The Hydrographic Services Review Panel met at the Hall of States, 444 N. Capitol Street, N.W., Washington, D.C., at 9:00 a.m., Ed Saade, Chair, presiding.

HSRP MEMBERS PRESENT:

EDWARD J. SAADE, HSRP Chair
JULIE THOMAS, HSRP Vice Chair
CAPTAIN ANUJ CHOPRA
SEAN M. DUFFY, SR.
KIM HALL
DEANNE HARGRAVE
EDWARD J. KELLY
CAPTAIN ANN KINNER
DR. DAVID MAUNE
CAPTAIN ANNE MCINTYRE*
CAPTAIN (ret. USCG) ED PAGE
CAPTAIN SALVATORE RASSELLO
GARY THOMPSON

*present by telephone/webinar
NON-VOTING HSRP MEMBERS:

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

STAFF PRESENT:

REAR ADMIRAL TIM GALLAUDET, Ph.D. (ret. USN),
Assistant Secretary of Commerce for Oceans and Atmosphere, NOAA
NICOLE LEBOEUF, Acting Assistant Secretary, NOS
REAR ADMIRAL SHEP SMITH, HSRP Designated Federal Official; Director, Office of Coast Survey
GLENN BOLEDOVICH, Director, NOS PCAD
CAPTAIN JIM CROCKER, Chief, Navigation Services Division, Office of Coast Survey
VIRGINIA DENTLER, Center for Operational Oceanographic Products and Services
LYNNE MERSFELDER-LEWIS, HSRP Coordinator
ALSO PRESENT:

DR. QASSIM ABDULLAH, Chief Scientist, Geospatial Services, Woolpert, Inc.
CHRIS EDMONSTON, President, BoatUS Foundation for Boating Safety and Clean Water
WILL FEDIW, Industry and Government Affairs, Virginia Maritime Association
SARA ROTHI-GONZALEZ, Senior Counsel, Senate Commerce Committee
SUSAN MONTEVERDE, Vice President for Government Relations, American Association of Port Authorities
REAR ADMIRAL JOHN P. NADEAU, Assistant Commandant for Prevention Policy, U.S. Coast Guard
THOMAS P. SMITH, P.E., SES, Chief, Operations and Regulatory Division, LRD/NAD Regional Integration Team Leader, Directorate of Civil Works, U.S. Army Corps of Engineers
CAPTAIN JORGE VISO, President, American Pilots' Association
CONTENTS

Ed Saade ........................................ 5
Nicole LeBoeuf .................................. 24
Rear Admiral Tim Gallaudet .................. 39
Thomas P. Smith .................................. 51
Rear Admiral John P. Nadeau .................. 65
Rear Admiral Shepard Smith ................... 75
Sean M. McDuffy, Sr. ............................ 103
Glenn Boledovich ................................. 109
Sara Rothi-Gonzalez ............................ 117

Panel: NOS Stakeholder Perspectives, Priorities and Partnerships for the future: the mission of the Navigation Services - data, products and services

Critical Information in a Timely Manner
Captain Jorge Viso .............................. 139

The Role of NOAA's Services in Our Success: The Geospatial Community Perspectives and How They Make Boating Safer
Dr. Qassim Abdullah ............................. 154

Recreational Boating Perspectives on NOAA's Navigation Data, Products, and Services
Chris Edmonston ................................. 166

Industry Perspectives on NOAA's Navigation Data, Products, and Services
Will Fediw ................................. 176

NOAA Navigation Services and Parts
Susan Monteverde ................................ 189

Public Comment ................................ 247

HSRP Planning and Engagement Working Group .................................. 261
Recap and Wrap-Up .............................. 322
Adjourn ........................................ 341
CHAIR SAADE: All right, we're going to gavel this open. Thanks. Welcome, everyone, to the Hydrographic Services Review Panel meeting here in Washington, D.C. I've got to look at my notes. Great to see everyone. Great to see everyone in the audience here, if we have to turn around.

Good morning. I'm Ed Saade. I'm the chair of NOAA Hydrographic Services Review Panel. The HSRP co-chair is Julie Thomas here, and we're both new in this -- in our respective positions, happy to be here. It's great to be in D.C., where we'll highlight the importance of the Blue economy in NOAA's headquarter hometown.

We're joined by many stakeholders, partners and NOAA staff this week. I encourage your attendance on Wednesday and Thursday for speakers of, on geospatial data, marine weather services and the NOS Navigation Services portfolio, and that's going to include lots of
commentary on new technologies and things.

In addition to the stakeholders session this afternoon, on Thursday there is a session on sea level rise and coastal inundation, and that was an amazing lineup. Please join us for that as well. We're joined by NOAA senior leadership. Warm welcome to the NOS Acting Assistant Administrator Nicole LeBoeuf, and also the NOAA Deputy Assistant Secretary for Oceans and Atmosphere, Rear Admiral Tim Gallaudet.

We had excellent discussions in Juneau as you all remember, which was at our last HSRP meeting. We had a great turnout from the local community and interested parties. We hope to achieve the same thing here in Washington.

Wow, that was a nice effect. There's going to be a lot of that this week.

(Laughter.)

CHAIR SAADE: We're joined by senior leadership from U.S. Army Corps of Engineers, Thomas Smith, and Rear Admiral Nadeau from the U.S. Coast Guard. Thanks to the congressional
staff for breaking away from their busy March schedules and the budget rollout. In this case, this will be in particular Sara Rothi-Gonzalez will be attending.

I've got to kind of turn my head for those of you in the public. We really encourage you all to make comments. We really hope that you get involved. We take all of your comments and questions to heart, and they really do have an impact on some of the directions that the Panel goes, so please participate.

I'd like to thank the NOAA Corp and other key NOS and NOAA staff who worked during the government shutdown to keep the Navigation Services operating. We truly, really appreciate all that you did, and the complications to your personal lives and challenges. We understand how important it is and thank you sincerely.

This is a request to the NOS and the NOAA leadership to comment on the short and long-term impacts to the Navigation Services portfolio, especially to the fleet and other key
impacts of the shutdown and lessons learned, and then also pending contracts, task orders if you believe there's anything relevant to share with the audience.

We have NOAA NOS staff assisting us. I'm going to read through all the attendees here. Can you please stand up? First of all Lynne Mersfelder-Lewis. Virginia Dentler.

Okay. Melanie Colatuno, Captain Kretovic, Nathan Littlejohn. Amanda Phelps, Michelle Burt and Galen Scott. And many others, and I'm sure their names will pop up and we'll do our best to make sure we recognize everybody. They will assist you with public comments, security, logistics and other items.

On the public comments time, please do not start speaking until someone brings the microphone to you, not only for the benefit of the people in the room, but also for the benefit of the people that are online following this panel meeting.

I encourage you to sign up for the
daily opportunities for public comment, whether
in person or to submit your comments in writing.
That can be read into the record and of course
raise your hand if you're online. Please see
Lynne or Virginia.

Okay. That's it for the
introductions. So it's now my pleasure to
introduce Rear Admiral Smith, the Director of
Office of Coastal Survey, and the HSRP Designated
Federal Officer. His bio is in your materials.
Shepard.

RDML S. SMITH: Thank you, Ed. Good
morning. I'm the HSRP DFO. This is an
especially warm welcome to our three new HSRP
members.

We have Captain Anuj Chopra and Deanne
Hargrave and Captain Ann Kinner, who all join us
for their first meeting today. We did have an
opportunity yesterday to introduce them a little
more broadly to NOAA and the NOAA programs, and
some of the NOAA people at an orientation session
in Silver Spring, which went very well.
We are thrilled to have Rear Admiral Tim Gallaudet with us today, the Assistant Secretary of Commerce for Oceans and Atmosphere, who will swear in the new members. Can you please take out your oath of office and read along? Do we have this choreographed? Who knows the choreography? Okay.

RADM GALLAUDET: Oh, is there someone online?

So this is a really special day because these three individuals have taken up the calling for federal service.

They're becoming public servants here, and it is something we do at NOAA and our NOAA Corps officers, and we know it by heart and it's in our -- it's in our every fiber of our being, and it's from my Navy experience as well.

So it's a very special thing, and I'm honored to be able to swear you in today and have you embark on this great journey supporting the Hydrographic Services Review Panel, but also being public stewards. So will you please face
me and raise your right hand?

[MEMBERS SWORN IN.]

RADM GALLAUDET: Congratulations. Well done. Excellent, all right.

(Applause.)

RADM GALLAUDET: All right. Let's get this show on the road.

CHAIR SAADE: Thank you, Admiral Gallaudet. Before we get started, I wanted a few housekeeping items. First of all, this is a public meeting. There is a webinar and we are being recorded. So think of yourself in a large stadium with a panel of reporters when thinking about how you approach topics.

There will be a public comment period, so we do encourage public participation. But we do have a window where that is -- where we focus those comments.

So for those of you observing the meeting, please think about your questions and unfortunately we don't have them -- we have them at a few points during the agenda, and do not
have them frequently.

So be ready for those questions. If you've not already signed up to make a comment or signed into the meeting, the sign-in sheets for both are coming around. The emergency exits are the way we -- in the direction that we came in.

Where are the bathrooms? I don't know where the restrooms are, but I'm supposed to tell you so -- okay. Down that way and to the right. We have a great session this morning and this week to focus on NOAA's Navigation Services, sea level rise, coastal resilience, tech transfer and Arctic priorities.

The next two days will allow ample formal and informal opportunities to discuss in depth and focus on HSRP's prioritization of topics, development of a revised HSRP Arctic issue and other topics.

I would like to acknowledge the following individuals who made time to attend the meeting and/or travel to D.C.: Rear Admiral John Nadeau from the United States Coast Guard, Thomas
Smith from the Army Corps of Engineers. Is Claire Trokey from Representative Scalise's office here? Okay. The stakeholder session will be led by HSRP Member Ed Kelly, here, and Captain Jim Crocker, George Viso from the American Pilots Association, Susan Monteverde, Qassim Abdullah, Will Fediw and Chris Edmonston. The Sea Level Rise Coastal Resilience session on Thursday, led by a HSRP Member.

We'll have a substitute and Audra Luscher from NOAA, including Mark Osler, Rear Admiral Ann Phillips, Billy Sweet, Brian Batten and John Eggleston. Have I missed any congressional staff who have joined us today?

There are NOS and NOAA directors, staff and subject matter experts in the room who can reach out -- who you can reach out to during the meeting and during the year to delve deeper into the Navigation Services mission. I'd like to introduce some of them. Rich Edwing, here's Rich, the director of CO-OPS, Juliana Blackwell.

(Off mic comment.)
CHAIR SAADE: Yes, I was locating you first, from NGS. Dr. Larry Mayer and Captain Andy Armstrong from the University of New Hampshire, are non-voting members of the HSRP. Captain Liz Kretovic and Liz Mersfelder-Lewis serve as alternate designated federal officers, and Lynne is the HSRP's program manager. Both can help you find experts and answers.

There's excellent turnout, and there are many NOS staff and subject matter experts in the audience. I'd like to introduce a few of them, so that -- so that we know who's in the room. From NGS, Galen Scott, Mike Aslasken, Brad Pierce. Some of those are here. Oh, there's Mike. From CO-OPS, Laura Rear McLaughlin, Audra Luscher, Billy Sweet, Michelle Burt, Brent Ache, and Marian Westley.

In Coast Survey, Captain Brennan will be joining us later. Captain Crocker, Jim Crocker is here, Neeraj Saraf, Lucy Hicks. Katie Ries will be joining us later, and Ashley
Chappell is here.

From NOS Policy, we have Glen Boledovich and Rich Schwabacher. From NOS headquarters, Emily Menashes will be joining us later and Robert -- Robin Czerwinski.

On site, you'll have help from Lynne Mersfelder-Lewis, Virginia Dentler and Melanie Colatuno and others. All right, back to you, chair.

CHAIR SAADE: As the speaker and HSRP member bios are in your materials and are posted publicly, we'll only do some very short intros right now. So I'd like to thank the NOAA Corps and other key NOS and NOAA staff who worked during the government -- oops. I already said that one. God, you can tell I'm a rookie at this.

I'd like the HSRP members to introduce themselves with your name, organization, expertise, area, geographic area of expertise, whatever, whatever you feel is relevant. But keep in mind to help out with the -- all the
public participation and give them an idea of the breadth and the diversity that we have on this panel.

As we don't have time to do the audience introductions during this -- breaks -- at each break it would be great if those in the audience we can ask you to introduce yourselves to someone you don't know, or introduce yourself to any one of us on the panel, and we truly want your feedback again.

So let's go ahead and try for that.

So why don't we start with you, Julie, and we'll go around the table this way.

CO-CHAIR THOMAS: Julie Thomas. I sit -- sit in San Diego, Scripps Institution of Oceanography, and I've been principal investigator and program manager for a program that has 71 real-time wave monitoring buoys. We ship them right out to NOAA, to NDBC, where they're assigned a NOAA ID, and they become part of the NOAA network for National Weather Service.

Also, I was director of Southern
California Ocean -- Coastal Ocean Observing System SCCOOS, which was -- which is one of the NOAA IOOS 11 regions, and I was director there for nine years. So I've had the pleasure of working both closely with the Army Corps, which funded CDIP, our wave program, and also NOAA over several years. Thank you.

MS. BLACKWELL: Good morning. I'm Juliana Blackwell. I'm the Director of NOAA's National Geodetic Survey, headquartered in NOAA's headquarters in Silver Spring, Maryland. Thank you.

MEMBER DUFFY: So I'm Sean Duffy of the Big River Coalition from New Orleans here on Mardi Gras day. That has to show commitment to the effort. Happy Mardi Gras. I didn't bring any beads or king cake. I represent the navigation interests on the Mississippi River, focusing on ship traffic, and we also do a shallow draft above. Thank you.

MEMBER CHOPRA: Good morning. My name is Anuj Chopra. I lead the RightShip team for
Americas based out of Houston. I'm a mariner by profession, started -- sail for 15 years. I ran a fleet, large fleet for 20 years and then last six years on the commercial risk side. My focus is really on safety and sustainability of the maritime supply chain, and try to bring that experience to the panel. Thank you.

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 represent commercial navigation interests. Our membership of over 560 corporate and individual members includes marine terminals, deep sea international lines, tug and barge operators, admiralty attorneys, all sorts of terminal operations.

So we have a very broad spectrum of commercial and port activity. Our area is maritime transportation. Previously to doing this with the Maritime Association, I was president and CEO of two different Asian international lines running their operations in
North and South America.

I'm a graduate at King's Point, and I have sailed as a deck officer on several, well actually quite a few American-flagged vessels.

MEMBER MAUNE: Good morning. My name is Dave Maune. I work for Dewberry Engineers in Fairfax, Virginia. I'm a retired Army colonel from the U.S. Army Corps of Engineers, sir, and for the last 26 years I have been working for Dewberry, where we specialize in elevation mapping.

