think it's a very reasonable timeframe actually. And I think we need to recognize that as a panel, that yes, the industry is always going to push for more and better.

But sometimes we need to realize that there is, you know, those safety and security things that are going to kind of outweigh the facilitation of trade and tourism. But there's a balance that needs to be struck.

But I think that Miami is kind of the test bed for a lot of, especially what the Coast Guard does, and the cooperation between local, state and federal bodies. So, I think we need to kind of applaud Miami for having a very good system, lots of SOPs.

And hey, you can always improve your processes. But it's not a complete black hole here. So, that's my comment for yesterday.

MEMBER DUFFY: Good morning. I'm Sean Duffy, Executive Director of the Big River Coalition and Louisiana Maritime Association. So, I represent navigation on the Mississippi River.

So, I heard a lot of similar issues yesterday. We too benefit from a strong relationship with our Government partners. Participate heavily in Port Coordination Teams.

I've been on enough of those conference calls that my son wakes up in the middle of the night imitating me quite often. So, we have our share of issues and things to recover from as well.

So, through those efforts, two of the things that I did notice. We are too very interested in acquiring new port sensors. The program's been one I was looking to be involved on a subcommittee that decided where we started with our first round after Katrina.

We of course have more requests, and want more sensors, and bells and whistles, and proper placement. I've been working closely with Chris recently on working on some of the ones we have.

And then, the other thing that I thought was very similar was, our pilots do like to look at some of the survey assets behind their pilot boats.

Because of the length of the Mississippi River ship channel, over 250 miles, a lot of the assets go further up river than the pilot boats may during a storm event, and are usually the first ones able to get down. Of course they coordinate very closely with the Coast Guard.

So, in working through that, that is one of the requests that the bar pilots have looked at. And with that, I'm happy to be here, and look forward to serving this panel. Thank you.

MEMBER THOMPSON: Good morning. The name is Gary Thompson. I'm the Chief of the North Carolina Geodetic Survey, and also serve as the Deputy Risk Management Chief for North Carolina Emergency Management.

Unfortunately I wasn't able to attend the meeting yesterday. We were having a statewide hurricane exercise in North Carolina. Sounds like I missed a good meeting. But glad to be here today.

MEMBER LOCKHART: Hi. I'm Carol Lockhart. I run a woman-owned small business called Geomatics Data Solutions. My expertise is in lidar surveying and multibeam surveying. And I'm a hydrographer.

I think there was one sentence that stood out to me yesterday. And it was actually when they were talking about the Intracoastal Waterway. And one of the captains there talked about running aground in the channel.

I think it highlights things that have come up in these meetings a lot, which is, who's responsible for the channel? Who's responsible for making the charts for that channel?

And these intergovernment agency issues we always seem to run into when we talk about these things. But I think that was actually what stood out for me yesterday more than anything else, was that one sentence.

MEMBER THOMAS: I'm on. Okay. Julie Thomas from Scripps. And let's see, I come from a really observational background. And I think, well, it was just really fascinating to see the current meters. And I know how much they're used, are needed.

And I'm happy to follow through on a HF radar request to see if that would serve. I don't know if you want me to contact Deborah. But that's SECOORA. So, I can certainly do that.

And it is interesting about the app. Because the last speaker, because coming from the IOOS background we're always dealing with this, as far as citizen science, or apps that are created for surfing, or whatever.

Like, how do you really provide that quality control to the user, to let them know the level of standard that that data are actually, how they were collected, and what level of data are they getting.

So, it was just interesting. Because it highlighted the need for those apps, but yet the issue of always letting the user know the level of standardization. Thanks.

MEMBER KELLY: Good morning. My name is Ed Kelly. I'm the Executive Director of the Maritime Association of the Port of New York and New Jersey. We're a trade association and a marine exchange representing the various commercial maritime industry people in the port.

My comments about yesterday's meeting. I was also quite enthused about the comments, the positivity, and the experience level of the Acting Administrator. That bodes well for integration and forward movement.

I also noted here in Miami it's primarily a people port, as opposed to a cargo port. And people are a lot less patient than cargo. We can take cargo ships and put them out, let them sit someplace for two days, three days. They don't complain. They don't need to be fed. They don't write letters home, et cetera.

But this port is particularly pressed with an urgency issue because of the number of people, and the ripple effect, and the pile on into hotels, airport reservations, flights, parking, the need to cycle customers, the provisions, a lot of which are perishable, and have ramifications throughout.

That being said, what I did hear is, there is a lot of cooperation. But my sense was there's not enough. And I think there needs to be some better planning, as far as contingency work, to streamline this very critical timeline to get things done, with the most critical piece being surveying the channels themselves to open the port.

And it seems there was still not a good resolution to that. And I think NOAA can have a good part in playing with that and/or integrating with local contractors or some suitable connection, to improve that timeline. I think that's very critical.

And as, you know, Carol mentioned this is not the first meeting we have heard problems regarding particularly recreational boaters, the Intracoastal Waterway, and the question of going aground in the channel, and the overlapping responsibilities and/or lack thereof on some of the intergovernmental agencies to resolve that issue.

We're hearing that consistently and repeatedly. And I think it's time we need to find better ways to address that.

MEMBER RASSELLO: Hi. Good morning. My name is Sal. I'm a nautical director for Carnival Cruise Line. And I'm a active cruise ship captain.

I'd like to make a small correction on the introduction you made, Joyce, regarding the speed. Once the pilot boarded the ship in Miami they need speed to face the current on the first leg of the channel. Once they are inside the breakwater they need to reduce speed, to reduce the squat.

Because actually the channel it gets narrow. And also the depth is less than outside in the channel. So, it's six knots is inside, from inside the breakwater, passing the docking ships on the various terminal along the channel.

Nowadays there are ships with azimuthal propulsion, called Azipod. Those ship are able to manage better the speed in the channel. They manage better the squat.

Using the crabbing techniques with Azipod thrusters they can reduce the speed, thus reducing the squat. So, that's not, the squat inside, that's not applied to all the ships.

Regarding the post-major storm recovery, I would like to say some also. I'd like to emphasize that the cruise ship has a unique human safety factor.

We have thousands of people onboard not able to return to their home. Our provisions maybe last a few more days. So, everything's getting critical onboard once we don't know when the port is going to reopen.

So, we would like to be more involved in the upfront planning on all anticipated needs. Collaborative effort between Government and the private sector I think is critical to have a good result, a good plan, post-hurricane, post-major storm.

This does not apply just to Miami, but also to all the major port. As Carnival Cruise Line covers 12 U.S. ports, our business is based on the U.S. port operation. If they open, we can operate. If they close, obviously we cannot.

Better data, I think we made a good step forward placing the PORTS in the channel for measuring the data. And additional current data inside the port will be useful for the piloting inside the channel.

Crowd sourcing, obviously we say that the, it would be good to have a good survey post-hurricane. And the faster the better, to recover for the cruise line, for the people onboard, also for the community.

In conclusion, in this era of climate changes we need to better cooperate and communicate within the stakeholders. I think that is good, is cost effective. And I'm sure we got good results. Thank you.

MEMBER PAGE: I'm Ed Page. I'm the Executive Director of the Marine Exchange of Alaska, out of Juneau. And I was thinking the other day, as far as when I look at the port, and I look where I just came from the other day.

I flew all the way from Juneau, which is like 3,500 miles, in a plane, in the middle seat. It's pretty painful.

But it made me think about in one year the containers coming in this port would go from Miami all the way to my house in Juneau. That's really 3,500 miles of containers. You do the one million TEUs, and do the math issue, it's 3,500 miles of containers, even a little bit more than that.

So, when you talk about, and then you look at a Google Earth and try to get a visual feel of where we were yesterday, and how small the port is, and how impactful it is. You know, the number of cruise ship passengers, all the, how that affects their economy.

And then the larger and larger ships. One of the new ships at 14,000 TEU, and put it in perspective. That's 50 miles of containers on one ship if you put them on a dock end for end.

And so, and I think back to the role, and it makes me mindful of the role, and I'm just new to HSRP. But not new to NOAA. My maritime career started 50 years ago. And I used to do BT casts and XBT casts with the Coast Guard cutters to help NOAA.

And NOAA used to sit on the weather stations with us back in the North Atlantic and the Pacific. And NOAA used to come out with these really nice books, the tide books, and current books. And we depended on it. It's not good enough anymore.

And so, the tolerances are less. The ships are bigger and bigger. Industry's moving very, very fast on technology and advancements. And the harbors aren't getting much bigger. That's the same size unfortunately for the most part.

And so, I certainly appreciate now the new tools and the advances in technology, you know, that NOAA has responsibility to some degree, is to ensure that our ports are indeed the operational, recognized, and the tremendous impact it has on our economy and our quality of life and welfare.

So, to me it's, I see more than ever beforehand the vital role of NOAA in facilitating maritime trade. Because they'll be to our country.

And so, it's encouraging to see the efforts, the much more progressive efforts that PORTS, as well some real time system that I watched the other day is a far advancement to the tide and current tables that you would have in a book, which just, you know, were guessed as to what it's going to be like, as opposed to what it really is today.

It's really critical in looking at the size of ships and maneuver in these tight quarters. And it doesn't take much. One ship can block the channel. And there's a tremendous ripple effect, and impact on economy and businesses, and what have you.

So, NOAA's role gets even greater and greater, more important. And it's encouraging to see the technology and application. But I think there's more and more we can do on that end to improve that.

So, I'm very encouraged by being onboard. It's really an eye opener just to kind of see Miami, and work with people around the country. And kind of see the different channels we have in maritime shipping.

And for Alaska, we're just, got a new maritime frontier with the Arctic opening up. So, we have some new challenges. And we're not going to do it the old way, as far as lighthouses and buoys. We're going to use that new technology. So, I'm glad that NOAA's involved in the technological advances in enhancing maritime safety and navigation. Done.

MEMBER MCINTYRE: Be a hard act to follow there. A lot of information in a short period of time. I'm Anne McIntyre. I'm a maritime pilot with the Columbia River Pilots.

We serve five ports on the Columbia River, within the states of Oregon and Washington. We are heavy users of the NOAA PORTS system. And the products really help us keep cargo moving.

I had two takeaways yesterday. The first one was from Admiral Gallaudet. I'm not sure if my pronunciation is correct there. And it's as it relates to public/private partnerships.

I have the impression with the new administration that the whole way that the public/private partnerships work, and the way projects are funded is going to change.

And I think that that's something that this committee should be looking at, as far as making some recommendations as to how that might work.

My other takeaway was from the presentations that were given by Captain Simpson and Mr. Bailey. And I do think that it seems that the small commercial operators, recreational boaters, that we need to provide more outreach, and get a better understanding of what they're needs are, as far as products are. They seem to feel unheard.

And in every port we go to there's always a big emphasis on the major commercial operators, and the major port. And I think there is a whole group of stakeholders that we need to have more focus on.

MEMBER GEE: Good morning. Lindsay Gee from the, I'm the Mapping and Science Coordinator within the last month at the Ocean Exploration Trust. And we operate the Exploration Vessel Nautilus that is exploring on the West Coast of the U.S. again this year.

My takeaways from yesterday, I think is all of us that are related to the marine environment, it's just again to see the susceptibility of a major port to the environment.

And so, the benefits of having that real time observations of the current meters there was such a big impact to them that, you know, the three current meters was obviously a substantial impact to draw those people to open that system. But also then to the storms.

And so, how does that, you know, and the way that the services of NOAA. I think it's not just the standalone current meter or tide gauge, and those sort of things, or the standalone charting. And it's the integrational of all of that to provide the service. And I think that's a key area.

We talked about communications. But I think it's also in the integration of the, using technology to integrate that data for the captains and the ports, and those around. And I think there's still work to be done there that would allow them to better operate in the port, and have access to all that information.

So, as we transition from the, as Ed's saying, from the tide tables to the, and the things that were in printed copy, we always seem to be lagging a little bit behind the technology I think in that.

And the integration with the major portable pilot units, and serving all that data, and integrating it together is still a challenge that I think -- And our services still have to, what's the role in that?

And I've used that there's a, and it's related to what we're talking about I think with the information technology infrastructure. That that's the key to how do you put that in place, so that that can be used by the rest of, all the variety of operators. Thank you.

MEMBER ATKINSON: My name's Larry Atkinson. I'm from Old Dominion University. Since I've studied the Gulf Stream for like 50 years, which is a major ocean current, I was really interested to see. And this is a case where a major ocean current actually affects the approaches to a harbor. Pretty neat.

It reminded me of works we did many years ago on the Kuroshio as it goes past Tokyo. And how they manage the traffic in that area, which is pretty intense.

Julie mentioned the HF radar. I operate a HF radar system funded by NOAA through IOOS, in the mouth of the bay. And it seems an obvious thing they can try out down here. Be glad to help out, coordinate that.

MEMBER MAUNE: Good morning. My name is Dave Maune. I'm from Dewberry Engineers. I am a geodesist and an area remote sensing guy who normally maps things. And that data are used for years, and we don't change it very often.

I was impressed yesterday by the Physical Oceanographic Real Time System, the PORTS. I've looked at that acronym several times. And I never really focused on the real time aspect of it, and the impact that that has on the port.

I mean, that chart was, that information was being updated every couple of minutes. And that really impressed me on the impact that would have on safety of navigation.

I was impressed by Admiral Gallaudet. I think it's great that we somebody with a sharp mind like his at the top there. And the one other thing was the identification of submerged obstructions after hurricanes. That seems like it's a problem we ought to be able to solve, to identify that, those obstructions more quickly. Thank you.

MR. EDWING: Good morning. I'm Richard Edwing. I'm the Director of the Center for Operational Oceanographic Products and Services.

And the first thing I have to say is, Ed, the tide tables are not guesses. They're astronomically driven predictions. And yes, on a weather day they're not, they may be not that accurate. But they're not guesses, okay. So, let the record reflect that. Okay.

So, but I have two big takeaways from yesterday. And like a lot of the other people around the table I was just very impressed by the diversity of this port.

Every port is different. It's like snowflakes. There's no two ports that are exactly the same. They all have their own challenges and, you know, commerce.

Certainly I've been impressed with Miami, with the dominance of the cruise ship industry, and the people being moved. Also a substantial container ship traffic, you know, and down through the mega-yachts, and down to the recreational traffic. So, a very diverse seaport.

And of course, I also listened to Captain Nitkin. It's not unusual, when you establish a port system it's just a kernel for a larger system. Because people start using the sensors and get, you know, used to using real time data, and build confidence in it.

And certainly, some of the additional sensors they've asked for, it's really just a resource, you know, thing. They just need to come up with the funding to establish some of those.

The ones well offshore are a little bit more of a challenge. We could certainly work with IOOS, with the HFR. We have integrated HFR data into some of our ports displacement of the areas, Chesapeake Bay and New York, New Jersey.

So, I think that could help out here. Certainly may be much more cost effective to putting more buoys out there, and that sort of thing. So, yes, yes. And we will do that. So, and that really concludes my remarks. Thank you.

DR. CALLENDER: This is awesome. I get to go last. And I'm probably the least technically adept of anybody in the room about hydrography. But I'm going to actually hit a point that nobody hit.

So, one of the things that struck me that hasn't been talked about today was the move to LNG. And having to deal with the safety issues. Moving people at the same time you're repealing ships. And so, I think that was kind of an interesting piece.

Another piece that was talked about several times here, really the enthusiasm, the expertise, and the energy of the community that we heard yesterday, and the panel.

Yet, there was still an overall sense of we need to do, they, we collectively, need to do better in terms of communication across the board. Even though there already really tightly connected.

And finally, I think that the two Eds here, with comments about people management and data. So, if I think about the number of people coming into the port, and the cruise ship industry, it's almost eight times the population of the city where I live, Washington, DC, every year coming in. There are 5.3 million people. It's pretty amazing. Thank you.

RDML SMITH: Madam Chairman, do I get to comment too?

CHAIR MILLER: I believe so.

RDML SMITH: I, most of what I would have said has been said already. But I did want to flag just a couple of things. One is that, back to the tide table thing. The tide tables are not, the tide book is not good enough anymore.

Well, the tide book was not a real time system. It was for predictions, right. So, we're putting in real time systems. The predictions half is still necessary.

And that's where the hydrodynamic models that have been under development at NOAA, and are now, just now this year available through navigation systems, and will be available later this year in an internationally standardized format, are so critical.

Because we now have, the decision point is not when you get to the channel. You decide to go an hour before that. And so, what is the current going to be when you're there? Or when you're deciding to load what are the water levels going to be?

And those, so that looking ahead a few days out is really important. And that's, it's weather driven, et cetera. So, it includes, so it's better than the old tide tables, both because it takes into account the observations. And then the very latest ones can integrate even HF radar and other things to improve the model.

So, I do want to flag that. Because I hear about that less than I would expect, given how important I think it is to the future of navigation.

So, I'm going to put that on my mental list of things to return to in later meetings as well. And I think we have some exciting developments.

The second thing I wanted to flag was, I think maybe Anne mentioned it first, was these middle size ports. You know, we do tend, fewer and fewer ports can be the biggest ones.

And the ports are fighting like mad to stay on the list of the biggest ports, right, the ones that can take the biggest ships. Leaving behind many, many ports that would have been considered important big ports 50 years ago.

These are still important ports. They're still important to their region. They're still important to the U.S. economy. And I think as a public set of services we need to have a strategy on supporting the unique needs of those ports, as well as the mega-ports. So, I wanted to thank you for flagging that.

And the last, I just wanted to also recognize the really critical role of the new PORTS system. I think it's easy when you get into bureaucracyland to look at, oh, we've got, you know, 782 observation points around the country.

Well, to this port, you know, every single one of those is important. And once they become a critical part of the navigation system we need to maintain them with that level of service that is responsive to how important they are to the local community. So, with that I will pass the mic to our Chair.

CHAIR MILLER: These things are hard to see. I believe Dr. Callender will now address the group.

DR. CALLENDER: Thanks, Joyce. It's my pleasure to join the Hydrographic Services Review Panel, here in a windowless room in beautiful Miami.

I really have appreciated hearing the comments around the table. And, you know, seeing first hand the commitment and the energy of this panel. I think it's an exciting time for the panel.

I think it's an exciting time for the programs that you're advising. With the new technologies coming onboard there's a lot of opportunities to address some of the emerging challenges.

The agenda here in next couple of days is pretty robust. And I'm really looking forward to engaging with you, to learning what you're up to, and receiving your insights and recommendations.

So, some of the topics around post event response, thank you. Coastal community risk reduction and resilience aren't only timely. But they're certainly relevant here in South Florida. Don't get excited. I've only got two slides. And I'm not going to hit them yet.

So, I do want to congratulate the HSRP newest members, Sean Duffy, Julie Thomas, and Captain Ed Page. And welcome back Ed Kelly and Sal Rassello for a second term.

And, Sal, thank you on behalf of Admiral Gallaudet, Neil Jacobs, and myself, for arranging the tour of the Carnival Cruise Lines Operations Center on Monday. That was fabulous.

Acting NOAA Administrator, Admiral Gallaudet really enjoyed the engagement with you yesterday. And wanted me to convey his regrets for not being here today. If I think my life is crazily scheduled, his is even worse than that.

He definitely has appreciated the brief time that he spent with you, and is really looking forward to engaging with the panel, and capitalizing, if you will, on your time, your talents, and your advice.

And I think for him, being able to see the enthusiasm of the community for the PORTS system, to get out there and see that one ship coming in, crabbing as it came into the channel yesterday, he really saw the value. And being a mariner I think he totally got it.

Clearly, this new PORTS system in Miami is a great example of what we've been calling informational infrastructure that's critical for safe and efficient maritime navigation.

And we saw definitely from the panel yesterday, you know, the amount and types of ships that come in here, and the challenges that they're dealing with here in this port, dealing with the larger and larger vessels that are post-PANAMAX. But having this new tool, the PORTS system, I think is going to enable their decisions across the board.

So we, and Joyce said a great summary. That was a good summary around the room. And it was really impressive to hear the challenges they have here.

But this is an opportunity for this kind of panel to really put your ideas out there, your cutting edge thinking, your innovations to help improve and advance our navigation programs collectively, and help us to aid the community in delivering federal products and services for the future.

I'm sorry I wasn't able to join you at Portsmouth last September. I heard that was a very good meeting. You made a lot of good progress on your issue papers, especially the timely updates to the paper on the NOAA Hydrographic Services Fleet.

The NOAA Fleet, as you know, has already shrunk from 19 to 16 ships. And over the next ten years another eight ships are due to be retired. This includes two of our hydrographic survey vessels, the Fairweather and the Rainier, which turned 50 this year. That's 100 collectively. I don't think that's a good number to have.

The Ocean Service is supporting the NOAA Fleet Recapitalization Plan. And we're encouraged that Congress is appropriating funding to acquire new ships. And I'll talk about that briefly when I talk about the budget.

I really look forward to your recommendations on the NOAA fleet, and the other topics on your agenda. And I'm really looking forward to hearing from our interagency partners, and the local experts, which we heard some from yesterday.

There's going to be some good summaries I think from the Office Directors from Coast Survey, from CO-OPS, and the National Geodetic Survey. Admiral Smith will be providing a presentation.

One of the things he'll be talking about is the role of the International Convention for the Safety of Life at Sea, or SOLAS, and intersection in their hydrography mission, gaps in our charting that could inform the new Seabed 2030 initiative, and what it would take to actually map the entire U.S. EEZ. And we're having those conversations internal to NOAA right now.

Rich Edwing, the Director of CO-OPS is going to talk to you about the program's efforts to fully leverage the Global Navigation Satellite System, or GNSS, for vertical control of tide stations.

Juliana Blackwell, the Director of the National Geodetic Survey, will provide an update on their network of foundational GNSS reference stations, which serve as a backbone to the National Spatial Reference System, which as you know underpins the national, is the national framework for all geospatial application.

So, I was going to talk a little bit about the administration transition, the new political team in NOAA. You got that summary yesterday from Admiral Gallaudet.

A couple of pieces to note. Hopefully, you got an opportunity to engage with Neil Jacobs as well. So, he and Admiral Gallaudet are really the sort of co-leads. They're both Assistant Secretaries coming in. However, Admiral Gallaudet is the Acting Administrator right now.

Kevin Wheeler, who was there yesterday, is our policy lead. And he will be someone to engage with as well. There's, one of the other political appointees, more at the junior level, that's going to be focusing on the, if you will, the wet side, or the maritime side of NOAA. And that's Brandon Elsner. He was a staffer from Senator Wicker's office. And is helping to advise Admiral Gallaudet right now.

So, a lot of what I've been trying to do, literally since the fall, and now as our political team has come onboard, is to build a relationship, and build a trust with that team.

There's typically a dynamic of an us versus them mentality when you get a new political team onboard. And I've been doing everything I can to not make it an us versus them thing, but an us kind of conversation. And they've been extremely receptive, and very supportive.

I think you got a sense from hearing the brief remarks from Admiral Gallaudet yesterday, and at the dinner we had with the leadership group on Monday night, that he is extremely engaged. He is extremely excited about the work of this panel.

The purview of this panel is extremely supportive of our navigational mission writ large. We've had a lot of engagements with the Admiral. He's one of those rare senior administrators where you don't just give him a one page brief or a PowerPoint.

We sent him 20 pages of briefing materials two days ahead of time. He reads it all. And then the briefing's all about questions. So, he's got a large assimilative capacity. And really a desire to support these programs.

One of the areas that he has been supportive of is the concept of precision navigation. This isn't just about the navigation, the coast survey side.

But it's the integration, Lindsay, as you talked about, of what we have in terms of the CO-OPS data, the NGS data, and frankly, some of the IOOS information.

And so, I think an area for this panel to help engage the Admiral is going to be along the precision navigation. You know, and part of what I've been trying to do in the precision navigation, if you will, as one vehicle, is to give the new political team some wins.

They're looking for some early wins as they come into the administration. And I think this is going to be a good win for them. They're looking for return on investments of the federal investments.

They're looking for connections to the private sector. And they're, frankly, looking for successes in the next couple of years. So, I think the precision navigation idea, and the kinds of things that we talk about, you talk about in this panel are going to be very influential in the thinking of NOAA, and in terms of their priorities.

I'm going to switch to budget now. And lately it's been bad news. But it's not bad news this time. So, that's fabulous. That's one good point.

As you know, in February Congress and the White House reached a two year budget deal. As part of that deal there was an agreement on hurricane supplemental funding.

For NOAA some of the supplemental funding included funds for repairing facilities, some of our observational sensors in CO-OPS and the IOOS program, and other kinds of infrastructure.

It also provided $40 million for our mapping, charting, and geodesy programs, to conduct surveys and update products for the areas impacted by last year's storms, including those storms in Florida.

Many of the activities in the supplemental -- I'm not ready to do that yet, but thank you. Many of the activities that are in the supplemental are under review at the administration.

We have to submit a spend plan to Congress. There's, you know, we in the Government don't move fast. And we're not moving super-fast on this. Although I think we need to.

You know, the $40 million that we have, in terms of the mapping, charting, and geodesy mission, a majority of those funds will be used to support contract surveys.

And I would like to thank any of you in the room that may have supported that, the supplemental request, and the dialogue to help receive those funds. Now I can go to the budget slide.

So, on March 22 Congress and the administration reached an agreement on FY'18 funding. So, this is the funding for the Ocean Service, all of the Ocean Service since 2010.

If you take a look at the trend from roughly, the numbers are kind of hard to see at the bottom, 2013 to 2018, the trend has been in the right direction.

The President's request for '18 was $376 million. The '18 appropriation given to us by Congress is $185 million above our request. I like to see that kind of trend.

FY'19 you see the bar drops a lot. The FY, Fiscal Year '19 request for the Ocean Service is going to be very consistent with the Fiscal Year '18 request.

One thing that I will say that's very clear I think from this chart, is that we do have strong Congressional support for our missions. And they've been incredibly receptive to what we do.

We actually had, I was wanting to be there yesterday. But my Deputy ended up briefing the Senate Appropriations staff on the FY'19 request. And it was a very quick conversation.

So, I don't think they were super interested in hearing, frankly, the administration request. They're much more interested in looking at the programs. And hopefully continuing in '19 what we saw in Fiscal Year '18.

So, here's a little bit more detail. These are the major budget lines. This isn't all of the detail for the Ocean Service. The areas you're most interested in is in the top blue bar, Navigation, Observations, and Positioning line.

The FY'18 funding increased our funding from, if you will, '17, enacted 206, to the '18 enacted in the middle column of 219. It's about a $13 million dollar increase.

There's some increases to the contract surveys line, increases for regional partners in the IOOS program. You see they got a $5 million dollar increase. And there's also some funding for regional geospatial modeling grants that are in there.

And Glenn, in the lunch session today, is going to walk through a bit more detail about this budget. And I don't want to steal any more of his thunder really on that.

A couple of other points just for the larger NOS budget is, there was in the President's request in '18 a request to terminate major grant programs, such as our Coastal Zone Management Program, or National Estuarine Research Reserves Program, and Our Extramural Research Program. And Congress did not accept that proposal from the administration. And provided those funds in Fiscal Year '18.

There's also, where the heck is it? In the Coastal Zone Management Grants line there, you don't see the detail here. But there was an increase from $15 million to $30 million for resilience related activities.

This is part of the Oceans and Coastal Security Act. And we're working with the National Fish and Wildlife Foundation, National Marine Fisheries Service, and us to sort out how we're going to administer those funds this year. I've been spending a lot of time on the phone already this week on that.

What's not in this budget that would be of interest to you is in the Fleet Operations budget. There is some support, some significant support for the NOAA fleet.

There's slightly over $20 million dollars to address deferred maintenance, which is I think fantastic, which, one of the challenges as you know that we've had is keeping the hydro ships, 50 years plus, on line and running. So, having $20 million for maintenance is going to help.

There's also $75 million for fleet recapitalization, to continue the support we received in '17. So, I'm very encouraged by the budget that we received from Congress in '18. Now in the short period of time that we have we need to execute that, which I think we're prepared to do.

So, I'm going to move off of budget now. So, you heard from, a couple of the priorities, major priorities for NOAA, from Admiral Gallaudet yesterday.

One was essentially implement the Weather Act, which is not, you know, deeply part of this purview of you all. But there is some support for some of the storm surge modeling work that we do.

The second part of the budget really is what the Admiral is talking about, the blue economy. And this is a concept that's not a NOAA concept. It's been used globally for a number of years.

The definition that I like is coming from the World Bank, which talks about the blue economy is a sustainable use of ocean resources for economic growth, improved livelihoods and jobs, and ocean ecosystem health.

And I think that this focus on the blue economy really aligns well with the administration's emphasis on jobs and the economy. We've been working to advise the Admiral, the leadership at my level, and set some priorities within this blue economy.

He talked about those briefly yesterday. One was enhancing maritime commerce. So, that's huge, frankly, that that's in there. I think it's kind of no brainer, in terms of supporting jobs and the economy in this country.

Secondly is a focus on fisheries and aquaculture. Third is a focus on recreation and tourism, which would also include support for the recreational boating community. And finally, there's interest and support for some of the deep ocean mapping, and support for Seabed 2030.

What's missing in that, in my view, and what I've been hearing loud and clear from constituents, is a focus on enhancing preparedness and risk reduction.

I've been pushing that. I've got agreement with, from the career team in NOAA to add that to the blue economy priority. But we haven't really moved that up to the political level yet.

So, if you think about those four areas, five areas potentially, the hydrographic services across the board are incredibly well positioned. And you've heard that enthusiasm from Admiral Gallaudet, and the support.

So, I think there's going to be a great opportunity for the HSRP to help us identify and quantify the value and benefit of what we do in terms of hydrographic services. And really explore opportunities for innovative partnerships.

So, other areas that I've been doing on, in terms of outreach, beyond reach after the NOAA team. I've been interacting with Congress a fair bit. In November I testified before Congress on the Hydrographic Services Improvement Act re-authorization, and the Working Waterfronts legislation.

I will say that Representative Don Young pushed me pretty hard on increasing support for contract surveys, particularly up on the great state of Alaska.

I did try to be very respectful. But let Mr. Young know that we'll spend every penny that's appropriated to do those contract surveys. I think that message was received.

And on a more serious note, Admiral Smith was able to follow-up, and continue that relationship building in a one on one conversation with Mr. Young. So, I was certainly encouraged by that outreach and that interest.

Also, this past year several of the office directors here, and I, presented to the bipartisan House Ports Caucus, for an all interested Congressional staff brief. It was a standing room only crowd. And our briefing I think was incredibly well received.

Representative Lowenthal, from California, who you met at our meeting in Long Beach, stopped by and reaffirmed his support and commitment to the NOAA effort, and to our Navigation Services Program.

I also led an all interested staff brief on the NOS response to this year's major storm event. And I'll be touching on that briefly in the next panel.

So, I really want to thank you for the advice and suggestions you have given us. And thank you in advance for the continued work you are going to do.

I think we've had really good success so far with this current team elevating the message that these hydrographic services are of immense value to the nation.

I can't think of any better example than having the Secretary of Commerce in some recent testimony actually talk about precision navigation, calling it transformational infrastructure. And he actually gave a lengthy, and I will say mostly accurate description of what precision navigation was.

And I've been working to try to build those connections, and get things up at that level. And I've never been able to it until now. And I think that just shows the value and that support from the NOAA leadership team that we've been able to get.