I'm really, if you will hold up that book, that's the book that I'm the editor and principal author of, published in November on digital elevation models. It's about photogrammetry, LIDAR, IfSAR, and sonar. So that's my specialty, elevation modeling.

MEMBER PAGE: I'm Ed Page. I'm executive director for the Marine Exchange of Alaska. Also serve as a vice chair of the Alaska Ocean Observing System. My Coast Guard -- my maritime career goes back to 1968, when I first
entered the Coast Guard, so it's about 50 years
and 30 years of which has been in Alaska.

So I think I'm going to stay up there
since every once in a while they let me back into
the America, it's very nice down here. But the
Marine Exchange runs a vessel tracking system
comprised of about 130 AIS stations, another 30
transmitting AIS stations, and 49 weather
stations, and a variety of current sensors
throughout the state.

So what we do is very much into --
compared -- or complements what NOAA's doing. We
work very close with the Weather Service,
transport them around on our landing craft and
what have you, and we're all about providing
information to mariners to help ensure safe,
secure, efficient and environmentally sound
maritime operations. So I'm pleased to be on the
panel, and that's my story, and I'm sticking to
it.

MEMBER RASSELO: Dr. Sal Rassello.

I'm Nautical Director of Carnival Cruise Line in
Miami. I do port assessment of new ports for larger vessel, precise navigation, electronic navigation for new ports. Also for old ports with bigger ships.

MR. EDWING: Morning. I'm Richard Edwing, Director of the Center for Operational Oceanographic Products and Services headquartered here in Silver Spring. We acquire Oceanographic Information and turn it into meaningful information for the nation. Thank you.

MEMBER HARGRAVE: Good morning, I'm Deanne Hargrave. Thank you for the warm welcome. I'm a senior operationssurveyor for Shell International Exploration and Production, and we acquire seabed data for managing safe operations in the oil and gas industry for drilling and other operations. Thank you.

MEMBER THOMPSON: Good morning. My name is Gary Thompson. I'm the Director of the North Carolina Geodetic Survey, and also I'm the interim Risk Management Director for North Carolina Emergency Management. My area is
geodetic survey.

MEMBER KINNER: Good morning. I'm Ann Kinner. I own Seabreeze Books and Charts in San Diego, and I've been dealing with the recreational community for probably 35 years. I also am now the chair of the San Diego Harbor Safety Committee, and we provide charts to all, basically all levels of the maritime community from hydrographic services all around the world. Anything that's available, we can get it.

CAPT ARMSTRONG: Good morning. I'm Andy Armstrong, and I'm the NOAA co-director of the NOAA-University of New Hampshire Joint Hydrographic Center in Durham, New Hampshire.

DR. MAYER: And I'm Larry Mayer. I'm the other co-director of the Joint Hydrographic Center at the University of New Hampshire. Andy and I are both non-voting members on the panel, and I'm also the Director of the School of Marine Science and Ocean Engineering at the University of New Hampshire and, probably more relevant, the director of the Center for Coastal and Ocean
Mapping at the University of New Hampshire, and
I've kind of dabbled in ocean mapping and
visualization technologies for a few years.

RDML S. SMITH: Sure. I'm Rear Admiral Shep Smith. I'm the Director of the
Office of Coast Survey at NOAA. I've been a NOAA Corps officer for 26 years, mostly in the
hydrographic program. I've been at sea,
commanded the NOAA ship Thomas Jefferson,
involved a lot in technology development.

I was the very first masters student
at the brand new University of New Hampshire when
it opened up in 2000, and I also serve on the
Mississippi River Commission, where I see a lot
of Sean, and as the chair of the IHO Executive
Council for the International Hydrographic
Organization.

CHAIR SAADE: Thanks, everyone. I'm
Ed Saade. I'm the chair of the Hydrographic Services Review Panel. I'm the president of
Fugro USA, and I'm the regional director for
everything that Fugro does in the Americas
region.

We're a large international surveying and mapping firm. We are acutely aware and interested in everything that comes out of this panel because, as much as anything else, it directly affects the types of work we do, but also the tremendous amount of technology that comes out of the various developments, both sponsored by NOAA directly and what goes on at the University of New Hampshire and the other labs that produce these types of technologies. To me, it's a phenomenal achievement, and we're going to talk some more about it this week.

So with all that out of the way, we'll go ahead and start moving towards our distinguished speakers to kick off this meeting. So a warm welcome to NOS Acting Assistant Administrator Nicole LaBoeuf, who has remarks to share. Her full bio is in your materials, but, Nicole, if you're ready, please go ahead.

MS. LeBOEUF: Thank you. Good morning everyone. My sincere apologies for being late.
I was in a Lyft car for almost two hours. I am all caught up on Latino pop music. I'm very happy about that and very happy to be here. This is not my normal accoutrement. Hopefully, some of you are aware, raise your hand if you know what today is. All right. Happy Mardi Gras, everyone.

Thank you, Ed. It's good to see you again. It's good to see a lot of familiar faces, and welcome to Washington, D.C. for HSRP 2019. A special welcome to our three new members. Captain Anuj Chopra, welcome. Captain -- or Deanne Hargrove, welcome, and, Captain Ann Kinner, welcome very much. I'm looking forward to integrating your expertise into the panel, so looking forward to a good week.

I want to thank Lynne Mersfelder, who's going to hear me now. Right, hi. Welcome, Lynne. Thank you everything you've done to get this meeting off the ground and running, and I know it will be successful despite the 35-day delay that we had. Unexpected. So it took a
toll on folks who were planning things just after we returned. So, Lynne and team, thank you so much.

So yeah. So Mardi Gras is a special tradition for my family. I was born and raised in South Texas, but with a name like LeBoeuf, you can't get away from being a Cajun. So I was up late last night and early this morning making gumbo and prepping the boudin and getting everything ready for tonight. So I'm going to be here with you today, but in spirit I might be thinking about when my guests arrive.

So this is not my first HSRP now, this is my second HSRP, which is exciting. My first one was in Juneau, Alaska, a city that I know quite well. I lived there for a little while a few years ago. Had a great time getting to know all of you, and as an introduction to HSRP, it was a little unusual, I think, because there were some firsts or at least some sort of landmark activities.

One was a joint session with the IOOS
Advisory Committee, which I thought was quite
good and productive. Another was, you know, back
to back with AMEC, and in doing so we were able
to get some really nice advances in incorporating
coastal issues into their scope, and I think that
was really worthwhile.

We also were able to advance the use
of AIS data in our PORTS, and so I think we made
some really good progress in Juneau. We also saw
some whales. We also heard some singing and
guitar playing, and at least maybe one or two
bottles of juniper gin made it home with me. So
thank you to Juneau for hosting us and for Ed
Page for his remarkable hospitality, fantastic.

So we have a high bar to hit this
week, but all of those successes, I think, are
just ones that we build upon. A lot of
leveraging, a lot of fostering partnerships is
going to be essential to get at our shared
objectives and yeah, looking forward to just
continuing to learn about the panel and the
importance of its work.
As you all know, the advice you provide or the programs to which you provide advice provide foundational data and products that support just the very, very basic aspects, not basic as in simple, but basic as in fundamental aspects of our nation's economy and national security.

Not everybody knows that, but I know you all know that. Those programs are the core of the National Ocean Service, and we're very, very proud of them, and we are very, very interested in your discussions, your issue papers, the recommendations in those issue papers. They provide us with direction. They help set our priorities. You're going to hear about the programs this week, and you're going to have an opportunity to provide us with those recommendations. But we're always, always very interested in what you have to say.

And we are increasingly aware that not only are we in, I'll say, dire, significant, maybe heightened need to reinforce our nation's
infrastructure, not just along the coast but throughout, and so we are not just planning for today, but we're planning for a future that is increasingly uncertain and the programs that you advise are at the core of that.

You know, just to give an example of the National Geodetic Survey, their products and services touch such a wide range of infrastructure-related projects and initiatives around our country, way beyond maritime navigation, though that's part of it, but air and land, transportation, construction, flood risk determinations, water management.

I mean it's kind of everything when you start to think about it, and I want to thank you for all the advice you've given specifically to NGS, but also to others. I know Juliana and Brad are very thankful for that as well. You're going to get some updates from our offices, so that you know the latest and greatest of what they're working on so that you can best advise them.
So you're going to hear this week from Coast Survey, National Geodetic Survey as well, and CO-OPS. I know that Admiral Smith from the Office of Coast Survey is going to talk to you about the National Charting Plan, and the impacts on the raster charts and improving the electronic navigational charts.

You're going to hear from Juliana some of her major program areas that are underway, including an update on the reference frames, GRAV-D and Foundation CORS. Rich is going to talk to you about his implementation of a strategic plan that you all greatly helped inform, so thank you for that. You should probably recognize yourself a little bit in what he has to say.

And I'm looking forward to hearing from Larry and Andy, our partners in crime at UNH. We really appreciate all you guys do, whether it's dabbling or more than that. We really appreciate that. It's a fantastic team.

So what we need from you guys is a
couple of key areas that I'll hone in on, of
course provide advice as you see fit, you're the
experts. But a couple of key or three key areas
I'd like to highlight. One is with regard to
modernization. So, you know, more than ever we
are seeing technology and innovation and
everything from cloud computing to machine
learning just rapidly, rapidly advancing.

The federal government is not often
considered right on the cutting edge, right,
sometimes for the behemoth that gets drug behind.
But really do want to be on the cutting edge of
these technologies and keeping up with the pace,
and it's difficult. More than that, we want to
build a reputation for and actually be a federal
agency that is on the cutting edge with you guys,
and we'll need your insights there.

And we want to be as nimble as we can
be. We want to be aware of new technologies and
capabilities coming online, so that we can
respond to everything that's ahead of us. But
we're going to need you to help us to do that.
It is hard to steer the government ship, so we want to hear from you all.

We're looking for advice on our role in emergency response. Across the board, NOS is really leaning into and being asked to provide assistance in emergency response, which is something that we're hearing from FEMA, the states, Army Corps, and others. We already provide some essential services, CO-OPS Quick Looks, for example, NGS's aerial survey and basic positioning data, and also from OCS we have our navigational response teams and nowCoast. But I think we're just seeing the tip of the iceberg of what NOS can do, and folks are noticing, you know.

We played a crucial role, the National Geodetic Survey in particular, after an Alaskan earthquake, and we are providing data that we know we have, but folks are finding new applications for it in emergency response. Congress is noticing, and that's usually a good thing, right, when Congress notices. We'll keep
It on the positive, right, when Congress notices.

They provided $40 million in supplemental funding for our mapping, charting and geodesy program line for response and recovery activities. We also have a request in for additional supplemental funds for the next year for the Florence and Michael hurricanes, where we're asking for another $30 million in response costs that will help us not just recoup, but will help us prepare for the next emergencies.

So that's good. Congress is watching, and other agencies are noticing, and so we need to continue to raise awareness and just have a consistent push and press to get out the word that we can provide these services and these data, and I'm hopeful you guys can help us with that.

The work that the offices do, that you advise, and the work of HSRP is largely about technology and innovation, and we want it to be that way. But I think increasingly our work will
have to be about planning for life in the future
on a changing planet.

And something that's been on my mind
a lot in the last few weeks and months is
something that you guys have willingly said you'd
like to talk about this week, and that's sea
level rise. So I commend you for having a panel
on sea level rise. I will be listening keenly to
the discussion and any ideas that you all come up
with on that.

Some might say well, you know, sea
level rise, that's out of HSRP's scope, right.
You should be sticking to the core stuff that you
work on. I'm not sure sea level rise is going to
be outside of anyone's scope, and that's
daunting. That doesn't mean you don't find your
lane and fill it out, and let others fill their
lanes out.

But I'm increasingly of the mind that
sea level rise will be everyone's job, and we
already provide information that is valuable for
sea level rise planning. CO-OPS provides data
and services critical with regard to rising sea levels and coastal hazards. Our Office for Coastal Management, who you guys don't often advise, communicates with coastal managers and the public about risks from coastal inundation.

But I think we're going to need to do more. I believe that NOS is ideally poised to assert leadership in this regard, not just technically and scientifically but in terms of risk communications, in terms of building decision support tools that help people make decisions and not just frighten them, although fear is a motivator, right?

It can't be everything, and we are a data-driven organization. I think we're going to find ourselves increasingly demanded upon for those kinds of planning tools. We're the folks that are advising on infrastructure, surveying, mapping, charting, monitoring the coast, water levels, ecological changes. That's kind of everything NOS does.

And it's a bit of a light bulb is
starting to go off, I'm afraid, and I think we need to continue to develop and push out the very best data and the very best services and the very best communications to the public to help them understand what's ahead. I think there are -- there's information and data we can provide for very difficult and very expensive decision-making. Folks will not take data that is not validated. They will not take data that is not verifiable. People look to us for those data already.

I think we're starting to get to a point where those data are going to have to really be placed in the right hands to inform the right kinds of decisions, and I would value greatly your input on how best to utilize, leverage, and potentially augment NOS expertise and capacity to deal with sea level rise, particularly with regard to the offices that will be represented today.

A little bit about budget. For FY '19, HSRP-related programs in general look pretty
good. I've worked in budget throughout my career here and there, and I know that increases are great and decreases are bad, and that level budgets are very challenging.

Most of our programs at NOS are level budgeted, which is good. It does create challenges. We do have some notable increases though in that, for example, some hydrographic surveys. I think that's fantastic. The CO-OPS and National Water Level Observation Network got some additional funds to repair some stations. That's good.

We also at NOAA received another $75 million to help recapitalize our aging white boat fleet, and that is good. We also received additional funds to help with the backlog of deferred maintenance. I will say I think we need more. I think both admirals in the room would agree with me there. But it's a start, and now it's up to us to prove to Congress that we can spend that money wisely, and see if we can get some more of it.
But I do feel that austere budget times are going to continue to face us, and so it's up to all of us to continually message what we do and how valuable that is. So to your agenda, it's ambitious, it's busy. We look forward to everything we can do to help support you in your discussions.

Please consider the issue papers that you're going to draft, and let's talk about what those might need to be. We really appreciate the issue paper you provided recently on precision navigation. It was very, very helpful.

So along those lines, I'd like you to consider pushing the envelope, whether it's emergency response or sea level rise that you choose to focus on. I think we need to get out ahead on those issues. If we succeed, right, we can reduce harm to the economy and to lives and livelihoods. I don't think we have the option to fail, so with that, I appreciate you all being here. Happy Mardi Gras, welcome to D.C., and have a great meeting.
(Applause.)

CHAIR SAADE: Thank you, Nicole.

Well-received on the challenge, so I think that's really great to spell those out. So a warm welcome back to Rear Admiral Gallaudet. He has remarks to share. His full bio's in your materials. You'll find his full bio is in your materials for review.