It also shows, frankly, the great information that I've been getting from Coast Survey, from CO-OPS, and NGS, that I've been able to feed up into the NOAA senior team.

So, in conclusion just a couple of last points. As we all know, larger ships are navigating already constrained ports. There's an increasing threat of coastal storms and disasters, and impacts from that.

Clearly there's a need for foundational, authoritative, and accurate hydrographic and positioning data and services. And that need is increasing.

Technology and innovation are fundamental to providing the next generation of services. You heard from Admiral Gallaudet his deep interest in looking at technological solutions to challenges, particular autonomous systems.

Clearly partnerships with the private sector and academia will also be clear to our successes. And frankly, there's a need for greater collaboration across all sectors, not just the federal sector or the private sector, but essentially all sectors.

NOAA's going to do what it can to provide the foundational data and validated datastreams to help the country navigate safely and efficiently. But we're looking for new opportunities where all partners can play to their strengths.

And so, I do appreciate the opportunity to speak to you today. I appreciate the opportunity to be here at this meeting, to learn.

Again, the more I can learn and better understand what you do and the challenges that we collectively have, the more I can hopefully be useful to you as I engage with the administration and Congress. So, thank you, Joyce.

CHAIR MILLER: Yes. I believe next Rear Admiral Smith will -- Oh, I'm sorry. Rich Edwing will address the group on, I'm not sure what you -- Sorry. I don't have that. Rich.

MR. EDWING: Okay, yes. So, I was asked just to talk a little bit about PORTS, just given, you know, the event yesterday. And I thought what might be helpful was just for me to give a brief overview, status update of the program since it began with --

It's been a while since I've done that. We've got some new members. And so, I think, as folks are aware, the PORTS program started in 1991. The first one was in Tampa Bay. I think Mark Luther is in there. Yes. Mark's a plank owner of the original system.

And, you know, we're now in our 27th year of the program. And it's been continuing to grow over that time. It really grew pretty slowly at first, kind of slowly but steadily. But it's just, the last five to eight years it's just really, really taken off.

I'm not sure why. I can't really ascribe that to anything in particular. But we've, the system's been just really expanding. And not just in adding new PORTS systems, but it's these, you know, the existing systems themselves continuing ahead with centers as well.

We're up to number 31 with the dedication of, you know, Miami yesterday. Thirty-two and 33 are around the corner. Port Everglades is about ready to come online. The same thing with Corpus Christie in Texas.

And Corpus Christie was one of the, was the last top ten seaport by some measures in the U.S. to have a PORTS system. And a small one up in Toledo, Ohio are all in the works. So, that will get us up to 34.

And there's more in the wings. With interest, not yet signed agreements, we've got Kings Bay in Georgia, with the U.S. Navy at the sub base there. Wilmington, North Carolina has been expressing a lot of interest.

There's a new LNG facility being built, or being proposed to be built in Coos Bay, Oregon. And the Coast Guard has hopefully made a requirement on PORTS as part of the permitting process.

So, there's a lot of, you know, there's more in the wings. And there's centers being added as we go on here. So, at this point we've reached a point where we're really covering most of the tonnage that pass through U.S. seaports.

Over 85 percent, over 90 percent of the value. We've not been able to find any one statistic that really captures all of the vessels and cargo types, and people passing through seaports. So, we use different measures.

But, you know, and the system has really evolved to the point now where we offer every observation parameter that the community has identified to us as being important, as being a critical parameter.

The last few that have been added were visibility. We did a lot of testing with the FAA and the Coast Guard to come up with a visibility center that actually worked in the marine environment.

The air gap sensor, which I know you've heard a lot about, that was an emerging issue that we developed the technology for. And we worked with IOOS and the CDIP, the Coastal Data Information Program for wave buoys to provide waves. And so, really they, where there's CDIP buoys in existence we've integrated those into PORTS.

And there's been a few instances where the partner have funded additional CDIP buoys to become part of PORTS. So, we can provide that entire suite of parameters over, you know, over this time.

So, and of course, we're still continuing to improve and infuse new technology into the system. The eAtoNs that you saw yesterday were a significant advancement in how we can put current meters on buoys, you know, significantly reduced costs, and extended their range. It's going to improve the reliability of that data. So, we're always looking at ways to do things better there.

You know, we've done a number of economic benefit studies of this system. We started off with a number of individual studies. And then, as I think Admiral Gallaudet mentioned this yesterday, Eric Wolfe is the analyst, chief economist has done some studies, looked at what the benefits of what a national system would be.

And more lately he's been drilling down and looking at more detailed information on safety benefits. And he's even come up with a way now to kind of give us a bit of a strategic approach, identifying seaports that don't have capital ports, that could most benefit from PORTS by accident reduction. So, we're starting to use that information.

And the other way I think PORTS has evolved over that time is, when we first started the program, the only way it really worked was we would require the partners who had to fund, the partners always have had to fund the establishment and maintenance of the system, the local observing systems.

We originally just always required them to pass those funds to us, and we would manage everything, and provide that oversight. And that's because it was a -- real time data was a new thing.

We were a little concerned about if something went wrong what, you know, liabilities and other things were with that. But over time we've developed some other kind of models, and working with people, that allowed us to continue to work with people.

Because there are some partners that have the expertise. And they want to put the systems in themselves. And they want to maintain them. And that's fine.

And we still enter into agreements with them. We just call them data share agreements. They agree to, you know, do the systems to our standards, and maintain them to our standards. And that's fine.

There's also been more recently, a lot of partners are getting grants to establish their systems. And those are federal grants coming from other parts of the Government. And it's against Federal Appropriations laws for those funds to be passed to me.

So, even if they wanted us to totally manage things for them, I can't do it. Because I cannot accept those funds. So, more and more we're hooking those people up directly with our contractors.

So, we've got a nice stable of IDIQ contractors who have, you know, been putting this systems for us, and maintaining for them. And we just put them directly with the contractors, and let them get the systems established. And then, you know, we still have the agreement with them to make sure standards are followed.

And at some point they have to come up with their own funding for the maintenance. Sometimes they'll pass that to us, and we'll do that for them. Sometimes they'll just continue doing it themselves.

So, and then there's some systems that we call hybrids, where it's a little bit of a combination of both. Some partners have some level of expertise in like the certain parts of it, don't have the expertise to do other parts. So, they may, you know, pass us some funds to do some level of the work, where they do some.

So, the program has really evolved and changed over those 27 years. We've tried to be as flexible as we can in, you know, finding new ways to work with people to keep this all going. And, you know, here we are today I think with a pretty successful program.

And really, the program that you can say is, you can never say it's complete. But we're covering most of that tonnage and value today. So, that's a good thing.

And I think our, just our biggest challenge is, it's been such a successful program that we've been pressed to have the capacity to handle all this.

So, we've not been out there promoting this program in the -- In fact, it seems the less we promote it the quicker it grows. I'm not sure why. So, that's something we're dealing with. And I'm hoping, you know, we would, as Russell said, a lot of support from the administration.

So, I'm looking, kind of a bridging strategy is, how can I kind of hang in there, and continue to try to support this as best we can, until hopefully maybe some new resources are on, you know, may be available to continue the program. So, thank you.

CHAIR MILLER: Thank you, Rich. We will have questions for all three speakers after Admiral Smith finishes his presentation on SOLAS.

RDML SMITH: Thank you, Joyce. I'm going to do a little bit of welcome to Miami, and preview of a few of the topics that are ahead of us well, that I'm going to sneak into this presentation. So, next slide please. Or do I have the slides?

So, I'm only going to, I'm going to cover the first two bits there, the Miami and the SOLAS. And then come back to program updates this afternoon. So, oh, oh, was that supposed to do that?

Hurricane response. At the last HSRP we were in the middle of Hurricane Irma. And Captain Rassello was unfortunately not able to join us for that reason. But his presence was felt in the room during the storm.

But I did want to recap a little bit of the hurricane, the latter half of the hurricane season, as we experienced it from NOAA. And will then go into the panel later.

So, Irma made landfall in Key West. And then swept up the Florida peninsula. We had response from NRT 5, which is homeported in Connecticut. And I guess I want to say, for all of these storms, and all of the ports we responded to, again, they're all, you know, each port is a little bit different.

In general we always coordinate with the Army Corps of Engineers for survey response. Every port is, we don't really know. Sometimes we don't know ahead of time how much of the Army Corps resource was taken out by the storm, or what their types of equipment will be. And what kind of a response they'll be willing to, able to give.

So, I did want to flag that as a challenge in preparation. So, we usually have a contingency to support the local port, including the Army Corps. But we often have to adapt that after the storm, when we see which ports were actually impacted.

So, that was one lesson I wanted to flag. The other is, and I wanted to come back to something that Dr. Maune pointed out. And that is about object detection.

Clearly we do this as part of our surveys every day, both with high resolution multibeam and with sidescan when that's the most appropriate.

There has really not been a great deal of consistency from the Captains of the Port during different storms about what type of survey is required. And I think part of this is just, there's a list of, there's a checklist to go down.

You get to, get a survey done, you know, you ask somebody to do a survey. They say they're doing a survey, and they come back. But that level of detail about exactly what is necessary is not really baked deeply into that system.

So, we're working on that. We're putting together under Captain Crocker's leadership a little bit of a quick description of different types of surveys, and why you might want to do one instead of another.

And really what our experience has been in the last few storms is that we find submerged debris, dangerous submerged debris when there was overland flooding. And generally not when there's not been overland flooding.

And so, between the overland flooding and the number of missing boats, we can sort of get a, working with the Captain of the Port, get an idea of whether an object detection survey is necessary.

I'm going to tell just one sea story on that. And that is a port, which I will not, I won't rat out the name of the port. The Captain of the Port and response team, you know, got this survey going. And they asked the surveyor, why are you going so slow? Because they were out there, you know.

The Army Corps, when they go do a survey, go zip, zip, zip, zip, zip. Every couple of hundred feet you do a cross section. And off we go, we get a survey back.

Now, you're out there doing, you know, these really tight lines. And they were doing an object detection survey. And so they turned around and said, no, don't do that. Do it the quick way.

Well, you know, that's a risk, that's a risk management challenge. So, anyway, this is an issue that we have an ongoing conversation with all the Army Corps districts, and with the Captains of the Port.

But it's going to take a while. Because there are a lot of Captains of the Port, and a lot of Army Corps districts to work through this type of awareness.

A couple more, so that was one thing I wanted to flag. The other, in the pictures on the screen, the upper right there is our MIST, is our MIST kit. It was a little bit disparaged yesterday I thought. But this is a really great way to get equipment and expertise on site quickly.

Because you don't have to drag a boat, with its fuel and other problems. And oftentimes there are plenty of boats. That's not the problem. So, we can, you know, we can get these installed pretty quickly.

And this is, we have, coming into next year we're going to have a second MIST kit available. So, we'll be able to do two at once, or a multibeam, or a sidescan.

The second was, again, back to Dr. Maune's comment. In the lower left there is a big pile of containers that were swept off a pier in Puerto Rico. Those were picked up by one of the Thomas Jefferson surveys in, as they were clearing those ports.

And there was a, you know, a single beam survey both out, both there and in Key West. Neither one picked up the large number of obstructions that were in the channel. So, we're, those object detection surveys are important.

And the last was, just a big shout out to my former ship, the Thomas Jefferson. They left, you know, when it was clear that Puerto Rico was going to be in trouble, and all the ports of Puerto Rico were going to be affected. And it was pretty clear there wasn't going to be any response assets available on the island.

They left from Florida at, just after the storm passed Puerto Rico, and went south of the Bahamas as the storm went north, and were able to, you know, work, you know, sort of do-si-do around the storm to get to the, to Puerto Rico as quickly as possible.

And they went, you know, port to port to port, opening ports, all the way around the island and the Virgin Islands. All right. So, I look forward to our discussion on emergency response later on this morning.

The Miami Boat Show. So, one of the things that's special about Miami, we talked about cruise ships a lot. Emergency response was really critical.

One of the other things that's special is there's a huge recreational boating community here. Florida and Texas are the biggest recreational boating states. And the Miami Boat Show is really a highlight of the year for reaching recreational boaters. And we typically have a big booth there, and get a lot of insight.

But a couple of the takeaways from this year. Many of the users that stopped by the booth were boating in vessels 30 to 60 foot length, and using electronic chart plotters as their primary means of navigation, with a book under the, with a chart kit book under the cushion as they're, usually outdated, as their backup. But what they were focused on was electronic navigation.

We heard, as we always do in Miami, when are you guys going to fix the charts of the Bahamas? They're terrible. You know, there's a, you know, we need larger scale coverage. And they're never updated. And they're not available.

After a little bit of a deep breath, and we observe that the Bahamas are not our country. But we have started to, you know, because this is so consistently heard we have opened a conversation with the United Kingdom Hydrographic Office and BoatUS to try to figure out if there is anything that we can, with our expertise and resources, can do.

Because this is a place where, these are American boaters. They're American money, and American economy that is affected by the limitations on cruising to the Bahamas.

The power users of our products were increasingly this year buying electronic charting systems, chart plotters or PC based systems that have the ability to update charts either automatically or frequently.

In previous years the maps came with a box. And that was sort of it until you bought a new box. And that's really, that has changed fundamentally in the last few years and, such that some of the mobile apps and wifi enabled chart plotter systems can update their charts on a weekly basis, which frankly is faster than most of our commercial users do, which is usually more like a monthly basis.

So, that's pretty exciting that that part of the community has gotten that concerned about, and responsive to latency issues.

And lastly, we did start to show the models, the hydrodynamic models to, there, through Rosepoint, and at our booth. And got a couple of other navigation systems providers very excited about the possibilities for those models integrated into their systems.

So, I expect that we will see by next show, we'll see quite a bit of adoption of those in the recreational market. I changed it on my screen, it doesn't change on yours.

This is just one, another local example. This is just a simple chart update. But in a lot of ways this is the, this is an example of a new, higher performance normal for us.

So, what you see is just this first, the slip expansion. They extended it. And, you know, if you use the old chart the vessels would plot on the pier.

In the old days, like four years ago, we would have had to, you know, have a big shoreline project. We would have applied it a new edition of the chart.

We would have had to wait for the new edition to be published, and then distributed, before that could actually reach the public. And this was very frustrating to everyone involved.

Our new system, we can take a small piece of data, or a subset of a larger shoreline project. We say, this is an important change. We can apply it to the ENC, get it validated, and out the door on Thursday.

And it's just fundamentally changed the update cycle for high frequency changes like these types of things. This is, wouldn't really be possible to do through a Notice to Mariners. It's not what the notice system is for.

So, the new normal, you know, in the background, has become just much higher performance for our, the update cycle on our charts.

All right. The last thing I want to talk about is SOLAS. So --

(Off microphone comment)

RDML SMITH: Sorry. So, when we talk about the sort of authorities that underlie what we do for navigation services in NOAA, we often refer to the Coastal Geodetic Survey Act, and the Hydrographic Services Improvement Act.

Those are, you know, Congressional authorizations in law. And they are necessary. But this is, this both precedes those particular laws, and in a sense is a more fundamental requirement on the nation.

So, the International Convention on Safety of Life at Sea was first signed after the sinking of the Titanic. And so, it's been 100 years. And has been updated successively since.

Under, it covers a wide variety of, you know, construction, you know, equipment, operation, increasingly training requirements on shipping.

But it also puts requirements on signatory nations to provide navigation services. And it obligates these signatories to provide these services. It's a little bit more fundamental than the authorization to do so.

In particular, Regulation 9 covers hydrographic services. This was last updated, you read this in 1974 language. Because that was the last time it was wholesale updated. But it requires that hydrographic surveying is conducted adequate to the requirements of safe navigation.

Now, you know, I read that as our surveys should be done to those standards, not just by NOAA, but that we have to provide that for the nation.

And so, when we look at how we're coordinating with the Army Corps, for instance, for survey requirements in Channels, fundamentally, if we don't have surveys that are adequate for safe navigation in the channels, we are not upholding our obligation under this treaty. And so, this is the, you know, this is sort of a fundamental point of departure for those discussions.

The second thing I wanted to highlight here was that there's an obligation for our products to be uniform, in order to be internationally compatible.

Now, we hear about this a lot from the cruise ship industry, an big shipping. Because they, you know, one voyage will go through a number of different nations. Hydrographic services, their systems need to be compatible. Their training needs to be compatible, et cetera.

And specifically in that there's a footnote. It's not written in any -- that specifically calls out the standards developed by the IHO.

So, when we talk about, you know, developing navigation services for ports, for instance, and we have a way of distributing the tide and current information, that we should be aligning those with international standards for those formats and dissemination services, so that they're compatible not only with ships, but with systems that operate worldwide.

And then lastly, there's a, the last one I wanted to highlight was under Number 4 here. That the services are made available on a worldwide scale in a timely, reliably, and unambiguously as possible. So, that's really about worldwide dissemination.

And there are systems in place. And I won't get into a lot of IHO and rank business here. But there are distribution systems in place for ENCs right now. And it's really only ENCs that are distributed through these worldwide networks.

But as we develop new services that use the new IHO formats, and are, perhaps are more dynamic in nature, we need to be looking for how we're going to fulfil those worldwide dissemination obligations with those services as well, so that we don't have, you know, every nation have its own little way of doing it. Or worse, have every port within the U.S. have their own little way of doing it, which would be quickly very unmanageable.

So, that's all I wanted to cover as background for today's discussion. I'll turn it back to our Chair.

CHAIR MILLER: Thank you, Admiral Smith. Are there questions? We're a bit short on time. We're into our break time already. And we have a large panel. But I would encourage, if there are questions for particularly Dr. Callender or Ed, or Rich, that they be asked.

Yes. He's another Ed. So, yes. Are there any questions for -- He's the fourth Ed. Are there any questions for Dr. Callender or Rich?

MEMBER THOMAS: I love it that during the briefing on the Hill Lowenthal came up and acknowledged that. Because this last summer we actually took Lowenthal out on the pilot boat at Long Beach. And he saw one of the transfers of the pilots.

He was so impressed. He, we actually, he drove the boat. I mean, we put him right out, not when they were transferring. But up to that point. And I have this great picture of him at the helm.

But, you know, I, who was it, Liz. I was talking to her about what Congressional people like. And we found that just exposing them to what goes on offshore is great. So, I'm pleased that he actually acknowledged you, and he came up.

DR. CALLENDER: Yes. So, one of the values of this panel is inviting Congressional staff, inviting Members. Having them get excited and engaged on these issues is fantastic.

And since Representative Lowenthal came out to the HSRP in Long Beach he's been a fan of the program. And so, you know, he's helping to spread the gospel, if you will, for the value of this panel.

CHAIR MILLER: Any other questions or comments? Okay. It's 11 after. Can I ask that we take, try to be back by 20 after. Take a ten minute break. And then we'll get going on the panel.

(Whereupon, the above‑entitled matter went off the record at 10:13 a.m. and resumed at 10:27 a.m.)

CHAIR MILLER: Mike Aslaksen will be leading this panel, and briefly introducing our speakers. Thank you.

MR. ASLAKSEN: Well, good morning. Again, Mike Aslaksen. I'm with the National Geographical Survey, from the Chief Remote Sensing Division. And I'm excited to be here on the panel, centering on Navigation Services Support and Federal Emergency Response, lessons learned, and future directions.

Again, we have a great panel here of our federal, state, local, and private interests. And going to give their perspectives on the efforts they provided, as well as the efforts that NOAA provided.

In a minute I'm going to ask Dr. Callender to do an introduction of the NOS response to the storms of 2017. But in my preparation for the panel I came across the keynote of Ed Rappaport, who's the Acting Director of the National Hurricane Center, at the National Hurricane Conference last week.

And just some beyond interesting statistics about this storm season. There were three Category 4 U.S. landfalls in a period of 26 days, Harvey, Irma, and Maria. For context, the previous three occurred over a period of 56 years.

In terms of accumulated cyclone energy it was the most active season in 167 years. Five Category 5 landfalls occurred, Irma in Barbuda, St. Maarten, British Virgin Islands, in Cuba, and Maria in Dominica.

Harvey set the U.S. tropical rainfall record of 60.58 inches in Texas. For likely the first time forecasters issued three concurrent hurricane warnings for Katia, Irma, and Jose. U.S. damages reached $265 billion, surpassing the old record of $211 billion in 2005.

And in closing, you know, if you had, he said, if there's a single event that puts the season in perspective, the Island of Barbuda became uninhabited for the first time in 300 years, after they suffered through Irma and in anticipation of the fear of Jose. Pretty challenging there to understand with those sudden impacts.

So, at this time I'd like to introduce Dr. Callender, who is the Assistant Administrator for Ocean Services. And he's going to go do an overview of the NOS response to the storms.

DR. CALLENDER: Thanks, Mike. I was originally going to give a very brief, high level overview. And then Mike talked me into reprising the presentation that I gave on Capitol Hill, summarizing the NOS response to the hurricane seasons. And hopefully there will be a slide that will come up.

Okay. Thank you. So, this is Hurricane Irma making landfall. And you may or may not be able to actually see Florida underneath that storm. This is on September 10, 2017.

I'm going to really talk about the Ocean Service response to this. And you'll see the date of the presentation that I gave on Capitol Hill.

But our role doesn't just focus on response. It actually starts with preparedness, with planning, and relationship building that continues all the way through recovery as well.

So, prior to the hurricane landfall, at the request of FEMA, NOAA was embedded early on in the FEMA National Response Coordination Center, to provide those connections between FEMA and the NOAA response operation.

As the storms approached our navigation, our regional Nav Managers, such as Kyle Ward, who's in the back here, were also embedded at U.S. Coast Guard incident command centers to coordinate post storm surveys.

We also embedded scientific support coordinators to assist with hazardous material response efforts. These scientific support coordinators in our Office of Response and Restoration provides the scientific support to the Coast Guard for any oil or chemical releases in the coastal zone.

Before the landfall of Harvey, Irma, and Maria, the Ocean Service was requested by FEMA, through mission assignments, to provide emergency response imagery for damage assessment and response priorities.

This imagery is usually the first look at the scale of the damage and support search and rescue, impact assessment, and resource allocation decisions.

The top left corner shows Lieutenant Commander Chris Skapin briefing Secretary Ross, who came to the FEMA National Response Coordination Center. The bottom left is the Gulf of Mexico Disaster Response Center, which is a regional hub for disaster preparedness and response.

Some of the other things we did was work in advance. This is an image from the Florida Marine Debris Emergency Response Guide, which helped the State of Florida plan for marine debris challenges that they would be facing potentially after a major storm event.

In the days leading up to the hurricanes, Rich Edwing's team at COOPS monitors and disseminates observations on water levels, currents, and weather information.

The product is called Quicklook and it's initiated when the National Weather Service issues a tropical storm or hurricane warning. And it provides a synopsis of near real time oceanographic and meteorological observations along the path of the storm every six hours.

Having these kind of reliable real time observations enables the Weather Service to validate or adjust their forecasts. And knowing the actual conditions is essential for emergency responders making critical decisions on evacuation routes, rescue operations, and safety of life and property decisions.

On the bottom right you see an image from the Coastal Floor Exposure Mapper. This shows the eastern coast of Puerto Rico. But this is the kind of visualization tool that we provide, that enables coastal managers to assess coastal hazard risks and vulnerabilities.

Immediately following the hurricanes our navigation response teams jumped into gear to provide emergency response, excuse me, emergency hydrographic services for impacted port areas.

These navigation response teams, as many of you know, are mobile teams that can deploy anywhere in the country to conduct initial rapid hydrographic surveys, using small vessels and side scan sonar. Because they're mobile what we do is, we pre-position these assets in advance of storms.

We're not the ones that are making the decisions on reopening the port. That decision goes to the Coast Guard. But our job is to provide them data, so that they can make informed decisions to quickly and safely open ports.

So, an example here in Miami, on -- at 2:30 in the morning on September 11th, the Navigation Response Team got onto the first flight coming into Miami. This was on a C-130. By 2:00 p.m. the following day they began surveying, using a Miami-Dade police boat. You can see the team there on the left side of the picture.

This NRT, this Navigation Response Team, worked all night and the next day to validate the survey. Then gave the data to the Coast Guard and the North Channel opened at 6:30 p.m. on September 12th, and the South Channel opened Wednesday morning on September 13th.

All together our Navigation Response Teams throughout these storms opened up 26 ports in the region, from Texas, Florida, Puerto Rico, and the VI.

Just for a point of comparison, the loss of trade for these ports, and this is a very conservative number, was about $500 million a day. So, essentially the Navigation Response Teams have recouped the entire budget of the National Ocean Service in one day. So, that's the kind of return on investments that Admiral Gallaudet was talking to us about yesterday.

So, let me show very briefly Puerto Rico and the USVI for a moment. And really, what I want to do is to use this to really, as a point to demonstrate the value of the NOAA fleet.

Admiral Smith mentioned this briefly earlier this morning, but we sent NOAA ship Thomas Jefferson down the coast of Florida to Port Everglades, and then towards Puerto Rico, arriving on September 28th.

That team spent three weeks in Puerto Rico and the VI. They surveyed 14 areas and 19 individual port facilities, as well as conducting emergency repair to tide and weather stations. They opened ports, and allowed the delivery of supplies for the ongoing humanitarian response in this region.

This really I think points out the value of the NOAA fleet, being able to go down into a region which didn't have infrastructure, surveying over a dozen ports. They had the right expertise. They had the right equipment. They had a right endurance for a three week deployment.

As soon as weather permits after these storm events we begin aerial survey missions to assess damages to the areas impacted by the hurricane. The data that we collected were rapidly processed, and provided to emergency responders, often within hours of collection.

They facilitate search and rescue, enable expedited rental assistance, allow property owners to look at their property. And in many cases it's the first look at what may be damaged by a storm event.

To give you an idea of the scale of those operations, in over a month of operations our survey team, primarily on the King Air platform, flew about 40,000 miles. To put that in perspective, it's equivalent to flying cross country and back 17 times, in over a month of operations.

The amount of data that we collected, more then 65,000 images, covering the same area essentially as the State of Maryland. So, this image is near Lynchburg, Texas, which is east of Houston, following Hurricane Harvey. Oops. Supposed to change, but it didn't. That's okay. I'll change it back.

This was, one of the kinds of challenges that we had, we got questions about tug and barge, barges that were piled up post storm. And they wanted to look at our emergency response images to figure out how to untangle this big collection of tug and barges. You can't really see it that well in this picture. But that was one of the reasons this picture was taken.

This is an image from Big Pine Key, Florida, following Hurricane Irma. And you can see the devastation there as well.

The rapid aerial imagery is connected -- that's connected by the National Geographic Survey is also critical for emergency responders. They use the imagery to immediately identify coastal areas, sensitive habitats, and navigation routes that may be adversely impacted from debris or damaged recreational vessels.

Once we were able to help identify what vessels and debris that were a pollution threat we then worked with the Coast Guard on which targets should be prioritized for removal. As I mentioned briefly earlier, our scientific support coordinators support the Coast Guard in hazardous material response efforts.

We tracked all total over 3,500 potential pollution targets in Florida, Puerto Rico, and the VI. And the map up at the top shows concentrations of debris and vessels in that area. Not going to go. My slide refuses to change here. And there's a great slide coming up too.

So, you got to get out of that on the right for me to make this work. Beautiful.

PARTICIPANT: There it is.

DR. CALLENDER: Awesome. I thought this was an image that you would really appreciate seeing. This is a screenshot of AIS data, Automatic Identification System data, that was taken as ships are getting out of the way for Irma on September 9th.

This is pretty amazing, I think, to see that collection of ships that are skedaddling out of the way. Is that the right navigation term?

So, we did learn some key lessons learned from our response. And I'll touch briefly on that. But I'm frankly more interested in hearing your perspective.

One of the things that we did learn is that, although we have lots of trained responders in the Ocean Service and in NOAA, we need a deeper bench. We need a deeper bench of trained responders.

One of our goals was to plan for two major events at the same time. We got three. We were able to do it, but it really pushed our capabilities.

We also saw in many cases that we were very close to having single points of failure that created unnecessary risks. King Air was one major platform that we used. You know, there was, we didn't have spares for cables. So, if we're looking at collecting imagery and we lose a cable, we're done.

So, you know, some of those single points of failure I think were really critical for operations. What we found also, that what works in the Continental U.S. may not work in islands.

When you lose infrastructure, when you don't have power, when you don't have roads, you know, getting teams onboard, and being able to drive through roads that don't -- aren't open, is kind of tough.

So, we really learned a lot about the value, again, of having the NOAA fleet that could come, and actually be a hotel as well as a platform to do the work.

And clearly the value of preparedness and planning enabled us to respond more quickly. And I think what we learned is, we need to be constantly evolving in our planning and our response. And learn from things that we screwed up. Learn from areas where we had challenges, and really be a continuing -- continuously learning organization, so that response is going to be even more effective the next time.

And with that, that was kind of the whirlwind tour of our response, and part of our role, just to give you an idea of the capabilities that we brought to bear. Mike, it's up to you.

MR. ASLAKSEN: All right. Any questions for Dr. Callender from the panel? Okay. All right. I'd like to welcome Captain LaDonn Allen. Captain Allen is currently assigned to the U.S. Coast Guard 7th District in Miami, Florida, as the Prevention Chief, where she leads and promotes consistency in prevention field operations for 21 shipping ports, 34 Caribbean nations, and the world's three largest cruise ports, for seven Captains of Ports and officers in charge of marine inspection. Thank you, Captain Allen.

CAPT ALLEN: Good morning. Good morning, HSRP Federal Advisory Committee, Honorable Representatives, Commissioners, Admiral, Administrators, Doctors, ladies and gentlemen. I think I covered everyone in the room.

First of all, before I begin my presentation, listening to all the comments of the Committee, I'd like to say that we work, the Coast Guard, side by side, NOAA, and the Army Corps, 24/7 for these events. And this, in fact, I have to admit that I talked to Kyle Ward more than I did my husband for two months. Yes.

So, for two months, limited resources, equipment, and personnel to conduct these responses. And in my opinion, opening up these ports in record time, considering the circumstances, including not only port surveys, search and rescue, hazardous material response, considering the wind, the sea state, and the safety of the responding personnel.

So, I just wanted to mention that before I begin. We'll start with my first slide. You can click on it. There you go. Thank you.

Okay. Coast Guard District 7 exercised a mock hurricane hitting every single deep water port within our area of responsibility in the spring of 2017. We never even realized how true that would become.

Hurricane Irma made landfall on 6 September 2017. Every deep water shipping port closed within the District 7 Area of Responsibility, which includes Florida, Georgia, South Carolina, Puerto Rico, the Virgin Islands and surrounding islands, as well as several Caribbean nation ports.

As you can see, the natural path of Irma dictated the closures and the openings of the ports. The majority of the ports were opened in three to five days. While DoD, I'm sorry. Arrival of Coast Guard, NOAA, and Army Corps, and DoD resources also determined port openings.

While DoD was able to scan a military outlet port, pier, in Key West, with the devastation, the rest of the port awaited NOAA and Army Corps side scan sonar, due to a sunken vessel, and 18 other targets to be salvaged and evacuated in the turning basin, which caused the port opening to be delayed by two weeks. So, for these significant delays, there was a reason for that.

The Coast Guard Sector Key West, Miami, St. Pete, and D7 all continuity of operations, which we call COOPed to other location, because our actually facilities were in the path of the hurricane.