He's the Assistant Secretary of Commerce for Oceans and Atmosphere for the Department of Commerce in the National Oceanic and Atmospheric Administration. He was previously a rear admiral in the U.S. Navy with experience in weather and ocean forecasting, hydrographic surveying, developing policy and plans to counter illegal, unreported and unreported fishing, as well as assessing the national security impacts of climate change.

So, Rear Admiral Gallaudet, if you'll go ahead please. Thank you.

RADM GALLAUDET: Thank you very much, Ed and Julie. Thanks for having me here. It's
good to be back with this great panel, and I also
want to recognize again our three newest members,
Captain Ann Kinner, Captain Anuj, and Deanne.
It's great to have you on board the team.

So just first off, I want you all to
know how much I value the recommendations of this
great body, and it's as you've heard me brief in
several other venues, you know, the Blue economy
is one of our top priorities, and you do so much
to advance that priority.

I thought our meeting in Juneau last
week was or last time was just terrific. I had a
lot of fun. Thanks again for hosting us, and we
got some good work done, so that was -- that was
great. I also want to welcome our colleagues on
this plenary panel here, Admiral Nadeau and Tom
Smith from the Army Corps and Coast Guard
respectively.

It's great to have you on board. We
sit on the Committee for Maritime Transportation
or Marine Transportation System, and that's a
really important body that does great work for
our nation. So it's great to have our partners here.

So first off, you know, in navigation, there's a thing called a position report. You know, a ship will kind of get a fix and make a report usually to our headquarters. I thought I would give you a position report on my position because you might have heard recently that Neil, Dr. Jacobs, and I have basically switched.

He is now performing the functions of the undersecretary and Administrator, and I've gone back to my -- the job I was confirmed for, which is Deputy Administrator and Assistant Secretary for Commerce for Oceans and Atmosphere, Interestingly, you know, whenever big positions in government change, there's usually a lot of press, and it's not always good.

There wasn't much press about this because of the simple fact that there really was no drama. What Secretary Ross did is he saw that we had gone really far in advancing our weather priorities. We had just reauthorized the Weather
Research and Forecasting Innovation Act, and it has some new things in it that are really important that we've been pushing, and that's really going to fast forward a lot of great work like our model development and our observation portfolio.

But meanwhile, I haven't been able to focus on the wet side of NOAA's -- you know, which is my job, because I've had the Administrator function. So we all looked at the sort of situation and we thought you know what? Neil is kind of freer now to assume some of those higher headquarters roles and interface with the Department, and I'm now really locked onto our wet side issues, which I am incredibly excited about.

And so this, the work of this body, advancing our navigation services is front and center to that, along with other things. So we're really going to work to address and get -- make more progress, whether it be through actual activity or even legislation on issues like ocean
exploration, the National Oceanographic Partnership Program, of course navigation services and hydrography, and coral reefs, for example, and conservation of those and others that I could mention.

Our fisheries, I think, are also at the top of the list and growing aquaculture. Those are some of the things that I'm very eager to move forward and thus the change. So the story is our priorities haven't shifted a bit, and actually just for me personally I'm going to be able to focus more on what I was confirmed to do.

And so this body is now going to take even more time and attention, and so you'd better watch out. So let me talk a little bit about also with the maritime sector right now. It is every day where I see some new press report about the increasing activity and importance of our maritime sector and the maritime regions.

If you just look at some of the examples, you know, Carnival, four more ships
that were ordered this year. I mean every major
cruise line has added -- is adding ships and
bigger ships. You look at our U.S. seaports.
They're all growing.

I've been to San Diego, I've been to
Charleston, which is adding a new terminal, I've
been to Miami which just completed a cruise
terminal, et cetera, et cetera. You look at the
port of Portsmouth. Portsmouth has doubled its
capacity over the last few years, and the story
keeps on going.

So it's a very exciting time because
our work here as a body has never been more
important. So you have that. Then there's the
national security aspects of it, which you
mentioned, Nicole, which is also becoming
increasingly important, and then there's the
things that I've talked about earlier, like
trying to reduce our seafood trade deficit.

So mapping our EEZ and habitats within
them to properly manage our fisheries is now
taking another, really a sense of focus for our
agency. And so, you know, the Ocean Policy Committee of the White House is finally getting on step, and now one additionally, it's getting attention by the new White House Science Advisor.

It's a guy named Dr. Kelvin Droegemeier. Anybody here meet him? Raise your hand if you have. Oh, very good. Great guy. He's a meteorologist, so that's one. Secondly though, he's just got tons of energy and genuine I mean concern for our country.

So his goal is to really lead a new era, have the U.S. lead a new era. He calls it a second bold era in American research and development, and he's referring to what happened after World War II, where the government led the initiatives which sort of built the space program. They did all these great things in technology advancement, and he sees us being in the same exact position, and Nicole addressed this in her initial comments.

But the difference is that the private sector is now taking on the larger role. So
that's something we're going to capitalize on. And then -- and so there's that. That's exciting. So with that, we have a kind of back story of a lot of great work over the last time since we last met in Juneau.

Just let me tick off a couple things. Andy Armstrong being named to the Hydrographic Society of America's Hall of Fame. So you're going to take a -- yeah.

(Applause.)

RADM GALLAUDET: We have Juliana, since her great National Geodetics Survey, has taken on these GRAV-D, you know, Gravity for the Redefinition of the American Vertical Datum surveys in Alaska. You've done the mainland Alaska, you're going to do the Aleutians, and we addressed that at the AMEC, and so here we are. We're already underway and making way on the task we identified during that meeting.

Really important, because all our charts tie to that, and I mean everything. Anybody who relies on positioning, which is
everybody, depends on the great service of NGS.
So we've done that. We've done some great things
in terms of technology advancement for surveying.
We have experimented -- not experimented. We've
operationally employed unmanned systems. We've
used them, unmanned surface vehicles for
hydrographic surveying.

We've also been experimenting with
UAVs to do shoreline mapping. We did this off
the Thomas Jefferson this year, and then of
course we've been doing the straight stick bread
and butter survey work that's so important.
We've been doing this in Alaska. We did great
response work off Puerto Rico.

Look at it, Shep is smiling ear to ear
because I'm just telling him what a great job
he's done. Then we've done the great Navigation
Response Team work right after Hurricanes
Florence and Michael, all opening up our
waterways, which had significant obstructions in
them.

So as you can tell, I couldn't be more
proud or excited of the great work we've done in
our Hydrographic Program and the Ocean Service in
general. I got to visit one of Rich Edwing's not
newest sites but upgraded sites for water level
monitoring in Annapolis, Maryland, and that was a
real treat I got in there.

I didn't get to dive with your folks,
who dove the day before. I just missed it. That
will be next time, but I did get to see -- help
them install some of the infrastructure pieces of
that. So I really like that.

And so I'll leave it -- actually, one
more thing to mention. I'm working with Admiral
Nadeau here to make NOAA data more available via
AIS. We have an IOC, I think, targeted for about
2020. But it's a big push of mine. Information
technology is allowing for that. It's going to
provide for more safety, and as we saw with the
El Faro mishap and loss, that we can avoid things
like that and increase safety for our mariners by
getting our data out there on these coms networks
that are available.
So that's all awesome. What is next ahead for us is that we are going to -- I will chair the Committee on Marine Transportation System starting this summer. I'm very excited for that. I'd ask this body to think about what I can do in that capacity for our country and for the specific area that we oversee in hydrography and hydrographic services. It's a great opportunity there. We are excited to show leadership in that area. It's so important to our blue economy, and I know you all are going to help us do that well.

We're going to keep on doing unmanned systems development and operations, and an area of increasing focus for the White House is the Pacific. So we are going to work on really not pivoting but expanding and strengthening our work in the Pacific.

Admiral Smith just came back from the Southwest Pacific Regional Hydrographic Commission. Commission, yes? Yeah, and there's work for us out there. I'm meeting with Admiral
Bob Sharp. He's the NGA director this Thursday, and we're going to talk about what we can do to improve our charting out there.

It's an important area for the country strategically, and we're going to meet our end of that by improving our hydrography and navigation services out there. So with that, I want to thank you for your time and attention, and I'll look forward to us making big progress this week.

Thanks.

(Applause.)

CHAIR SAADE: Thank you, Admiral.

That's great, and we really appreciate specifically your ability to focus on what we do, and that I think that's going to be a beneficial and a good challenge for the panel. I think I can speak for the panel that we really want to embrace the opportunity to take on those challenges and respond in really meaningful and useful ways. So thanks. We appreciate it.

RADM GALLAUDET: You bet, thanks.

CHAIR SAADE: I have a couple of
quick housekeeping items that I'm supposed to cover. So when you all speak, try and get a little bit closer to the microphone. Yours was perfect, Admiral, so --

RADM GALLAUDET: Of course.

CHAIR SAADE: Yeah, of course.

(Laughter.)

CHAIR SAADE: I'd also like to recognize that there's a few of the panel members that couldn't make it to this particular meeting for a variety of reasons. A couple of them are listening in, and that would include Kim Hall, Lindsay Gee, Anne McIntyre, and Larry Atkinson. So we'll miss them, but they are doing their best to stay engaged with us.

Okay. Next on the agenda, we're going to hear from Thomas Smith from the U.S. Army Corps of Engineers. NOAA and USACE work is ongoing and a top interest for the HSRP, and we actually have some position papers on that. So if you would, Mr. Smith, please take us on.

MR. T. SMITH: Thanks. Good morning,
Ed. I am Tom Smith from the Army Corps of Engineers, and I do have a slide deck. I don't know if it's necessary to show, but it might help a little bit if you can -- I'll give you a moment to pull up the slides that we had sent over.

Anyway, while they're doing that I would say that it is busy week in Washington. General Spellmon, who's currently the chair of the CMTS, is making remarks at another forum. But I appreciate the opportunity to talk to this panel. I have not had the opportunity to work with the Hydrographic Services Review Panel before.

So as I was, you know, came over with some information, I think, to share about the Army Corps of Engineers, I'm looking at the cross-section of people there and realize that some of you have a great depth of knowledge about what we do. So maybe some of this is a little bit of an overview for a couple of folks, and then maybe a couple of technical points that are probably more relevant to the panel. So if you
can go to the next slide.

I do tend to -- the function. Oh, it
is on me to do this. Okay, so is that the main
button there? The green arrow, okay. All right,
I got it. I'm good.

So, you know, we typically or I
typically use this slide, but it's speaking to
the choir here that we're a maritime nation,
despite our great physical expanse, that we move
$2 trillion of commerce through our systems, both
ports and inland system every year. Significant
number of short tons, both in foreign goods. It
says on this slide 2015 date, 1.3 billion short
tons and almost a billion short tons
domestically. But for the part that I'd like to
call your attention to, because we sit here with
our federal partners, and you know when I go back
to my headquarters, we're consumed by our own
role.

But really we have a shared role with
our partners here about maintaining this
navigation system, and the Army Corps of Engineer
part is maybe focused down on those lower, those
last two bullets, really the last three, that
there are -- the federal government over time has
basically taken some level of responsibility for
1,000 ports and harbors around this nation, and
13,000 miles of coastal and deep drift channel,
12,000 miles of the inland system.

In other words, you know, the federal
government has said that it is part of its
responsibility to maintain the depth, the width,
and basically the navigation capability of those
channels and ports. That's a huge statement.

Now by making -- by making it part of the federal inventory and the responsibility that we have partly with the Army Corps of Engineers, it doesn't mean that we get -- that we accomplish that mission every year. In fact, we go through a performance-based budgeting process that many of you are familiar with if you're in the federal government, where we look to say well what -- with the federal resources that are available, how much -- how much of that inventory, how much
of those 1,000 ports and harbors, how much of
those 20,000 miles of channel, 25,000 miles of
channel, can we maintain to the depth that was
authorized, to the depths and widths that were
authorized by statute.

So this brief slide just tries to
highlight that our navigation projects, we use
kind of a performance tool that talks about high
use, medium use, and low use, and as we go
through our budgeting process, we focus resources
primarily on those. We do get direction from
Congress every year or every other year in some
of these statutory provisions and the Water
Resource Development Act that -- while we also
need to do ten percent to emerging harbors and
other things. But what that means to us is, is
that we -- working with really private industry.

The dredging community, contractors,
and others who kind of support or survey capacity
spend virtually all of our time trying to
maintain these channels, and it is not an easy
task. You talk -- I'll talk briefly in a minute
about some contingency response. But we own 122 survey vessels.

We also get support from contractors. We get support from our federal partners, because it's a dynamic system. You know, the mystery of the see is dynamic, and at no given point of time is it with absolute certainty -- or at least over a period of time with certainty that the navigation industry expects of us.

So I just wanted to highlight then, if that's a little bit of a survey that we do spend a good bit of our time in partnership with each other and dialogue. So talking with Admiral Smith and NOAA as a counterpart, you know, we realize as our counterpart on the panel mentioned about, you know, data ought to enable something.

It ought to enable another level of service, another level of expectation, of meeting expectations on the reliability, the speed, the agility of information, and -- but those take time. I mean it is -- it is a slow month to month, year to year kind of journey that we keep
improving, but then we also find that the next frontier is you in front of us.

So, you know, recently sat down with NOAA to talk about, you know, our need to use the data, some of which we generate, to enable, you know, obstructions, better knowledge of obstruction surveys and increased confidence on information we provide to NOAA that can go on their charts.

And so these are the type of issues that we're working with them on. We recognize they're important, and I will stay committed, and I think this may kind of be something that's worth some discussion over the next couple of days.

One of the main tools we bring, something that we've invested in quite a bit that we find has been very helpful for us is this. We call it eHydro. Some of you may have been part of the formation of it. Some of you may have given us feedback on it, or certainly you're welcome to do that as we go forward. But this is
a publicly accessible, this, by the website. But it is how we're taking the survey, those 122 survey vessels that are out there every day, surveying our channels and ports and harbors and, you know, through this data management tool kind of making it available to NOAA, and then enabling it to be visually displayed on the products like you see there.

So it is improving our consistency. I mean we have some internal challenges about our own discipline, which is really, you know, in order for you to count on the data you have, you need to know that it's being developed, posted, and quality controlled to the extent that what you see can be relied upon for the importance of the industries and the different functions you represent.

But we're really, we're really -- we're betting big on this tool. It's been out for a few years now, but we're kind of pushing harder on our internal compliance, and then some of those previous things I mentioned about
working with NOAA and where we go with it.

It's interesting that emergency response came, you know. It doesn't get quite as much attention when it's not quite a life safety issue. But there's an emergency response going on right now in a sense. We have an enormous navigation challenge in the Southwest Pass.

I think one of our members, panel members here can talk about to us at length, because he talks to the Army Corps of Engineers about it at length. But you know, since about November or December, we saw a rapid shoaling in the Southwest Pass, which leads to four of the major port systems in the country and then the entire inland navigation system. So it's affecting agriculture and many other exports.

And just to -- so while I sometimes, and I do have a brief mention about emergency response in the sense of life safety in Puerto Rico in response to hurricanes, this is a mission that is consuming a significant amount of our attention, and it's taking all the technology
that we have and all just the physical brute
force of dredging and other tools every day.

    That snapshot, I don't know how well
it can be seen, it's, you know, really is -- we
run on our own common operating picture back in
the Army Corps of Engineers headquarters. It's
literally where every dredge is in the system and
their performance and how much they're doing.
And quite frankly, as Sean was telling you this
morning when we came in, we've got an additional
three feet of draft restriction over the last 24
hours.

    So the amount of water in the system
now, I think someone else made mention of it, is
causing tremendous challenge to us. So these
surveys are going literally every day. We survey
it so that we can immediately provide it to --
through the Army Corps of Engineers to our
private industry contractors, so they can remove
sediment deposited and then virtually at this
point, I suppose we're not even keeping up, I
guess is fair to say, and we can take some
questions.

So that's one use. You know we do

obviously partner during the big events, you

know, the life safety events that shut down

significant regions in terms of their ability to
do all manner of things, including commerce. So

we wouldn't do it alone, we can't do it alone.

Certainly the Coast Guard, you know, governs much

of what we do there. But we partner with NOAA on

survey vessels. We contract out for them, and I

think some of the other things we've done through

the CMTS and others have shown that we're getting

better at this because practice does make you get

better. But we have more to go, you know. We

can reduce those efficiencies.

We're not without challenges. As I

said, those 25,000 miles of channel and 1,000

ports, you know, has tremendous interest

throughout the country. Someone made mention of

the shipbuilding at Carnival. Well all of our

ports, as you know, all want to go deeper because

the ships are getting bigger, and so we have
tremendous pressure on us to both authorize and
then deepen and then maintain those channels.

But the challenge is, you know, if it
is a federal responsibility, you know, the
commitment of long term operation and maintenance
to those channels is always a concern. So we
work through that with cost and then like many
others in the industry, you know, a lot of our
fleet and a lot of things we do to actually
accomplish this mission does, you know, does
require continuous discussion with our
environmental partners.

I think that we're dramatically better
than we were, but we have continue to have
discussions over year to year, week to week on
that.

I would say, and I'll probably stop
with this slide instead of going into some other
things, that just like this panel's focused on
some of the technical things and the use of data
to basically improve our ability to deliver on
our missions, we believe the same thing in the
Army Corps of Engineers.

So it is not just through the data that we collect that can inform NOAA and the charts they produce, but we believe that it's actually a game changer for how we deliver our mission in dredging. And so we are taking data that we're getting from survey and building channel portfolio tools that we hope are going to enable a more, in some cases, surgical approach to where we dredge.

Maybe we can group projects better, maybe we can better understand how the environmental windows are affecting our mission. So all of those things are kind of influence, or try to be shown on this graphic here, which is really kind of foundational to what we do.

If we can move from -- because of the experience-based knowledge we have, which has taken us quite far, and now add the additional context you get from just sitting back and looking at a lot of information about, you know, what happens month to month and year to year and
see if you can do it better. That may be of
great benefit to us.

So I did have one more, but I think
I'll just stop there, and just say that I do
appreciate being here. I know that as I say,
General Spellmon, who's the chair of the CMTS at
this point is at another engagement but would
prefer to probably be at this one. But I'm
excited that I was invited, and I hope that this
brief overview of the Corps of Engineers and some
of the things they're working on are of value to
the panel. Thank you very much.

(Applause.)

CHAIR SAADE: Thanks, Tim. Thomas,
sorry. I'm still there.

So our next speaker is Rear Admiral
Nadeau from the U.S. Coast Guard. NOAA and the
Coast Guard obviously work together a lot, and
there's an ongoing top interest for the HSRP in
past topics that we've covered, and as well as
I'm sure we're going to have some more right now.
So without any more delay, Admiral Nadeau.
RADM NADEAU: Good morning. Thanks Ed, thanks Julie. Shep, it's great to see you again and our distinguished guests up here. It's great to be with you this morning. When I listen -- I'm a little bit humbled. When I listen to your background and your expertise, I'm always amazed sometimes that -- I'm humbled to be with you all. Put it that way.

And we have, as we have a few federal advisory committees that we work with as well, and I've got to tell you Shep that ours aren't managed quite like this, so I'm taking some notes to take back home with me. Thank you. Best practices, if you will.

RDM S. SMITH: That's true.

RADM NADEAU: Well, did I just hear that? Did someone else hear that as well? Great to be with you. As you've already heard --

(Laughter.)

RADM NADEAU: Talking about what this nation has, and when we talk about the marine transportation system, that 25,000 miles of
waterway and then the 95,000 miles of shoreline, the 361 ports that are connected by that, we have roughly almost 50,000 aids or buoys and different other aids that help mark that waterway.

At this very moment, as we sit in this room, there are thousands of vessels navigating throughout that system safely and securely. And in doing so, are moving and we like to say it's $4.6 trillion of economic activity. 4.6 trillion dollars of economic activity that's supported by that system of waterways, vessels, all the workers, the 23 million U.S. jobs that are supported by that as well.

And as you heard, that system, that whole network, which is a gift to this nation; most nations don't have a gift like that, that system, this gift we enjoy is what makes us really a superpower.

And if you listen to the Four-Star that has the great pleasure to manage the Transportation Command, if you hear them testify, they'll often say that, you know, we're a
superpower because we can move our U.S. military forces when we need to, anywhere we need to, any time we want to, and you don't do that without an effective system of waterways, ports, ships, mariners, partners, stakeholders to make that machine work.

So it's great to hear that. Everyone in this room I think knows that story. But it's good to remind ourselves just how important this treasure, this gift we have is to the economic prosperity and our national security of this great nation that we all so enjoy.

The Commandant, now we have Admiral Karl Schultz, soon after he came and took over last June, the first kind of big strategic document he signed out, he's only had a couple, was this one, the Maritime Commerce Strategic Outlook. And it's a nice glossy, some beautiful pictures. But it's boiled down to a couple of key points, again which is not lost -- I know this crowd would know these.

But you know, three lines of effort
there you see. Facilitate lawful trade and
travel in secure waterways, modernize our aids to
navigation and mariner information systems, and
transform our workforce capacity and our
partnerships. And baked within that there are
several objectives. I won't go through them all.

But if you're not familiar with this,
I'd encourage you, based on where I think you all
work, it might be good to flip through it at some
point, just to see where we're going.

We see this as a ten year vision for
where we believe the Coast Guard needs to be, and
how we need to work with our partners and all
stakeholders to make sure that we deliver and
continue to protect this gift, and ensure that
future generations -- I want my grandchildren be
able to enjoy it as I have, and benefit from it
as we all have.

So that's what is packed into this
again, document. We are very happy to see it
come out because for the preventions missions
that I have the good pleasure and the honor and
the privilege to support every day, we never
really had something like this within the Coast
Guard that clearly articulated what it all means,
and this kind of ties to all together.

So I'll just name a couple that might
be of interest to you. First I think is of
course modernizing aids to navigation and mariner
information systems. You heard Tim kind of
mention this.

We are, and I'm not an expert in this
area. Some of you might know Mike Emerson. He
is the director for the Marine Transportation
System within Coast Guard headquarters, and
Mike's got the ball on this. He's doing a
fabulous job with his team.

I look at it as I'm a big fan of Lyft
and Uber. I love it. You know, I used to wonder
why I'd possibly want a phone I'd get email on;
now I wonder what I'd do without it, right. Who
uses it as a phone anymore? But the idea that I
can go outside and get a ride, go anywhere I want
right now, without having to call a cab, wait,
get some guy who doesn't speak English and now I use Uber.

   When I drive home at night, if you live in this D.C. area, I'm sure a show of hands, who uses Waze, right, that app Waze. That allows me to get home. I don't have to -- I can still read a map. I try and taught my two Boy Scouts how to navigate using a compass. But let's face it. I mean that's just not the way how we do it today.

   So when we look at mariners of tomorrow, the idea that they're going to be laying out charts, right? It's not how it works anymore. So what's the ways for the waterway? That's where Tim I think is pushing us and rightly so. John, let's go, we've got to get there.

   To get the information that the mariner needs presented in a format that they can use, that they're used to seeing because they grew up using it, and allows them to make risk-informed decisions at every point along that
transit. It's real-time information, real water levels, real tide and when it's a pothole in the road and I get notified and I know, or there's a wreck in the road and I get notified and I know, that same type of real-time information presented to the mariner in a fashion they can use it.

That's what I dream of having out there, and we're slowly working towards. It's not to say that we are going to take away the physical aids. People think we're moving to electronic navigation. You'll never see these buoys out there anymore.

That's not true. Just like I love having Waze and I love having Google Maps. But I still want to see the sign when I'm going right, to make sure that I've got the right road. Or when I'm not getting any service on the stupid thing, I need to see the signs.

Same thing on the waterway. We want to use the information and project it and give the best tools. But when we need a resilient waterway and a resilient waterway is going to
have physical aids.

So that whether it's storm damage or some 16 year old in North Korea decides to take down the GPS somehow, we can still operate. We can never lose sight of that. We still need to operate and keep that system functioning.

So that's where we're headed. We want to get more information. PORTS over AIS Tim mentioned. Again, electronic aids, we've done some of this now using the NAIS system, where we can broadcast a position. So there may or may not be a physical aid there, but if you're on board when you're looking at the display, you will see an aid there, just as if it was, and we're doing more of that and that has come out very handy, recently in the hurricanes.

In advance of a hurricane, we know it's coming, we'll quickly post some magic and some people work some strings, and the next thing you know, those aids are marked electronically. So if the real aid gets washed away, the pilots go back to work as soon as our good friends say
the channels are clear. You may not have
physical aids out there, but they've got
electronic ones.

There we go. And lastly, just a
slide, you know. We've worked closely with NOAA
and the Army Corps for a long time. We've had,
just doing the math, we've had people at the
National Data Buoy Center since -- well, for 92
years is what we've said.

So we're there, we're tied at the hip.
We need to be, as federal agencies we need to
work together and partner. You heard us all have
the same theme. We all recognize the value of
this gift that this nation enjoys, and we all
recognize that we need to team together to make
sure that we're being smart about how we go out.

Again, maximizing the utility and the
efficiency, because as ships are getting bigger
and bigger, most of the waterways are not getting
any deeper or wider and it's just greater
congestion. There are more users, more
recreational boaters we see out there.
Paddleboarders going through downtown Chicago and New York. I never thought I'd see it. It's a great thing, the water's cleaner, they can do that. Automation, autonomous vessels. It's all coming. It just makes things more complex, and you add all that, there's more of it, it's more complicated, more complex. And then you add on the public, the stakeholders in general expects us to minimize the environmental footprint on the system.

If you go to IMO, and many -- some of you do, you see that the agenda there is occupied with reducing the environmental footprint, which is a good thing. That creates challenges for industry, for operators to accommodate all those demands. We're here to help, be a part of the team, deliver the solutions that are going to make this all successful in the future. Thanks for having me.

(Appplause.)

CHAIR SAADE: Okay, thank you Rear Admiral Nadeau. Okay. It's time for questions.
We've got, we've got some good -- a good gap here to be able to ask some questions of, particularly from the panel. But we're going to kick it off with Shep.

RDML S. SMITH: Thank you, Ed. Thank you to the panel. It's a fabulous panel, particularly towards the headquarters level folks from Army Corps and Coast Guard. We usually have more regionally focused of your colleagues, and this panel has often pressed them on questions that are really should be to you.

So I hope that they remember, that the panel remembers all those questions, and now that we -- now that we're here in Washington and can sort of speak from the agency level. But I did want to -- I did want to share one epiphany. I've been passionate about improving our services to ports, particularly the charts, because I think it's been really ineffective for a long time as technology has moved on, and we're doing that now.

But as I started to look for models
for how other nations, and I have an
international role, so I get a chance to talk to
my international counterparts quite a bit, what
are other nations doing about this? And they
always just gave me this blank stare, because
they said well, that's not my problem. The port
authority does that.

It slowly dawned on me that everyone
else around the world has these really strong
port authorities, with levy -- the ability to
levy taxes on the ships using the waterway, pay
for the dredging, they do, you know. We have
federalized all of that, and so that the duties
that are -- and services that are provided,
particularly information services and navigation
services that are provided by port authorities
around the world are jointly provided by our
three agencies across the whole nation.

So you know, I don't think that we
generally think of ourselves as the port
authority for the United States but that -- I
think we do serve that role. And many of the
initiatives that we have been jointly undertaking
to improve the services to ports in the U.S.
really sort of are more like the community of
practice of port authorities.

So anyway, I wanted to share that
epiphany, because I think it's a really helpful
way of thinking about one segment of our
services. It's certainly not everything we do,
but one segment of our services. With that, I'll
turn it back to the panel.

CHAIR SAADE: Thank you. Okay. Who
wants to go first? Ann.

MEMBER KINNER: Part of how I got here
is about five years, the sea buoy in San Diego
sank, and at that time -- move a bit closer? At
the time, what I was told was that the intent was
not to replace it, but was to put an AIS signal
out there.

I mentioned I've had 35-odd years with
the recreational boating community. I deal with
boats of all sizes frankly, but a lot of small
ones. And after considerable discussion, we had
NOAA, we had the Coast Guard there over my chart
table looking at the chart and talking about the
issue of AIS accessibility and the fact that a
lot of people, me included, relied on a physical
object which showed up on radar, which had a
white light, which had a RACON and a bell, and
which if it was not replaced I couldn't see.

And that really got me concerned,
because I'm dealing with the little guys, and the
little guys don't have access or don't know about
how to use a lot of the technology. I love the
technology. I use a navigation software program
on my computer for planning. But I won't go
anywhere without a physical paper chart, a pair
of binoculars and some understanding of what it
is I'm going to be looking for.

And it concerns me when I see
everything kind of leaning toward this magic
electronic signal, which is subject to
interference. There was a recent notice put out
about LED lighting interfering with AIS if it's
not placed properly. This came out of Maritime
Commons.

There have been things put out about interference and hacking of the GPS system. I love my GPS, but again I use my eyes and a paper chart to confirm that I am where I think I am. I want to know for sure that the guys in my tier, predominantly in my tier, and I am an owner of two boats at this point -- well, one of them has AIS, the other one doesn't.

But the point is I'm a little guy, and I represent a lot of little guys, and they don't know a lot about what this is being -- that this subject is being discussed, let's put it that way.

It's tough enough explaining to them how to read a chart, and then to have to explain to them well, you might not see a physical aid out there because you're going to have a symbol. Where is it going to show up? Well, do you have radar? Yeah, but do you have an AIS receiver? What's that. That's what I deal with every day.

So I'm really concerned about the little guys and
to some extent the intermediate guys who have
gotten too complacent about using the toys. I
call them toys, because to me in some respects
they are toys.