So, we did COOP. And we ran operations while deployed, in addition to the response as well. So, communications definitely was a challenge for these hurricanes.

Okay. The Maritime Transportation System Recovery Unit, or which I'll from now on refer to as the MTSRU, and resources for Hurricane Irma consisted of the Coast Guard, NOAA, Army Corps, Navy, State, and local and industry resources.

Prior to the hurricane, resources were staged throughout the district, as you can see on the slide. In order to prevent damage to resources, pre-determined shelter, evacuation areas were essential for our resources. Two times a day we had phone conferences. And numerous MTSRU conversations were had with all the resource unit leaders.

With the natural northern path of the hurricane, passage of the high winds and seas determined when resources were able to start port recovery, as well as staging areas for resources. The majority of the ports, like I said, were reopened in three to five days for Irma.

This is a port and facilities commodity slide for fuel. This is just one of the venues that we use to determine port priorities, when the path of the storm is not that particular item driving the port priorities. And this is just for fuel consumption for the State of Florida.

In addition to that we look at port and facility commodities. We look at humanitarian aid. We look at product supply, which drove our port prioritization, among other factors. Like I said, search and rescue, hazardous material, surveys. So, all of these were in consideration.

This slide is of our vessel queue for Hurricane Irma. And a vessel queue is basically those vessels waiting to get into port. As you can see this is -- I chose specific slides on certain days, just so you can see the impact, and what we had coming in basically.

So, this vessel queue is a traffic system which we developed at the Coast Guard in order, with the Captain of the Ports, and the Port Advisory Committees.

So, not only do we have Coast Guard input into this, we have the ports' input. We have industry's input. And we have all of those port partners to establish this. We get that advice from the Captain of the Ports after they meet with their Port Advisory Committees in order to determine this vessel traffic system scheme.

All right. This slide depicts our port statuses. We look at our ports as either open, restricted, closed, and port conditions, which are either normal, Whisky, X-ray, Yankee, or Zulu, for major ports and waterways. We also look at those military and economically strategic ports as well.

This depicts 11 September slide. As you can see, what we report out on for each port is essential for determining where our survey teams are going.

Okay. I'm going to move on to Hurricane Maria now. While still providing support from the disastrous effects of Hurricane Irma, Hurricane Maria followed shortly thereafter.

And on 19 September all ports in Puerto Rico and USVI were closed, followed by many other Florida ports. On 20 September vessel arrival activity shifted completely to our District Office in Sector Miami, where we screened over 500 vessels on behalf of Sector San Juan during two weeks.

The reason for this, they lost complete communications on the island. So, that was a huge factor. In fact, for two days we were using a fax machine to get information from them, and send them information. So yes, communications was definitely a challenge for this.

Openings depended a lot on the pilot -- port pilots, commercial vessels, industry partners, to scan the channel prior to NOAA and Army Corps' arrival.

While ports were being opened restrictions remained due to power outages, inoperable facilities, including damage to infrastructure.

By 4 October all ports in Puerto Rico and the USVI were open. Several ports still had draft and daytime restrictions due to lack of power, and official survey completion, and/or salvage by NOAA and Army Corps.

So, initially these ports were open with restrictions, using other resources. And then followed by Army Corps and NOAA as soon as they got there.

Okay. This depicts our District port prioritizations initially for Puerto Rico and USVI. This was our initial assessment, based on what information we had about their ports for commodities, and other information, fuel status, and the list that I previously spoke to you about.

But subsequently, when we gained communications with Puerto Rico, Sector Puerto Rico, and they met with their port partners, those did change somewhat. But we did have a good plan for port prioritization.

Port statuses, as you know from the last slide, were open, restricted, or closed. As soon as ports were open marine safety information bulletins were put out by the Captain of the Port on a website that we have called Homeport.

So, as soon as those ports were open industry had, all they had to do was go to Homeport to access that MSIB port information. And that is not a secure site. That's open to the public.

Here's our vessel queue for Puerto Rico and Virgin Islands. As you can see it's quite lengthy, and continues on as well. Again, fuel, humanitarian aid, and victim evacuation were prioritized.

This is the Maria MTSRU force laydown. As you can see, most of our assets were located within Florida, Georgia area. So, having to travel down to Puerto Rico was definitely a challenge for all of our teams.

So, teams from NOAA and the Army Corps flew in from all over the country to meet Coast Guard air assets, to fly them to Guantanamo Bay, Cuba, to ride the Coast Guard cutter to Puerto Rico.

And let me tell you this, this was in high seas. I think Kyle Ward can attest to that, and the fun that they had. Roads were impassible, fuel was low or nonexistent. And the water route was the only option initially.

For Hurricane Maria MTSRU report survey resources and Aids to Navigation resources were extremely challenging. Teams from NOAA and Army Corps flew in, as I said, and then port priorities were determined by the district and the local Captain of the Port for the respective AOR. They were determined by necessity, impact to port opening, versus survey resources available at the given time.

For Irma, Miami Port Everglades contained 40 percent fuel resource for the State of Florida, which was considered a high priority. All ports, with the exception of Key West, had survey resources readily available.

San Juan was first priority for Maria. Due to the infrastructure constraints and delivery of resources to other ports, they were surveyed in order of survey asset accessibility.

For Irma survey assets the NOAA MIST relied on Coast Guard transportation of the port resources available for surveying, because they don't come with a boat to house the survey equipment. But we managed to coordinate and work that out, so they were able to be used significantly.

Now, I do have, with the time constraint, a lot more detail with regard to our resources. Where they surveyed, and the dates, if anyone is interested in that afterwards.

I do want to mention for Maria that no federal or state resources were available on the island for surveying, other than the local port pilots.

Army Corps did have a contracting team. But they were not able to get underway. They were on the land side and they were not able to get underway immediately.

This slide depicts AtoN resources involved. The Coast Guard Cutter Elm sailed from North Carolina to Port Everglades, Miami, and Key West to correct Irma discrepancies.

Then went to PR, Puerto Rico and USVI following Maria, followed by the Cypress D9, which is another district for D7 Aids to Navigation Teams. The Coast Guard Dive Locker, and the Joshua Appleby, and Maria Bray, in addition to the Vise, and the Hudson, and the Hammer.

Okay. In addition to the AtoN impact of reports, we also had to establish and implement a temporary regulated navigation area, as well as safety zones for Key West and Puerto Rico.

This was necessary due to many things, including looting and law enforcement. So, for the security side of the house, as well as navigation, we had to have people operate at slow speed, and prohibit vessels from entering, anchoring, loitering, and moving within the safety zone around law enforcement, for salvage teams, and for wreckages.

And finally, I'm going to move on to lessons learned. And this will be my last slide. Our daily interaction with NOAA and the Army Corps was priceless, absolutely priceless.

Having both in the MTSRU was invaluable. The only thing that would have been more valuable would have been to have a rep from each agency physically in the MTSRU, since we did confer so often. Fully integrate -- we were both fully integrated at every single level, in the field, at the District. We were integrated everywhere.

No FEMA and DoD vessel advance notice of arrivals were received, or very few were received by the Coast Guard. They didn't provide this, which caused difficulty for berthing spaces, vessel queues, and exams for first time callers to the U.S.

We actually had to work with our Activities Europe team to do inspections over there, and where other ships were located, in order for them to come to the U.S. for humanitarian reasons.

Some FEMA and DoD contracted vessels had not been to the U.S., did not have a valid certificate of inspection for their intended voyage and cargo, or passengers. And expectations were for these vessels to transit a closed port, which was not authorized.

For Maria, berthing spaces in ports extremely limited. Passenger vessels for Maria had special authorization to moor as temporary berthing vessels.

FEMA and DoD vessels did not prearrange berthing spaces, which caused a little difficulty for us as well. They continuously selected ports that were not capable of receiving the size of vessel, nor were they operable.

Sewage emissions in ports, we did require for vessels to report those to EPA, or PREPA, for authorization. So, that was an issue. New to zone vessels, like I said, there were no security plans, no certificate of financial responsibility, didn't meet safety or security standards. And we did what we could with the limited inspectors we had within Puerto Rico.

We created new policy letters. Our headquarters declared the event a national maritime special event to authorize berthing vessels. We waivered these vessels. And then we also waivered some offshore supply vessels as well, for humanitarian aid.

eAtoN was used. It was successful in the States, but we did not have adequate reception for Puerto Rico and USVI.

Political inquiries. This was a full time job, as I think everyone else knows. For the MTSRU especially. They were extremely busy. We were extremely busy considering the Jones Act waivers, vessel waivers, and requests to waiver double hull standards, firefighting, lifesaving, reduced crew, and reduced crew for international voyage, which were all denied by the Coast Guard. And of course, Congressional and Presidential visits were continuous.

Port prioritization. With input from our incident commanders and Captain of the Ports, the Port Current Steering Committees, the Port Survey Teams, the States, we were able to determine the most critical factors that required resources immediately.

Opening of the ports, AtoN, eAtoN was used. And of course, like I said, not available in Puerto Rico. Channel surveys, due to multiple ports being closed with damage and channel impediments, not enough survey teams and sonar equipment, hence port prioritization.

We found out that the size and hull of the survey vessels do matter. Coast Guard, NOAA and Army Corps boats required to evade the hurricane. They were not big enough to transit when the wind and sea state was beyond six foot, except for the -- one of the NOAA ships. They were required, they also required a certain type of hull for side scan sonar equipment.

Storage and location of survey vessels and buoy tenders, and contract -- We found that contractor response is uncertain. Staging areas for equipment and team should be predetermined by Coast Guard, NOAA, Army Corps, for each hurricane. Not where they're currently staged.

Flooded facilities. Although ports were open, some facilities could not receive vessels due to flooding, lack of power, damaged equipment and piers.

Fuel supply. Critically -- critical commodity that required constant status update to the highest levels of Government. Inaccurate news, or fake news. Ports were not receiving fuel. They were. Port Everglades and Puerto Rico were receiving fuel and vessels.

Real news was that there was a backup of fuel supplied due to lack of power, flooding, damage, lack of trucks and drivers to deliver this fuel.

And finally, the use of NOAA assets and resources. NOAA has access to eAtoN for LNMs with the Coast Guard. This was invaluable. Bridge vertical clearance updates, chart notes, changes in mean tidal range and current direction, we used significantly.

We used LNMs to ensure our AtoN discrepancies or any significant federal waterway changes were depicted and annotated. We used NOAA's weather, tide, and current predictions significantly by our operational planners, and planner service wide.

We used aerial data for our port assessments. We used the NOAA Scientific Support Coordinator for hazardous material and oil response. And we also have a active MOA we know of for service in offshore NOAA buoys.

Additionally, in response to both hurricanes we tremendously valued the use of the MIST, the NRTs, and the NOAA ship Thomas Jefferson. The NRTs were self-reliant because they came with a survey boat asset, and the MIST was more easily transferrable across districts.

It was relatively easy using Coast Guard and other port partner boats to carry the survey equipment. Both resources were helpful in different ways. And we could not have completed the fast and efficient survey of ports without them.

For Maria the Thomas Jefferson provided channel surveys, operated in high seas, and with product. They provided a product faster to open the ports faster. Especially for the islands, the Thomas Jefferson was fully self-sufficient for fuel, food, lodging, connectivity, and comms. And it came with survey boats.

MR. ASLAKSEN: Wrap it up, Captain, please.

CAPT ALLEN: Okay. Our D7 waterways team has worked with companies with great success in installing smart weather stations on some of our buoys in AtoN. We would recommend that these weather stations provide real time weather and sea info that's accessible to mariners on the internet.

We recommend, if NOAA as our federal partner, worked with the Coast Guard to install similar instruments on the entrance buoys to all of our major ports, this would be a huge advantage to pilot associations and deep draft captains.

Also possible to integrate weather information into some of our aids that already have AIS transponders installed for on scene weather. And AIS and our layers in GIS electronic charts.

And finally, recommend we further strengthen our partnership in service to port partners by developing an annual plan using NOAA, Army Corps, and the Coast Guard, and other Government agencies with small boats.

We also recommend having NOAA and Army Corps personnel physically located with the MTSRU and response, which we're currently working on. And the MVP for these hurricanes goes to Kyle Ward of NOAA.

MR. ASLAKSEN: Shocker. Well, I'll ask we hold questions in the interest of time. And we'll move on to Captain Sam Stephenson. Captain Stephenson is a U.S. Coast Guard Master Mariner of any gross tugs, and an active harbor pilot with Port Everglades, Florida here, and current President of the Florida Harbor Pilots. Captain Stephenson.

CAPT STEPHENSON: Hey, good morning. First, I'd like to thank everyone for inviting me here. Okay. What I'm going to talk about is the pilot's role in general, and also what we did during the hurricane, after the hurricane, and where we're going from here.

Most people, when you talk about pilots, they think that our job is just to drive the ship in and out of the port. In Florida that's not our job. Our job is to protect the state's interest. That's the economy, and also the environment.

Some of the pilot's duties when we're onboard the ship is first to make sure the equipment's working properly. We have the weather conditions are correct for coming in the port. We have the proper tugs, helm commands. And we give commands to the tugs. And again, our main goal is to protect the state's interest. We will not allow ships to come in or depart which are not safe.

Some of the discretions we have, along with the Coast Guard, is to keep the ships from sailing and arriving. In Florida the Coast Guard and the pilots are the two groups which can keep the ship from sailing or arriving, depending on safety issues. If one of the engines is not working, we will not sail the ship without Coast Guard approval.

Also, we determine the number of tugs in Florida. That's solely based on safety. A lot of the times the companies do not want tugs because it's expensive. And we will not sail the ship unless we have the number of tugs required to have the ship safely transit the channel.

We also have draft restrictions. I think you all, through the pilots Miami yesterday learned about that, with the squat, how much underkeel clearance we need on the ships to arrive and depart. Okay.

And the bottom line is, safety is number one for us. And we are immune from the economic pressures from the different companies. Okay.

Now, when most people look at this, they see a ship in a channel. That right there is a $40 billion dollar channel. You're looking at Port Miami. It's a rock sided channel. Our job is to make sure the ships come and go safely in that channel, so there's no disruption to commerce, or the environment.

Now, what's that risk? Number one is the economy, the environment, and jobs. Port Miami economy, like I said, it's a $40 billion dollar economy, that channel. The environment, we have a huge tourism industry in Florida. And also, there's thousands and thousands of jobs at stake every time a ship transits the channel. Okay.

Now, one of the issues we have in Florida is that the channels are single point failures. Compared to the rest of the nation the channels are very narrow. They're 450 feet to 500 feet wide. What would happen if the surveys were not correct, or if we had a mechanical issue on the ship, loss of propulsion? The channel's blocked.

You think three days is a lot for the ports to be closed in a hurricane. Imagine what it's going to be like if the channel's blocked. It could be months to years to remove the wrecks.

In addition to piloting I also work for Resolve Marine Group. That's the third largest salvage company in the world. And to remove a large ship, a cargo ship, container ship, passenger ship, it's taking up to three years to remove from the channel.

With these larger ships the margin of error is exponentially smaller than in the past. I don't know if you saw the ships in Miami. But these ships are getting huge, that we're bringing in these narrow channels.

Okay. Some of the other duties, and here's where we're going to get into the -- what we're doing for the hurricane recovery is, we're the first line of defense for terrorism. We work very closely with the Coast Guard for port safety.

We work with the Army Corps of Engineers on dredging projects, before Port Miami was dredged. Port Everglades is being dredged. We are doing the simulations with the Army Corps of Engineers to make sure that we have enough water for bringing the ships in.

One of the lessons learned from Port Miami, which is being applied to Port Everglades for the dredging project is that we need more water for squat.

The South Florida ports are unique because of the Gulf Stream current, which goes by. And we can have, like I said earlier, six knots of current. The faster the ship goes, the deeper in the water it sits.

And in order to get through these currents we have to go fast. And that's the squat. So, if we're going 14 knots the ship may be another meter deeper than if we're doing six knots. So, we have to have that extra depth underwater.

Also, we work very closely with the local and state police for port protection. If there's an oil incident on a ship, we report that incident. And also, we're updating the Government publications, Coast Pilots. Last year too, the Florida ports, we've been updating each port in the system. Okay.

Now we're getting to the hurricanes. Some of the things which started -- this happened during Hurricane Matthew. I met with the Emergency Operations Center in Florida, in Tallahassee.

They asked during the next hurricane if the pilots would start doing updates on the port status, so they could have more real time information. And I said, sure, that's no problem at all.

Once Hurricane Matthew hit, each day, twice a day, I was doing updates on the port status. How many ships were in port, when the port opened, were the aids to navigation in place? Was there shoaling in the channel? Whatever it may be, they wanted to know.

We did that for close to four or five days during Hurricane Matthew. After that I heard nothing at all. So, I didn't think it was too valuable to them. So, when Hurricane Irma hit I did not plan on doing it.

The day before the storm I received a call from the Emergency Management office, asking where the updates were. I said, you want the updates? And they said, yes, starting immediately. So, I said okay.

So, we started doing the updates, when the ports were closing. One of the issues was in Tampa. They wanted to keep the oil tankers in port as long as possible, to keep the oil flowing, to get the cars out of Florida.

I received a call, I think it was 17 -- 5 o'clock in the afternoon, from the Attorney General of the state saying, we've been told the Florida pilots, or the Tampa pilots will no longer move the ships. And they need to keep the ships moving.

I said, wait, time out. You have something wrong there, I guarantee you. I called the Tampa pilots. What happened was, they were shutting down the port, because of the approaching hurricane. The Captain of the Port shut it down.

What we worked out was, through the Captain of the Port, that we would put a pilot on the ship, and keep the pilot on the ship to sail the tankers until the last minute possible and the pilot thinks it would be too rough, would go to the next port and get off in Texas, wherever it may be, and fly home from there.

So, the updates started. I was doing two updates a day for close to nine days on the ports. I did one in the morning, and one afternoon. I would call up the ports, find out what was going on, how many tankers were in port, when the cargo started moving. And it worked out quite well.

First it was being used by the Office of Emergency Management for Florida. Then it was being used by the state reps. It was used by FEMA, the Maritime Administration. I received calls from the Coast Guard too, when they had questions.

I don't know if you all are aware, but for Key West they sent down one of the U.S. training ships, the Empire State, to act as a disaster relief ship.

When the ship was going down to Key West, at that point we did not know if the ship had any, or excuse me, if Key West had any buoys in the channel, or what the situation was.

I received a call from the U.S. Maritime Administration. Previously to being a pilot I was a captain on a U.S. training ship and also U.S. Naval ship. Asking if we could help out getting the ship into the port. I said, what do you need? They said, one is, there's no, we're worried about the buoy issue.

At that point there were reports there were no buoys in Key West. I called the Key West pilots, and at that point they were not in Key West yet. I said, what can we do about that? They said, we're going to go home. We'll get our fenders from our boats, whatever's left, and we'll make a makeshift channel.

This has been done before where they'll take small boat fenders, make a channel once the survey work is done to get the ship in as soon as possible.

I called the Maritime Administration. I said, here's -- Plan A is we will have the pilots make a makeshift channel. Or if you want to divert the ship to Port Everglades, I'll buy some large regatta fenders from West Marine. We can put them on the training ship, and the pilots can put them in place for the ship to come in.

The ship was diverted to Port Everglades. So, I picked up the regatta fenders in order to make a makeshift channel. At the end it was not required, because the channels were there. But they had just been moved out of place. Okay.

This is an example of one of the updates, which was being sent out for each port during the hurricane. That was right after the hurricane status was unknown. Only info is the pilot's house did not flood. That's the only information we had. That was the pilot's personal house. He found out through Google.

After the hurricane I met with the Governor. And he made it very clear he was not happy at the speed the Florida ports were opened. He asked what could be done to expedite opening the ports. And we talked about some different scenarios.

One thing I suggested was, I said, in the port we have these pilot boats. They're all-weather boats. What I mean by that is, they can go out in any weather. Twenty foot seas, it's not an issue.

I said, one of the issues had been the survey boats. They could not go out in rough weather. I said, why don't you put the MIST equipment on the pilot boats? That's a possibility. And he said, I like that idea.

Two days later I received a call from Colonel Jason Kirk, U.S. Army Corps of Engineers, Jacksonville, to discuss this. The Governor called the colonel and said, please talk to pilots about putting the equipment on the pilot boats to open up the ports sooner.

We've had a few discussions on that. And from there I met with Kyle Ward, Tim Osborne. And we've been discussing some of the possibilities of using the pilot boats to put the equipment on, the MIST equipment on the pilot boats for future hurricanes.

About two months ago I met with the Office of Emergency Management in Florida. And they asked that in the future, if we have pilots up in the Emergency Operations Center, Tallahassee for hurricanes. And I said, yes, we are going to do that. We'll have several pilots up there to help out in opening the ports.

Before putting the MIST equipment on the pilot boats, the question is, why would you use pilot boats? One, they're an all-weather boat. They can go out in literally any sea condition. It's not going to affect the pilot boat.

Two, the pilot boats are generally kept in the water during a hurricane. We do not take the boats out of the water. If they are out of the water the boats are usually kept in the sling where they're hauled out. So they're the first boats back in the water. Okay.

Also, the boats are large. In general they're about 40 to 60 feet long. And they can accommodate the equipment for, the MIST equipment. And it's no problem at all.

One thing I've talked about with the operations, Emergency Operations Center is that we're happy to use the pilot boats as a platform. That's it.

We do not want to maintain the equipment. And we don't want to be the technician working the equipment. Just use the pilot boat as a platform. That's where it will end, if that's what's going to happen. We're more than happy to use the pilot boats for that. Okay.

Some of the other things we're working on is the FEMA Incident Command Courses in the different associations. We have pilots getting certified as incident, taking the FEMA Incident Command Courses.

Another thing we're working on right now is, with the Emergency Management Center Florida, is contingency plans for a blocked channel, something no one really wants to talk about. But these channels are narrow. They're 450 to 500 feet long.

The main concern is fuel. What would happen if one of these channels were blocked for a considerable amount of time? How would fuel flow into the state? Recently in the last month we've been working with the Florida Emergency Management Center on some contingency plans for this.

One of the other issues is, if you take Port Everglades here on a busy weekend with the cruise ships, what would happen if a channel were blocked by either a cargo ship, passenger ship, or a tanker? It could have devastating consequences for the cruise industry.

Okay. Just something real briefly. One of the other issues we're working on right now is radiation and nuclear detection for pilots. I think we're the first in the country to be working on this. It's better to find out if there's a threat five miles offshore, than when it's in the port.

We have some equipment from DARPA, the Defense Advanced Research Planning Agency, we're testing right now. It's state of the art. We're doing nuclear and radiological detection on the ships. Okay. All right. Are there any questions?

MEMBER RASSELLO: Hi. This is Captain Rassello. I have a question for you. So, who will be the point of contact for private sector to find out about the condition of the ports, since Coast Guard is busy in dealing with the issues. Will it be the pilots?

CAPT STEPHENSON: The condition, we were doing that solely, it started at the state level. That was it. And it was, the reports I was doing were sent from the state to other government agencies.

MEMBER RASSELLO: So, if we are, need to know what would be the opening, when will be the opening, who do we contact?

CAPT STEPHENSON: I did not say when, it's completely factual the information we're putting in the reports. The port opened at 1600, and the next report will say, Port Miami opened 1600. We did no forecasting, or anything like that.

MEMBER RASSELLO: So, we don't have a forecast? We just --

CAPT STEPHENSON: Correct. We were, the information I put in the reports was factual. We have X number of tankers at the berths. We have three tankers offshore. That sort of information.

MEMBER RASSELLO: No. I'm just wondering, not just for the case of Miami, but in, is there protocol where the private sector can find out when, you know? Because our ship are not outside the -- they're not outside the port. Our ships are sheltered somewhere --

CAPT STEPHENSON: Correct.

MEMBER RASSELLO: -- 400, 500 miles away. So --

CAPT STEPHENSON: Correct.

MEMBER RASSELLO: How we plan a timely arrival? And also, with other ships that we don't --

CAPT STEPHENSON: Yes. Well, one of the issues --

MEMBER RASSELLO: -- project at the port.

CAPT STEPHENSON: Yes. One of the issues is, one, the soundings have to be done. If there's obstructions in the channel that -- obstructions have to be cleared. The aids to navigation have to be up and working. So, there's a lot more issues.

It's easy to say, we're going to open the port at 1500. But if we still have a vessel in the middle of the channel that sunk, it's not going to open at 1500.

MEMBER RASSELLO: Okay. Thank you.

MEMBER PAGE: Doesn't Homeport address that, Captain? Doesn't Homeport give the answers that your Captains are looking for?

CAPT ALLEN: Yes. That's correct. As soon as the ports are open an MSIB goes out. And it is directly on Homeport, as soon as the ports are open.

PARTICIPANT: And that's a website?

CAPT ALLEN: That is a website open to the public.

MR. ASLAKSEN: Okay. Thank you. If there's follow-up questions, please see the panelist afterwards. Next I'd like to introduce Mr. Chris Vaughan, a personal friend, and a great user of NOAA information.

He's actually the FEMA Geospatial Information Officer. He coordinates a lot of geospatial technologies across multiple response and recovery programs. Welcome, Chris.

MR. VAUGHAN: Thanks, Mike. I'm going to stand up. I feel like we're back at dinner last night. It was a great time. Thanks for having me here. We're going to go through this slide deck pretty quick.

Like Mike said, I'm the Geospatial Information Officer. So, my primary use of the NOAA information is from an aerial imagery perspective. And so, I'll get into how we use that information in a little bit.

We've all kind of talked about it, but I wanted to give you guys a little bit more context about what we were really facing. I apologize that this is so small.

Will this be made public? Okay. So, if you're interested all these details are out there on these slide decks. But just real quick, a lot on this slide, you know, first time two Atlantic Category 4 hurricanes hit, both Harvey and Irma, that made landfall in the Continental U.S.

There's a whole litany of, you know, this was bad, right. Catastrophic, crisis, Armageddon, all happened at once. The top slide up here is actually a picture of where our resources and our commodities were shipped, right.

And so, the very first thing obviously was Hurricane Harvey. We shipped over 4,000 shipments. And those are things like tarps, and water bottles, and shelters, and infant and toddler kits.

And then we had to shift focus and move to Irma, right. And that was a little more, 5,000 shipments. But when it hit Puerto Rico, that doubled our shipments of both, you know, Harvey and Irma, right. So, 10,000 shipments to Puerto Rico.

I recall, you know, going through all those operations. And I recall going over to our resource and logistics guys. And they started talking about an air bridge and a sea bridge.

And I didn't really understand what that was. It's not my line of work. But they had this side infinity, you know, side figure eight going on. And I asked, what is that? Well, that was their air bridge and their sea bridge, right.

As soon as the resources would land they'd take back off, switch out pilots and crews, and they'd fly back to Florida, and land back in Puerto Rico. It was just continuous.

And then they averted that from an air bridge perspective, and they started going with ships. And we just had barges, after barges, after barges, you know, moving these commodities into Puerto Rico.

So, it was truly an amazing operation. I thank everybody in the room that was involved in that to open those ports and the airports as well.

From a dollar perspective, right, we generally, you know, talk in terms of incident. Well, you know, 2005 was the last real big one, if you think about Katrina, Wilma, and Rita. That's where I broke my, you know, emergency management experience came from Katrina.

I was on the ground for Katrina. That was a $209 billion dollar series of events. Sandy alone was $71 billion in 2012. These three incidents, Harvey, Irma, and Maria was $265 billion dollars, right.

What that means in terms of inspections, how many people were applying. A lot of people apply, but the people that actually get an inspection is a smaller subset of that. But still, the numbers are staggering.

For Katrina it was, you know, close to 1.4 million inspections were issued. For Harvey, Irma, and Maria you're looking at roughly what, you know, somewhere around, help me with the math here, 2.4. No more drinking at the pool bar last night. I can't do the math that quick.

MR. VAUGHAN: All right. So FEMA by the numbers, right? Significant incidents somewhere in the neighborhood of 85 percent of our organization was deployed, over 21,000 folks were put out into the field. Sixteen and a half billion dollars from the disaster relief fund was obligated, so an incredible amount of money coming out of the coffers from the U.S. Government.

A little hard to read this slide. Once again, I apologize but, you know, things --- staggering numbers like, you know, five million flood insurance policies kicked in. Just staggering numbers. This is just an example of kind of the life cycle of how we typically look at an incident.

You have preparedness, the pre-stage of an incident, and then your short, your initial response, your short-term recovery, intermediate recovery, long-term recovery. And that's how we move in our cycles, how we deploy our forces, how we handle, you know, individual systems, or public assistance, or how we, you know, organize ourselves.

Geospatial Analysis, what we do is in support of each one of those things. We help with grants, you know, using Mike's aerial imagery, NOAA's aerial imagery to expedite those grants, to expedite debris, where the debris is located, things like that.

But the point what I was trying to make here is, you know, as soon as Harvey hit we went through our normal flow, and we got about, I don't know, two weeks into it then boom, Irma hits and we had to start the whole cycle over again. But don't forget we're still dealing with Harvey. And then all of a sudden Maria hits and we're still dealing with Irma and Harvey. And so it was very much a pivot and a shift, pivot, shift, pivot, shift, and, oh by the way, thousands and thousands of homes were burnt in California in October.

So it wasn't that we were completely done with the hurricane response, but we also had to deal with the other side of the country with thousands of homes dealing with significant wildfires.

A little bit about who we are and what we do is damage assessments. From my specific team's perspective we conduct damage assessments from a geospatial perspective. I believe very passionately about this, you know, having that number, you know, for Hurricane Harvey alone we were able to come up with about 155,000 house by house damage assessments within the first two days following landfall.

Having that number drives so many operations, you know, having that number helps us understand how many resources are needed. And so we use a cacophony of information, stream gage information both forecast and observe. We intersect that with remote sensing data, whether that's satellite or aerial from NOAA, and then we apply that in various modeling methodologies to identify impact to structures, to the residential structures impacted.

We use it all. Wind speed, that was a big one for us especially in Puerto Rico. As one of our earlier panelists, or I believe one of the panel members here talked about the lack of power, or communications. And that was very significant especially in Puerto Rico. Our traditional methodologies of reading this information in real time was not there because the power was out.

And so we had to default to other capabilities. Principally we used imagery, and I can't stress this point, I believe that Dr. Callender, sorry, Dr. Callender spoke very specifically about this, it's a limited resource. In Harvey and Irma, and I'm going to make the point here about the limited resource in Maria, in Harvey and Irma we were able to use, you know, principally things like stream gage information to come up with those damage assessments.

All of that was off the table especially when it comes to Maria. We had to default to aerial imagery. Two days in Harvey we were able to come up with those numbers. About the same time for Irma. When it came to Maria it took us about three weeks, right? We had to fly the entire island, and then we had to do these house by house damage assessments. Buy the way, Puerto Rico has about 1.4 million structures on it, and we had to look at each individual structure to assess the damage.

So you can imagine, you know, we're giving these numbers to the President. This is how many folks are impacted in Hurricane Harvey within two days. Well by time Maria came and we had to default to imagery and a slower capability folks were right beside apoplectic, you know, how long is it going to take you to tell me how big and bad this incident is?

Well, it was just valuable, this data that you provide is just so valuable for us to do that. And, by the way, -- doing these damage assessments by the way, geospatially, I would, you know, I would argue is the fastest out there, right, being able to canvas the entire island very quickly. And it's just critical to have your information to do that.

So just real quick, you know, one slide here for NOAA specifically, right? And I told Mike, I said, I'm sorry, I've only got one slide in here about NOAA, but I flew unhappy, but all the way down to Miami to give a 15 minute presentation for this one slide. So, you know, I'm really trying to drive this home, right, you know, this capability that NOAA provides is so valuable to us to perform these damage assessments.

You know, we did issue a FEMA mission assignment. I heard a lot about mission assignments last night at dinner. I heard some this morning. I am happy to entertain any of those questions. I'm sure you'll have plenty of them. But we do have a good relationship worked out with Mike's team, specifically for cutting a mission assignment for the imagery, because it meets a very specific purpose. And our leadership is very attuned and accustomed to the purpose of why that is.

So I'm happy to talk about other mission assignments that are a little outside of my scope, but I'm happy to explain the process. The NOAA LNO, Dr. Callender also talked about that, is very successful. You guys did help us with the port and airport status. The imagery and your assessments were critical there. Hospital status, I'll get into that a little bit later.

Road networks was such a critical crisis, you know, we had to know where the roads were open or closed. Yes, we were able to ship large resources to Puerto Rico, but if you couldn't get it to the community that needed it it was all for naught, right? So it was very critical for us to use the imagery to figure out which roads were open and closed.

Two real quick comments about this, you know, just to commend the NOAA team, especially in Key West, you know. I remember nobody could see past Key West. I don't know if you guys really remember watching the news, right, but, you know, they were saying it was just completely obliterated, right? And it was --- there was a moment, I remember it very distinctly, when there was a large network that got up there and said it was just completely wiped off the face of the earth.

But the issue was we had actually seen Mike's imagery, and it wasn't jiving with what they were saying, that large network, right? I'm not saying fake news, I'm just saying --- I guess I did say fake news. I'm so sorry --- yes, fake imagery. So what had happened was they --- see what had happened was they got stopped, you know, we weren't letting anybody in beyond a certain point, and what they could see, you know, colored their perspective.

Well, the imagery that NOAA was providing gave us that blanketed coverage, and we were able to see, yes, there is extreme devastation, but it's not like a nuke went off. You got a nuke detector, right? I was looking at that thing, it's pretty cool. Not only that --- so it gave us really good perspective on this bottom side. Mike actually --- his team actually came in and helped us upload additional imagery. So it's beyond just the imagery, taking the imagery, it's providing the services out there, getting that imagery out to the community, just fantastic partnership that we have with the team.

You know, surging of our manpower, these are some of the lessons learned. We're doing as part of our overall FEMA continuous improvement program. We actually launched a crowd sourcing application in the middle of Hurricane Irma. We had over 5,000 volunteers looking at this imagery, and helping us comb through this amount of imagery, fantastic.

Once again crowdsourcing was a huge aspect here, helping us determine the impact to roads and hospitals. That was a major discussion point of where's the hospitals that are impacted? Who's open? How do we appropriate our resources for that? How do we get the resources in there from a road network status and crowdsourcing was a major player.

I put this slide up. This is our --- kind of our love me wall, I guess, you know. So I put this up to say we're able to use geospatial technologies very quickly, very rapidly, but most importantly very accurately. Last night we had a very quick discussion about Louisiana and the floods in 2016. We were able to come up with those flood extents within the first five days following that significant event.

Ninety-two percent of all claims that came into FEMA fell within those flood extents, whereas the traditional method of going out and doing house-by-house assessment, boots on the ground, took about 70 days. So five days versus 70 days. Having that knowledge early on in the incident helps to really categorize how we respond appropriately.

So you could --- I'm just going to beat that home one more time. Having that imagery to allow us to do what we did in Maria, I do think really drove significant operations. Having that knowledge early cut down on the chaos, right? You can get more of that.

Just a few more slides. The data that you're providing supported so many of our critical sectors. In fact, in Maria the way that they ended up breaking it out is by sector, and the interdependencies on one sector and how it played into another sector, right? So it's very complex.

There's a huge analytic cell down in Puerto Rico right now, and data is driving operations, right? Data to drive how the power is getting restored, you know, working with the various teams to get the things back on line, how the information is being collected, right? This is just an example from our Urban Search and Rescue Teams.

The availability of smart phones, -- this is not a smart phone, but it's what I'm going to use as my prop. So smart phones, getting that from the Urban Search and Rescue Teams in real time really helped us understand context in, you know, within moments or in days.

Data analysis and integration, I can honestly say no major decision was not made without significant data and a deep dive from analytic perspective, right? When we shut down food distribution it was based on all those critical sectors, a whole bunch of folks coming to agreement, obviously working with the states, and the locals, and the counties, the municipals to make sure that we've done our due diligence. That when we start to ramp down operations it's done very thoughtfully and thoroughly, because we, you know, the federal government can't be there forever in the sense that we --- we have to rely and get the economy back up and running again. So there's a tremendous amount of data, analytics, that went in, especially when you start talking about feeding missions and housing missions.

So I believe -- yes, this is my very last slide. You know, we use the imagery to help us identify, you know, not only a canvas of where the baseline is, where our resources should go, and making sure that we're appropriately staffed and resourced, and our posture is aligned, but it also helps our program.

So with that, my time is up, and I'm grateful to be here. Thank you for the opportunity. Thanks Mike.

MR. ASLAKSEN: Do we have a quick question for Chris?

(No audible response.)

MR. ASLAKSEN: All right. Thank you, sir.

Next, Mr. Terry Thornton. He's currently the senior vice president, Ford Operations, Guest Care for Carnival International. He represents the Florida Caribbean Cruise Association as the Chairman of the Marketing Committee. Welcome, sir.

MR. THORNTON: Thank you. Good morning everybody. Great to be here with you. I know we've been talking a lot about how disruptive this hurricane season was. I've had the great privilege of working the cruise industry for 40 years, and I can honestly tell you we've never seen anything like we went through this year in the 40 years I've been in the business, so it was pretty disruptive.

For those of you that don't know much about Carnival Cruise Line, which is the company I work for, we had ships home ported in every area that got hit with a major storm. Starting with Harvey, three ships in Galveston. Everybody forgot a little about Nate. Nate got into New Orleans, and in the Mobile area. We have ships in both places. We have ships home ported in every Florida port, and including South Carolina, moving a little bit north.

So you can imagine we had the --- we had 25 ships in our fleet. Seventeen of our ships were impacted by these storms, so --- and some all at the same time.

MEMBER RASSELLO: Nineteen.

MR. THORNTON: Nineteen. Okay, count Ms. Sullivan.

(Laughter.)

MR. THORNTON: So when I say impacted, we have to think about it in two ways from our business. One is where the ships home port. So where they come and people get on and get off the ships, but we also have to deal with what we call ports to call where the ships visit on the itineraries themselves. And this obviously had impacted both, because we have a lot of deployment that goes into the Caribbean region, and a lot of the Caribbean destinations were impacted.

You know, I --- you know, sometimes I think the cruise industry gets a bad rap, and I'd like to say first and foremost, there is nothing more important in our business than safety. Every decision we make is based on the safety of our guests, our crew, our ships, and there's nothing more important than that. So if it's ever said that we run our business based on financial implication to this, it's not true. Number one decision on everything we make is based on safety.

Now, it's really important to do these things right for obviously the safety reasons. I can't say that financial implications don't come into it, because it's not only financial implications for what it means for our business, but our business has so much flow through financial implications to the communities that we go to, to the places we visit, and it's very far reaching in terms of financial implications that our business brings to other than ourselves.

So when you think about a hurricane coming, we drill for this all the time. And so the first things -- I kind of went through the considerations that we go through as a cruise line, so very early on we're starting --- when we see something brewing we're already starting to look at our marine assessment, maritime assessments, what that might be in terms of impact to home port, what that might mean in terms of ports of call, and worse case scenarios based on that.

So what happens then when we get scenarios? Before changing itineraries, for example, we've got to go out to all of the other ports we want to go to. Are they available? Can we do this? Can the ship make the speed and itinerary to do this. So there's lots of maritime considerations that we start well in advance.

It also depends on whether, like I said, whether it's a home port or a port of call. And then our critical factors when we got into a really delicate situation, what are they, fuel, provisions, and fresh water. Those are the things that we have to worry most about in terms of taking care of the guests and making sure that we have a safe operation. So we're planning that well in advance, because sometimes those decisions have to be made ahead of time in order to ensure that we don't have any foul ups in that area.

So we have two --- when we're taking itinerary decisions, we have two guiding principles that we go with, and it's come with a lot of experience. Our first principal is make the decision as late as you can. And why do we do that? In case things change. You guys have all seen so many things change with hurricanes that making the decision at the very last minute is the most appropriate way to run the business, because that way we have the best information, and we know exactly, more or less, what's going to happen, the timing and can do the best thing for our guests.

What we also did from a guest perspective, we have to think about our guests, and what we try to do is minimize as much as possible any changes we've made to whatever they bought. So whether they have to change itineraries, we take this very seriously. Of course if we have to bring a ship back to a different home port than they left from, very serious, but we try to minimize any of the itinerary implications as best we can given the situation.

So we talked about --- I've heard a lot of people talk about communication and coordination. There are so many things that come into play that we've talked about here, but we obviously have a very close working relationship with the Coast Guard in this situation, the local pilots associations, all of our vendors and suppliers, because you think about the ship being provisioned in a different place. Well now all of our vendors and suppliers have to be in coordination with what we're doing.

Even the local --- you think about the communications, it happens internally within the neighborhoods and the communities. We had a bad situation that was just because we didn't have the right communication. We had a ship coming back into Port Everglades. We were giving guests the option of having ship --- some people get off one day, some people getting off the next day. Some people got off the first day, went to the Fort Lauderdale Airport, and all of a sudden the airport authority said why did Carnival Cruise Lines dump all of these people and put them in the airport where there's no flights.

Well that's not what happened. We communicated that the guests had the option. We told them to check the airlines to see if their flights were operating, and they elected to go to the airport. Now that is something that we could have worked better with the airport officials, and had that as a different outcome, but it's the communication and the coordination of that is very, very complex.

When we think about our guests who obviously are airline partners, they're very important. Are they flying, are the airports open, what flights are they operating. It became particularly challenging in San Juan.

And you think about the communication and internally to us, we have lots of guest communication going on. So you think about a ship that's out at sea when the storm comes, we are communicating with the people on the ship of what's happening, what's going on, what changes might be made, what they can expect. Obviously the ships are always operating in a safe distance from the storm. So they're never put in harm's way in any way in the navigation, and we communicate that because lots of people don't understand, you know, that -- how we do this, and what they can expect. And so communication with them is very, very important.

Then there's a whole other group of people which is --- they're getting ready to get on the next cruise. And so okay what's going to happen to my cruise? Are you going to operate it? Is it going to be on time? Is it going to be the same itinerary? What if I can't get to the ship because my airline's cancelled my flight? All of these things come into play for the people that are trying to get on the ship. So there's a lot of communication going on.

How do we do that? The best tool we have is our website, carnival.com, so we're constantly providing updates to both the people trying to get on the ship, as well as people that --- or what's going on on the ships that are out at sea, because we have friends, relatives, people that want to know. I know they're out on the cruise, but I want to know what's happenings and are they safe. And so we use carnival.com to provide a lot of information about that.

Something far out, we can also --- for the guests that are coming onto the ships, or scheduled to come on the ships, we use email, and get a communication out to them in email. As we get a little closer to what we're really going to do, we ask them to sign up for text updates so that we can get immediate communication on text out to them on a much more short notice than email. Sometime people will not see the email, or what --- if they know that they're expecting a text, then they're watching a text, and we have great success communicating with them that way. So those are the big important things we do from guest communication and coordination standpoint.

You know, where --- I know you -- a lot of you talked about where would the industry, I think, like to see things improve. And so obviously we've talked a lot about reopening ports. We'd like to be a partner in that as best we can. What we think is important in reopening ports, and we've talked about it sometimes here, is a much more organized process in preplanning as we get closer to a storm approaching because we would like to kind of be part of the processes to understand the decisions and the prioritizations that have been happening because that will drive our planning, and if we can be part of the process -- and we know things change, we're not --- we're completely understanding that here is what it is now, here's what it might move to, here's what it finally is. We're --- but we'd like to be a part of that as the prioritization stuff happens, because it'll drive our plans.

And we could be helpful, because we won't have ships in the wrong position that would disrupt the prioritization, or disrupt the plans in any way. So we can be a helpful partner if we can be that --- in a preplanning stage as we look at that. Obviously this one was unprecedented in terms of the reports that were impacted and so forth, so --- but the best we can be a partner, we'd like to be a partner and be a part of the process as we go along.

Now, we've had --- by the way we've talked a lot about the Florida reports, just on a related matter, and it is --- and, again, I think we're a little misunderstood as an industry on this one. We'd like to see a more organized process from all the stakeholders that would allow us to safely navigate into port under reduced visibility, fog situations and those kind of things.

Now, again, safety is number one. There is nothing higher priority than safety, but are there things we can work together to have better information, to have better systems, better technology in place that will allow us to navigate under reduced visibility in good weather conditions. We're not talking about coming in under reduced visibility in very bad weather conditions. We're talking about good weather conditions, reduced visibility, or the things we can do working together that will allow us to safely bring ships in that environment.

The --- one thing in terms of this communication I'd like to have a better protocol for the local municipalities of how we are communicating what's going to happen because, again, I told you this story about Port Everglades. We'd like to be out ahead that so that we have --- we're not trying to find out who to talk to when we're in the heat of the moment of the storm. We'd like to have local municipalities involved and be able to understand what we're doing so that they have the correct information and we just don't get this misperception out in the market of what's happening.

I'd actually --- this is --- I know all --- the resources are very limited for all of us. Believe it or not there are for Carnival Cruise Lines too, so I don't want you to take it that it's just your entities that have resource constraints, we have them too. But I'd like to --- I'd really like to simulate these exercises at least once a year. I'd like to go through a full simulation of these exercises with all of the stakeholders involved.

I know it's a big time commitment. I know it's a very draining thing on limited resources, but I think it'll help us iron out the kinks that we might find in the system ahead of the time, and head off a problem that could happen, or make something a way better experience than it would be otherwise. So I know that that's something that I think we would benefit from internally in Carnival Cruise Lines. We drill for this all the time. So we don't start August 1st or June 1st, or whatever it is. We drill for this consistently, all the time, so that we have the process down and ready to go.

For those of you that don't know, I just touched quickly on FEMA. We have a great relationship within FEMA. We participated in Katrina by sending three of our ships to New Orleans for the relief efforts in New Orleans. We are very proud to be able to participate in that. We also had --- in this event we had one of our ships spend four months in Saint Croix housing relief workers, and I can tell you working with FEMA was just a great operation. They were doing amazing things, as we talked about here, in Saint Croix under very difficult situations.

And in working with FEMA there's two things I would like to ask that be considered. For people that don't do this very often, like us, contracting with Government entities, I'd like to have a contracting process put in place before we need it so that we can talk about financials, we can talk about the process, what needs to happen. We're not talking circumnavigating our fees and --- I'm not talking about going against bids or anything like that. Have the process simplified upfront so when we're dealing with this, and FEMA needs assistance in something like what we can provide, let's have that administrative stuff behind us so that all we have to deal with is taking care of the situation. And if we have an asset available getting it there as quickly as possible to help in the relief efforts, that's the most important thing.

So that would really be helpful because, like I said, we don't contract with the government very often, and it's a little bit harrowing to get your footing as you work your way through it, until you finally understand what's going on.

The other thing is from FEMA's standpoint -- I know we talked about all the critical decisions they're making all the time. Again, we would love them to ask us if we could help in other ways. So chartering ships for housing is one thing. We have ships moving throughout the areas that are affected by the storms. We have some capability for transportation and supplies, and things that we could help with.

So if we could be in part of that process, we could be a partner again to FEMA in a broader sense than we are today other than just chartering ships. So it's --- I think we can do much better together if we're thinking about it. Again, while things are a little bit calmer and what --- how could we best integrate into the process.

From NOAA's standpoint, they played a unbelievable big effort in getting the Port of Saint Croix open, which was --- obviously there was a ship before ours in Saint Croix that allowed --- they allowed the ship to get in there and provide the housing, because I can tell you it would have been a very, very difficult accommodation situation in Saint Croix for all the relief workers had it not been for the ships. I don't know what would have happened. It could have been very, very bad.

It's --- you know, I've been through Andrew. I've been through some major storms my personal tours and stuff. When I flew to Saint Croix, when the ship arrived I had never seen such devastation. It was --- it was just totally devastation, and so we're very excited that the Carnival Fascination could have been part of that relief effort.

But --- so the services that NOAA provides in opening the ports I think is critical. I can hear from the --- what I've heard today, obviously the resources are limited. So I think we ought to think about ways that we can improve on the resources. I know money is tight, money is tight everywhere, to allow us to be even faster to help, either in getting the -- kind of commerce going, whether it be cruise ships, or cargo or whatever it might be, or just helping on the relief efforts. Get these ports open, in a safe way, nobody wants to take any kind of unsafe actions with ships.

But is there a way that we could help NOAA come in faster, and do things faster, working with the Coast Guard and the other stakeholders, to even improve on the process. I'm not saying that -- we didn't do a horrible job this time. I just always think that there's room for improvement, and there's so much at stake. There's so much at stake in terms of commerce, money, people, relief, all kinds of things that it's worth the investment in thinking about how we could do it better.

MR. ASLAKSEN: Thank you, sir. You have a quick question for Terry?

(No audible response.)

MR. ASLAKSEN: Okay. Let's keep moving forward here. Next we have Mr. Steve Detwiler, he's a whole community recovery planner with Miami-Dade County for the Office of Emergency Management, and he's responsible for the EOC Infrastructure Branch, the Public-Private Partnership Program, and the Recovery Program. Welcome Steve.

MR. DETWILER: Thank you. What I wanted to do is just kind of give a quick overview in terms of how the local government interacts with the Port Miami and also Coast Guard, U.S. Army Corps of Engineers, and also NOAA.

So my presentation will kind of deal with --- here goes. My presentation will deal with more like an overview of our port, which I know you toured yesterday, so you probably have a pretty good idea of what goes into that. I'll kind of give you an overview of the emergency operation center that I work at, the drawbridge operations guide, which is one of our principal plans that we use with dealing with the port, and some of the lessons learned we had for Hurricane Irma, and then finally a little bit about a resiliency program for Miami-Dade, which I know you'll probably hear about later on from Jim Murley, our chief resiliency officer.

So a little bit of overview for the Port Miami --- oops, I keep doing that. Port Miami is actually part of the county. It's a county government agency, so the port director answers to the county mayor. Annually the port contributes about $41 billion dollars to the economy. We --- the port also employs about 324,000 people for most of south Florida.

It's also known as the cruise capitol of the world. We're very proud of that. 5.3 million people annually come into the port for getting on cruises, and also receives about one million tons of cargo annually. It's a one --- number one container port in the state of Florida.

To give you an overview for Miami Dade County, I work out of the office of emergency Management, so the emergency operation center is more or less our command and control facility for the entire county. It's a 22,000 square foot facility at fire rescue headquarters. It responds to anything from a hurricane to a terrorism event, to everything in between. We have three levels of activation. For Irma we were at level one for about --- almost two weeks. Level two is a partial activation where we have a lesser degree of an incident and we just need certain agencies there, and level three is what we're at right now. So we're just monitoring and seeing if anything's happening that we need to be worrying about.

EOC has about 200 network computers, we have redundant communication, several conference rooms. I can tell you for Irma we were running out of space. We were busy. And Irma for us was a small storm. It wasn't as bad as it could have been thankfully.

To give you an overview of the EOC, so we have a number of different positions. We have our EOC incident commander, which is our county mayor. We have --- we of course incorporate incident command system into our operation, so I'm the infrastructure branch director. Right now we're also in recovery, so Irma is not done for me. I'm still going to be doing Irma probably for the next year or so. I'm also the recovery coordinator for the recovery operation center.

To answer one of the questions earlier in terms of private sector coordination, when we get into an operation we have our own ESF 18 that coordinates with the entire industry in terms of our private sector, in terms of our port, in terms of Miami River, which I'll talk about in a little bit. So we have that going on an also Carnival Cruise Line is a member of our ESF 18 partners.

So we're shipping --- we're sending out information to them on a regular basis, so we get into a disaster we have somebody at the desk from 7:00 a.m. to 7:00 p.m. daily, and they're sending out information, usually a couple times a day to make sure all of our private sector partners are informed, so that there's no hiccups or that they know what's going on --- what the county is going to be doing.

So Port Miami is one of our major, like I said, it's one of our major economic players. So it has a very critical part to play in the EOC. It has a seat in the EOC as well as Miami International Airport. Port director services on the mayor's executive policy group. So they're making the advice --- or they're giving advice to the mayor in terms of what the conditions of the county will be doing, what we'll be doing during disaster.

For me, of course, I said I'm the infrastructure branch director for Irma. Port Miami is part of that branch. The infrastructure branch, we have a --- think of us as more or less --- we're the back up to make sure that the first responders can do their jobs. So worrying about whether or not power is coming back online, whether or not the water and waste water plants are operational, opening up roadways, clearing debris. So we're worrying about utility and infrastructure support needs for an activation.

For the EOC we activate for an exercise at least a couple of times a year. We have at least two exercises that are planned. That includes the Turkey Point Nuclear Power Plant exercise, and also the statewide hurricane exercise. And then we also do an exercise every year with our ESF 18 partners.

Talking a little bit about the Drawbridge Operations Plan. This is mainly our major issue in terms of when we deal with the Port. As some of you guys know, we have a lot of bridges in Miami Dade County. Miami River especially we have huge amount of bridges, and most of them are drawbridges. That kind of --- we needed to have a plan to be able to facilitate opening and closing those drawbridges and locking them down because it directly impacts evacuations.

So we developed the Drawbridge Operations Plan a number of years ago. It's done in concert with the Corps of Engineer --- or I'm sorry, the U.S. Coast Guard. So we work very closely with the captain of the port from Miami. We also work with the Department of Transportation for the state. We work with Miami River Marine Group, which is mainly our tugs within Miami River. And also Port Miami and Miami Tunnel.

So in terms of what's going on, we have different phases when we activate the drawbridge operations plan. So it's kind of hard to see, and I apologize for that. Basically we're 72 hours out. We're starting to notify all the partners to say we have a storm coming in. We're going to start thinking about locking the bridges down, start making your preparations. Forty-eight hours out we're notifying the bridge owners and the U.S. Coast Guard. Of course all of this is happening when we're working with the port.

So we're basing our operations on not only the severe weather awareness calls that the Coast Guard is conducting. We're also adapting our operations according to when the captain of the port is going to issue marine safety weather advisory --- or marine safety information bulletins.

So we have three different operational statuses for the drawbridge. There's modified operations where we're facilitating evacuations, we're keeping the bridges open. We're opening and closing them to also allow marine traffic out of the Miami River. That's one of the biggest things is getting the traffic out of there so we don't have boats that sink and then we have to go clear them out afterwards.

And then close operation where we're locking the bridges down. So we already got all the boats out. Then locked operations is the bridges are locked, the crews are going back to their safe areas, and we're waiting for the storm to pass, the opening back up.

So I mentioned before, and the captain mentioned in terms of the marine --- we're --- of course depending on the captain and the port, so we're working very closely with them. So when they're on their SWA calls, we're also on those as well. And we're adapting our operations in terms of when the captain of the port issues, you know, port condition whiskey when they do X-ray and also, of course, Zulu, as well.

So we work very closely with the Coast Guard. We're at least talking to them at least once a day and the Coast Guard actually has a seat in the OC as well, so we work with them very, very closely.

So this kind of gives you an overview when I was saying about the Miami River. So you'll see up on the, you know, the number of bridges right in the middle cutting diagonally across the county, that's the Miami River. So we closed that --- we had to get all the traffic, the boat traffic out, and we also had to get all the evacuations done. That --- a lot of that area is storm surge zones B and C. So that's when we have a hurricane coming in that's usually one of the areas that we were evacuating.

And then we also have the inner coastal water waves, those are the bridges that we worry about as well. So we close those usually in a --- trying to remember now, from a west to east perspective to make sure we get all the boats out in time. Like I said, for Hurricane Irma it was relatively good for us, I mean, it wasn't as bad as it could have been.

We were on the SWA calls prior to the storm on a daily basis. And then after the storm we had a state-wide port call with not only Port Miami, Port Tampa --- or Tampa's Port, Port Everglades. And they were giving us updates in terms of what they're going on, and also we're providing updates in terms of what emergency management is doing. So we were aware of what, you know, of course Port Everglades for us is very critical in terms of fuel, so that's something we paid very close attention to.

Port Miami just going to give perspective. Port Miami went to Port Condition Zulu on Friday, September 8th, and we were completely reopened by September 13th. So probably about two days after the storm passed we were open partially. So that's a huge amount of work, and that could have only happened because we had a very seamless transition, seamless team between the captain of the port, U.S. Coast Guard, Miami District, NOAA, and also the Corps of Engineers. So they were working very seamlessly. They understood the necessity of opening the port as quickly as we could.

And then resiliency strategy, I know Jim Murley will kind of talk a little bit about this, but this is more of a project between the Miami-Dade County government, City of Miami and City of Miami Beach. We're collectively known as Resilient 305. It's led --- county mayor is also a member of the City Leader Advisory Committee, which is part of the 100 cities initiative.

Right now Resilient 305 is starting our second tier a project, so after we're done with the second phase we'll be issuing the overall resiliency strategy. Emergency management is part of that effort. We're actually working with them in terms of post-disaster recovery issues in terms of long-term recovery because that flows very easily into what we do.

So they --- one of the things they identified for Resilient 305 is basically top shocks, and also top stressors. And basically stressors are disasters that have impacted us that kind of push the program and also our resources to the absolute limit. And then shocks are in terms of big disasters that have happened that have a regular --- I'm sorry. The stressors are like our infrastructure, and then our shocks are our disasters. I always get those confused, sorry.

With that, is there any questions? I know I went through that pretty quick.

(No audible response.)

MR. ASLAKSEN: Panelists?

(No audible response.)

MR. ASLAKSEN: Okay. We'll Move forward here. Next, the Army Corps of Engineers here. We got Mr. Brian Brodehl as the chief, Surveying and Mapping Branch in the Army Corps in the Jacksonville District, correct?

MR. BRODEHL: Yes.

MR. ASLAKSEN: Yes, and so you've had some good job here. You got nine survey vessels, as well as a myriad of unmanned survey equipment and land survey instrument devices. That sounds like a great job.

MR. BRODEHL: It is, and I love it. Thanks, Mike. I see I'm last here before lunch, so I'll keep this brief, I assure you. I don't have a pretty PowerPoint presentation, so you just get my pretty face. I'm sorry about that.

A quick background on what the Corps of Engineers does, I mean, I'm only in the survey side of the house. So I'm only going to talk about surveys, and my perspectives on those. I'm not going to talk about the myriad of other things that the Corps of Engineer does for emergency operations and response for these storms, because that just is a big broad hairy beast.

So what we do here is --- in a regular basis day-to-day operations we do federal navigation surveys, or federal harbors, the authorized harbors and only those, that's the extent of our mission. So we'll do the condition surveys of the harbors, and then we'll do the dredging contract support surveys. So that's our main mission. We do other things, like, we'll do wreck removals, a search and debris removals for the Coast Guard in support of them and maybe the Navy.

We get into other things, like, maybe we'll do environmental protection, coastal storm damage monitoring, flood risk management, national security through the Navy and the Marines. So we do a lot of different things with our survey boats, and that's really what I handle.

Now, as far as, you know, working with NOAA, on a normal basis our primary mission is to get NOAA survey data so they can use in their charting operations. So that's something we do throughout the year, and we have a special program the Corps Engineers has set up called eHydro where we push all our data, and NOAA will take that and use it for their business practices.

And then we also do the storm planning with NOAA, and I call it --- we even get involved with the --- it's a road show that Kyle will attest to, and we participate in that. We'll go around and talk to the Coast Guard various operations, and various districts, and let them know that what are our capabilities, the extent of those, and what we can do to support, and what changes, what new equipment, and stuff like that. So just to keep our relationship with the Coast Guard and the discussions going off season.

And so then we get in more into the storm situation. So under normal conditions we have, you know, a hand full of boats and equipment. And for 95 percent of the time that's great. We can do all of our harbors and ports and everything else without issue, we can handle it.

Now, when you start getting into post-storm response that's a completely other issue and I sort of look at it like, you know, when you got a big storm like Irma, you're putting out a house fire with buckets of water. We only have so many resources, and that's what we have so we kind of bring that to bear to support the storm response. Well, that's why it's --- it's most important that we get our other partners, such as NOAA and, you know, other districts like maybe Mobile or Savannah, whomever we can get to bring to the table to help us get these ports open. Everybody's got their missions and their workload, but we do what we can because we are stretched so thin.

And frankly, from my perspective, running the survey operations, I don't really care, you know, who gets there first, you know, we're not territorial in our operations. If NOAA can get to a channel first and get it surveyed, great, you know, we'll go do another one. So it spreads out the resources and, frankly, under Irma we could not have been successful without NOAA's support in there. And then the support of some --- we used AE Contractor, we used Mobile District, and even, I think, in Tampa we used the pilot --- the port had surveyors. They participated in clearing that channel, because, you know, those are --- yes, Tampa Harbor is huge.

So right off the bat we probably had 20 surveys requests that came in to my office to get done immediately. Some of those came from the Coast Guard, and some of those came from our navigation program manager. Hey, get all these done, right. So 20 surveys is about probably 75 percent of what we would do in an entire year, over the course of a year, right?

So we're told to do all those immediately, so you can see it's putting out a fire. But the reality is in post-storm, as I see it, we are really --- we're there to support the captain of the port who are trying to open these channels, and so commerce can flow and the cruise ships and all that can get in.

So there's a lot of --- we had a lot of help from our internal command staff. But we really try to be responsive to the Coast Guard's needs, and, you know, so if. You know, if captain Allen over here is happy then basically I'm happy and we're happy. So we try to keep her satisfied. And that really goes to the improvements we've seen over the last few years, last couple of events of the communication that we've had between all of our offices. And we kind of started out with Marie a little bit. We had --- it was sort of a learning exercise, because it's been, you know, 10 years or so since we had ---

(Cell phone ringing.)

MR. BRODEHL: You want me to sing? I can sing too, but --- All right. Well, anyway, everything else but what the captain wants is kind of just noise out there, so we cater to what they have. And we actually have --- I have an employee that works for me who is 100 percent resigned to support Coast Guard operations, and to work with NOAA, and coordinate the operations during the year, and then especially during the storm response. So that is her --- her sole job is to be on those calls, answer questions, make sure that we understand what everybody wants, the priorities and requirements are fully understood and communicated.

So, now, I'm not going to really talk about --- specifically about Maria. I think Captain Allen covered that pretty well. I really feel for NOAA, because they had a much larger mission in the islands than we did. We only have four authorized projects in Puerto Rico and one in Saint Croix, so much smaller role, but NOAA really did a standout job there, and they did a lot of work. We were --- we did go down on the Coast Guard vessel too, and so that was a bit of a challenge, and it just got worse from there. Once on island. The conditions were terrible, there was no fuel, accommodations sparse, and the one thing we bought afterward, we bought a bunch of chainsaws, and we now are going to train our surveyors to be able to cut trees. So that is a lesson learned. So I now have a lot of chainsaws on my inventory list.