There's a book out there, it's been
out for a while, Bridge Resource Management, and
it's a whole series of case studies of people not
looking out the window when it comes right down
to it, and thinking that the screen in front of
them was going to keep them safe, show them
exactly where to go and solve all their problems.

So I want to know more about this push
towards eNav, but I also want to know how is it
going to integrate with something physical, so
that the little guys are going to be okay.

RADM NADEAU: I would offer -- I think
we're in complete agreement. I see the new
technology supplementing what we have, not
replacing it. I think that it provides the
ability, in fact it enhances the capability.
Again, once -- if they -- if we are able to
market within a symbol that shows up on an
electronic chart, if the physical aid is removed somehow due to storm or hurricane, I still have something there.

So that if I'm not able to replace that aid yet physically, and the pilots want to start moving going down the river and they have sufficient water, I can let them go. At least there's something there for them to see; otherwise, there would be nothing. So we would supplement it and in all cases, like maybe I should have prefaced this.

We are engaging the stakeholders to tell us what are the user requirements for this waterway. We don't set off on our own and sit back in our glass palace trying to figure out where we think the buoys should be and how they should be marked.

They should be talking to smart people like you that are actually on the water and the stakeholder groups. We've done these WAM studies. We've done it on the east coast, we're doing it right now on the western rivers, we're
doing the Pacific, to really help us understand
where we need to be.

There are drivers. There's costs. So
we're always under pressure to cut back on
physical aids. That's a fact, but we want to
make sure we're meeting your needs.

MEMBER KINNER: And just as a comment
on that, and it partly has to do with outreach
and education. When this was being proposed,
there were I think four meetings, four public
hearings on the east coast, one on the west
coast. Through making a little noise, we got a
second meeting in Long Beach, out of which came a
third meeting in San Diego.

And that became -- that happened
because a couple of us heard about it and said
wait a minute, we need to know more. You need to
know more, and the public wasn't really aware
that it was even being considered, because the
consideration was don't replace the buoy.

And I said oh no, no, no. I don't
want to come into San Diego Bay at night with
this series of lights where I can't find the buoy because there's no RACON. That changed the decision to just put AIS to okay, put a temporary buoy and eventually we got the old one. Well, we got a refurbished buoy back.

But there wasn't, and I understand there are more ports on the east coast, but there's a lot of coastline on the west side too, and there are a lot of boaters out there. Somehow they weren't getting the information that this was even being considered.

So what I'd like to see, and I don't even know exactly how you go at it, whether you enlist power squadron, Coast Guard auxiliary people like that, but to get more word out forcefully to the small boat fleet, so that they know something is being considered that might have an impact.

RADM NADEAU: Thank you.

CHAIR SAADE: Okay. Thanks, Ann.

Anybody, anyone else have a question? Ed? Ed, number one.
MR. T. SMITH: I'm number one. That will always be me, Ed.

(Laughter.)

MEMBER KELLY: Don't start with old Ed, young Ed. That's not going to work.

Mr. Smith, just a question. In past meetings, we've had discussions where it seems that although everybody's working for the common good, we sometimes find that there are in fact silos within the organizations.

Where do you see the best opportunities for the three key agencies involved in the MTS sharing resources, data, et cetera, particularly data in these cases, survey results, working together to determine proper areas for surveys? Where do you see are the best opportunities for synergy?

MR. T. SMITH: So, I mean, I think let's just recognize that those silos do exist. They exist when one of us gets ahead of the other because we see something or a capability that's emerging and begin to see it and it takes some
time before we kind of recalibrate.

So certainly at the national level, I think it's a function of engagement, forms like this, you know. I said Admiral Smith, meet with me or my boss and our Coast Guard counterparts, sometimes to these bigger organized forms like the CMTS.

But often better on taking on a few specific issues and kind of setting up some work groups to take them on. That's at the national level, and there are a few of those.

Some of them are chartered by the CMTS, but in other cases, like I know that particularly with NOAA on some of the data we collect and how we share it, I listed four areas where they're putting pressure on us to do a better job of capturing data, so that it can be made more available more quickly, and meet their statutory responsibilities. So there's that.

I think, you know, maybe the Admiral talked about, you know, at the regional level on physical buoys that they're placed where they
need to for that purpose. I think there's another level which is locally, where we have people like this, you know, our command structure has local leaders at the general officer and colonel level and similarly with our partners, that that has to take place at those levels.

    They have to balance probably with a better understanding of the needs of the community, you know, what really are the pressures? What is the type of movement? What are the type of vessels? What are the challenges literally in a specific place, because a traffic jam has emerged because it is a new need.

    So I don't know. Has that helped, Mr. Kelly? I guess I want to recognize there is a challenge, and we have to keep -- we have keep communicating, sometimes through organized forms, but then also just, you know, these relationships, where we realize that one of us has gotten ahead of the other and is pulling us forward, and then one leapfrogs and tries to pull the other forward.
But kind of a specific example of mine that maybe my partners could kind of --

MEMBER KELLY: No, no. I was just trying to see if there was a wish list. We all recognize. We all work in organizations where, you know, we have common goals.

We need to share information. I was just trying to see if in fact any of the three of you may have a wish list of where do you think might be the best opportunity to improve some of that information-sharing and cohesion that is so necessary for the final product that we as users use, because we as a port, you know, commercial maritime and operation and a port, we rely on all three of these agencies to coordinate, to give us the products we need.

So we're just trying to see, is there any wish list? Do you see any nail that's sticking up that might, with a judicial bang on the head of the nail might fix something for us, make an improvement?

MR. T. SMITH: Tim has a wish list.
Tim usually has a list of things.

RADM GALLAUDET: I always have a wish list. No, well there's a couple of things and one was mission, using AIS as a means to disseminate data, and it's a crawl, walk, run. Hydro data charts, big data sets. But you know, weather overlays are a simple one. So you know, that's what we'll do and we're going to move forward with that.

There are other things though, sharing capabilities. One of them, you probably are aware that in many of the dredged channel surveys, sometimes often single beam echo sounders are used by the Army Corps, which are in kind of a rough cut just to get an initial assessment, whereas if we were able to outfit every boat you have with multibeam and use that data in IHO order one type of capacity, that's a survey.

So we're moving forward together in that respect. I am really proud of the Army Corps making advances in that area, and there's
others. In fact, I met with the Coast Guard Commandant. Initially, our agreement was we're going to share training facilities and capabilities with unmanned systems, primarily aerial systems for surveying and observing illegal, unregulated and unreported fishing.

But then again, I told you about the Thomas Jefferson doing initial, exploratory shoreline mapping with UAVs. So we're getting into a point where we're going to use data from these systems to advance sensor technology for everything, whether it be IAU, NDA, charting. So that's kind of an area we want to move forward to. So using, you know, sharing capabilities.


MEMBER PAGE: Did you do this to me Ed? Tough competition with three Eds here. Ed Page from Marine Exchange of Alaska again. And all three of you, through your representative agencies, serve on the community of the Marine Transportation System.

I was thinking if there's any
discussion or asked if any discussion about how
LNG is changing a lot about maritime safety. I
worked Exxon Valdez spill for three years and
then OPA-90 implementation, and that was kind of
-- that's 30 years ago now.

That was a lot of opportunity for the
Coast Guard and other agencies to focus on oil,
preventing oil spills and responding to oil
spills, and then gave you the funding mechanism,
the Oil Spill Liability Trust Fund, to act upon
things when they were happening.

Now we're getting these container
ships that will have 20,000 TEUs, which is like
60 miles of containers end for end, and they may
be LNG powered some day and suddenly all these
prevention things oriented towards keeping oil
out of the water, the funding available to
respond to oil spills, these shipboard
firefighting salvage regulations all triggered by
oil, no longer oil's there, you know, and I think
there's still some risk of these huge vessels
operating.
So it almost seems to me that CMTS, go look at that and hopefully Congress somewhere along the way get an update or re-racking of the OPA-90 type of prevention response capabilities oriented towards, you know, maritime activity that's changing now, that oil's not really the whole issue, that maybe these containers floating at sea is a problem and a shipwreck on the beach, and certainly 60 miles of containers in Reese would be a problem for you, Admiral Gallaudet.

Admiral Nadeau would be worried about ships crashing into him and the Corps of Engineers will be worried about clogging up the channels. So we all have a role and this has impact. So this is to me I think is the kind of shift that we're seeing very quickly develop with this LNG transition, and it really kind of changes that, what your authorities are and capabilities are and resources are based on this change.

So I'm hoping that's something CMTS can look at and I would -- I will talk to my
Congressional representative when they come visit us and talk about the same context. Hopefully they can see that maybe it's something they can get behind to address these things.

CHAIR SAADE: Yeah. Ed, that's great. As the incoming chair, I'm very keen on that. I asked you outright for a recommendation and you gave me a great one. You know, as an administration official, I'm charged to support the America First Energy Strategy and executive order, and LNG is a huge part of that.

So we've got to balance the need, you know, the good thing that that's doing for the country. We're now a net energy exporter. That's good. However, we've got increasing risk in certain areas. So, but I think technology is going to be -- allow us to advance it, as well as data and information-sharing.

RADM NADEAU: The LNG, we are seeing it, particularly in south Florida, and in coastal around North America, our mission control area it makes a lot of sense, but you're at a .1 percent
sulfur content. So it's a great option if you're building new, and that's really where we're seeing it.

Globally, it's not quite as -- picking up as quickly. There are pockets of it on known trade. But I don't -- I think we still need OPA-90. We still need those -- at most, the vast majority of ships will be carrying and running on oil, less sulfur in that oil, for the rest of our lifetime anyway yeah, until --

But LNG's a great option for local, if you're building new or converting.

RADM GALLAUDET: Ed and members of the panel, I apologize but I have to excuse myself. I have another meeting at the Department of Commerce. But thanks for allowing me to be here today with you, and thanks for all the good work you're going to do this week.

CHAIR SAADE: Thanks Admiral.

(Applause.)

CHAIR SAADE: Okay. We still have some time for some more comments and questions.
Go ahead, Nicole.

**MS. LeBOEUF:** Sure. I'm hoping Ed, I can include myself in the three. To answer your question, I would love to see the federal agencies that have coastal-dependent infrastructure talk to one another about what the future's going to hold. That includes sea level rise, but it also just includes aging infrastructure across the board.

I know that some of our sister federal agencies are looking at this in a more concerted effort than -- in a more concerted way than I think NOAA actually is. But I think we are starting to look at local areas where we can co-locate, where we can be smarter about the assets that we have there or recapitalization.

I don't see the U.S. Coast Guard, I don't see the U.S. Navy, I don't see some of NOAA's facilities moving inland, right. And so I think it would be really good for us to work together, perhaps under the CMTS umbrella or elsewhere, to talk about what we're going to do
together, given that the data for a given area is going to be shared information, and we have some shared mission.

But I think overall, it's the -- it's the how do we manage our assets as a unified federal government, and send a smart signal to the coastal communities about what we see as the risks and not in these area where won't have, in some cases, the choices to leave the coastal zone.

CHAIR SAADE: Okay. I'm going to throw a question at you, the three of you and whatever other agencies here. With the huge expansion of the offshore wind farm activity on the east coast, the latest challenge to us as contractors is unexploded ordinance on the sea floor.

So I'm going to ask you if anybody could answer the question, who has jurisdiction? Between the Coast Guard and Corps of Engineers and NOAA and the Navy, and the particular state and BOEM, who's in charge?
RADM NADEAU: I'll start and then they can tell me, correct whatever I say I guess. Depends on where it is. If you're talking offshore I guess, well beyond --

CHAIR SAADE: It's with -- it's within the 14 -- it's within 14 miles of the coast, and let's just say for argument's sake it's in federal waters.

RADM NADEAU: Federal waters. Not Coast Guard.

(Laughter.)

RADM NADEAU: I don't think it would be -- we'd be more concerned, I guess our authorities would be more tied to the vessels involved in the operations, more so than the ordinance on the bottom and how do you pick that up and what do you about it. You still want to bring it into port, we'll probably want to talk to you.

But yeah, I don't know. I have a hard time tying Coast Guard jurisdiction to something that's sitting on the bottom 12 miles out.
MR. T. SMITH: So I think -- just Tom Smith here, to make sure to answer the question. I don't think it's us directly. So this is being taped and everything else, we have to be careful here. But there's a comparable problem we're dealing with, and I'm not as familiar with the unexploded ordinance one, which is pipelines and there's pipeline growth everywhere.

We have, I mean it looks like we threw a Verizon or AT&T commercial up here. That's what the pipelines look like, the growth in pipelines through all -- and we have federal channels. Through federal channels, it's a significant concern.

And we ask ourselves in meetings like this with just our federal partners, well who really owns the problem? No, I don't think there's a single person. So we have several efforts underway.

This won't get to the unexploded ordinance, but it's a like problem I just wanted to share, that these -- the complexities we deal
with a lot is we have several efforts to make
sure everything we know about what might be in
the water, in the sea, is made available to, for
example in the federal channel, to either our
dredge that might be dredging it, or to a private
contractor who's dredging.

But we have never come down to say
that we could provide 100 percent certainty, or
that we uniquely versus any other federal actors
owns that. So I don't know if that's -- I mean,
that's just what I understand to be the case now.
But it is a complex problem and I'm sure the
unexploded ordinance one you described is equally
challenging.

But like I said, if we put up a -- if
we turn the TV on and you saw an AT&T commercial,
that spider web is what it looks like down in
particularly the Gulf Coast. It is incredible,
so -- and it's growing. Yes ma'am.

MS. LeBOEUF: Yeah, Ed. So you asked
with regard to offshore wind as a preface to your
question. So NOAA and BOEM have a really nice
partnership. We've developed an online tool called the Marine Cadastre, which is public-facing. It has thousands of data layers in it, and is very, very good at helping to inform folks about what's out there under the water, industries, et cetera.

It is very useful to the oil and gas companies but others. We have just, are about to launch in the next couple of months an offshoot of the Marine Cadastre called the Ocean Reports tool, and that is going to provide over 100 layers of data that are instantaneously analyzed.

You just draw a box in the ocean, state waters, federal waters, whatever data sets are available for that. You'll have a three-dimensional picture of that neighborhood, you know. If you're going to move into a neighborhood and thinking about buying a home, you want to know what the crime rate is, know what the schools are like, how long is your commute to work, you know, if there's zoning issues nearby.
All of that kind of information will be provided in the Ocean Reports tool. Now to the degree that unexplosed ordinances are already on publicly-available maps, you'll see those right away. But the Ocean Reports tool is really just an opening conversation for wind, been talking to the Marine hydrokinetics industry, others that are looking to get into an already very busy ocean, and they know it's very busy.

They want to get a little space and they want to know if that space is usable for what they're looking for. In addition to detailed oceanographic information, current at-depth, et cetera, it also provides someone like -- excuse me, someone like NOAA an opportunity if a member of an industry comes to us and says so I found a spot. It looks good for what I want. I think I'd like to have that first conversation with, you know, Army Corps or NOAA or BOEM or someone else.