Now, you know, that's just general. I want to get into some good, and some bad, or what went well. And as was stated before, the communication was excellent between all the parties, all the phone calls. They were staffed, they were --- everybody I think was more or less on the same page. I don't know that it could have been a lot better, so very pleased all around with that.

The working relationships with the Coast Guard --- because what we're doing now --- when we show up with a boat we are grabbing a Coast Guard somebody, whoever's available. And they are riding our survey boats. And I don't know, they may be doing with NOAA boats too, but --- so they're on our boats, and we're trying to clear the channels immediately.

You know, gone are the days where we collect a bunch of data, send it back to the office in Jacksonville, they do their mapping thing, we send it back out, you know, days are going by, right? So we get the Coast Guard folks on the boat, we make an assessment right there, then they can call the captain for --- say it looks good to me, you know, bring them in , open it, whatever you got to do.

So that's --- that was a sea change going, you know, starting last year. And the coordination with NOAA, which, you know, we do pre-storm, but you still have to continue to do it during storm and after storm about who's got what assets, what capabilities and where they are. And that's going to dictate who's going to go where, and who's going to accomplish what --- what mission. And that went really well, I mean, I don't know. I just am very, very happy with the way it went.

And this is probably the most important I think. What I notice is the dedication of our workforce, to work at all hours of the day or night, to go wherever they're asked, whenever, was just an amazing amount of self-sacrifice demonstrated to support Florida, and Puerto Rico, and the Virgin Islands. I mean, it's just truly, truly amazing and impressive, and I'm very proud of my people who went above and beyond to help out and to support, you know, our partners and stakeholders.

And the willingness of other agencies and organizations to get involved, I mean, I called up Mobile District, they got a boat down there. We were able to get an AE contractor there. NOAA was --- like in Tampa, NOAA was in --- we had probably five different survey organizations in Tampa Harbor at one time, I mean, doing work. It's so huge. It's nothing we could do all by our self. It normally takes us a year to survey Tampa Harbor. So the willingness of everybody to help out was fantastic, you know, all the work got done, nobody got hurt, no injuries, that was a big plus to my point. We were, you know, we had some situations where there is a potential for that, but it never happened, so we're going to look at that and review that to see where we can improve the risk down the road.

And, you know, there is a silver lining out of all this. You do these disaster responses and they do happen, but there's a lot of money that tends to come to the table after these things. So we are going to probably get some new equipment and some boats that will better help us support storm response after the fact and going forward. So that's --- that's, like I said, that's a little bit of a silver lining that comes out of it, but.

Now, that --- those are some of the good things. Some of the things that were not so well we did take some unnecessary risks with some of our people and equipment, and maybe that's our communication issue, or not, but we really want --- safety of our people is paramount. We don't want to put them in harm's way. And if our equipment gets damaged, our boats get damaged we can't do anything. So that stuff has to be taken care of upfront.

There may have been some unrealistic expectations out there floating around, or --- and maybe some less than stellar decision making from the leaders, but, you know, we work with that, and we try to educate and train in what our capabilities are. So that's just a constant discussion we need to have. And it seemed like maybe there were --- you know, in our organization there's a lot of cook --- head cooks in the kitchen and trying to, you know, convince them that that doesn't work well. We need a very need a very few number of leaders making the call out there.

And then there were many, many, as I noticed sort of off script decisions going, you know, and that absorbs a lot of our energy and time, and maybe there's not as much little, or maybe no gain from those on the fly decisions. And I realize that they're going to happen, they're necessary in emergency situation, but I think if we can --- if we can come up with a plan, and more or less stick to the plan, I think we'll be better off.

You never know where the storm is going to track at the end, so you can't plan for every scenario. But if you have a good basic plan, and you stick to it I think you'll be okay. But, again, some of the leaders like to get off script and, you know, it kind of throws us for a whirlwind. We're not sure what to do next, because we're off script.

And another lesson is that the lodging and fuel is not available in something like Irma. Our --- all of our expectations are maybe that a storm crosses the state going east to west so there's a smaller impact. You get an entire peninsular impact like this, you know, there were no hotels, our guys were sleeping out of trucks. It's just the way it was. And the fuel was scarce, and kudos to Port Everglades. We were out of fuel at one point and, you know, they showed up and said here, here's some fuel. We filled up our trucks, and we were able to continue our mission. So, you know, Port Everglades is a great, great help there, so.

Finally, you know, the --- we are what we are. We have a base set of personnel, and equipment, and boats. So that's our capability, so we're going to have to continue to rely upon others for these storm events. And everybody's willingness to participate or help get the mission done.

Regardless of who does it I think that's a real --- that was good and I think we can even improve upon that. I don't know why I had it under the what to do better. But I think there's maybe a little room for improvement there, but all in all this past season went very well, and I hope we don't have to go through it again anytime soon, but I think if we do we're going to be very well prepared after going through last year. We just want to make sure we don't forget the lessons we learned.

So After Action Reports are key in our district, so, you know, it's a big topic. We're going through those constantly getting ready for the next hurricane season. So I think the Corps and our group, my group specifically, will be ready for the next storm or storms as they come in. So that's all I have. Thank you.

MR. ASLAKSEN: Thank you, Brian. Any questions from the panel?

(No audible response.)

MR. ASLAKSEN: Since this will probably be my last time being moderator, I'm going to ask one last thing, especially at lunch. You know, I've heard some things, opening the port quicker, portable systems, imagery being important, partnering, blue skies planning. And, again, this is an advisory panel. These folks are going to make recommendations up to the administrator. Maybe just one by one I would hand you the mic, and if you had either official or unofficially things that you think that know to do better, and/or look to the future. Please provide that comment for the panel to take in consideration as they go forward and see how we all can do this better in the future.

And as well as we have private sector partners here that should be a part of this discussion.

MEMBER SAADE: Can everybody give their opinion if things are back to normal now? The combination of Harvey, Irma and Maria happening back to back to back, would that make it impossible? And relative to Captain Allen, I want to applaud you for the action that the Coast Guard took to suspend some of the rules and regulations. And then just how does that apply to something like the Cajun Navy, which is kind of a hybrid of all of that? Thanks.

CHAIR MILLER: Can I ask that we be very brief, because we are now 25 minutes and we have to have a public comment period. So we're very short on time.

CAPT ALLEN: The Cajun Navy was a whole new endeavor, which we supported actually. They helped us out quite a lot. With regard to assets, definitely NOAA missed, more NRTs are needed, all-encompassing ships, because we're going to have to do humanitarian aid I'm sure in our future, and you'll be called upon for that. I can't --- as well as Army Corps Teams resources. It's just essential. I also think, and I wrote down here that I am going to invite NOAA and Army Corps so we will start a plan, hopefully, in the very near future prior to this hurricane season to coordinate things even better than we did.

CAPT STEPHENSON: From our perspective, for the pilot's perspective, in Florida the ports are back to normal. Thing I would say is we do have the pilot boats in the port, and we're more than happy to have them used as vessels of opportunity by any of the government agencies.

MR. VAUGHAN: To address Mike's question, you know, I just want to hammer home the point of a single point of failure. We've talked about that whether it be the buoys or the sensors, but from the imagery perspective because of what it provides, you know, just please, please don't forget that we can't lose that kind of a capability that resource, and more than the plane, it's the services and the delivery of the imagery and the team. Are we back to normal? I don't know, you know, we're actually doing a hurricane exercise. I guess let me just take a moment here to speak to that FEMA routinely does large exercises.

Our next one is a category three hitting the East Coast. National level exercise 2018. So we'd encourage you to either reach out to me, and I'll make that conduit, but we're going to do it again in about a month, so.

CAPT STEPHENSON: Well from what I'm hearing, the resources relative to NOAA, the Army, are critical, so it's something to think about. I was kind of interested to hear whether there was a way to involve the private sector more in this with specialized training and capability to help the Army Corps and the other entities beef up in times where the resources are really tight. Now that would have to be sanctioned by the authorities, proper training, but involve them early and see if you can involve the private sector to help augment when things are really, really tight in resources.

From our business, our business is back to normal. The only lingering issue we have is perception people have about some of the islands. It's not reality. I can tell you that our --- we measure guest satisfaction very closely of how people like their destinations. Our scores of satisfaction now are higher than they were before the storms, but people's perception are, yes, do I really want to go down to those areas of the Caribbean Islands. That's the only thing so we're working hard on that.

MR. DETWILER: In terms of back to normal for Miami Dade Emergency Management, we're pretty much back to normal. We're still dealing with Irma issues in terms of reimbursement, and overall long-term recovery. And, of course, Maria we also have a lot of evacuees that came from Puerto Rico and the Virgin Islands up here to Florida, and they are even in the process of getting assistance here, or going back home at some point.

I like the idea in terms of maybe doing an exercise that gets more into this detail about opening and closing a port. Like I said, for Irma we got lucky. We got the ports reopened. We had a very good team down here, but there's always that worse-case scenario, and I'd really like to see how that played out in terms of how we all work together during a disaster, both at the state and also the federal level, and the local level.

I can just say NOAA, from our perspective, did really well. We were very pleased with the federal response. We saw for Hurricane Irma everything from FEMA on down. Obviously we weren't a top priority. We weren't as hard hit as the Keys were, or some of our West Coast --- or Gulf Coast partners, and also Puerto Rico and Virgin Islands, but for our perspective we are very pleased with the response.

MR. BRODEHL: I'm just really grateful for the support NOAA gave us with their NRT and their MIST on the islands and in Florida, supporting some of the federal projects that we just couldn't get to, I mean, people like to say that they're our responsibility because they're federal authorized channels, but there is a limit to what we can do and provide. So it's good to have NOAA there. If they just keep developing that and maintaining that system --- those systems that would be good for us, and I think for the Coast Guard as well, so --- And, you know, we're still supporting post-Maria work down in Puerto Rico. We're surveying some damns down there with a number of hydrographic survey requirements. And then, you know, back in the states we were normal, you know, within three, four weeks after Irma went through, because it's really hard and fast and then we're sort of done.

So, --- and then the Corps of Engineers has a number of missions with power and debris still going on in Puerto Rico, so that's pretty much about it.

MR. ASLAKSEN: Well, thank you, and I think there ought to be a round of applause for this long, long panel, so thank you.

(Applause.)

MR. ASLAKSEN: Joyce, we'll turn it back over to you.

CHAIR MILLER: Okay. Thank you all. We really appreciate all the expertise, and I wish we had more time for questions, but we must move on. It's now time to allow questions and public comment from our audience here today. If there are any questions there's a --- Nikki has a microphone. Are there any questions from the audience?

(No audible response.)

CHAIR MILLER: I understand we have no questions from the webinar at this point.

(No audible response.)

CHAIR MILLER: No. Okay, the HSRP will adjourn and go into the lunchroom. This is a working lunch for us, and we will return at 1:30 and --- for the afternoon session. Thank you.

(Whereupon, the above-entitled matter went off the record at 12:33 p.m. and resumed at 1:50 p.m.)

CHAIR MILLER: Good afternoon. Our speakers for this afternoon are our leaders from the National Ocean Service. And in the schedule it says that Richard is going to go first, but in fact Juliana is going to go first.

So I will -- Juliana Blackwell is the Director of the National Geodetic Survey. She is responsible for financial, administrative and programmatic performance of the lead federal agency for positioning activities in the nation.

She serves as chair of the Federal Geodetic Control Subcommittee of the Federal Geographic Data Committee, exercising government-wide leadership in the development and improvement of geodetic surveying specifications, methods, instrumentation and data transfers. Juliana?

MS. BLACKWELL: Thank you, Joyce. Can you all hear me? Okay. Fantastic.

All right. Well, for this meeting's presentation on NGS activities, what I'd like to do is focus on one project that we have currently underway as part of our modernization effort.

And so today's talk is going to be on our foundation reference stations or our plan to develop this foundation reference station network.

What I'm going to go through in the next 10, 15 minutes is just an overview of our CORS network, which many of you have heard me mention before, continuously operating reference stations, and the plan to modernize that to something that is a more federally owned, managed network that supports and connects us better to the international reference system.

And I'm going to try not to go into too much technical detail, but I would like you to at least understand the spacing of the stations that we have and what are plans are for the future and ask for your support and comments on what we at NGS are planning to do with our other federal partners.

So I usually mention our 10 year strategic plan. I want to just point out that what I'm talking about today is part of our current plan. It will also be part of our revised plan that we have underway this year that's going to get us to 2023 in this whole modernization effort.

For those of you who are new to the panel or are not as familiar with the National Spatial Reference System, you will have plenty of opportunities to hear me talk more about this. And I would be happy to point you to some informational material that will help you understand the basic concepts of the NSRS and what that provides.

But just for the record, the NGS mission is to define and maintain and provide access to the National Spatial Reference System in order to meet our nation's economic, social and environmental needs.

What the National Spatial Reference System is, and, you know, when you think about it in your mind, it's a national coordinate system that we maintain working with our partners to make sure that we have foundational survey information, latitude and longitude, elevation, gravity information that people can use as starting points for all of their surveying, mapping, geospatial needs.

And so we are it for the nation as far as providing those accurate starting points and keeping that information fresh and available to the public.

So today's talk is focusing on Goal 2 of our 10 year plan, which is to modernize and improve the National Spatial Reference System. In particular one of the projects under Goal 2 of the plan is to replace the North American Datum of 1983.

So I know many of you understand datums from the last presentation I gave about, you know, how high things are and what you're referencing to.

This is more on the horizontal side of replacing the existing datum for the nation, which is, again, NAD 83, which if you consider the date when it was developed, it was pre-GPS. So when we developed NAD 83, it was before we were using GPS for positioning, for surveying, et cetera.

So we know that we did a great job with it with the technology that we had at the time. But we also know that it's got, you know, we know a lot more about the earth now than we did before.

So we're taking a fresh look at updating the North American Datum of 1983 and we're going to be calling it reference frames. And I'm going to get into that in a little bit.

But the bottom line is here on the screen, you see the passive control, the marks in the ground, how we did things historically prior to GPS. We still use marks in the ground. They're still important. But the advent of what we're doing for the modernization effort is really going to be focused on our continuously operating reference station's CORS.

This is going to be the new foundation of the 2022 reference frames that we're developing. Now the CORS network, and I'm going to go really fast through this, but the CORS network is a partnership. Okay?

There are about 2,000 stations that are currently in the NOAA managed, NGS managed network of CORS. You see them all here on the map? There are over 200 organizations who own these stations, other federal and state government. There's academic institutions. There's private sector.

NGS receives data from all of these stations on a daily, hourly basis and manages that data, computes it, checks it, provides statistics on it and makes that data available back to the public for them to be able to use for their surveying or scientific endeavors.

These CORS stations are really being used now as the primary, the best of the best stations as far as the NSRS goes. But if you look at it in a little bit more detail you can see on the screen here the actual stations that are owned by NGS are really very few. Okay?

So that's just a highlight. And there's a few little clumps here and there, but those are the stations that are NGS owned and are operating right now.

And as you can see, there's not really a good dispersion of those. And a lot of those stations were installed to certain criteria but are not necessarily what we would call the geodetic gold star type of station that we would like to have for our framework.

So what we are planning on doing by 2022 is, again, modernizing the National Spatial Reference System and using CORS to become more of a foundational component to the NSRS.

Our gold stars are our starting points for positioning versus using the benchmarks as the underlying thing to create the datums and to be able to position from. The marks are not going away, but what we're going to be relying on in the future are the CORS themselves.

I also want to point out that part of our role is not only to develop this for the nation, but to make those connections to the international system. And that's what the second bullet is talking about.

The International Earth Rotation and Reference Systems Service, or IERS, and the International Terrestrial Reference System will continue to be the worldwide standard for our reference.

So everything is relative, right? So we are positioning ourselves as a nation relative to this international system. And we want to be able to have stations that are at the highest level and can contribute to that international system as well as serve our nation.

So we're going to continue to support the ITRF. We do that now. We are very engaged with ITRF activities through the International GNSS service and the reference sites that are available.

And I know that's a lot, but I just want to make sure that you understand that we are trying to make sure that we are world class, and we are the best at doing what we do. And we have the stations to support that for the NSRS.

So this is just a quick picture of those stations which are the International GNSS Service Network. So if you look there and you see what I just highlighted, those stations that are NGS owned that are part of the international network.

And, again, the point that I'm trying to make is we really do not have enough or, you know, we don't have enough, we don't have the right spacing to make this framework viable.

So the plan is to continue to work together on the four different plates that we support. Because we think about the North American datum, but we really are serving stakeholders on four different tectonic plates.

And so when we do this for 2022, we're going to make sure that we look at each of those plates and develop a reference frame for all of them, independently, that can be used by not just us in the United States, but others who are interested and are part of Pacific plate or the Mariana plate or the Caribbean plate.

So we're doing this. We're doing this with a lot of international partners, too. Whether or not they adopt it, it's up to them. But when we do it, we want to do it right, and we want to make sure that we have the best information available.

There will be four different terrestrial reference frames that will be developed. I'm not going to go into a lot of detail on that. I just wanted to give you the big picture view of the areas that we're covering with the modernization of the NSRS and talk about the foundation CORS that we are also looking to establish in all of these areas.

So in order to get to this foundation CORS network which currently exists a little bit, we need to put a lot of effort into building these stations or improving the sites that are already available to us.

The first thing that we want to do is make sure that we can co-locate these foundations, these new foundation CORS sites, in areas where there's already existing infrastructure with other geodetic techniques, space-based techniques, VLBI, SLR, DORIS.

If you don't know what those mean, do not worry about them. I'm not going to go into in detail right now. But from a geodetic perspective, those are the other ways that we can do measurements. And we want to be able to put our foundation CORS, if possible, where those other observations are actually taking place.

So I'm not going to go into too much detail about the bottom of this slide here, but I want to show you where these other space-based technologies, techniques are already happening.

These are primarily NASA owned sites which have these DORIS, SLR and VLBI observations that are occurring now. So what we are doing is we are looking at this as these are places that we know that we want to establish foundation CORS sites that NGS either owns or works with other federal agencies, through interagency agreements, to ensure that these are long lasting, high quality stations that would have GNSS equipment at them that would be part of the new foundation CORS for the future, for the modernization effort.

So the same sites are here in yellow. In addition to where those existing space-based technologies already exist, we know that we need to add some other stations to the mix in order to get full coverage out of 800 kilometers facing across the United States and our territories.

We also know that we need a minimum of three foundation CORS for each of the plates that we are creating reference frames for. So, again, this is just a very high level snapshot of what we're trying to do, the stations that we're trying to build. And I just wanted to show you visually where we're looking at the sites.

I wouldn't worry too much about the different colors, but you can see where the coverage is planned. You can also see in the oval there is the Caribbean plate.

And right now, we are still looking at identifying some other stations because we need at least three in order to do what we need to do geodetically to make sure that we have an accurate reference frame for the Caribbean plate, which basically that means we're going to be looking at other countries and other nation islands to be able to get additional sites for the Caribbean plate.

So how are we going to do this? What's the plan? Well, first of all, the good news is when we looked at all those sites that are available, the NGS owned sites, the partner CORS sites, the other space-based techniques, the DORIS, VLBI, SLR sites, what we found is that if we break this into three different phases, using Phase 1, there are 28 existing CORS that we can convert and adopt into our foundation CORS network.

Some of those are NGS owned. Most of them are not. But the good news is there's already 28 stations that are out there and that we could very easily create into foundation CORS network stations.

We could also upgrade about seven of our existing CORS to meet the requirements to be GNSS. And what that means is -- GNSS is just GPS and other satellite systems that are put up by other countries. So Phase 2 would be upgrading seven of the existing CORS to GNSS to meet foundation CORS requirement.

And lastly, and probably the most onerous of it, would be to construct approximately eight new sites in order to fill out the rest of the network. So it's manageable, but it is something that we need to get started on right away in order to be able to meet our 2022 requirements for the modernization effort.

I'm just going to throw this in here. I think this is my last slide. The socioeconomic benefits of having a CORS network and having one that NGS has more ownership and control of is something that is critical for the NSRS of the future.

The economical scoping study that we had done values the CORS at a net present value of $18-1/2 billion at a 15 percent growth rate.

I'm not an economist, but we had socioeconomic studies done on this several years ago. And we're going to have another scoping study done here soon so that we can update these numbers. But we are seeing continued growth in the CORS network, the partner network, at 22 percent annually since 2003.

We know that there's a lot -- that the CORS stations are being used to support a number of NOAA products and services. We've got a list of 35 different NOAA products and services currently. And that we have two mission goals and six mission service areas that the CORS supports.

So it's a critical component. We're not proposing that we do anything to eliminate any of the partnering CORS. So the 2000 stations are still going to be supported, but out of that we want to have a foundation subset that is going to be the highest caliber CORS that is possible for the NSRS. And with that, my time is up.

CHAIR MILLER: I think we've got time. Are there any questions for Juliana? Gary.

MEMBER THOMPSON: Juliana is going to get tired of hearing me asking this question, but any flexibility in the 70 kilometer rule or is still?

MS. BLACKWELL: Right now nothing has changed with the 70 kilometer rule. So we put some guidelines out there. And I guess we would say that they are not really guidelines any more. They are sort of requirements.

If you want to add new stations, we're really looking at -- to add to partner CORS networks, those areas that are currently underserved, the areas that are outside 70 kilometers of an existing site.

I know some states have a lot more and would add to it, if they could. But we're really trying to manage the existing network with the resources we have and not bring in more within the 70 kilometer spacing.

MEMBER THOMPSON: So I understand about the new ones. What my concern and many other states is is the ones that are existing and we have to move them to 50 feet away. And then that becomes a new CORS and you all won't accept it so because it's within 70 kilometers.

MS. BLACKWELL: Gary, I would say at this point, until we can get a better handle on managing the existing network that we're probably not going to make any major changes in our requirements right now.

But we are working to get a new CORS program manager and get a whole refresh of the CORS program itself. And so I will certainly take that into consideration when we do a refresh of how we are managing the partner network.

CHAIR MILLER: Other questions? I guess -- okay, please.

MR. RICE: Growth rates that you have on the second to last line, were those the annual growth rates?

MS. BLACKWELL: I'm sorry. I probably did say annual, didn't I?

MR. RICE: Well, I didn't see it up on the slide. I'm just curious if it was --

MS. BLACKWELL: I think, well, we continue to get new stations in every year and I would say, I guess, 22 percent growth since 2003 --

MR. RICE: I'm just going to restate my question.

MS. BLACKWELL: CORS products and services and associated usage have grown at a 22 percent rate since 2000. So it's not just the CORS network.

A lot of people use the CORS data for processing other projects or submitting data through our online positioning user service. And so that continues to grow and it's some of the metrics that we report up to NOS as to, you know, how many people are using the CORS network for positioning, for control for their projects and processing of their GPS data.

So the CORS network itself continues to take in new stations. Some stations get decommissioned because they're not supported by their hosting organization. So there is change over time. But for the most part when people establish a CORS station, they continue to keep it maintained and have it in service for decades if not forever if possible.

I don't know if that answers your question, but I can follow-up with some details with your later, Jim.

MR. RICE: Sure. One quick follow-up. At Phase 3, which you said was going to be the most onerous section of your project for upgrading to the foundation CORS network. You said there were going to be eight new stations.

MS. BLACKWELL: Yes.

MR. RICE: Are those eight new stations going to be solely constructed by NGS or are those also going to be --

MS. BLACKWELL: Yes. Right now it looks like those will be eight stations that we would construct with our funds.

CHAIR MILLER: Other question? Okay. Our next speaker is going to be Rich Edwing, Director of NOAA's Center for Operational Oceanographic Products and Services, better known as CO-OPS.

Rich has held many positions of increasing responsibility within NOAA. He oversees the 24/7 operation of providing physical oceanographic information to mariners and other users.

He also serves as an advisor to the American Association of Port Authorities, Harbors and Navigation Committee. Rich?

MR. EDWING: Thank you, Joyce. So let me just go to my next slide. So I think you're all familiar with the National Water Level Observation Network, a little over 200 stations. About a quarter of them are -- I'm sorry. A quarter of them are up in the Great Lakes and the rest are in the tidal coastal shores of the U.S.

You see a typical Great Lakes station up there in the right hand corner. A typical tide station in the lower right. On the left, there's tidal datums established by the coastal stations. And there's the IGLD datums established up in the Great Lakes.

And those are the reference datums that you would use to communicate water levels. And those datums have to be updated every so often.

Of course, the NWLON, you know, supports many applications. There's real time marine transportation, storm surge, tsunami, all those sorts of things. But really, it's most fundamental purpose is to establish that reference system for the U.S. in terms of the tidal datums and IGLD.

And to accomplish that, I would say the NWLON is a bit more of a challenging observing system, perhaps, than some because it's really two sets of observations.

We, of course, continuously monitor the water levels with water level sensors. But then we have to periodically do geodetic observations to document the stability of the station itself. Because if sensors get changed down and stations get moved and other things go on, you want to have a continuous data series over those long-term data series that we use for sea level trends and updating these datums and so forth.

And we have worked very closely with NGS over the years. We follow their standards for doing these things. And thank you, NGS, for all the help you provided over the years. I'll say that several times throughout this presentation.

So my next couple of slides are going to be about how we've been traditionally doing this. It's kind of at three levels, kind of at the station level, kind of connecting to a national reference system level and then kind of a land motion level. And then I'll talk about how we're trying to modernize using GNSS techniques as we go along so.

So again, right now, we need to have geodetic control. We use geodetic control at the station level to first of all make sure our sensor is not moving. And if it is, we can compensate for that as long as we know how it's moving.

And then also we use it to transfer the information collected by the water level sensor to the local benchmark network that's set at every NWLON station. And that's how the users access the information, the tidal datums, at the station.

And then we also -- and, again, that's what's used to ensure these continuous data series. And then we also connect these stations where we can to the National Spatial Reference System. So that allows you to compare datums and stations against each other.

When we're collecting water level data and we're publishing a datum, whether it's in the Great Lakes or along the coasts, it's a local datum. The two comparisons, you have to, you know, connect into a common framework. And then we're also looking to understand what's going to with land motion at a station.

An NWLON station determines local sea level rise, which integrates land motion. It integrates global sea level, you know, change and it integrates other oceanographic dynamics. But to kind of derive that global sea level measurement, we have to, you know, understand what's going on with the land.

So just a simple graphic, which really illustrates kind of how we do things at a station. So just we use, you know, line of sight leveling to connect it to tide gauge.

We survey directly to the sensor zero and then we transfer those elevations to a series of benchmarks on the land, again, ten benchmarks.

This shows that, you know, there's just one set up between benchmarks. But, you know, that's just for simplification. Often there's many setups between benchmarks.

But we do cite all of our benchmarks within a mile of the station. And we have 10 benchmarks because if a gauge gets destroyed, that's how we recover the tidal datums.

And since we invest so much in an NWLON station, we want to make sure we don't -- if we lose a number of benchmarks the same time as we lose a station, we could lose everything. So the benchmarks preserve the tidal datums.

I'm not going to go through the rest of the slide, or the graphic I should say.

And so, again, we're users of NGS standards, and we follow their 2nd Order, Class 1 standards for our long-term NWLON stations.

And we follow 3rd Order for short-term and that prescribes certain types of instrumentation and methodologies for doing line of sight surveying. We use electronic, you know, digital bar code equipment to make those measurements.

You know, we do these stability checks every time we go to an NWLON station on an annual basis.

For shorter term stations, we do it when we put them in and when we take out to demonstrate stability, document stability, over those short-term measurements.

And then the other instances after, you know, a storm event we usually go around and we survey the sensors because sometimes the piers or structures may have moved during those extreme events. So that's at the station level.

To connect to the National Spatial Reference System, we used to have to survey to the old 1st Order NGS benchmark networks, which they no longer maintain. And that was kind of hit or miss because one of these networks kind of had to pass within five miles of our stations.

And it was still a lot of work and effort to do that surveying over 5 miles, and we could only do that very infrequently. So a lot of NWLON stations were not connected to the NSRS at that time.

But today we do that through GPS. Each station, one of their marks is designated as a GPS mark as well. So we do do observations at roughly 20 stations where we know there's a sea level change. But really where we're see extreme sea level changes, it's really because the land motion is either subsiding or rebound.

And so we do it annually at about 20 stations and then every five years at other stations. And, again, we collect that information at IGLD and submit it to NGS for processing, archiving, and we can, you know, look at things over time by looking at that data.

And then at the land motion level, about 27 of my stations are GLOSS stations. GLOSS is an international oceanic graphic commission organization. Our organization under the IOC that brings together all of the nations that are operating tide gauges for the determination of a global sea level.

So 27 of my stations are designated as GLOSS stations. And there was a requirement put in place a number of years ago to co-locate, I'll say GPS, along with the water level stations so that you could understand, you know, land motion and be able to get the global sea level rise out of the data series. And we've been working with NGS collaboratively to do that by co-locating CORS at some of these stations.

So on the left you see an example of Crescent City. On the right it's just an example from one of our Great Lakes stations, not for global sea level rise, but for coastal motion studies up there.

But there's been some problems with this approach and not so much from a technology perspective, but really because it is co-location, I think, from a -- it doesn't really fit the NGS model for where they want to put CORS. So part of our effort is to find a better way forward.

So that's how we've done things traditionally at those three levels. And back in 2016, I asked my folks to start looking at how can we leverage what's been going on with, you know, GPS and really now GNSS to modernize how we do things.

And it's really, again, so here's the three levels. How can we continuously monitor the stability of that sensor and also maybe, you know, do things differently with surveying to the benchmarks? How can we make sure almost every benchmark is, you know, connect to the NSRS, the ellipsoid? And how can we do things better to determine land motion at our stations?

And right now, while it's not part of our plan, I just have one slide on this at the end, is the GPS sensor. They're showing a lot of promise as an actual water level sensor. So we're starting to look into that, and we haven't quite built that into the plan, but that will probably get added in here pretty soon.

So I've got a couple of series of slides, a series of pretty simple offsite cartoons. I've got really engineers, but they're pretty poor graphic artists. I need to get them a couple more different colored magic markers, I think, you know. But I think it will suffice. They were very embarrassed to bring these to you so I had to give them a hard time here.

So at the sensor level, really what we're trying to do is almost integrate, you know, that -- and that little c just stands for continuous when you see it in front of some of these other terms -- is integrate that GNSS sensor with our water level sensor because ideally we'd be getting daily updates. Is that sensor stable or not?

And sometimes there's issues with that because there's line of sight. There's blockage of GPS so the next best thing is to get it as close to that sensor as we can on the pier or the platform it's sitting on.

And that's probably fine because, you know, we mount these things pretty stoutly to the structure. So it's really the structure moving is more of a concern not so much our sensor.

And, again, ideally we can use that to continuously monitor the sensor stability. And if there is a CORS or some other, you know, continuously operating GPS scenario, we can also use that to refine our measurements.

And so the next one is how can we, you know, employ GNSS to better maintain our benchmark network? And is there kind of a number of different ways to do this? There's static observations or continuous observations.

There may be ways of using those and maybe we can use some of this for just our far off benchmarks that are more, you know, labor intensive to get to than maybe some of our closer ones. We'll see. But it may allow us to reduce that benchmark network or reduce leveling frequencies.