And we say okay, let's take a look at your spot, right, and then what we can do and
have begun doing is having a higher level conversation even with clearance with the Navy and others, who will help us better understand their training ranges, the location of unexploded ordinances and that kind of thing. We can work with them in a way that the public can't, that a new industry member can't.

But we can work with them to say okay, here's their desired box. Is this doable, is this no-go, and we can have those kind of sensitive conversations with them and we've begun doing that, to see if we can carve out as much space as possible for new industries coming into the ocean.

So when say wind farm, this is ideal for wind farm developers and aquaculture, hydrokinetics and others who are just looking to have a little bit of space at that really busy ocean, and that includes the location of unexploded ordinances.

CHAIR SAADE: Okay. Larry and then we'll have to take a break after that.
DR. MAYER: And this is just a comment, and it doesn't really address the ownership issue. But three other agencies not represented here, DoD, DOE and EPA have a joint office that's called SERDP/ESTCP, and they're charged with all the efforts to at least find and develop technologies to look at UxO.

I suspect they, I mean, they probably have a database in terms of what's out there. It would be nice to expand those three offices to include you guys too.

CHAIR SAADE: Thanks Larry. I'll just end it with one more comment, and then we have the break to think about it. The problem is insurance companies and responsibility and the need to move it or explode it, and who gets to make that decision. So besides the port contractor and the client that's on their back.

So with that, let's take a break. Thanks. Okay, and thank you all. That was really great. I really appreciate it.

(Whereupon, the above-entitled matter
went off the record at 10:47 a.m. and resumed at
11:03 a.m.)

CHAIR SAADE: Okay everyone. We're
going to get restarted. I'm going to use the
microphone, because I hate having my back to
everyone there.

So this next session I'm going to turn
this -- turn it over to Sean Duffy, Sr., and also
the HSRP -- he was an HSRP member, and Glen
Boledovich, the NOS Policy Director. This next
section, their full bios are in the materials.
So I'll let them introduce themselves and the
topic on the Congressional perspective on NOAA
Hydrographic Services, and oh, and Sara Rothi-
Gonzalez. Your presence is really appreciated.
So you guys are on. Thanks.

MEMBER DUFFY: Okay. Good morning,
everyone. I'm going to kind of use some
Louisiana acronyms and I'm going to say today I'm
your gumbo. I'm an appetizer, I tend to be a
little mysterious. There's a bunch of ways to do
things. Something very few of you will know is
that there's another name for a roux. We're
you're making the roux, they can be referred to
as Cajun napalm.

And if you ever get it on you, you
will know why. Lots of chefs start out with
shallow pans and learn there's a reason mama did
it in a big, deep cast iron pot. So with that,
I'll try not to get burned and keep things
moving.

So as you heard Tom Smith talk about,
there's a lot of attention on the Mississippi
River, and my role is I'm an advocate for the
river. I spend a lot of time in Washington, and
I really feel -- I'm very passionate about what I
do. But it's coming here and meeting with
members of not only the Louisiana delegation, but
also the basin states as was pointed out earlier.

So the Mississippi River system
connects more miles of navigable waterway than
the rest of the world combined. A huge 41
percent of the nation drains through that river.
Some of the things going on right now that are
challenging us are related to high water.

Most of the basin right now is wetter than it's been in 124 years. A lot of times we hear things about how you have to schedule dredging better. Well, I've never had anybody explain to me how we can do that when we have an event that hasn't happened in 124 years. There's a lot of challenges to it.

As I say in a lot of places, what I do is teamwork. I depend on our government partners. I'll be careful to not go against the decrees of being a member of the panel. But I will say that full federal funding floats all boats, and I spend a lot of time pressing for additional funding to recover our channel, to allow the government agencies that we depend on to function.

I'll tell you I've also been through probably more disaster recovery programs than maybe anyone in the country, from Hurricane Ivan was my first in my role, Hurricane Katrina, Deepwater Horizon, having ships go aground,
having inadequate channel, and each one of those efforts is led by National Weather Service providing an update.

It really evolved out of Hurricane Ivan where network communications were wiped out, and we're very happy to get texts. At the time, Nextel, walkie-talkie phones were -- if you didn't have one, you needed one because that's how we were able to communicate.

But setting up these conference call systems where we have the Weather Service give updates on what's current. Coast Guard, Corps give these updates, and then the pilot groups and the maritime representative is there to kind of coordinate efforts to recover the channel, talk about their most pressing issues.

As I look at it and right now, a lot of funding and a lot of dredges are tied up in the river. I was very happy when one of the dredging contractors said Sean, what's your Christmas list? And I was like hey, you know, part of being an advocate is when somebody asks
you what you want, you have to be able to tell
them what you want.

So my response was, I want over double
the budget we get now. The President's budget
for the Mississippi River is just inadequate. We
see a lot of challenges on the system and
maintaining it. We're talking about the future,
and we have to get away from inadequate funding,
at least inadequate channels.

So when I first started coming to
Washington I like terms, and I feel like when I
meet with staff that I want to be memorable. I
want them to like -- I know their schedule is 15
minutes in, 15 minutes out and they go from
subject to subject.

So I want to leave them with
something. So the first term that I really could
be -- say that I coined or authored was related
to the harbor maintenance tax. I simply said,
taxation without channelization. So when I see
Congressman DeFazio over ten years later, he
still points at me and says you're that taxation
without channelization guy.

So I guess my point there is simply to
-- you have to make an impression, have to be
willing to come and meet with the members and
meet with staff, have your list. So my Christmas
list is $200 million to maintain the Mississippi
River on October 1st every year. Dredge is
available when we need it.

I get called into meetings where other
areas aren't happy because their project or their
dredging was delayed because they had to send a
dredge to respond to a crisis on the Mississippi
River. Hopefully that means if we can solve my
problems, we can help deal with theirs. That's
how I look at it, because it is about teamwork
and depending on everyone.

With that, hopefully your gumbo was
not too spicy and didn't leave a bad taste in
your mouth, and that's my role here today. And
with that, I know Glenn has much more prepared
comments, and then I'll turn it over to him.

MR. BOLEDOVICH: Thank you, Sean.
(Applause.)

MR. BOLEDOVICH: Yes. I had to prepare comments, because I had to be careful.

(Laughter.)

MR. BOLEDOVICH: To stay with -- try to stay within my swim lane, which is always a challenge for me, as many of you know. But I'd like to take a few minutes to discuss some potential opportunities in the new Congress. As it relates to the new ocean policy and the blue economy, and also in the context of NOAA's navigation and observing program, which are of course under the purview of this panel, to kind of bring those things kind of together maybe.

The administration, including NOAA, has not put forward a lot of legislation related to the oceans. But the administration has released an executive order. It's called the Ocean Policy, and it's called the Ocean Policy to Advance the Economic Security and Environmental Interest of the United States.

Among other things, it recognizes
activities where NOAA plays an important role. That includes maritime commerce, recreation and tourism and fisheries. As a mechanism to advance these interests, the Ocean Policy promotes improved public access to marine data and information. Well, that certainly should resonate well with the work of this panel.

It also promotes interagency coordination and engagement with industry, the scientific community and others. That is something you do at every meeting, including the speakers this morning and the stakeholder panel this afternoon. The executive order also supports federal participation in regional ocean partnerships.

In addition to the executive order and Ocean Policy, you have heard Admiral Gallaudet talk about NOAA's priorities for our oceans and coasts in the context of the blue economy, which includes maritime commerce, ocean resource mapping, tourism and recreation and fishing and seafood production.
At your orientation yesterday, I discussed efforts by NOAA leadership to create a link or a line of sight from the President's Ocean Policy to NOAA's priorities in the blue economy to the relevant underlying program, such as the ones you oversee or that you support. NOAA leadership has done a really good job of that. I think it was pretty clear this morning in the Admiral's talking points, so kudos to Admiral Gallaudet and his team.

The programs of NOAA's National Ocean Service are well-reflected in the executive order and the blue economy. We have tremendous expertise in these areas, in marine commerce, ocean mapping, recreation and tourism. We're also leaders in providing public access to marine data, and have a long track record of forging interagency coordination, engagement with science and industry and regional ocean partnerships as Nicole discussed some this morning already.

So I think there are maybe some areas where Congress could act consistent with these
policies. One thing we probably don't need to create is anything wholly new. In fact, I would suggest that the ingredients already exist in the law. What Congress might do is support better integration of those ingredients, in other words, kind of bake the whole cake out of the authorities we already have on hand.

This is especially true in the area of marine data and information, where so many agencies play a role, as we saw this morning already, and there are existing frameworks for interagency coordination. One of those frameworks is the Integrated Ocean Observing System, the very people you met with in Juneau.

Like this panel, that group is authorized under law. In this case, the underlying authority is the Integrated Coastal Ocean Observing System Act. In addition to an advisory committee such as like this one, the law creates an interagency coordinating body to facilitate coordination across agencies with ocean and coastal observing interests.
Another existing law is the Ocean and Coastal Mapping Integration Act. It is basically a parallel law to the one that related IOOS, except it focuses on ocean and coastal geospatial data, as opposed to observing data. While it does not create an advisory committee, it does create an interagency committee which is very active.

And of course, there's the Hydrographic Services Improvement Act, which authorizes this committee and the programs under your purview. In addition, the National Ocean Service has an existing effort called the Digital Coast, which includes an interagency effort that Nicole discussed this morning, with BOEM and NOAA's Office for Coastal Management, and it's called out, it's actually called out, the Marine Cadastre, which is a part of it is called out in the President's executive order. Nicole talked about the upcoming augmentation of that with the Ocean Reports tool.

Legislation to codify the Digital
Coast was introduced in previous Congresses, and I suspect will be introduced again in the 116th Congress.

There are other existing authorities and programs that might be considered, but these four ingredients are a good example of programs who might be better integrated to bake the cake and advance the goals of the Ocean Policy and blue economy to create a coordinated effort to map and wire the coast.

So let me leave that at that. One thing Congress might consider is an effort to better coordinate existing ocean and coastal observing and mapping authorities and programs.

So how does this relate to the work of this panel? Well, pretty directly, I would say. In fact, your forward-thinking efforts are already demonstrating there's value to improved coordination. Meeting jointly with IOOS, the advisory committee in Juneau, is exactly the kind of improved coordination and integration that the Ocean Policy promotes.
So while it is true that under the Hydrographic Services Improvement Act, your input is focused on the three programs here under your purview, the Office of Coast Survey, the Geodetic Survey and CO-OPS, and their underlying important navigation-related missions. You have already looked beyond that. You are doing so again this week by hosting a panel on sea level rise.

These efforts are consistent with the orientation briefings you received yesterday from the program directors, where we learned that efforts to modernize national geospatial and tidal datums, and delivery of improved positioning, mapping and observing services supports a wide range of needs for data and information.

So let me conclude by first clarifying that your job, I must just say this, is not to advise Congress as the panel. You're authorized in the statute to advise the NOAA Administrator and the programs under your purview. But your efforts also help inform and educate a broader
range of people about the value and public
benefit of these programs.

I had the honor of staffing Admiral
James Watkins when he was appointed by President
George W. Bush to chair the U.S. Commission on
Ocean Policy. Admiral Watkins had previously
served as the Chief of Naval Operations and the
Secretary of Energy. He was a great guy. He had
a deep and abiding love for the oceans.

He also had a saying that he repeated
often. People care about what they know about,
and they don't know enough about the oceans. I
would add that people also don't know enough
about the value of the ocean and coastal programs
that benefit them every day, including the
foundational programs and services under the
purview of this panel.

So in addition to your technical
advice, this is an area where the panel has been
and continues to be of great assistance. There
are issue papers and other recommendations that
are a matter of public record. We use them every
day. Your leadership and willingness to look at
the bigger picture also helps us to better bake
the cake. Thank you.

(Applause.)

MS. ROTHI-GONZALEZ: Hi guys. I'm
Sara Gonzalez-Rothi. I'm a senior counsel on the
Senate Committee on Commerce, Science and
Transportation, and I work for the minority. And
I love that Glenn said your job isn't to advise
Congress, it's to advise NOAA, but you obviously
have other audiences, and that's why I'm here
today, because we do rely on your recommendations
really heavily.

Glenn mentioned you care about what
you know about, and people don't know enough
about the oceans. Well that's true about me too.
I've been working on ocean policy for a decade,
and I still learn new things every day. The way
to do that is to get outside of your wheelhouse
and learn from folks that have relevant
experience.

And I think the value of this
committee shows in the fact that Sean is here
today, and not in New Orleans saying, hey mister,
throw me something!

(Laughter.)

MS. ROTHI-GONZALEZ: And it speaks to
the value of a story, right. So Sean comes from
a place where the water is integrally tied to the
economy. It's integrally tied to traditions and
to culture. But though the Mississippi River
Delta is unique for its own culture, it's not
unique in the fact that water-based communities
have spring up over the entire nation.

And that's why Congress wisely put
jurisdiction for oceans and atmosphere in the
jurisdiction of the Commerce, Science and
Transportation Committee, and not within another
committee, for example. It's because we know
that the oceans obviously undergird huge swaths
of our economy.

And so to Sean's point about
investment, I think we've got to be really
careful not to be penny wise and pound foolish,
and kudos to the administration for wanting to quantify the blue economy in a more standardized way. Because when you go to Congress and say, we need 200 million every October 1st for MRT program, when you're able to say, and this is what that gets you in economic growth, it's a more compelling story.

Mississippi River is not the only one, though. Think about Puget Sound, for example. Think about large aquatic ecosystems all over the country. The good news about the new Congress is that at least on my committee, we've got some significant champions in the driver's seat that work on ocean and coastal issues.

So Senator Wicker is our new chairman. Senator Cantwell is our new ranking member. Think about states that think about hydrographic services? You can't pick two better ones that Mississippi and Washington State, right. So there are opportunities here to tell the story of the blue economy and why it's important for Congress to invest appropriately.
And I just want to build a little bit on what Glenn said. The notion that Congress, we come in and we like sometimes to do something new and exciting, right. But I think there is a lot of to-dos that have been kicking around for several Congresses, in the vein of what Glenn mentioned, reauthorization of the Integrated Coastal and Ocean Observing System, and authorization of the Digital Coast Act.

These are bills that we've passed through the Senate multiple times, that in previous years have gone over to the House and not been acted on. The dynamics politically in the House have fundamentally changed. There's a new majority and query whether they may be more interested in taking up these bills, to authorize and hopefully better integrate programs that are existing within NOAA now.

But I say that with an understandably myopic view, because in my role on the committee, my jurisdiction is specifically over NOAA issues. But NOAA is not the only agency that has a dog in
this fight, right. But NOAA looks at air and
water, and the Corps looks at land.

And where air and water and the land
meet, that's where people live and work and play,
right? And so one of the challenges in better
coordinating existing authorities is that
Congress, the agencies are siloed. Congress
itself is siloed, and then within Congress our
silos look different.

So on the Senate side, NOAA is wholly
within the jurisdiction of one committee. On the
House side, NOAA's jurisdiction is split between
three different committees. So when Sean comes
in and talks to staffers in 15 minute intervals,
he's talking to one staffer who handles fish and
agriculture and health care and immigration, and
then he goes over to the Senate side and talks to
one who handles four different issues in addition
to hydro.

So I think we really value when folks
who work in an interdisciplinary way can come to
us and see the bigger picture and say this is how
you coordinate those things that you think are disparate. You go find your colleagues on the Armed Services Committee and you talk to them about DoD needs for maritime transportation, and you go and you talk to the Senate Environment and Public Works Committee about hydrographic services needed for environmental restoration.

And we really appreciate and value the extent to which outside entities can tell us where those relationships lie, because when we work in a very narrow focus area it's hard for us to see them. So, with that, I'll stop talking and hopefully get some questions from you all.

CHAIR SAADE: Thank you all. That was really great. We're going to open it up to questions and Admiral, if you want to start.

RDML S. SMITH: Sure. Thank you very much for this panel and Sean, thank you very much for kicking it off colorfully, as usual. I really appreciate it, and I don't want to -- I don't want to hog the air time. I want to sort of give the panel a chance to ask questions that
perhaps are outside of the types of questions
that I can ask as well. So why don't I reserve my
questions for the end, and let the panel go
first. Thank you.

CHAIR SAADE: Anyone have any
questions? Anuj.

MEMBER CHOPRA: Good morning again.
This is for Sara especially. Sara, we know
there's an energy boom happening on the export
side, net energy, which is increasing
exponentially. We were talking about two million
barrels plus a day last year. We're talking
about three million barrels a day this year.
We're talking about six million barrels a day
export in about two to three years' time.

The infrastructure is aging. How do
you envisage, or how does -- in your teams, as to
how we're going to address this issue on a
national scale?

MS. ROTHI-GONZALEZ: It's a great
question. So when the President came into
office, obviously infrastructure was a
significant priority for him and one that folks really thought that we could work across the aisle and across the capitol to get a push across the finish line. Well, what does an infrastructure bill look like is a big question.

Is it what we call policy only, or is it increased funding for new initiatives, something more like the stimulus bill that we saw previously, and that question remains to be seen.

So in 2016, the Senate leadership, Democratic leadership pulled together what they called a blueprint for an infrastructure proposal, and asked for input from all of the relevant authorizing committees, including the Senate Commerce Committee.

That blueprint has not yet become legislative text, but it's my understanding that there is a desire to come to some more detail on what that would look like. In the House, there's a parallel effort. There's talk of just plussing up existing accounts and having that be considered an infrastructure bill.
The challenge that I think we run into is again that if we haven't yet told the story of what the Blue economy is quantifiably, even a big, bold infrastructure proposal isn't going to adequately reflect the needed investment. So I think we're hopeful obviously that something like that could get across the table, and that it will include recognition of the needs for energy infrastructure.

But we also -- I think in a broader sense -- need to not be maintaining energy infrastructure or water infrastructure crisis to crisis or new infrastructure -- build a new infrastructure bill. We need a more sustained and systematic way to capitalize infrastructure, including energy.

One thing I just want to flag is you think about the energy export boom being United States-specific. But it's true actually North America-wide, right? Canada is considering approving a new pipeline which would increase tanker traffic between Canada and the United
States sevenfold, and do we have the spill
prevention and response capacity to handle that.

So there are lots of considerations
when it relates to infrastructure with new
markets, new exports.

CHAIR SAADE: Thank you. Any other
questions? We've got time for one more.

RDML S. SMITH: Okay. I'll ask mine
right here. Thank you. So I spend a certain
amount of my time coordinating hydrographic
services globally, as well as nationally, and we
often run up against the sort of silo of national
boundaries, where international shipping, you
know, flows freely across those boundaries, but
in some cases NOAA's authorities stop at the
boundary.

So for -- and it's very irregular
where those -- where those authorities are fluid
across boundaries. But hydrographic services are
-- tend to be siloed between domestic and
overseas. But I think particularly when we start
to think about resilience and global modeling,
those types of silos are constrained.

So I wanted to flag that in the context of Glenn's -- of Glenn's call for more fluidity and coordination, that that's sort of an inadvertent silo in the way that we've structured our agencies.

MS. ROTHI-GONZALEZ: No, I think it's a great point. I used to say --- so I worked on these issues in a personal office before I came to the Committee, and I used to say that fish, water and money don't respect political boundaries.

It's really true when you think of, you know, the state to state boundary, national to international boundaries, and I think your point is absolutely correct in that for some issues, those boundaries are less salient.

We would really appreciate -- and I don't know if you're willing to take this on -- but kind of an itemized list of where those inadvertent boundaries are, so that we can assist in any way possible to break them down. I think
we struggle with the tension between you can't legislate culture and we wind up inadvertently legislating culture in a negative way, and harming coordination and collaboration.

And so if some really smart folks could sit around the table and say hey, I sit on three federal advisory committees that are all really looking at the same thing. Maybe you could streamline by making them a macro-committee instead. Those kinds -- that kind of feedback is very helpful for us, because the intent of Congress in creating what I call these legislated coordination isn't to make you all sit in three different rooms to say the same thing over and over again to the same people.

It's really that we want to get at a problem, and that's the solution we find. But if you all are finding a better way to do it, I think that would be welcome information for Congress.

MS. LEBOEUF: I just want to add -- as Sean will know -- a lagniappe to this
conversation. Sara, I don't know if you were here during our opening remarks earlier this morning. I am keen on the federal agencies working more closely together to prepare for sea level rise in coastal-dependent infrastructure.

We're not going to be able to leave our coasts, but we can't stay like we are, and I think that will break down our barriers for us if we don't do it in advance of -- in advance of a crisis situation. So I would love to talk to you more about that.

MS. ROTHI-GONZALEZ: Sounds great. Please come and find me. I've love to just pick all of your brains.

MEMBER DUFFY: I'd like to say one thing on that, and it's kind of odd to be a navigation person and talk about beneficial use of dredge material in elevations. But --- I often hear no, but I don't always accept it. So I heard from the Corps several years ago that we were not going to change the beneficial use elevation in Louisiana.
We were able to. And as scientists will say -- so four and a half feet -- mean low Gulf became four and a half feet. So they kept the number the same, NAVD 88, which was a three and a half foot increase. I continue to believe that that's not high enough, and it offers a lot of money, and by being able to pump higher we can pump closer and that there's plenty of areas that need that restoration.

I don't know what elevation is in other areas. I'm a Mississippi River guy every day. But when I looked at a map with a bunch of scientists and just said show me below Venice, Louisiana where there's a point that's too high, because I've spent my whole life around here and I've never seen it.

Because of that, we were able to go higher. So sometimes we have limits like that that were established, that as we look at subsidence and sea level rise, maybe it's time to work on changing those to be higher and adjust to the present circumstances.

MR. EDWING: Hi, Rich Edwing, Director of CO-OPS. So as Congress considers an infrastructure bill -- and of course an infrastructure bill is appropriately going to focus typically on physical infrastructure, you know, dams, bridges, highways, those sorts of things, you know. The information infrastructure programs, we're hoping that, you know, they'll be some attention I guess paid to us because information, you know, datums, sea level rise, all of that information is really needed to help inform to the construction of that physical infrastructure.

So I'm not sure if Congress is kind of factoring that in, but if not I'd request you think about it.

MS. ROTHI-GONZALEZ: Yeah. I mean I am right there with you. As a former colleague of mine would say, you're preaching to the preacher, not just preaching to the choir.

(Laughter.)
MS. ROTHI-GONZALEZ: But I say that because I think you have to have the people and the platforms. So when people think of infrastructure, they think of bricks and mortar, and not people and platforms. And platforms are broad right? It includes intelligence from which to make better decisions about where you put the bricks and mortar, and the people to make those decisions and to find that information.

So as far as if I'm in any STAC level conversations, I'll continue to make that pitch. I hope you all will too. The challenges -- there's such a need on the gray infrastructure side that the message is hard to push through. But as I mentioned, I am hopeful that once we really quantify the blue economy in a standardized way, we'll be able to make that pitch much more strongly.

The other piece I would say is, for example, NOAA ships and aircraft. Those are infrastructure. Satellites are infrastructure, essential to figuring out how do we reconstruct
our roads, bridges and maritime transportation
system in such a way that it is resilient to the
great equalizer, sea level rise. So anyway, I
know we're over time. Sorry guys.

MEMBER DUFFY: I'd like to end by
saying thank you Sara and Glenn. I realize how I
was in the dangerous territory, but I say I live
in a minefield every day. So I appreciate you
and your comments are well pointed. Thank you
everyone.

CHAIR SAADE: Okay. So thank you
Sean and Glenn and Sara. We're going to take a
lunch break now. This is going to be closed to
the HSRP members, and it's going to take place in
this room. So we'll reconvene with the public
and everyone else at about one o'clock this
afternoon. Thanks.

(Whereupon, the above-entitled matter
went off the record at 11:36 a.m. and resumed at
12:59 p.m.)

CHAIR SAADE: Welcome back to the
HSRP meeting. Welcome Kim Hall, glad to see you.
MS. HALL: I am eight months pregnant and she's coming two weeks early.

CHAIR SAADE: So no excitement. Okay. Kim, could we take a minute to let you introduce yourself?

MEMBER HALL: Sure. As I said, I am eight months pregnant, so sitting's a little hard for me. I might not look it, but I certainly feel it, and I do apologize for being late. We had a pre-term labor scare yesterday and had to go back to the hospital. Everything's good, she's fine.

But my name is Kim Hall. I am the principal and founder of Brizo Maritime Consulting, which is a woman-owned small business that focuses on maritime security and nautical operations, which includes hydro-related things, mostly charting not the actual science and math of figuring out how to chart.

But I appreciate you all being flexible for me in my late attendance.

CHAIR SAADE: Okay. I'm going to be
turning this session over to Captain Jim Crocker and Ed Kelly --- Ed's an HSRP member -- for the stakeholder session, and their bios of course are in all the materials. So take it away Captain Crocker and Ed.

CAPT CROCKER: Let's see if I can get close enough so it doesn't reverberate. Can you hear me okay? All right, I've got to get closer. All right. Good afternoon everybody. I'm Captain Jim Crocker. I'm the chief of the Navigation Service Division in the Office of Coast Survey, and I'll be moderating the session with Ed Kelly, as you know, who's an HSRP member and the executive director for the Maritime Associates for the Ports of New York and New Jersey.

For this session, which we have titled NOS Stakeholder Perspectives, Priorities and Partnerships for the Future: the Mission of the Navigation Services - Data, Products and Services, we brought together a panel of experts who broadly represents the maritime and
geospatial communities that use and rely on many of the NOAA Navigation Services data, products and services.

So the goal of this session really is to provide the HSRP a deeper understanding of the importance and relevance of the NOAA Navigation Services portfolio to the maritime and geospatial industry, how the industries are evolving to new technologies and where new or improved data products and services from the Navigation Services will be able to enhance their operations.

Each panel member is going to be provided 15 minutes to inform the HSRP members about the industry communities they represent, discuss how their members use NOAA Navigation Services data, products and services and -- in their daily operations and provide recommendations, you know, kind of where their industry is going, future needs for Navigation Services. We'll follow the presentations with questions and discussion on that.
So to start us off, I've asked Ed Kelly to do the first introduction for our speaker.

MEMBER KELLY: Yeah, and I'd like to say I have the pleasure of being co-chair here. I didn't get involved with much of the heavy lifting on this. The original HSRP panel co-moderator was Captain Anne McIntyre, and as most of you know, she blew her knee out skiing and is not able to travel. She'll be not able to work for a few months.

So I'm in the unenviable position of coming in at the last minute when all the work is done, and get to be up here sitting up at the front with this distinguished panel.

Although all of the bios are in your packets, for the benefit of the public and the people sitting here and because of the diversity of the organizations that they represent, we decided to read brief bios, so that you really understand the depth and breadth and the perspectives that these people are coming from.
So our first speaker will be Captain Jorge Viso. He's the president to the American Pilots' Association. He was elected president to the American Pilots' Association in 2016. He served in numerous leadership positions including vice president of APA's South Atlantic States, vice president and president of the Florida State Pilots Association, and chairman of the Tampa Bay Pilots Association.

He chaired the APA's Navigation and Technology Committee, where he facilitated dialogue among professional maritime pilots on portable pilot units and navigation technology matters, and he worked with local and federal officials for navigation policies and infrastructure support.

Captain Viso graduated from the U.S. Merchant Marine Academy at King's Point -- yay -- in 1985 with a degree in Marine Transportation and Nautical Science and was commissioned as an ensign in the U.S. Naval Reserve. He was a state pilot in the Port of Tampa Bay, Florida from 1990
through 2016.

He holds U.S. Coast Guard credentials as master of steam and motor vessels, and chief mate of steam and motor vessels, and first class pilot for Tampa Bay. Captain Viso served as vice chairman of the Florida Board of Pilot Commissioners, executive board member of the Harbor Safety and Security Committee of Tampa Bay, and instructor at the Maritime Institute of Training and Graduate Studies, and the Maritime Pilots Institute.

Captain Viso will be speaking today on the critical information in a timely manner, and as you can see from his bio he's eminently qualified to speak on that regard, and represents not only himself and his own local pilot organizations, but through his role in the APA he's able to speak to us from the wealth of knowledge held by pilots all over the country.

Captain, the table is yours.

CAPT VISO: Thank you, Ed. I really appreciate the intro. Good afternoon. Thank you
for the opportunity to speak before this panel, and to describe how harbor pilots utilize NOAA products and services. The APA is the national association of the piloting profession. Virtually all of the 1,200 state licensed pilots working the 24 coastal states, as well as the U.S. registered pilots in the Great Lakes, are members of the APA.

These pilots handle well over 90 percent of the commercial, large vessel traffic that uses the ports in the U.S. The role and official responsibility is to protect the safety of navigation and the marine environment in the waters for which they are licensed. There we go. There we go, there we go. Got it. We're good.

I wanted to go over and break this down into three main parts that pilots are very conversant with and use. Initially PORTS -- NOAA PORTS -- the Physical Oceanographic Real-Time System. I had the dumb luck, I guess, of being there when PORTS was established in Tampa Bay.

Initially PORTS -- the birth of PORTS
was we had a discrepancy with tidal current predictions in Tampa Bay after the construction of the new Skyway Bridge. So we had gone to NOAA at that time and said we seem to be having a discrepancy on slack water times.

They deployed the array of instruments to determine what the new prediction should be, and out of that -- out of that equipment was born what we know as PORTS now, and it was really the first place that it got established. At least that's the story I got when I was training and I'm sticking to it.