So we're looking to see how we can, you know, modify our procedures to take advantage of, you know, GNSS. And it's also going to allow us, again, to better connect to the ellipsoid and geoid and all those other oids that are out there.

And then finally, for the land motion, and again, the GLOSS requirement is to get it right there at the station, but we want to do that at all of our stations. And that's where we really do need, you know, we need to have something built on the structure and on land as well because sometimes up here or some other structure can be settling at a different rate than the land. We need to do some things there as well so.

So where are we? So, again, I asked folks back in late 2016 to start planning this. So we've actually made a lot of progress to date.

So in terms of planning, we formed a number of working groups across the organization because this affects a lot of my divisions. When we brought in folks from NGS -- we've had a number of detailees from NGS who have helped us. So, again, much thanks to NGS.

We had a workshop where we brought a lot of people in to kind of help us refine our strategy and when we've published that strategy, that's now going to guide us going forward.

But in parallel with that, we've also been, you know, working with some of the hardware. We've got some GPS units. You know, we're using them, understanding the hardware and how they work. We're also, you know, looking at the data side.

How do we bring the data in? How do we log it? You know, it's because any observing system is just not the hardware on the front end. It's bringing that data all the way through the pipeline.

And we've established two long-term test platforms, one at our fill facility in Chesapeake and the other one up in Silver Spring, up on the roof of our building.

And we've also been doing a little bit of field work. Actually, we have a nice collaboration with ODU. This really wasn't a part of this strategy, but it really plays into it well. It kind of got started a little before us.

Is it Hans Plag? Am I pronouncing his name right, Larry? Yes, a researcher from ODU came to us, and he wanted to establish GPS at four of our stations for research he was doing.

And we were glad to work with him because that would allow us to kind of do some design work to, you know, mount that GPS right with the water level sensor. So we've done that. So we've had some progress there.

Moving forward, we're going to take that strategic plan and turn it into an implementation plan. We'll continue working with the hardware and looking at other kind of mounting designs and continue working with the data processing capabilities.

And we're going to be putting forward these on sensor systems out at different locations there. And two of them will take care of GLOSS requirements and two of them will go to other stations. I won't read the names, but there they are.

FY19 and beyond, we're going to then start looking at the lessons we've been learning and start, you know, trying to implement some of those for sensor stability.

We'll also be looking to see what we can start using on the benchmark side of the station, looking at techniques for coming in and doing very short-term kind of surveys, maybe after a storm or something like that.

You know, I think one challenge we have, which I haven't had a chance to speak with NGS about, is that we're hoping to leverage their databases. But their database is just like CORS data, and we may not have CORS quality data. So we'll have to work through that, I think. And then looking at different options for processing to get to some of those land motion studies as well.

And then I mentioned in the beginning, I've just become aware of some recent work. It comes through an NGS sponsored webinar. A very interesting paper called The Accidental Tide Gauge. Yes, yes.

And I know AOOS is going some work, the Alaska Regional Association is doing some work up in the Arctic using this technology. It really can't get us to where we want to be right now for NWLON measurements, but maybe in areas where there's a real lack of data or applications that maybe it can be used for right now. So very interesting.

So we're going to start looking at that as maybe a next generation water level gauge and we can overcome some of the limitations that are there now.

So just in summary, you know, we've made this a priority for us because we see there's a lot of potential for efficiencies there, and it's really just time for us to monetize this part of our observing system.

You know, we've got a cross-office working group in place that's been guiding us. They developed a strategy and they're going to develop the implementation plan.

Again, this is my final thank you. Juliana, we've just gotten excellent support from NGS, you know, in terms of detailees and just in all sorts of other ways.

But, we're also looking to leverage many other folks as well, academia, the regional associations. There's a lot of people interested in, you know, how to better leverage GNSS and these sorts of things. So looking forward to working with them. And that's it. Thank you.

CHAIR MILLER: Thank you, Rich. Are there questions? Larry.

MEMBER ATKINSON: Yes. First a comment. Yes. This worked out really. We bought three or four of them. I don't know if they're all bobbed and deployed or not, but.

MR. EDWIN: No. They're all in.

MEMBER ATKINSON: Yes, so, I mean, I took a geodesy course like 40 years ago. I never thought I'd ever use it. But now, you know, finding out just being -- yes. No, I took marine geology before plate tectonics was accepted so. That was interesting. It makes it really hard.

But, you know, now it turns out that because subsidence is half of our sea level rise, just our neighborhood on Hampton Roads, this all of a sudden becomes really important. And now all of the cities are wondering, you know, what the subsidence rates are around every pumping station and tailwater outfall.

And so I was wondering, InSAR is coming along, and there's going to be reflectors at each of the CORS stations or -- I'm not sure. It seems like InSAR requires a good location at a CORS station or a GPS.

MS. BLACKWELL: Having InSAR reflectors is not something that's currently in the plan at this time.

MEMBER ATKINSON: I know in our area they're starting to reinject treated wastewater. And they're putting reflectors at each of the sites where that's being done. So that's probably going to tie into all of this not only in our area, but all along the coast line where this subsidence is part of the sea level rise equation.

So this stuff is really valuable. I mean, I remember years ago when there was, you know, let's privatize all the NWLON stations. I said that's probably not a good idea. And it just shows how important this is and the fact that we've got a tide gauge that's been there since 1927.

And the other just anecdotal stuff. I know when we started looking at sea level rise rates, we called you or somebody that we hoped the structure the tide gauge is on is not sinking. So this all -- yes, yes. So it's good work.

CHAIR MILLER: Did you have a comment?

MEMBER THOMAS: So are all of the gauges, are they at one second sampling now? Are they at one second sampling on the tide gauges? Remember that came up as an issue with the tsunami monitoring, and they couldn't use the Scripps Pier 1 because it was averaging at six minutes. And then I think you went --

MR. EDWING: Yes. So all the water level stations, the sensor sample is at one second. But for our purposes, we were averaging over six minutes.

But after the Indian Ocean tsunamis, we were able to convert all the tide stations to break it up into one minute averages and send those back.

And we provide a separate kind of higher resolution view of the water level data to the tsunami watering centers when, you know, it's there all the time. They just create it when event is happening.

But then also at the stations themselves, they're collecting 15 second data and just logging it and kind of overwriting at the station. And that's needed -- we get that after an event because that's used for the research to improve the models, which is too much data to bring back too often. So, okay.

CHAIR MILLER: Are there any other questions? Oh, Gary.

MEMBER THOMPSON: So we talked about we were going to install a gauge on CORS dome NC12. So has NGS developed a procedure of transferring the elevation from the arc to the gauge? Our arc is 16 foot above the ground. You know, it's all one tower. So is there a procedure that, you know, you all recommend?

MS. BLACKWELL: We don't have anything new.

MEMBER THOMPSON: Then we'll talk offline because we did a test with Corbin and came up with a procedure, but it never got published. So maybe we can revive that.

MS. BLACKWELL: Yes. We should talk about that offline.

MEMBER THOMPSON: That's fine.

CHAIR MILLER: The next speaker is Admiral Smith. I introduced him this morning a our designated federal official for the HSRP and the Director of the Office of Coast Survey. Shep.

RDML SMITH: Thank you, Joyce. So I -- do I have the buttons? Oh, that button. I'll skip ahead to where I dropped off this morning.

So I wanted to follow-up on the National Charting Plan. As you all recall, we published this for draft last winter. It was out for public review through most of last year.

We got 280 comments total with the 13 most insightful comments from the HSRP. And so thank you. And we published the final plan in November of 2017.

So the implementation plan is now under development. In particular, the main focus of that is on coming up with the end state chart scheme. So, again, re-envisioning what scale charts we need where.

And I think that you need to think no further than the Miami River example from yesterday if any of you were following along on your phones to see what kind of charts we had there. They were not good. They were adequate for paper era, but not in the digital era.

And so we heard great justification for why, and we just needed to take that type of detailed place by place type thinking with some basic general rules as well nationwide and to go to a fixed set of binary step scales for all of our charts.

So once we get the end state, then we'll talk about how to prioritize getting from where we are to where we have identified we need to be.

In addition, we're prototyping some additional tools to serve the residual paper requirement. As you recall, the National Charting Plan is about digital charts. It's not about paper charts.

But we recognize that there are some residual paper requirements and will be for some time. And there are significant raster chart requirements that don't seem to be going away very fast either.

So we want to continue to serve those needs as we shift our main production system. So there are two developments along those lines.

One is with the database now fully populated, we have an opportunity to make raster charts directly from the database instead of making paper charts and then essentially making master charts out of the paper charts so skipping a step.

So in our raster title service, which we introduced about four years ago, we now have begun populating parts of that tile service directly from the database.

It looks like a NOAA chart. I wish I had an example up here. But it never was a NOAA chart. It doesn't have a number. It cannot be updated by Notice to Mariners. And it's going to force us toward the future of continuously updated digital charting. It is tied to the ENC in the area.

And the second, which was just launched less than an hour ago, is the NOAA Custom Chart Tool, which is now available on our website where you can design your own chart.

You know, you choose the area that you would like to have covered. You choose the scale that you want to be portrayed. There's a couple of different changes you can make to a portrayal. You can choose where the blue tint is. You can choose the units of your soundings.

And then you hit go and it makes you a PDF, a geoPDF of that chart, which, if you want to print it out, you can do that. At this point, they're not for navigation.

Again, it was launched an hour ago. So we still have some glitches to work out. But we also probably need to put some constraints on the options that you could choose and still consider it to be appropriate for paper use for navigation.

So that's very exciting. I encourage you to look at our website for that.

We anticipate building a lot of new charts with this after we get this plan built out. In support of that, we've started to collect all of the bathy that we already have validated from our previous hydrographic surveys going back decades or centuries and pulling it all together in one place where it is accessible. And that project is the bathymetric --

CAPT. BRENNAN: National Bathymetric Source.

RDML SMITH: National Bathymetric Source database. And so we expect that to be built out over the next couple of years, and it will really form the foundation of the re-scheming for the bathy part of our re-scheming.

So the sequence of building the new charts will be driven by customer demand, by source availability, major source availability and really, it's probably going to be region by region.

We, for instance, in this hurricane supplemental that we got after the hurricanes this year, we identified a portion of that to re-scheme the charts before we put all the new source on. It really doesn't make sense to apply all this new source to old charts and then have to redo it again.

So when we have a big slug of new source like that, we'll build the new charts first then populate them. And so we'll be going through in that sort of order. Under precision navigation, we'll probably be doing the same for charts in major ports.

And we do have an international component to collaboration on this. And we've already started working with Canada on re-scheming in the Great lakes.

So that's enough on National Charting Plan.

External source data, this has continued to be a priority. We talked about the policy changes at the last meeting using the best available data for the charts.

We're continuing to bring more data -- we'll find more data as we are more open and the word gets out that we're excited about incorporating this type of data onto our charts.

Last year we set a goal of 30 percent of our surveys that we incorporate are from surveys that we didn't pay for. Now, they are often very good. Joyce gave a great testimonial to some of her own work, which I would concur, yesterday and which we've incorporated quite a bit of.

And so there's lots of different types, lots of different areas. And this is a big priority, and we're getting a lot of improvements to our charts based on it.

Unmanned systems -- whoop. Too many buttons. Unmanned systems, I think we're going to have a little bit of a conservation at the technology working group session tomorrow is it, Lindsay? Tomorrow. So I will save some of what we're doing for that.

But we do have a project underway right now to convert two of our existing survey launches to optionally manned. So we basically put an unmanned system's brain into an existing launch that already has survey systems installed on it.

Well-integrated, it already has launch and recovery systems, already has engineers that know how to fix the diesels on it, and we can advance the sort of state of the art of unmanned systems in accelerated fashion using our existing platforms.

Our partners at the University of Southern Mississippi just bought an ASV that they'll be using as part of their unmanned systems training course that they run every spring. And the folks at UNH are continuing to advance the state of the art with the system that they have.

Our contractors every year are using unmanned systems more and more as appropriate, as part of the contracts that they have with us. And that's helping to move the industry forward as well.

Two sources of uncertainty for Coast Survey's unmanned hydrographic systems program. One is that there is a bill introduced in Congress called CENOTE, C-E-N--O-T-E, which does change the governance structure for how unmanned systems are done in NOAA and could be a disruptor for the progress that we're making in the hydrographic program.

And then the second is just NOAA's internal organization for unmanned systems that may or may not be related to the CENOTE. Going forward, precision navigation, I don't think I need to talk about this very much. It's come up an awful lot already. So I'm going to skip over that.

One topic that's come up several times over the last few meetings is partnership with the Army Corps particularly for surveying and charting in channels.

We have traditionally gotten condition surveys in channels from the Army Corps and through quite a bit of effort with our cartographers have taken those surveys and analyzed them and turned them into these channel tabulations, which is a very old fashioned way of disseminating that information and very expensive for us to produce.

So under the National Charting Plan, we announced that we'd be going away from these, and we are now starting to do so. And so this is an effort not to stop publishing the condition surveys, but to shift our efforts to doing it in a more effective way through the ENCs and through overlays and a few other things that we're working on.

But right now, you know, on a bad day the cartographers will tell me we spend 30 percent of our time doing these right now with almost no value. And so we're just going to stop, and we'll see what happens.

This is also a major source of Notice to Mariners. Every one of these tables goes out in Notice to Mariners. And it's cut out by, you know, Third Mates all over the fleet, cut out and pasted onto the charts.

It's a huge amount of human effort. And then the pilots come in and they say, no, that's not right. We're going to do it this way instead.

And so anyway, going forward -- oh, no, you guys don't have the most recent one. The most recent one with the change in it didn't make it apparently. Anyway, I had the before and the after, but now I just had the before.

So the after, basically, takes that whole table, puts just the project depth on there, and says that there's -- there's a note on there that says the actual depth in the channel is variable, and, you know, if you want to know the current conditions, use your ENC or talk to the pilots or get it from the Army Corps.

So basically, we're, you know, slowly reducing the level of service associated with the paper charts. And this will coincide with the requirement starting in July for all SOLAS class vessels to have ECDIS and use ENCs.

Ocean mapping, we previewed this a little bit yesterday. There is a one pager. I think there's one on the table, but there is one definitely in your digital materials that's got our one pager.

It talks about the sort of three directions that we're going for for mapping, and that's precision navigation, dealing with discrepancies, things like position-approximate wrecks, shoal reported, discolored water, glaciers receding, approximate shoreline, all of it depending on where you are, what the nastiest thing is in your area.

But often those individual things turn into a -- you know, you start to unravel them and discover that there's something larger happening there.

Seabed 2030, there is a little article that was published in Hydro International that we put together sort of pitching this. This is a worldwide effort with a goal to get the big ocean mapped by 2030.

As part of this effort, I won't go into the international structure of how this is put together, but as part of our effort to understand what we need to do internally to the U.S. waters, we did a gap analysis. That was done by NCI and Coast Survey and the University of New Hampshire to look at what data we have.

And we did a very simple but highly replicable study where we looked at all the soundings. We binned them all into 100 meter bins and just saw which bins had soundings in them. And we used every sounding, whether it was good or not, that was in the archive back to 1960.

Before electronic navigation, we weren't sure enough about the quality of the navigation to even be able to say that the sounding that was observed fell there. I don't think most people would argue be that 57 years -- that we're being too picky here with that criteria.

The answer in the end was that 41 percent of these 100 meter bins in U.S. waters had one sounding or more in them. So the implication is not that we're 41 percent done because clearly we can't skip from bin to bin to bin.

If you look at the multi-beam or the sort of continuous coverage, it's more like 30 percent, although we're really nailing down that number a little better.

So those are the numbers that we want to be consistent about going forward as the areas that are fully mapped that we don't need to repeat and the areas where we have anything. And we'll take those numbers forward to sort of monitor our progress.

We've already gotten really good use out of this coverage map because, you know, I'll bring it around, and I'll show it to somebody. And they'll say, well, your coverage map is no good; it doesn't have my data in it.

And we'll say, yeah, that's right. Your data is not in here because it's not in the National Archive. It's still sitting in the shoebox underneath your desk.

And so once we get it out and get everything available, we'll probably accumulate another 5 percent or so from emptying all the shoeboxes of data. And then we go forward from there and start to get a more comprehensive map.

That is my last slide, and my time is up, Madam Chairman.

CHAIR MILLER: Thank you, Shep. Are there questions for the admiral? Anne?

MEMBER MCINTYRE: Just a quick comment. I wanted to thank you for the SOLAS slide from this morning because I think it's a very good example of the complexities in meeting industry's requests to gather data from all different kind of agencies and reconcile it.

That's something that I can take back to my stakeholders as a very clear example of what makes that task difficult and time consuming.

RDML SMITH: Can I comment on that actually? And that's sort of basic of SOLAS requirements. If you look at what is expected of nations to provide for navigation services, one could look at what services are being provided around the world and evaluate different nations' navigation services against the sort of hydrographic risk, the navigation risk.

It turns out IALA has done this. This is the International Association of Lighthouse Authorities. And they do sort of consulting work on this sort of thing. And they did a study basically for the insurance companies, for the, you know, Lloyd's of London, the big risk people, evaluating navigation services around the world versus risk.

And while the U.S. did well, China is the best in the world at providing the navigation services. Ours are not the best in the world although I'm very proud of what we do.

And so I think there are some -- we have the sort of checklist of what they were looking at. And I think there's some interesting -- it's not really for public distribution or else I would have given you a copy. But it's illustrative of the types of things that I think can help to guide a national program on how to provide better services. And many of the things in our precision navigation initiatives are in response to that sort of thing. So thank you.

MEMBER SAADE: So earlier today you were talking about requests for better data in the Caribbean, the Bahamas in particular. So you're probably aware of this, but I just wanted to emphasize that with that UK Hydrographic Office contract that ourselves and a couple other contractors are on, so far the British Virgin Islands, Guyana, Jamaica, Grenada, St. Vincent, the Grenadines, Anguilla, Cayman Islands, and Belize have all been mapped.

And they have told us specifically they encourage people to come to them and say, hey, we need some mapping. And they get the funds together and they go through the Commonwealth Network and they get it mapped.

So with your connections you may be able to accelerate that.

RDML SMITH: I just want to make a little distinction between surveyed and mapped, right? And if by mapped, we mean charted so that the charts for NGA, for instance, paid for a great deal of bathymetric lidar throughout the Bahamas for DoD.

But because UKHO is the charting authority, I am not allowed by law to make charts in the Bahamas as the law is currently written. While all of that data is available, it has not -- the UKHO has not seen a requirement based on their usual customer of deep draft traffic to make larger scale charts in the smaller islands of the Bahamas so --

MEMBER SAADE: So some of the problem is the fact that the people, U.S. citizens, come to you and talk about this, but they're not going to the proper charting agency to get the charts? They're expecting it to be on a NOAA chart? Is that part of the dilemma?

RDML SMITH: Well, I don't think they're expecting that after we point out that it's not the United States. But, in fact, you know, the business drivers for the UK Hydrographic Office are pretty different than many hydrographic offices around the world. And so I'll tell you the rest over a beer.

MEMBER SAADE: All right. I'm just -- I've seen it work. The people make a request and IHO standard hydrographic numbers come out of it. Now, whether it gets on the chart or not, I don't know.

CHAIR MILLER: I sailed in the Bahamas for over two years, and we used chart booklets that were commercially done. I mean, a lot of mapping has -- not charting, but mapping, has been done by the sailors themselves.

MEMBER SAADE: The point is this is a new system that got implemented about three years ago. So I understand there's a lot of problems in the past, but this new policy seems to be working, and it is really new.

CAPT ARMSTRONG: I just wanted you, admiral, to elaborate a little bit on where the savings is in removing the information from the tabulation if you go through that process for the ENC as opposed to putting it on the paper.

So you have to analyze the surveys for the ENC, and you are showing it there. And so where does the savings come?

RDML SMITH: There's a certain amount of overhead just in doing the Notice to Mariners of putting those tables together, making them look pretty, getting them published through the Coast Guard system as opposed to, you know, a fairly automatable system of, even if we don't improve the cartography, even if we just have a dredged area, just to get real carto-geeky here, a dredged area with a couple of attributes, those attributes can be automatically extracted from an XYZ dataset.

But really what we hope to do is to make the product better by having more detail contours, say, to be able to show where the shoals are. Not just that there's a shoal in this big box, but to actually show there's just a little slumping in this section of the channel or to have some sort of overlay at least in some channels that we can co-produce with the Army Corps.

That's one option. And without getting into the broad array of channel condition survey types, we don't want to always do that because we don't want to supersede a really high quality survey with a more recent poor quality survey, but in general, more detail exposed through the ENC system.

Now that may be -- what we did in Long Beach, for instance, which is, you know, more or less a Band 6 ENC, just a next scale larger, which is really only suitable for use within the channel. But it works through the ENC distribution system.

CHAIR MILLER: Lindsay.

MEMBER GEE: Yes, thanks, Shep. Just a question regarding the discrepancies in the charts. We noted from the charting plan it's, like, what's the plan for addressing those now? Is that just done in regular contract or your surveys? Or are there specific areas where you are planning to do that maybe with sort of the autonomous systems? Just interested to know how you're going to address that.

RDML SMITH: So I don't think -- I'm not thinking that we would sort of do all of that sort of thing by contract and this other thing by in-house, that it would be the sum of these things are the survey requirement for the program and that we would parcel them out through the various mechanisms we have to get surveys done, including outside source data.

So the first step should be to look on the shelf and see whether we already have something that's at NCEI or something that could address it.

But the NRTs, when they're not doing hurricane work, are really well suited to this type of small job where they can go out, deal -- you know, go to a certain place, go out and deal with 20 or 30 problematic charted features and then go home for a couple weeks and get it on the chart and go back out and do it again.

We have started to look at how we'll do that also through contract and through the ship work. But, you know, depending on what kind of an operation it is, little stuff can be inefficient for a big operation that works well 24/7 and keeps going.

MEMBER SAADE: Sorry. Yes, I guess that's what I was referring to of, like, the small stuff that you see that are normally near ports or where people are operating. It's how you can send.

You'll -- I always keep saying this, but it is that little guy that's the contractor that isn't doing contract work for you now that's around as sort of like an NRT, I guess, is something that could supplement that, I think, or even you've known. And there is now we're actually seeing some of those private contractors that actually just have autonomous systems.

So we see that around the world now that that's the model that the smaller companies are doing. And it's a two man show with just autonomous systems. So maybe that's something for the future.

CHAIR MILLER: Anyone else with questions in the audience or panel? Well, this is indeed unusual. We're running 15 minutes ahead of schedule. Yay.

We've got two options. We could take the break now and come back at 3:15. After the break, we have a discussion period.

Rick Brennan will give us a partial update on fleet issues, and then the newly appointed admiral for OMAO, and I'm sorry, I don't -- Nancy Hann will be addressing us by telephone. And we don't know exactly when that is.

So we will conduct -- okay, she's going to be addressing us at 4:00. So we will conduct business for the planning and engagement group kind of a bit sporadically, but I think we can get it done, Dave.

Yes, before and after, I think. Lynne just said she wasn't sure the break was set up. But we can all scatter to the bathroom and so forth or whatever.

(Whereupon, the above-entitled matter went off the record at 3:02 p.m. and resumed at 3:27 p.m.)

CHAIR MILLER: Well, Kim is part of the group that's discussing, and she just walked out, so.

Okay, Dave.

MEMBER MAUNE: Do you want to say anything before I start? Okay. The Planning and Engagement Group, a couple of years ago we decided that we would start publishing identifying issues for the panel to consider and to identify what the challenges were, the pros and cons, and to come up with recommendations to the NOAA Administrator.

We also found that these issue papers have other advantages for helping advise the National Ocean Service on things we consider important.

And so we have published a paper that is called the Introduction to NOAA's Hydrographic Services Review Panel that has the 11 issue papers summarized in it, and all these 11 issue papers are generally available.

This afternoon we're going to be discussing the revision to one of those 11 issue papers and one new issue paper. And so I would like to call up on the screen the issue paper on The NOAA Hydrographic Survey Fleet: A Critical National Asset.

And we'd like to go through that and read it and let people comment on it. We're going to be taking a minute or so to read. And then I'm going to ask people to scroll down.

If you come to something you disagree with, raise your hand and let us know. But right now, it's up there on the screen, and we have the first couple of paragraphs there. And I hope you can read it. This is an update to an old paper.

CHAIR MILLER: This is an update. There are a couple of known issues that I just didn't update. And there's one sentence that we're going to have to recraft in it for sure.

But, yes, it was an update. The problem, well, not a problem, we had written this a couple years ago. It was one of our very first papers. And there was some very time specific things about the budget in it. And we felt that it just needed an update to be more current with present financial issues.

MEMBER MAUNE: And Virginia is prepared to update this thing on the screen as we sit here and watch it so. Oh, you're not? We're not going to do that? Okay.

CHAIR MILLER: And Lynne just said that there are copies on the handout table. And I believe there's copies in our folder.

MEMBER MAUNE: Yes. So the visitors can pull it off the table on the left. Okay. Start reading and let us know if you have any issues.

Okay. Scroll down another paragraph, please. And, Joyce, if you had any comments you wanted to make, please do as we get to that paragraph.

CHAIR MILLER: Yeah. I think it's at the beginning of the second page.

MEMBER MAUNE: Okay. Scroll down. There we are at the beginning of the second page. Is it the highlighted areas there that you wanted to talk about?

CHAIR MILLER: Yes. And Rick Brennan provided a comment. And my understanding is that in their new analysis of survey needs, they're no longer using the 10,000 square nautical miles. Is that correct, Rick?

CAPT BRENNAN: We would like to move away from that, yes.

CHAIR MILLER: And so I think we need to state something similar to that, but I didn't have a good solution to it. Okay.

So, Rick, can you tell us what the more current thinking is in terms of survey backlog or what might be appropriate to indicate that, you know, there are a lot of survey needs that haven't been met?

CAPT BRENNAN: So we're currently working on the Hydro Health Model that I believe at one point or another has been briefed here. We can certainly plan a rebrief for the new members if we need to.

But ultimately, that's the risk-based model that's based on AIS traffic, age of surveys, passage of hurricanes, et cetera, that would define that. And I think ultimately what we would like to be able to show is that, you know, is those areas which would be much more adaptive than how the, you know, the previous method was, which was, you know, just basic polygons, which we worked at chipping away at.

And I think that ultimately, you know, that what we had was where that 10,000 came from, and we were just discussing this, was that, you know, originally there was 50,000 square nautical miles of critical area that we hoped to, you know, resurvey every five years.

So that boils down to a 10,000 square nautical mile annual refresh rate is what we, you know, was the math that we used to come up with that because we felt like that was a reasonable resurvey rate to do.

But I think that what we're seeing now is that our survey requests and the demands based on traffic and everything else are much more dynamic than that. And so that's why we've developed this model and are pushing that forward.

We're not there, I think, as the admiral alluded to. We've had some personnel changes that have stymied that a little bit because we would have liked to have been able to brief you more definitively on that, so.

MEMBER MAUNE: Well, I think we're looking for one or two sentences that describe the magnitude of the problem here we're trying to address. And I wonder if you could give us that one or two sentence part to insert here in place of what's there now.

CAPT BRENNAN: I'd be happy to do that.

MEMBER MAUNE: Thank you. Could you do it by tomorrow when we finalize this? We'd like to vote on it tomorrow at the latest.

CAPT BRENNAN: I'll get right on that.

MEMBER MAUNE: Thank you, sir. See, you make me feel like an admiral or something. I'm giving orders. Sir, is that okay if I ask you to do that? Sir, yes, sir, okay. All right. What about those dollar numbers there, 155?

CHAIR MILLER: I did receive a definitive from -- and I believe it is 105 million that has -- or 104 million that was appropriated between 2016 and 2017. I'm fairly certain that that was in an email. So we need to change that to, I believe, 104 million.

MEMBER MAUNE: Okay.

CHAIR MILLER: And 2022 is correct. Those were just facts I was having checked. And they were, so.

MEMBER MAUNE: Okay. Well, if Rick gives us the new sentence or two tomorrow, we can vote on it tomorrow that we accept the change. Is that okay with everybody?

CHAIR MILLER: Yeah. That's fine. Let's look at the recommendations and the changes we made there.

MEMBER MAUNE: Okay. Scroll down, please.

MEMBER KELLY: Rick, just a quick question. Is that 500 for the Arctic still accurate or not? Just go back up.

RDML SMITH: Let me jump in. Because the way I introduced the new way that we're talking about mapping requirements, I never said the words square nautical miles. And I've never said that since I've been in this chair because I don't think it's the right way of thinking about societal value delivered from this program.

I think the three things we did talk about, which is underkeel clearance and ports having good data where it matters the most, having discrepancies resolved in a timely way.

We have a shoal reported 1897 on our charts. Are we about to get to that, right? There's no performance measure that we've ever had that says you should deal with the problems on your charts, right? It's all this square nautical miles, which has nothing to do with dealing with problems, right?

And then there's the last one, which is that we only have a little bit of information on 41 percent of U.S. waters. With 100 percent, we would be supporting not only navigation needs, but all these other societal needs, too, whether it's seabed mining, offshore energy development, fisheries habitat, et cetera, et cetera.

So those are the three areas that we need to be focusing on, you know, for our ocean mapping. So can we say that in a sentence and a half, I doubt it because it's not one requirement. It's really kind of three separable requirements, each of which imply a different type of performance measure. But we will give ourselves the challenge of fixing it overnight.

MEMBER KELLY: Admiral, I think that the whole purpose of this --

MEMBER MAUNE: That includes the sentence there with the 500 square nautical miles following the one in yellow there.

MEMBER KELLY: Yeah, this paper is really designed as a high level recommendation recognizing that there is a backlog and a problem. There are things that need to be done, and we need to have the fleet to do it.

So you tell us what's the best way to frame that. You know, instead of saying -- it's the same issue, really. It's just how it's stated. So if you can help us with that, it would be appreciated. You hear that, Rick?

MEMBER MAUNE: Thank you very much, Rick.

MEMBER HALL: Dave, if you could provide that to me so that we have some continuity of where this is actually going to be put in. I didn't want to have her have to type in the middle of this because it's always -- sucks to be the person who can't type fast enough for the rest of us who are reading. So I wanted to do that.

So I'm keeping the copy that is now going to be the future copy. So, Rick, I will talk to you after class, and we'll figure this out. Thanks.

MEMBER MAUNE: Okay. And then we wanted to roll down through the recommendations there at the bottom with the four -- with the three bullets. Let people read that.

CHAIR MILLER: As an explanation, particularly to the new people, what we had said previously was that we recommended that part of the funding from the two years that were funded, the initial $80 million and then another -- I don't know the exact figure -- that part of that be used to start to replace the hydro fleet rather than right now, the first ship out of the locks is a multipurpose ship.

And that's partly because they could take the design for the Sally Ride and the Neil Armstrong and modify it for general purpose needs. But they couldn't modify that for a hydro ship. That's what we've learned in the past.

So our recommendation was at that time was to use part of that money for the hydro fleet. That's no longer accurate. And so these three things are what -- it's primarily the first one that changed, that basically instead of perhaps building a new ship, there's other options on the table in terms of possibly acquiring a ship, possibly leasing a ship.

And they put out a request for information for that several months ago of the types of vessels that might be available to at least replace one of the two Arctic vessels, the Fairweather or the Rainier.

So instead of saying use that money to build a ship, we're saying look broader, think out of the box and look at all opportunities. That's essentially what we're saying.

MEMBER MAUNE: Did anybody have any comments on those recommendations as cited there in the three bullets? Oh, yes, okay. Andy?

CAPT ARMSTRONG: Maybe I'm jumping ahead here, but a little earlier the admiral at the beginning of the meeting gave us the brief on the SOLAS treaty. And so I guess I would suggest that we might consider including the SOLAS treaty in the sort of footnote authority mandates for doing our hydrographic surveying.

MEMBER MAUNE: Can you give me the Footnote Number 2 to add to this?

CAPT ARMSTRONG: Yes, sir.

MEMBER MAUNE: You will note that that's sort of the role that I take here in saying, okay, you have a suggestion, give it to me in writing.

Yes? They say that's what colonels do. We're naggers and taskers. Okay. Any other comment? Thank you, Andy.

MEMBER HALL: Just that last bullet point, and Sean and I both noticed it, it says to develop whole government approach. Is that a whole of government? Is that an integrated government approach? What is whole government? That's not clear to either of us.

MEMBER MAUNE: What did you say, Joyce? An integrated government approach?

CHAIR MILLER: Yeah. Instead of whole government in that it's not very clear. That's fine.

MEMBER MAUNE: An integrated government.

CHAIR MILLER: Yeah.

MEMBER MAUNE: Okay. Anything else?

MEMBER MCINTYRE: Just looking at that last bullet point now that you point it out, it might just be better to say to develop an integrated approach and leave government out because you put agencies, academic organizations, interest, private and commercial. So I would say to develop an integrated approach to the challenge of aging oceanographic fleets and remove the word problem.

MEMBER MAUNE: I think everybody likes that. Thank you, Anne. Anybody else? Okay, seeing nothing else, we'll hold this off tomorrow to get two new comments in from those who got volunteered by me to submit input.

Then we have time, I think, to move on to the next paper, which is on Marine and Geospatial Data Infrastructure. Can you call that up on the screen, please?

Now this is one that has bounced around for a number of months. And we've had a number of monthly meetings to discuss this thing.

We've incorporated most of the recommendations submitted by a number of people, members of this panel. But let's scroll through these paragraphs and see if there's any last minute changes.

Can you scroll down a little bit further and read that whole paragraph if possible? I guess it's too big of a paragraph. Okay. It's as wide as it can go. No. Yes. We need to go to the width of the page.

And people have copies so you can be reading your hard copies and not even look at what's on the screen. Yes. So you should be looking at your hard copy.

Okay. Let's go down to the bottom line upfront. We didn't exactly put it totally upfront because we thought it would be better to define infrastructure and different types of infrastructure upfront and put the bottom line upfront, not quite upfront. But still in bold on the first page.

CHAIR MILLER: Actually, Dave, on the first paragraph, Lindsay suggested we hadn't made the statement of how different the marine infrastructure was from the land based infrastructure.

And so the sentence that starts unlike land based, at one point I had had that highlighted. I think I italicized or something just so it was a bit stronger statement. Is it italicized?

MEMBER HALL: It is still italicized. Maybe not put there, but on my copy it is.

CHAIR MILLER: Okay.

MEMBER MAUNE: Okay. Do you want to scroll down? That's the bottom line there in bold.

I can't hear you.

MEMBER HALL: Technically not a bottom line upfront. The bottom line is the last line for what we're actually recommending, which is no administration should highlight and emphasize the value of NOS because there's a lot going on in that paragraph.

And I'm not sure how much we can say about what happens. And I know I was not involved, and I apologize. I'm not looking to change a lot. But having that whole thing highlighted, I think we lose emphasis on what we, as HSRP, can really ask NOAA to do.

MEMBER MAUNE: So you're saying the sentence that starts NOAA administration should highlight and emphasize. That should be the only part that's highlighted?

MEMBER HALL: I guess my question maybe is to Glenn is how much do we influence the president's infrastructure proposal? How much does NOAA -- what is the best way to inform NOAA on this?

I know that the group did a great job working on it. But I'm a little confused as to where HSRP's line actually is in the sand here. Every other time I've tried to do something like this it's gotten poo-pooed because it's outside our lane in the road.

So I just wanted to make sure that we seem a little -- that we've gone out and there's only one mention of what NOAA can do. So, again, I'm happy to be told differently.

I just wanted to put the question out there. I'm not looking to rewrite a paper. I'm not volunteering, Dave. I'm just putting the point out there. Thanks.

MEMBER MAUNE: Okay.

CHAIR MILLER: Perhaps we should just unhighlight the rest of it and highlight only that last.

MEMBER MAUNE: We can do that.

MR. EDWING: And I'll defer to Glenn on this. Maybe he's about to say the same thing, but given the language Glenn showed us this morning about how this has been characterized as a transformative technology, perhaps we want to work some of those words in here because it's already been recognized as such. I think now it's trying to reinforce that.

MR. BOLEDOVICH: I think that's exactly correct. I would get that quoted language that I provided this morning. And I would say the panel was pleased to learn that the Secretary recently testified and used NOAA's navigation services as an example of an investment for the infrastructure initiative.

The panel fully supports this in that kind of a statement. Because you already have the Secretary of Commerce saying this is something that fits into the infrastructure initiative. Use that and offer your full support for that.

MEMBER MAUNE: What's going off? Okay. Glenn, could you stay afterwards to work with me on this? For maybe five minutes?

MR. BOLEDOVICH: After school, yes. Or I can run up to my computer and email you something.

MEMBER MAUNE: That's fine, too. That's fine. Yes, sir.

MR. BOLEDOVICH: Sir, yes, sir. That's right.

MEMBER MAUNE: Okay.

CHAIR MILLER: Sal had a comment. No, okay.

MEMBER MAUNE: Yes, Julie.

MEMBER THOMAS: It's also a place to add, let's see, levels that will accelerate MGDI improvement and importance to the blue economy. Because I don't think you really have the blue economy in here. And it seemed like a place to put it in here.

MEMBER MAUNE: Is that in the sentence that says NOAA administration should? Is that the sentence you're talking about?

MEMBER THOMAS: I know. Just the very end, at the very end. Will accelerate MGDI improvement and importance to the blue economy or something like that. It just seems like blue economy should be in there. Yes, yes.

MEMBER MAUNE: Okay. Thank you. All right.

CHAIR MILLER: So perhaps what you and Glenn work on, we should look at the president's infrastructure plan. And kind of, if not, yeah, modify that to reflect the most current language we've got, whatever it is.

MEMBER MAUNE: Okay. Can we scroll down to the background?

CHAIR MILLER: Oh, actually, there's one word I'd take out there. Data products aren't acquired. Data are acquired. At the right --

MEMBER MAUNE: I'm trying to see where that's at.

CHAIR MILLER: Second to the last sentence. Take out the products.

MEMBER MAUNE: So data from physical surveys?

CHAIR MILLER: Yeah.

MEMBER MAUNE: Okay. Done. Okay. Scroll down, please.

CHAIR MILLER: No, that says data products obtained from NOAA assets. They are products. My point on that last sentence was that it says data products are acquired. It's the data that are acquired, not the data products.

MEMBER MAUNE: I wonder if I'm looking at the wrong place.

CHAIR MILLER: Last two lines. Right there.

MEMBER MAUNE: Last two, okay.

CHAIR MILLER: Okay. You've got the one I changed. This is a bit earlier. Yeah, okay. Got it.

MEMBER MAUNE: Okay. Okay. Last paragraph on the first page. Thirty-one locations, what should it say?

MR. EDWING: It should be over 85 percent, not 80 percent, over 85 percent.

MEMBER MAUNE: Okay. Is everything else okay?

MEMBER THOMAS: I have one more quick question there if it's okay. That price which equates to 2 million per foot. So I know that's footnoted and I didn't look at the reference there, but it really depends on the price of oil. And so --

MEMBER MAUNE: Would you like a squiggle before it to show an approximate?

CHAIR MILLER: Yes, I would squiggle it.

MEMBER THOMAS: I mean, I'd just hate to put it. Maybe in the reference it says that, but I just don't know.

CHAIR MILLER: I took that right out of an NOS publication.

MEMBER MAUNE: Without the squiggle.

MEMBER THOMAS: It's what? Yeah. But then we should say on November, you know -- squiggle is fine.

MEMBER MAUNE: Okay. Can we go to the second page that starts with nautical charts? We're on the second page now. What did you say about the second to the last line, Joyce?

Okay, scroll down, please.

MS. BLACKWELL: This is Juliana. I have one edit for Footnote Number 6. Kim, I think I just sent it to you. The citation, as listed, at least on the paper copy, is for an NGS -- it's the wrong citation.

We should be citing the actual study itself rather than a paper written by somebody in NGS referring to the study. So I just sent Kim the actual -- it was in one of my --

MEMBER MAUNE: Okay. You've sent the correct citation again?

MS. BLACKWELL: Yes, yes.

CHAIR MILLER: It may be that you already have that. I'm not sure since you've got the most updated copy, but, yeah, okay.

MEMBER MAUNE: Okay. Can we scroll down? Okay. Then scroll down to the recommendations, please.

CHAIR MILLER: Now I should note that after the last phone call, we got a few comments in, some -- mostly minor. But we did we have suggestions to kind of sharpen our recommendations and thank you very much, Dave, for taking on that. I was to the point where I couldn't look at it anymore and make changes. So Dave took care of those.

MEMBER MAUNE: You did a great job of putting it together in the first place, Joyce. Okay. Any other feedback?

MEMBER THOMAS: I have one more quick one.

MEMBER MAUNE: Okay.

MEMBER THOMAS: The last bullet, I think we want to say federal agencies and industry. I mean, when I do economic studies, I'm always contacting the industry themself to ask how much a barrel is or, you know, that they're bringing in or whatever.

MEMBER MAUNE: I have no problem with that change. Work with other federal agencies and industry. Okay. Anything else? All right.

CHAIR MILLER: I have to say I really thank everyone who contributed. Ed made some major improvements to it. And I think it's a timely paper, especially if we can kind of fold in some of the words that we've heard in the last couple days, blue economy and so forth so.

MEMBER MAUNE: Kim, have you made all the changes already to the paper, or are we getting input from anybody on this one? On the previous one you did.

Did you have -- okay. All right. Then we can vote on both of them tomorrow hopefully. Okay.

MEMBER THOMAS: How come it says for NOS and NOAA in internal? It's the second bullet. Is NOS part of NOAA?

MEMBER MAUNE: Yes. NOS is part of NOAA. Well, I assume that that was written to pertain to people in NOS other than NOAA, but I'm not sure.

NOS provides services that support the MG -- we could do without NOAA, is that your point?

MEMBER THOMAS: Yeah. Or, yeah, if it's broader than NOS, then it should just be NOAA. Yeah.

MEMBER MAUNE: Okay. All right. We can do that. Second the motion, okay. Okay. All right. Any other comment? Yes, Shep.

CHAIR MILLER: Dave, you have to say -- do yours read --

MEMBER MAUNE: Okay.

CHAIR MILLER: And just one comment on final and final, final and final, final and -- it truly gets totally confusing, especially when you've just had -- we had a meeting and almost everybody on the phone said, hey, this looks good to me. And then I get --

MEMBER MAUNE: Yes. It happens all the time.

CHAIR MILLER: It happens all the time.

MEMBER MAUNE: Unfortunately.

CHAIR MILLER: You know, when we ask for input, I would really encourage people to provide the input before the telephone conversation.

And if we make changes during the telephone conversation, great. And I think it's because people don't really have a chance to look at it thoroughly before the telephone conversation.

So at any rate, I have the same -- what is in my folder is the same as what's on the screen.

CAPT KRETOVIC: I just wanted to ask a quick question of the panel. Would Google Docs help you all --

MEMBER MAUNE: No, usually not.

(Chorus of no.)

CAPT KRETOVIC: No. Okay. All right. Never mind. Thank you.

MEMBER MAUNE: Yes, Shep.

RDML SMITH: The acronym MGDI is that a term of art elsewhere? Because there's a one that's very similar to that called MSDI, which stands for Marine Spatial Data Infrastructure, which is the term of art preferred at least in sort of IHO/UN type circles. So --

MEMBER MAUNE: We have been debating this. This is a new acronym.

RDML SMITH: This is the new version?

MEMBER MAUNE: This is a new acronym that we created to be specifically marine and geospatial data infrastructure, which is not necessarily marine. There is geospatial data infrastructure in addition to marine. So that's why we came up with this one.

CHAIR MILLER: And Julie had pointed out that at one time in the government, marine spatial planning was kind of a no-no. It sort of was like other phrases that were not looked upon kindly.

And so we decided we would go somewhere else and what we came up that was agreeable to everyone. I think it's much more descriptive to say marine and geospatial because that broadens it to Juliana's bailiwick.

MEMBER MAUNE: That's the rationale, sir.

CAPT BRENNAN: The Canadians came up with the term hyperspatial so --

MEMBER MAUNE: You might disagree, but that was the rationale.

CAPT BRENNAN: You can go there if you wanted to.

CHAIR MILLER: I believe we've -- do we have our --

MEMBER MAUNE: 4 o'clock speaker.

CHAIR MILLER: Our 4 o'clock speaker?

MEMBER MAUNE: Our plan was to stop at 4:00 so we could have our speaker. Sir, I apologize if I seem a little bossy up here. It's just part of my nature. Oh, you weren't? I'm known back home as the nagger. I'm the chief nagger in my company.

CHAIR MILLER: Don't leave though, please.

(Whereupon, the above-entitled matter went off the record at 4:03 p.m. and resumed at 4:11 p.m.)

RDML SMITH: I'd like to introduce Rear Admiral Nancy Hann, who is the new Deputy Director of the Office of Marine Aviation Operations and the, Nancy, you're going to have to fix my title exactly here, but you're the Director of Operations for the fleet and the aircraft.

She has agreed to brief us on the update to NOAA's fleet plan and the discussions that have been happening in Washington on the fleet. So Admiral Hann was selected as a Rear Admiral about, I think she's been in her current role about two months, replacing Admiral Anita Lopez, who retired in January.

Nancy's background is in aircraft operations. She was the CO of the Aircraft Operations Center in Florida and has a wide variety of experience through NOAA.

So Nancy, just to give you a flavor of who you're talking to, we've got a room with a U-shaped table with about 20 people around it and then about another 20 in seats in the back, and we are webcasting this and it is a public meeting. So I want to make sure you know who you're talking to. So with that I'll turn it over to you, Admiral Hann.

RDML HANN: Thank you for that introduction and thank you for the opportunity to speak. I'll keep this pretty informal. I'll talk for about 15 minutes and then open it up for questions. Can you hear me okay? Is it coming through okay?

RDML SMITH: Loud and clear.

RDML HANN: Okay. I'll start with a little bit of background. Most of you have probably heard this but just to make sure we're all at the same starting point.

In October of 2016 NOAA released publicly, which means we're allowed to share it with the Hill, with Congress, with public industry the NOAA fleet recapitalization plan. That was a plan that went 2016 through 2028, and that time frame was chosen because that's the time frame during which half of our ships, so half the 15 ships are set to be decommissioned. Many will already be beyond the end of their service life, many already are, so it's not the end of the service life but it's the date at which based on the information we had at that time, we planned to take them out of service.

NOAA traditionally has built ships, so we had funding based on earmarks when those were a thing, or disaster supplemental, and about half of our ships, about eight of the ships were inherited from other services or hand-me-downs. We don't have a complete fleet that's specifically designed and built for us, which has been a somewhat limiting factor.

The NOAA fleet plan really took a hard look at our requirements from all across NOAA. Those prioritized requirements in those specific mission and activity areas for the long term, through 2028 but beyond that, what do we need to continue that level of support. The plan is available. If anybody hasn't read it and is interested in reading it, if you google it you'll find that it's on OMAO's website.

That plan started in OMAO but it was a cross-line effort from across NOAA so every line office had a member or more than one member that was on what we called the Tiger Team.' The Tiger Team came together and did that level of analysis in writing that produced the fleet plan.

Also kind of parallel to that which I think is important is prior to that. In January of 2016 we started an independent review team. That was a team of I think 12 individuals from across industry, academia, government, Coast Guard, Navy, NSF, really a who's who in shipbuilding, ship operations, ship technology. We brought them together as an independent review team so they had tasks from us but their opinion and analysis was completely their own with no control from NOAA to look at our fleet.

Look at our fleet of what do we need, how are we operating it, what's it long-term sustainability look like, and they're the ones that said well, first and foremost you need a long-term fleet plan, and from that recommendation the Tiger Team I mentioned was formed. The fleet plan was written.

That fleet plan went through review at the NOAA level, so every AA or system administrator which is the head of a NOAA line office signed it. The administrator at the time, Dr. Sullivan, signed it. It then went through Department of Commerce and got clearance, went through the Office of Management and Budget for clearance, and then went to the Hill and became public for everybody. So that's kind of the base of all that.

We are very clear in saying this plan is based on the best information we have at the time. We're putting a stake in the sand because information will constantly be changing and we know that. There will be updates to the fleet plan as necessary. We didn't define specific times to do updates because it's really going to depend on how dynamic and frequent that information is changing.

One major body of knowledge we knew was underway at the time was end of service life assessments on all the ships. Those were done by ABS, American Bureau of Shipping. We're doing those on almost all the ships. We're not doing them on a few of the newer ships. But that's really a stem to stern top to bottom assessment of infrastructure, material condition, mechanical assessment and figuring out what does the life of that ship and those four independent components look like?

We get that assessment from ABS, we perform additional analysis in-house with our engineering team, and that's the phase we're in right now. We have some of the reports and are doing in-house analysis. Ultimately we will take that and our detailed maintenance planning and that will inform an updated chart and there will be some movement on the end-of-service-life dates that are in the fleet plan. But it's a very involved, analytical, heavy process, so those dates have not been released and it will probably be a while until they will be but that will be the next update to the fleet plan that we foresee.

Also on par with the fleet plans we needed a stable funding profile, so ramping up an acquisition shop to build based on money here and there and then diffusing it does not give you economy to scale, it doesn't give you expertise, it doesn't give you a holistic fleet. So it's better than nothing is what we have, but we worked very hard across NOAA to get a stable funding profile with that fleet plan.

The first chunk was an FY fiscal year '16. We had 75 million and that's repeated in fiscal year '17 and just came out in the fiscal year '18 omnibus. We're on the third year of 75 million dollar funding, and our intent is to keep working to have that level of funding continue every year.

We are working with the Navy to develop the first vessel. The first vessel is an AGOR derivative and the AGOR is the new Armstrong or the Sally Ride that you don't have.

That AGOR will be a derivative of that vessel. We're doing an assisted acquisition, so we're leveraging the Navy Acquisition Office to help with that design, using our in-house platform acquisition division which, with this stable funding profile, has given us the opportunity to grow that shop, that platform acquisition division, in house and really have those economies of scale those lessons learned those holistic fleet advantages.

We are also, we put out an RFI request for information to query industry and see what's out there in terms of other capabilities, being responsive to the environment we're in right now. The price of oil has changed, it's a different market now than it was five years ago for ships, especially new ships that might be coming off-line and being laid up or set aside when they're only a year or two old.

So we are constantly looking at the industry and environment and being receptive to all our options, and again if those things were to change they would show up in an update to the fleet plan and then once it's publicly released that's where that information would be again.

I also mentioned maintenance, so in the FY18 omnibus, we had an increase of about 23 million dollars in maintenance funding, so while it's nice to build new ships and have a sustained level of funding to build the ships, it's equally important that we sustain the ships we have and keep them technologically relevant and operational and have a proactive maintenance plan.

So that increase in 23 million dollars in funding in the '18 omnibus really helped move our maintenance plan forward, can help implement the plans we have in the long-term maintenance plan, look for opportunities for standardization, technology integration, and that is part of the analysis that will go into those end-of-service-life dates, using the data from the end-of-service-life assessments and seeing where investments need to be made, looking at the money we have to invest in maintenance and then looking at the options for those ships holistically as a fleet.

One thing Admiral Smith and I have talked about is we're very aware of the programmatic needs which is driven by the NOAA-prioritized requirement, and so we're very cognizant of the need to maintain continuity in that ship support for programs as we go through all these moving pieces.

Admiral Smith, is there anything else you think would be helpful for me to address specifically?

RDML SMITH: Thank you, I think that was very helpful but this group is also looking at the NGS and COOPS and so maybe you could comment on the aircraft. We already discussed earlier today how we're one serial cable away from not having the King Air, for instance, for hurricane response.

RDML HANN: Sure. This year, as I've also said, I was the commanding officer for the aircraft operations center for this hurricane season, so it was very apparent first-hand that we have an important role to play for the nation.

Those products and services that we deliver, not just for the forecast but I think for the emergency response really got some attention this year that maybe it hadn't before and what the level of that data, the importance of it for emergency manager planning for, you know, where do you direct your limited assets first for the general public that's been evacuated from their home and they just want to see if they have a home, or a business owner that want to see.

The value of that data was incredible, but again we had one King Air to do that work and likewise, we had one G4 which is the only high altitude jet to inform those forecasts.

For a little context there, the Weather Bill came out, so the Weather Bill mandated us to have backup redundancy capability for the hurricane hunters, so for the P3, those are the lower altitude, they fly in the storms. We have two of those.

Alternately, they've been in maintenance getting new wings, doing a major overhaul but when we get the second one back later this year we'll have two, so that meets the Weather Bill requirements.

The G4, we only have one, and it's an older plane. It's tracking as expected on the Conklin and de Decker industry performance standards, but it's about 70 percent reliability right now and no matter how much money we pour in it, that's going to be where its performance is at.

So in the midst of the hurricane season this year there was a lot of attention, both media and congressional as you probably saw, around getting redundancy for the King Air emergency response and for the G4 storm forecasting, so that showed up in the FY18 omnibus. There's 133 million dollars. 12 million of that is to get a King Air.

That King Air will replace our current Turbo Commander, which is very old and needs to be retired, so it will be performing primarily the Turbo Commander mission, which is the snow survey or the water resource management but we are also working through the requirements process to see what level of capability we can have in it for emergency response, and certainly make it available as needed.

121 million of that is for a G4 replacement to do that hurricane work as well as other off-season work. So we are working, we are leaning forward pretty far on the requirements for those aircraft. If you're watching public documents you would have seen that come out, like an RFI for both of those aircraft again to do that industry research ahead of time. In the event we did get funding, we knew we needed to move very, very quickly to get those aircraft online as quickly as we can.

So we kind of picked up on the work we'd already done on those acquisitions and are moving forward very quickly by working to bring another King Air on line and then a G4 replacement, which we don't know exactly what that platform will be yet. Does that help with that question?

RDML SMITH: Yes. Thank you, Admiral. As I appear to have the chair temporarily here, Joyce, I hope you don't mind, I'll ask for any questions for Admiral Hann. Joyce?

CHAIR MILLER: Admiral, this is Joyce Miller. I'm chair of HSRP. Can you for us, we're actually revising a paper we wrote a couple of years ago about hydrographic fleet replacement, so could you update us on the status of both the Rainier and the Fairweather for Alaska work?

RDML HANN: Yeah, so they both had end-of-service-life assessments. There's still a level of analysis being done on both of them, but we're definitely very aware that they just passed their, you know, we just celebrated their 50th birthday, so they do need attention and we're looking at that.

We're looking at it from the perspective of charting and surveying and everything, all the activities that are within that mission, but it is definitely, as Admiral Smith and I have talked about, it is definitely on the front of our minds that those are older ships and while the Fairweather had some time laid up and in fresh water, so it benefitted from that, the Rainier did not.

So I can't give you an exact date that they'll be coming off line or an exact date or type of replacement that's allowed, but they are definitely at the front of our mind.

CHAIR MILLER: And are there any actions to replace them currently, or what's the status on that?

RDML HANN: If you look at the fleet plan, those two types of ships or missions are categorized as a Class B. We define the ships in the fleet plan as four types. Class A, newer Class A or Alpha, Class B, Class C and Class D. So those two fit into the Class B ships, and on those and C currently we're doing requirements analysis and some of the preliminary acquisition work that has to be done.

CHAIR MILLER: Other questions?

RDML SMITH: Admiral Hann, thank you very much for calling in. I did want to flag that our, the next meeting for the HSRP is in Juneau in August, and we will be sure to invite somebody from OMAO to join us, either remotely or in person, for that meeting as well. I really appreciate you taking the time to call us and update us on the fleet plan, and look forward to seeing you soon.

RDML HANN: Thank you for the opportunity, and I agree, I think it's a good thing to keep these updates at your meeting, so we're all sharing the same information. Thank you.

CHAIR MILLER: Rick, you have a short update on --- okay.

CAPT BRENNAN: Okay, so there's been a lot of discussion about precision navigation, so I'm going to at least give a brief update on that. This is the slide that I think we've used in a number of the previous ones to just get at what we're talking about when we talk about precision navigation. This may or may not be all of them. I think the thing that lays underneath this is obviously the National Spatial Network that controls the geodetics of all of this, so it's sort of like eggs, they're baked into the cookies in this, so you have to assume that that's there.

But on the website for orientation purposes, you can see that it has basically all the forecasts, so that would be our various model inputs, and on the right it's the actual observations and as the Admiral pointed out today, really I think if you're sailing a ship in you need both of those.

If you take, for instance, while in the Columbia or if you take the Chesapeake, those transits are frequently, may be multiple tide cycles depending on what coast you're on, and so the conditions that you experience at the mouth of that estuary or body of water may be completely different than what you experience by the time that you get to your destination. So knowing what that's going to look like before you get there and before you embark on that is critical.

Conceptually, I'd like to paint the idea of what we think that this looks like, so what I am proposing and for anybody that's dealt with mil spec computer equipment, this is a giant data cable.

I'd like you to imagine this, if you would, as what we'd like to be able to do is bring a big giant data cable to be able to plug into the back of a ECDIS system, we'll be able to plug into, and I use 'plug' loosely, to provide that data to a portable pilot unit, to be able to provide that data to the computer at the logistics desk inside of some port operations facility, but basically all the data that we talked about on that wheel before, we would be providing that digitally in a computer to computer readable format that the user doesn't have to think about.

So when you talk about, when you pull your iPhone out and you pull up the Google Earth app, you don't ask it for a map, you don't have to put in what chart number you want to see, you don't have to pull up what operational forecast model you want to be using, you don't have to pull up what tide gauge you want to see the data from. You just go and open it and it just presents it for you based on the spatial extents of the area you've zoomed into.

So ultimately that's the sort of smarts that we would like to build into this system so that it's available to everybody, it's open source and it's formatting its data structure so that it's there and it feeds all of those services.

So you've ripped the end off of that data plug. What you would get is each one of those data leads may have a, or cable leads, would have a different format. It may be water levels and I, just for the sake of simplicity I didn't put the observed in forecast variants of that but you can imagine that each one would carry a different data stream from that and it would be delivered to that point.

Again, I apologize if this is too electrical engineering techy for you, but that's the way I think about it, of how we want to be able to deliver that.

So anyway, just to give you a brief on where we stand with Long Beach. We've got a, some of you may have seen this, some of you may not, but I think it's an interesting video that talks about the most recent ship that was brought in, and just so everyone is aware, Tesoro was, I believe, bought and it's now actually Andeavor so I know in the past we talked about Tesoro and the partnership with Tesoro. I don't think Tesoro as a company exists any longer.

Did they change the name? Okay. I'll say what she just said. They just changed their name, they didn't want to be known for oil, so Tesoro's new name is now Andeavor. In this case, the video talks about the Andeavor ship TAQAH, so if you want to go ahead and roll that video.

(Video plays.)

It's interesting that the prime takeaway that they gave was that it was less fuel, or less, fewer ships and less pollution, which is obviously one of the big issues that they have in Long Beach and in Southern California, is their concern about pollution. They actually monitor the ships speeds, because I think that they don't want engines idling and putting exhaust fumes into the air so speed of getting in and reducing number of ships is an issue for them.

So I think it's not always great news with regard to the underkeel clearance system that they introduced, so this is one instance, this is what the port of Long Beach gets from their underkeel clearance system and it's a, basically it's a recommendation based on a ship's arrival time whether or not it can go or not go. You can see the red line, I think you can see the red line, it's on the left hand side of that blue graph at the top, is the scheduled arrival of a ship that they had proposed for that particular time and if you see the white areas are areas where it is not available to go. In this case, I believe that it's combined and it may be tide window and it may be waves.

But in this case I think you can see there's that large bar, that bar that stretches across the entire graph of white at the four kilometer mark, and these are all basically kilometers from the sea buoy into the pier, the now Andeavor pier, but at that one point, at the four kilometer mark, the ship changes course there. In this particular case, what they found was that it was the response to the particular wave train that was being sensed at that particular point and the response frequency of the vessel itself on that particular course.

So while it was fine under those wave conditions on the previous legs, as soon as it turns you can imagine if the waves on that leg were broadside, for instance, it may have had a different role characteristic or motion characteristic that would have caused its dynamic draft to change in a way that violated its draft restrictions there, and hence the whole transit was marked as a no go. That's why that route is shown in red right now. It got a no go and they had to reschedule it. I think they tried a couple of versions and found that there was a time when they could delay and get that ship in.

That's the kind of computational ability that this system has, and as I think some of you noticed, they were also referring to it in intensive feet, which is interesting, so I think they were able to bring this in at 68.7 feet of draft on that. I think we were excited. We just rounded it up to 69 which is to date the deepest draft that they have brought in at this point.

Coming up as far as precision nav goes, and certainly from coast surveys perspective, we're currently working on New York. We've had, over the past two summers we've had survey operations on the Hudson River all the way up to Albany using NRTs and Bay Hydros, and we also have other surveys within the port of New York.

This is also the area where we are starting the national charting plans, rescheming of charts. That's also where we are rolling out National Bathymetric Source Database, so that's currently being built in the same area. We hope to have new charts with higher resolution and depth areas and soundings as a part of that.

We're also going to be starting survey operations in the Mississippi this summer, so we're very excited about that. We'll be working with the NOBRA pilots and the Bar pilots for that. Houston and Savannah have also expressed interest in that, so those are based on the size of the ports or the ports that we're currently developing plans on going to next and what those particular ports are going to need.

I think as we've discussed, each port is different so while waves dominated in Long Beach, they're not a dominant factor in the Mississippi, they're not a dominant factor in Houston/Galveston and when you look at New York, for instance, air draft is a growing issue there so much that they're raising bridges.

MEMBER KELLY: Done.

CAPT BRENNAN: To date, I think that I'll just talk about what progress we've had. As I think the Admiral discussed, there are budget initiatives underway so we're anxiously waiting to see if those pan out.

We're currently developing a project manager position within coast survey to be able to manage this on a more robust and active schedule. It's currently been a collateral duty of mine and I think we're seeing as the project grows it's going to need more full time attention.

We're working on costing and benefit models now for each of these ports to understand, working with our navigation managers, to understand what those requirements for each port are. Is it a current meter, is it an air gap sensor, is it a high-resolution chart overlays or ENCs, and what is that going to cost for the initial build out, what is it going to be to maintain that, and what does that cost cycle look like? We're working that currently.

I think, again, to just repeat what Admiral Gallaudet said, we're excited because it seems to be gaining, the concept of precision navigation is gaining broader visibility. To hear Secretary Ross mentioned this in his briefing was certainly exciting and panic-inducing for all of us on the ground who for the longest time have been toiling in obscurity on that, so that was great news.

And then finally, the lab in conjunction with COOPS has been working with Rosepoint to work on which is a portable pilot unit manufacturer software developer. They may not be doing portable pilots anymore, I'm not sure. I think that had been a big part of their business. I think now they're just focusing on more to the electronic chart systems. They've been a partner that's been willing to lean forward with us on this technology, so they've been working on ingesting our operational forecast models into their software and working with us, because frequently that's the issue that we have.

We have these, like, a net CDF for anybody who knows what that is, it's a fairly wonky scientific data format that scientists use but it's not a great tool to bring data in for display and visualization on the fly in a real time navigation system. What we've been doing is iterating with these manufacturers to see okay, how does this work, how does that work, does this, you know, can you bring that in?

And that's frequently been the challenge because as we push forward, a lot of this data is much denser than we currently use and so when you start talking about gridded bathymetry, you start talking about gridded model fields that have multiple ensembles inside of that package, it becomes more difficult to transmit, more weighty to load into memory, and so figuring out what works on the fly so suddenly your portable pilot unit doesn't cease to operate and freeze as you're navigating in because the data that's trying to load is as critical. That's a project that we currently have going.

I believe that is it. My time was up from the minute I started, so I was just winging it. I'll take any questions if there's any. Lindsay?

MEMBER GEE: Just regarding, maybe it was intentional or not, you had your plug but it actually wasn't connected and plugged in. It seems like with all the others, like the underkeel clearance and the actors and potentially the vessel traffic radar and you want to send that out as well, providing that to the end user is not necessarily going to be a portable pilot unit, it's going to be something in between that's going to integrate that. I think that's what we see in overseas ports, right?

CAPT BRENNAN: Absolutely.

MEMBER GEE: And so are you working with anybody in that regard that might be a local integrator that, as you said it would be different in each port but are there any industrial partners that you've kind of identified for that role?

CAPT BRENNAN: We don't, and we've talked about a number of ways of doing that, so there's SBIRs, there's CRADAs, so I think we're in early stages. Again, we have no funding to do this. At this point we've just been talking about how would we be ready to go if we were to get that, and what can we be doing under existing funding to continue to push the idea and the concept forward. I think that's the vision, right?

And like I said, we're talking about a hard wire. It certainly wouldn't be a hard wire. I think what we would like to see is something wireless, right, because I think that's the thing that's clear. All commercial vessels right now, or 98 percent of commercial vessels have some sort of internet access on board at every minute of their transit from berth to berth, and so the restrictions that we've had in the past of getting data to the vessel are going away so I think thinking about this in a wireless semination protocol is the way that we would like to go which is why we were looking for that computer to computer interaction so that you're not having to go in and say, oh, I want file or chart 12345, I'm going to download that.

I think we want to move away from that sort of transactional interaction between the customer and our products. We want to just have the stream there, so having all that stuff ready and served up and available to be delivered in an easily-consumable format is, I think, nirvana for what we're trying to achieve.

MEMBER GEE: Right. That might be, I think, that eventual nirvana, but in the interim, in that transition, to sort of have that successful next pilot or next demonstration. As you say, the Rosepoint working on the ingestion of net CDF. It's kind of like every data structure you've got there is not simple and easily displayed, so it's that interim work that makes it easily displayable and pushes it out there into the eventual users.

And the people making the portable pilot units aren't necessarily the one that's going to do that work, I think. So I just see from what I've seen overseas I think there's something in the middle that helps deliver that to the end users.

RDML SMITH: May I jump in here? For example, on the Mississippi River there are four pilot groups on the Mississippi, Sean can jump in here and add some flavor, but they, anticipating that we're going in this direction, they already standardized for the four pilot associations, on Trelleborg and have started to get that built out and get the their pilots and user operations aligned with that technology.

I think what's tricky about this is that this is the customer's partner and not our partner. This is what's hard about public/private partnerships, right, is we have to look like the handsome guy in the corner that everybody wants to have a dance with and attract them, but we can't, we're not, we can't do the initiating here because it needs to be that partnership.

So we can't choose, we can't pick the sort of commercial winners. It really needs to be the customers and in the end the ports and the pilots and the other decision-makers need to choose their systems people that they want to work with.

What is important for us, though, is that we do that in a standard way. We don't want to have some half-baked thing that we do in Long Beach and a different half-baked thing that we do in the Mississippi that is ultimately incompatible with what needs to happen in New York. Whatever comes out of that plug should be what comes out of that plug, and has a geographic context but it's the same stuff.

And in fact, it should be the same stuff that comes out of the plug in Rotterdam and in Singapore. This is what we're working toward, you know, each of those things does have an international standard in development and we're working both with the manufacturers and our counterparts around the world to get those in place as soon as we can.

CAPT BRENNAN: If I can jump in, that's one thing, that's the exciting part about these relationships with Trelleborg, with Rosepoint and just in the realm of the portable pilot units, is they're completely unconstrained. When you start talking about an ECDIS system it has to be type approved, it has to be IHO compliant, you have to have all of that.

When we're talking about the portable pilot units, we can try all sorts of things. So if we lean forward here in the U.S. and we try those, try and fail and try and fail and come up with something that really works in the portable pilot units, we can push that forward through our IHO channels to the IHO and lead the development of those standards, which is really where we want to be. We want to lead those standards. We want to start it here in the US.

And the places that are doing this in Europe, it's not typically the HOs. It's usually the port. So when we look at Rotterdam and we look at all these other ones, it's the ports that are doing that. They control the surveys, they control the chart production, they control all that. It's different than here in the US.

MEMBER GEE: Sorry, I totally agree. I was just trying to say that I wouldn't like the panel to think that this is something that just happens. I think it does need the ports to be actively engaged in like, how do we solve this problem? You're going to provide, and it comes back to this digital infrastructure again, the goal should be this is an essential bit of infrastructure but the rest of it? Over to the ports, not you. Over to the ports to utilize that properly to their benefit. I agree, totally.

MEMBER DUFFY: I'd just like to follow up, since we are talking about the Mississippi River. There's also other components too. Right now we have draft restrictions on the river. We've had a high river, we've had some issues with getting dredges to respond, so the economics of the ability to include more data sets, air gap sensors are a huge deal but it's very hard to quantify.

Sometimes we have a draft restriction and we have vessels that go elsewhere, and you never really have a way to capture that. I've been asked that question a lot over the last 15 years and I have no better answer now than I did 15 years ago. We know what we know.

We have one vessel in port right now that loaded to 47 feet, which was the draft at the time it was loading, and 44 came up so it's trapped in the river. I'll be careful what I say because it's being recorded, but that agent calls me a couple of times every day, asks me how I'm doing, when's the draft going back to normal, when can he get out of Dodge?

So looking at those kind of, trying to help provide data that we don't have. As you mentioned, we do have the four pilot groups of three state pilots and the federal pilots, and each area in many ways is a little bit different with different challenges, but trying to capture, increase air gap sensors, that's one thing we definitely would look at for a multitude of reasons.

I know that we have a good working relationship, Captain Brannon's been down, we work closely and would be happy to help with kind of deferring to the pilots on some of that related to the PPUs and how they look to capture that.

But the advantages to the navigation industry and being able to have more information, looking at having draft restrictions right now, I get the call every day, when are we going down? We have multiple dredges working now but it takes a while to recover the channel. And of course it's the most dynamic shoaling in the country and it changes very quickly at times. Lots of specific challenges to the river system.

CHAIR MILLER: Other questions or comments for Rick? Okay, Dave --- Actually we had the public comment period this morning and we will have one tomorrow at about the same time. Is that not correct, Lynne?

MS. MERSFELDER-LEWIS: Yes.

MEMBER MAUNE: Okay, then, fine, we can continue with the Planning and Engagement Group section, and I'm going to turn this over to Kim because last year we were talking about are we running out of ideas on issue papers and what should we address next? And Kim came up with the idea of trying to identify other topics and to prioritize them. We call this our HSRP Matrix. We don't? What are you calling it

MEMBER HALL: It's a prioritization matrix, and it's not really a matrix because that's not how it ended up getting built, so it's just really our topic prioritization list.

MEMBER MAUNE: Okay. Go ahead.

MEMBER HALL: I am going to say one thing before I start. I'm a little frustrated because I know that there's been some different takes on how we did this. Like I said in our meeting this morning, I think it was actually very successful for a first try at getting folks to answer, and I've made it as painless as I possibly could.

I know there's two different surveys via Survey Monkey. It was all based on the fact that I wasn't going to pay for the higher level one to get us where you could do it all in one. So we're using free software and there are limitations to that, as people know I'm sure, in the hydrographic world as well.

So when we did it we briefed it out to the group several times in our Planning Engagement Working Group. I think where we are now and what we need to do is what we expect happens with that list because I do believe that some of those priorities are on there, there is some expectation that there would be coverage at the meeting here, and I think we have some things to do to grow from it.

I think we should continue to do it that way. I think it provides an opportunity. Obviously I think we should have a good discussion on topics that people are interested in, and I will update the survey and send it out fairly quickly after the meeting with the newer topics, or see where we stand.

But I think it's really an important thing to do kind of behind the scenes to allow people to, number one, think about it and number two, not all of us are as vocal as others so it provides yet another venue for maybe the more quiet folks to still be able to be squeaky wheel in some way.

So I really, I was asked maybe to try to change it, I'm open to change but I think we need to give it at least one more round. I'm happy to chat about that if it did or didn't work for you. And then I would just ask that folks, when we do it, please participate.

It doesn't take much time, it's super helpful, hopefully it makes the meetings, how we approach the issues papers if we have an issue paper, and that kind of work is excessively helpful I think to get our panel viewpoint on what we'd like to do without one person perhaps being the tail that wags the dog.

So that's where we are now. I'm happy to talk about the topics that were the top five for the folks that weren't around for those. I know they keep getting put into every email that Lynne sends out as a list of what we've got, and kind of the thinking behind how I organize what we could do next whether it's a new presentation, and we'll talk about the hydrographer's surveyor issue.

I know that a lot of us need more information before we are anywhere in the realm of being able to write a paper, and so there was some kind of catalyst here to direct us that so that we're not writing five papers at the same time but that we're advancing ourselves so that we're prepared if we believe we need to.

So again, happy to take on any feedback on how that went but would ask you folks just give me a change on the second go, and also it really depends on your participation if it's successful or not. I can certainly make it more painful but I don't think we want that.

CHAIR MILLER: Just one comment. It's not just the issue papers, it's what we might discuss at the next meeting, what we might have a webinar about, I just wanted to emphasize that. It's kind of, where is the panel going and in what form?

MEMBER HALL: And obviously we're going to have some requests and direction from NOAA, or not even direction, we do things in tandem, but this way when there are things that we want to talk about we do it in an organized fashion and it's not just somebody decided to write a paper and the next thing you know we're all either rewriting or editing, and trying to take away some of that frustration that was occurring for some of us, not all of us.

I think it's a helpful tool in giving NOAA some feedback, giving our own chair and vice chair some feedback as a committee. It's our voice, so use it.

MEMBER MCINTYRE: I thought it worked pretty well and that we should give it another try. I just, just a couple of observations is that I think as a panel we need to stay focused on what our mission and what our priorities are. It's easy when we go to a lot of different areas we hear interesting topics that we all may have an opinion or we note at the meetings that something should be done, but they really maybe are not within the purview of what the HSRP does.

For example, we've noticed a lot of communication issues in the hurricane preparation for them coming and the recovery, but in my mind a lot of the issues that we were presented with today are very important but perhaps not relevant to the work that the HSRP does.

I think the other thing related to the prioritization list is that we make sure it remains a living document. I think after hearing Admiral Gallaudet's vision for where we're going, I see the prioritization of what we need to look at as being very different and shifting. Those are my comments. I think that even maybe we go back and reprioritize what we have on the list perhaps we should be looking at new topics to include in reaction to the change in administration.

MEMBER MAUNE: Yes, and the Admiral talked about autonomous systems as something he thought we should address and that is something that could be handled by the technology people or by the Planning and Engagement, or both. I don't know how people feel about that as a topic for us to pursue. Anybody care to comment on that one?

RDML SMITH: I guess I just would, I wanted to observe that you all did review the Hydrographic-specific Unmanned Systems Strategy this past year. While NOAA has broader unmanned maritime systems requirements, it's probably beyond the remit of this panel to advise on unmanned systems beyond hydrography, and you already did that.

MEMBER HALL: That's what I was going to ask, actually, with regard to that. Knowing that just because we hear something, doesn't mean we do something. But when it comes to that, I would love more feedback and that's the exact feedback I was hoping we would get. It's something we need to definitely keep on our radar but if it's either any of the three directors, if it is the folks from his offices, Glenn and Jim, can tell us hey, what can HSRP help the Admiral with?

I'm not sure the Admiral always knows what we're up to, either. He's got his priorities, he's got his talking points and loved hearing what he had to say yesterday but we've got to be able to take it and understand how that actually plays out.

So if there's somewhere where there can be direct, when you hear him say something about hydrographic-related, vessels or systems or whatever, that we can be of help with, I think that almost takes it outside of this prioritization list and it's something that you and the three directors ask us, or Russell asked us to look at.

I think there's kind of two things going here, right? NOAA can ask us and let us know that there are issues that we should probably be paying attention to, and we can also decide based on our own background and current work, something that we think NOAA needs to hear more about from us and we'd like to learn more about. There's two tracks here and I just don't want to ignore either.

MEMBER GEE: Could I just come at that again, regarding the autonomous. Strange that the Admiral would raise that as something that he obviously pushing on. I would ask the question of Shep is like, is there anything more we can do as the HSRP directly related to the hydrographic use of autonomous systems that we haven't done already? Is there more that we can do on that previous paper and your strategy? That would be how I would interpret it and what we potentially could do.

RDML SMITH: Perhaps being responsive to the fact that you heard what he said, reflecting that back in the letter that you will send him and perhaps calling his attention to the work that you and we have already done, which I don't think he was aware of when he said that. That might be the simplest first step, and you could offer, leave the door open for him to, he might very well respond to you himself, right, that's a different administrator than we've ever had.

Usually when you all write to him, the response comes starting from our offices and then gets staffed up through. You very well could hear back from him. So you should probably write your letter thinking that that's what's going to happen.

DR. CALLENDER: I think that's right. He's sent out 124 requests to NOS programs in 92 days, so he's got a, seriously, 94 days now, he's got a pretty high bandwidth and I suspect he will respond back. I think Jeff is right. He'll go in back in pointing out, here's the thinking you've already done. I think it would help him maybe stimulate some ideas.

The challenge he's got, I believe, is that he is trying to sort how to wrangle all of the agency because there's some research activities, there's fisheries activities going on, how does he come together with the NOAA- wide strategy and certainly, emphasizing the hydrographic piece of that strategy, I think would be valued.

CHAIR MILLER: Another thing we might consider given the, what we've heard about precision navigation, we have a strong paper on that, but maybe somebody should look at it with new eyes and say okay, here's what we heard, you know, can we strengthen that paper potentially?

(Laughter.)

I wasn't offering anybody, I just meant that in that there's been new developments, it's sort of like the fleet paper, you know, maybe there's something else and ---

MEMBER MCINTYRE: My thought would be maybe we need to hear a bit more about his vision at the next meeting. I think that there's something there with this blue economy and public/private partnerships and precision navigation, what it's all going to look like, but I don't feel like we're at a point as a panel where we know enough about it to really put something together. So I like your idea of revising that, but I think we need to learn more.

MEMBER GEE: And again, is this something we could comment in the letter, to say how we were pleased to see his support of the precise navigation and the previous work we've done and we support that and sit ready to provide further advice if that's appropriate.

DR. CALLENDER: So I think that's completely fair game. I personally felt like, from what I've heard him talk about the blue economy, you got the blue economy light version yesterday. He didn't have a ton of time. I think asking for additional clarification and trying to pull more of that vision out for him would be useful.

Just for context, there's a white paper that's being developed in the agency that I have some hopes for, I'm going to give it 50/50 at this point, but it may, when it comes out, give you some additional commentary. But I think asking for more about that vision, pull that thread, I think it would be useful.

RDML SMITH: I think that's an excellent suggestion. We're always grappling to identify what we think we need to work on, what issues we need to address, what's important to NOAA, and one of the topics that came up in our prioritization may be of no interest to you whatsoever, when we get to this licensure of hydrographic surveyors, for example.

It may be that you feel, what the heck does HSRP have to do with that? You may be addressing this, is this of any interest to you at all? It's a very controversial topic and it came out on top when we prioritized things, but what was it, six people responded and four out of six thought that was in important topic and so it came out on top because the next one had three out of six, I think. I don't know now NOAA feels about, is that an issue to you at all, sir, on whether or not hydrographers are licensed to do the hydrographic surveys.

RDML SMITH: It is of course of keen interest to everyone within the hydrographic community. However, it is not within our span of control in any meaningful way. So if you all recommend to NOAA that NOAA do something about licensure, NOAA's not doing something about licensure and will not have any authority over it.

We may, individually or in some way as part of a larger community of practice, have some role in implementing a national strategy, but it's certainly outside of our span of control. So I don't know that it would be particularly impactful for the HSRP to recommend to NOAA something specific on that since it's not our problem.

MEMBER MAUNE: Okay. But I was thinking along the lines of NOAA establishing or helping to establish exam questions if there is an NCEES process for having a national test, something along that line. Captain Brennan has been tracking this issue in much more detail than I have.

MEMBER HALL: I just have one question. Are we going to address the letter? Should we wait until we have the next, there's plenty of time in the next Planning Engagement, can we wait until tomorrow, can we table this for today? The issue of licensure is, I mean, that's a whole conversation, or do we want to kill it tonight?

MEMBER MAUNE: I'm not sure we're going to kill it now, but I do think I'd like to hear what Captain Brennan has to say.

MEMBER HALL: Okay. Because I think we have, what, a couple hours tomorrow that we can ---

MEMBER MAUNE: Yes, we're going to be reviewing the two issue papers tomorrow and we'll have time to continue our discussion tomorrow, but I think we can continue on and we still have some time available this afternoon, so I think tomorrow can be a continuation of what we do now.

MEMBER HALL: Okay. So we're done with prioritization? Is that what I'm hearing?

(Simultaneous speaking.)

MEMBER MAUNE: That was topic number one on the prioritization list, so I don't think we're through with prioritization yet. I was just looking at what was number one on that list.

MEMBER HALL: Okay. I think it's actually separate to do a deep dive at this point. I think we were just talking about the process, so I just want to make sure that the committee is keen on me continuing to try the survey methodology that I used, which was not very robust but it worked.

MEMBER MAUNE: Yes, we want you to continue that.

MEMBER HALL: Okay, and then my only other thing which might be out of order but I am going to have to regretfully resign as the co-chair. I don't think I'm the right fit but I did find a replacement, I have an exit strategy, and so Julie Thomas is learning, which she just got herself into.

I'm not entirely sure we need two co-chairs. I'm still happy to take on the prioritization list work, I think that's something that I'm happy to do. The co-chair thing is kind of a different animal than I'd expected it to be. I think having one point of contact as the chair of a working group is helpful, and you can always, if you can't make it to the call, you know, deputize somebody for the day to do a call.

So I am not comfortable continuing on as a co-chair. Happy to do the prioritization matrix and want to thank the panel for voting me in in the fall and apologize, I am failing greatly in only having lasted six months. I don't think it's even six months. I don't exactly know when I took over, I don't exactly know if I actually had, but officially no more. Thanks.

MEMBER MAUNE: But are you going to finish those two issue papers that you're working on tonight?

MEMBER HALL: I'm not writing anything. I've got inputs and I will do the editing as required. One is already in your inbox, ready to go for tomorrow and just waiting for Captain Brennan and his very insightful inputs for the paper, and it will be ready to go when we're in there. I don't think it has anything to do with me being co-chair, though. I think that's just me trying to be helpful.

MEMBER MAUNE: Okay. Thank you. All right. We were at the point where I was asking Captain Brenner to give me some input that Shep had recommended on that subject. Are you ready to talk about that or would you rather avoid the subject?

RDML SMITH: I'm a little bit confused, because there was a process question I thought we were on prioritization and the way ahead, and I'm not sure I, okay, so we got concurrence on that and now we're going to the actual topics? Okay. I just want to make sure that everybody's on the same page on where we are.

MEMBER MAUNE: Well, if you are confused you have every right to be so, sir.

RDML SMITH: Maybe I'm not the only one in the room.

MEMBER MAUNE: You aren't the only one confused.

RDML SMITH: Okay. With that clarification, then ---

MEMBER MAUNE: Well, because that topic turned out number one on the prioritization list and we had, well, I thought it was four of six, now it's three of six.

MEMBER HALL: Look at it, and that's where the confusion came on. I didn't actually ever put how many people I said, those were just the five that tied, there were actually three that tied for our first issue based on votes, based on how people did it. So that's certification of hydrographic surveyors, disaster response, and managing big data. And the only reason why certification of hydrographic surveyors is top it alphabetical order. Nothing more.

So there's obviously an issue that four of six and three of six was the way forward, those who wanted more information before we even tried to do an issue paper. So as we were working on this in the Planning and Engagement working group, we realized perhaps you have an informational meeting before you write a paper, instead of writing the paper and having an informational meeting.

MEMBER MAUNE: Well, we did have a webinar on this subject a month or two ago also, and we had some speakers on that subject. I know that Andy Armstrong had some strong feelings about it, and I was just puzzled is this something the HSRP should even pursue, and from your perspective it sounded as though there wasn't much you were going to do about it.

The only thing I was thinking of was might NOAA be interested in contributing or reviewing exam questions should NCEES come up with some standardized hydro test that could be used by the various states. That's where I was coming from on that particular question. And you look like you're confused by my question.

RDML SMITH: No, I don't think so. I'm just trying to catch Rick's eye here, whether he wants to engage or not. You can't tell. He's got a poker face going back there.

CAPT BRENNAN: Sorry, I heard hornets buzzing around and I was just trying to stay out of the nest. If I'm ordered into it I'll go, so yes, I think a couple of points on this. I think at least with regard to our conversation with our hydrographic survey contractors who have been at the center of this licensure argument, I think the thing that all of them have said that they're very interested in is a national license. Because to maintain licenses across individual states is really onerous.

I think the other thing that was very clear as well is that the hydrographic community itself is too small to sustain any sort of licensure requirements with regard to NCEES on our own. However, there are the aerial lidar communities, there's the mobile scanning communities, there's the photogrammatrist community, there's the GIS community, and the thinking was that if we were to, as a geospatial community, a much broader geospatial community, that within that you could then begin to imagine that you would have enough critical mass to support a national licensure.

Where it could potentially become an interest for NOAA or a responsibility for NOAA is the thing that had come back from NCEES was that there would need to be some federal agency would need to be the central clearing house for managing and overseeing such a national licensure program.

Sounds great, it sounds like a major issue and a thorny issue from regards to how we are currently staffed, and certainly NOAA has nowhere near the infrastructure to manage this at any level so it would, I think if that was something that ended up developing, that would need to be part of that discussion and that's way above my pay grade.

I think that those are the points that have been discussed when we did go talk to NCEES, who Gary's a board member of, by the way, and so that's just to add a little context to where the Venn diagram that includes NOAA on that, where there is overlap.

MEMBER MAUNE: Okay, thank you. And Andy was telling me about some exams already being prepared. Didn't see Gary. Gary?

RDML SMITH: So we did have, one of the obstacles I guess to a national license is currently many states already license hydrographic surveyors, so to have a national license you would have to do away with those state licenses which would be an issue. That's one obstacle. So Captain Brennan came to the NCEES back in August. Does everybody know what NCEES is?

NCEES stands for National Council of Examiners for Engineering and Surveying, and all 50 states have licensing boards for engineering and surveying and other things too, but NCEES and all those licensing boards are members of NCEES and NCEES develops model rules, model laws and exams for engineering and surveying.

So after their presentation at the council meeting, a motion was made to develop a task force to study the surveyors' exams and I'm on that task force. So one of the options that we're looking at which we'll vote on in August is to develop a math and science exam which would cover photographic survey and photogrammetry, all the different ones that were mentioned.

We'll know more after August if the council, all 74 license boards, votes to move forward with that. And if they do go with that option, then the states would have, wouldn't do away, you'd still have to go state by state, but then there would be an exam that was more fitting, I guess, to hydrographic surveyors. So there is some action going on, we'll know more after the August meeting.

MEMBER GEE: The NCEES, how does that relate, we got a letter actually we got to respond to anyway from the National Society of Professional Surveyors. Is the National Society of Professional Surveyors, are they the ones that are connected to FIG, the national board? Because if they are, they're the, one of the things that a lot of us, people who work in the industry, you know, work internationally, so they would want apart from being licensed in the States, they would want to make sure that they have international transfer.

So the response back to the professional societies is okay, well, shouldn't they be facilitating that part of it with the NCEES to make sure that that is kind of covered? Because there's already, you know, the exams and the accreditation internationally for both courses and structures that are in place. So how does that kind of pull together?

CAPT BRENNAN: I think that that completely ignores the issue. I think that the issue we have right now is not an international issue. It's a U.S. issue, and the fact of the matter is right now is that, with all deference to my land surveying friends in here, they are sweeping the hydrographic profession right now by requiring every hydrographic surveyor to basically be a registered land surveyor.

And the rub on that is that the only way you can get, in most cases with the exception of North Carolina, and that is one of the beacons for us right now as a possible wedge for us to start to gain some licensure capabilities, is that they require boundary survey experience and so you could have years, as Dave Maune points out, you could have 30 years of survey experience but if you don't have so many years of boundary experience you're completely written out of the ability to get a land surveying license in many of the states right now.

Basically, it barricades hydrographic surveyors from being able to conduct business in any way or they have to co-opt a willing land surveyor to sign off on their survey work. I think it has nothing to do with the international requirements because basically the states don't give a hoot about the international requirements. They care about their own particular state requirements.

RDML SMITH: So, I don't think we're going to solve this problem here, but I want to get the question back on the table of what the role of the HSRP is in advising NOAA because that's --- Not what NOAA should be doing with North Carolina or what North Carolina should do about the rest of the country, but what the HSRP should do with respect to licensing and their advisory roles at NOAA.

I don't want to be the one to suggest an answer to that, but I just want to try to direct the conversation in that direction.

CHAIR MILLER: My thought, we had discussed this issue but when the NSPS memo came to us it became more of an issue because I don't even know that we have to respond to it but we probably should.

But my thought was that many of us just don't know much about the subject, and yes there was a seminar, or webinar, but that was a little tiny piece of it from what I saw. We had talked at one point about having a panel on it and, you know, and maybe that's the thing to do just as a learning thing. Not just a webinar but if possible for the next meeting or the following meeting we could have a webinar or something.

What we, whether we recommend something to NOAA or we decide not to recommend something to NOAA, when you're working from ignorance where do you go? And some people here know about it but nine-tenths of us don't, I would say. Kim?

MEMBER HALL: I honestly think that it's an interesting topic, I mean we've all been interested in it, highly controversial so it's fun to learn about. I would hate to lose an opportunity to learn about one of the things that really is in our purview and I think we've found out from talking about it amongst ourselves from what the Admiral just said, that perhaps this isn't in our purview, we've got to figure out how to answer the letter in some way but to designate a panel in Juneau or following that, I think we've made a mountain out of a molehill.

We have to be really careful because there are other subjects that really are in our wheelhouse. I think it's okay that we can put that number 1A and come to find out that it really isn't something we deal with. So I understand, Joyce, what you're saying but I think there's kind of the devil's advocacy side of that going, if we dedicate too much time to this and it really isn't something that we're supposed to be designating time to, there is definitely a possibility of information fatigue for information for information's sake and I'd hate to do that.

CHAIR MILLER: However if, as was suggested, that FUGRO would lose any ability to do hydro surveys because they don't have land surveyors or any of --- Carol?

MEMBER HALL: You learned that the federal government doesn't require those, right, when you guys do your contracts, so I, what I'd like to do is ask NOAA, can you come back to us and tell us, give you some time to think about it amongst yourselves, and let us know if this happens, how it affects NOAA's ability to get the work done? Not Ed Saade's FUGRO's ability to get work done, NOAA and Ed doing work for NOAA.

I care very much for everybody being able to do their work, but I, exactly what Anne said earlier is staying inside our lane. We've got a pretty broad lane. We've got some really great things we want to work on. I think it's going to be tough if we do too much of a detour on this.

I'm happy to be told differently but again I think we need more information from NOAA with their perspective on this is how it could affect us or not. We don't need to tell NOAA that it will, necessarily. I think if it does, then we start to think about it a little bit more deeply.

MEMBER SAADE: Okay, so here's why I think it's a big deal. When we go collect data for NOAA, it's in shallow water so by definition it's within the State's three-mile limit which it means it's hypocrisy to me to say that this is not something that's important, because we're collecting data to the standards that NOAA dictates. It directly relates to the state, and then the state all of a sudden to say no, you have to collect it under these rules now. Somebody has to be in charge, and I believe NOAA has to be in charge of hydrographic surveying in the United States. Full stop.

MEMBER HALL: Or is that HSRP's ---

MEMBER SAADE: I'd be glad to have it be HSRP's rule to say that, as an advisor.

MEMBER HALL: I'm just not, I have not been convinced that, I'm convinced the very important issue, and everybody else here, I'm not convinced it's a subject for the panel and our FACA dictates and authorities to actually jump into. And I'm concerned about that.

MEMBER MAUNE: Gary?

MEMBER THOMPSON: Let me calm down a minute.

(Laughter.)

So you're telling me that we hire professional land surveying firms to do hydrographic surveyors in the river ravines of North Carolina for a flood map. You're telling me that NOAA should be in charge of that?

MEMBER THOMPSON: Yes. I think hydrographic-quality data should have a single standard and a single oversight.

MEMBER SAADE: Even if the state's is higher than yours? Than NOAA's?

MEMBER THOMPSON: That's not the point. We have a hydrographic-quality data that goes on a navigation chart that is a standard. You can do a more accurate, you can definitely do some more accurately mapping. I mean, no matter what any surveyor does there's always a higher standard of some sort if you want to spend the money and do that type of activity.

MEMBER GEE: I think it comes down to, what I'm listing here is if this is important to support NOAA's role for navigation surveys, that's one issue, but supporting other things in the state of North, South Carolina, it doesn't matter. And so I think that's where we draw the line is like, okay, I agree, how much, it really comes back to NOAA if you can think about okay, is this something we should address to support NOAA in the role of the sole last, or the primary role of where, define this committee to do. It needs to be something that's within our purview. Otherwise, we have plenty more to do, I think, and it would be time better spent.

CHAIR MILLER: We're, can we table this and continue it later tomorrow? We do need to talk about prioritization and get new ideas on the table and figure out what our order of importance is. We can have conversation over drinks, there's obviously differences of opinion and to some extent lack of information.

So we are at 5:30 and I would suggest we continue the Planning and Engagement working group in the time slots tomorrow. But let's put this off until we've talked about maybe overall priorities and then see where this shakes out. That acceptable?

MEMBER MAUNE: Yes.

CHAIR MILLER: I think that's it. Shep, do you want to offer any closing remarks?

RDML SMITH: Well, that is a lot to think about today and not the least of which the last topic. It has been a long day and I want to thank you all for staying engaged right to the bitter end, and look forward to working with the issues again tomorrow. So thank you all.

(Whereupon the above-entitled matter went off the record at 5:33 p.m.)