The other area that's used quite frequently is air gap. Air gap sensors are used to measure the vertical distance between bridge structures and the water level --- or the water surface. Forecast services are another area. Overall weather conditions and geographically specific forecasts that may be critical to a particular maneuver.

I'm going to start with PORTS. Let's see. What I'm going to do with PORTS is sort of
cover --- I canvassed some of the pilot associations across the United States, and I wanted to give you real life examples of how these services are being used, and I'll start just with PORTS.

Speaking to Maryland specifically, the wind sensor that is located on the northeast tower of the Key Bridge is very critical in determining the number and size of tugs that are going to be required for docking. Baltimore water level sensor is used to maximize draft throughput in the port.

In the Chesapeake Bay, as you can imagine being such a large mass of water moving through that area there, it has a substantial impact --- the weather does, the wind. So wind events and weather events can affect the water level all the way up in Baltimore Harbor. The water level sensors are very critical to maximize cargo throughput.

Wind and current sensors along the entire transit of Chesapeake Bay enhance the
pilot's situational awareness. Deployment of visibility sensors has been appreciated, but they've been less reliable than the other sensors that have been deployed. PORTS is used heavily on mobile apps, on pilots using it on their phones. But they've also been able to integrate PORTS via AIS delivery onto their portable pilot units. That's been very beneficial.

Charleston -- the Port of Charleston, which is handling some very large container ships at this point, employs three main sensors right now. One tide level gauge and two air gap sensors for the two bridges there. Tide level is critical to cargo tonnage throughput, especially when you're handling 14,000 TEU container ships.

Every foot of cargo of draft equals money, you know, and that's both in cargo and in crane time. That's critical to them. Jacksonville, in Florida, the pilots avail themselves of all the sensors available, but funding has dried up in that port and they're essentially down to wind and air gap sensors.
Moving on to the West Coast, San Francisco. Current predictions there versus actual PORTS data helps them determine if the ebb is running late due to high runoff from the rivers, and that is very critical to some maneuvers. Visibility sensors determine visibility for passage through a federal regulated navigation area, or the local critical management area which has been determined by the VTS here and the pilots.

There is access to information through the platform that they use for their PPUs. So they have access to the internet with their portable pilot units to get that information. And finally, I'll mention Tampa. We're going to -- for me, it kind of all started there.

We use tide for maximizing bulk cargo movements through there. Wind sensors are basically a wide array that lets us look ahead and see what frontal movements are coming through the bay, since we have such a spread of sensors, and then we can adjust our passages accordingly.
Several movements in Tampa Bay are very current critical, and PORTS has been phenomenal for that. Tampa also served as a test bed for AIS transmission of PORTS information. By that I mean the information that's derived from the PORTS sensors, besides being on the internet, can be broadcast through the Coast Guard Automatic Identification System that they have control of, and can be broadcast to anybody who's got the equipment to receive it.

All the portable pilot units that are on the market right now have that capability to receive that information if it's being transmitted locally.

This slide here shows you what that information looks like in an internet format, where there -- this particular one's on my phone. But right there you can see that you've got tide levels, you've got currents, wind and visibility.

This slide here next depicts what that looks like on a PPU. When we first had the information transmitted to the portable pilot
units, we asked NOAA at the time and the other people that were involved -- Eleon Technology was involved. We just wanted it in text information, in this text format, just to make sure that it was going to work, because we were a little doubtful whether it was going to actually be able to push through all the time.

So this is what it originally looked like, but now many of the softwares that pilots are using will actually give you a graphic depiction of some of this information. But right there you can see not all the sensors are lit off all the time.

But this information that you see here on this slide came through the air, through an AIS receiver on the ship, and then sent to the pilot plug and the pilot was able to gain access on his computer right there, and as you know with PORTS, you're talking about every six minutes being an update. So very critical and very useful for us.

Here's another representation of what
you might find on the internet if you go look, and here's a consolidation of actual versus predicted on tide levels, currents, wind speeds, directions and salinity and temperature.

The next thing I wanted to cover was air gap sensors, and here is the Francis Scott Key Bridge in Baltimore, and you can actually graphically see what's going on with the air gap as it opens up some more and closes down. So this is critical obviously.

As ships are getting bigger, the tolerance on both ends, under keel clearance on one end with the ships getting deeper, but as they're getting bigger, we're restricted by overhead structures, power lines and bridge structures. This is so critical. As I'm sure you've seen in the news, the Bayonne Bridge, the vertical clearance there was changed from 151 feet to 215 feet by the reconfiguration of the bridge and removing that lower roadbed. That's huge. That has enabled 14,000 TEU container ships go up into Jersey through
that area. Otherwise, they'd have to put the
ship somewhere else or maybe it would go
somewhere else or trade somewhere else. So air
gap becomes critical as ships increase in size.

As an example in Tampa, when the new
Skyway Bridge was built, completed in 1986, the
vertical clearance there is 180 feet, and nobody
ever thought that that was going to be an issue.
Right now, some of the cruise ships and container
ships are in the 200 foot air draft range.

So right now Tampa is limited and
nobody ever thought that would be possible at the
time of the construction. We can't handle ships
that have an air draft of more than 180 feet.
Well that excludes Tampa from some of the major
cruise ship business and from extremely ultra-
large container ships.

This is how close it gets. This is a
Cosco development going under the Ravenel Bridge
in Charleston last year that I rode with the
pilots. That's the underside of the bridge, and
I'm taking that picture right from the bridge
wing, so you're right there. So I think you can see why air gap becomes critical.

The last product that's used heavily by pilots I want to talk about were forecasts, and two in particular. Graphical forecasts, what you see here, are useful for regional weather trends. We can easily see cold fronts --- so for wind shifts -- and also we can see fog development starting here.

These particular forecasts are very accurate for the most part, as accurate as they can be in a forecast, and very useful to us. Especially I can speak from experience in Tampa, these are very good indicators of what visibility was going to look like in the next 12-24 hours and we used them pretty heavily.

The other thing that we use is the Marine Channel forecasts, which are very localized, specific forecasts. They're useful for weather-critical choke points and weather sensitive maneuvers. An example, we have a very narrow channel that we transit in Tampa, the Big
Bend Channel that runs east-west.

It's only 200 feet wide. We're taking ships that are a little over 106 foot wide through that channel. There's not a lot of room to put leeway on the ship, because there's no water outside the channel. We would have to shut that channel down for certain wind speeds, and we've been able to open up that window with the localized forecast.

We can get a prediction. We can get it down to which direction the wind is coming from. There is some variability that we can handle wind on the bow or on the stern, not so much on the beam of the ship. But these localized forecasts are very effective for that.

We can project out ahead and tell the agent it's looking good for your inbound transit tomorrow at six in the morning. We're going to set up to get it done. Of course that can change, but it gives us some foresight and some planning ability.

The last thing I want to talk about
was delivery. The easy access, it's trending
that way what we can get on the web, and we ask
that you continue to make it. Sometimes the NOAA
sites are a bit scattered, and I know that you've
made an effort to consolidate those so we can
find things a little bit easier. But things tend
to be scattered a bit.

We'd love to see more AIS delivery of
information. That's very useful to us. It also
surmounts the problem of cell phone coverage. So
AIS delivery of information, you know, takes care
of gaps in cell phones. Continued cooperation
between NOAA and other agencies like the Army
Corps of Engineers, that has been very effective
in some areas and I'll just show you a couple of
slides here to finish up. I'm getting prodded
here.

We'd like to see expansion of
bathymetric ENC surveys and here's an example.
In Long Beach, where bathymetric ENCs are being
provided at a very high refresh rate as far as
what's available, what you see here is what the
pilot sees on the PPU, where the no-go areas are clearly marked in the darker blue and the red outline. This shows a pilot graphically exactly where he can and can't go, and it's been very effective.

So we would like to see more of that.

That's very helpful for us and AIS delivery would be wonderful. Thank you.

MEMBER KELLY: Thank you.

CAPT CROCKER: Okay. So our next speaker is Dr. Qassim Abdullah. He's a Chief Scientist and Senior Associate for Geospatial Services of Woolpert, Incorporated. Dr. Abdullah obtained his doctorate and master's degree in photogrammetry from the Civil Engineering Department of the University of Washington in Seattle.

He's an accomplished scientist with more than 40 years of combined industrial research and academic experience in analytical photogrammetry, digital remote sensing, and civil and survey engineering. Dr. Abdullah is also a
certified photogrammetrist by the American
Society for Photogrammetry and Remote Sensing,
and a licensed professional surveyor and mapper
with the states of Florida, Oregon, Virginia and
South Carolina.

He's also a certified thermographer by
the FLIR -- F-L-I-R -- Infrared Training Center
and a certified geospatial intelligence
professional in remote sensing and imagery
analysis by the United States Geospatial
Intelligence Foundation.

As chief scientist for Woolpert
Geospatial Services and a member of the Woolpert
Labs team, his current responsibilities include
designing and managing strategic programs to
develop and implement new remote sensing
technologies focused on meeting the evolving
needs of geospatial users.

His latest accomplishments include
evaluating and introducing the Geiger and single
photon LIDAR to geospatial industry, and leading
Woolpert Research activities in the field of
unmanned aerial systems, in sensor calibration
and workflow development.

Dr. Abdullah also serves as an adjunct
professor at the University of Maryland in
Baltimore County and at Penn State, teaching
graduate courses in UAS photogrammetry and remote
sensing. So, very pleased to have you with us
today, Dr. Abdullah.

DR. ABDULLAH: Thank you very much,
Jim, and thank you for the opportunity for me to
speak and Admiral Smith, thank you for the
invitation. We really appreciate it here. So my
representation is to kind of speak on behalf of,
unofficially, I mean on the geospatial data
provider. Woolpert we are data provider
ing engineering.

But I'm very heavily involved with the
ASPRS, American Society of Photogrammetry and
Remote Sensing, maps, members, and Penn State and
the University of Maryland-Baltimore County,
where I teach here. I would like just to give a
special thanks to our industry partners, my
colleagues, Jon Dasler and Jason Creech from Dave Evans, and Nathan Wardwell from JOA Surveys and Dave Kuxhausen from Woolpert. They really helped me a lot with the presentation slide.

So all I can say now -- I was talking to Jim earlier. Technology-wise in our industry, we are in a golden era definitely by all means. I mean nothing we could dream better where we are now. So we reach new highs in data acquisition and capability, and here what you really see, this is digital camera. We move to digital camera from film about 19 years ago.

But you see the quality of the digital imagery is just amazing. I mean the depth, radiometric depth of it and if we go to LIDAR -- I mean I assume most of you are familiar with the LIDAR, which is laser profiler. We fly it on aircraft, and thus could be with our bathy LIDAR, what you see here. I mean very important to this community definitely.

Or aerial LIDAR. Aerial LIDAR, we get -- we fly it now latest technology. We fly it
from 26,000 feet above the ground to get ten
centimeter accuracy, absolute accuracy on the
ground. So it is really amazing, mind-boggling
technology definitely.

Or mobile LIDAR. This is the
workhorse for the road infrastructure mapping for
now for transportation and DOTs. Nothing can
compare documenting the field as is. You drive
it once, you use it many times and it shows what
you see on the left side of the slide.

The wire, this is not an image. This
is just a 3D model for what's on the road,
whether pool, or wires, whether manhole, whether
road sit drives, everything you can see. So
you're really tracing the scene, but in 3D. With
accuracy, we're talking about less than two
centimeter accuracy, positional accuracy.

Stationary LIDAR, definitely. I mean
instead of airs, can't live without the LIDAR now
and its capability, and what you see here,
bridges and things being scanned by this LIDAR.
Or the latest now, the carry-on LIDAR, what you
see, you know. That's the best way to document
the scene. A lot of, as is planned now
engineering, the one done decades ago, they are
wrong because nobody map it right away where that
fiber optics or pipes is buried.

They buried it and somebody come later
to document it with hand-held board. But now
this is the way to do it. I mean somebody
carrying it on their back, they walk and it give
you accuracy, to the centimeter accuracy, where
that pipe was buried for example.

And now in the last few years, with
the UAV that runs now, it's getting very active
now, there are so many offering of LIDAR on board
of drones. So really LIDAR give us everything we
need, by all means. I mean there's no doubt
about it.

Whether sea floor mapping or
topographic map. What you see here, this is our
latest project with the latest single photon
LIDAR. We flew the big island in Hawaii. So
what you see is a three-dimensional, very clean,
very dense. You talk about 20-30 point per
square meter to define the surface. So density,
we never see it. We couldn't afford with our
regular land surveying or photogrammetric mapping
serial compilation.

We cannot afford to map the terrain
the way LIDAR has given us and what you see here.
For engineering design, it's beautiful. Nothing
can match the as-is documentation of engineering
project like LIDAR, because you could go with the
field surveying and you can get a few points on
the arch.

But you cannot map the exact and
compare it to the design. That's the advantage
now. You have accurate map to compare it to the
design, and you know whether the contractor met
the specs or not. So what brought us to this
golden era which I describe now?

There are so many factors contributing
to success by all means. First of it is advances
of technology. I mean the sensor technology is
like our smartphones. It's going so fast. It's
amazing definitely. You can't even follow it anymore. The second thing geo-location capability, like GPS, CORS station, OPUS services by NGS. And then the IMU, because all these technologies, the laser technology I spoke about, LIDAR we can -- we wouldn't be able to do LIDAR without GPS, you know, period.

I mean LIDAR wouldn't exist if it wasn't for the GPS. But GPS also by itself is not enough without the ground support of what NGS is doing, you know, with our OPUS processing, whether the monuments -- you know, the NGS monuments because we need the datum. We need to connect to a datum.

And then we have the ground surveying technique and survey monuments. That's all contribute to our success, and then OPUS and -- processing software. All that mix made us where we are now.

So I pointed to the OPUS and CORS station definitely. This is the excellent work of NOAA and NGS specifically, and so as the
ground surveying technique and survey. We are very capable now to survey to the millimeter and centimeter accuracy, and we'll talk a little bit about the exciting coming, the new datum of 2022.

So among the useful NOAA services which we cannot live without definitely is the CORS and OPUS project. I'm just listing a few. Horizontal time-dependent positioning, the HTDP. Access to aeronautical data, NGS Coordinate Conversion and Transformation tool, NCAT. VERTCON, weather forecasting for mission planning. Snow coverage maps, tidal records, historical weather, vertical -- the VDatum, the vertical datum transformation and National Reference System Modernization.

We are anxiously waiting for that. NGS did excellent job preparing the industry. They started five years ago for 2022 release, which was great preparation for the industry. That's what we really use on daily basis for our geospatial, whether land surveying, whether aerial mapping, whether bathy LIDAR and so on.
So some of the service acknowledgment and suggestions for improvement, because we requested to come up with some suggestions for improvement. I'm just going to list a few again here. VDatum is a great program, heavily used by geospatial industry. More funding to support more frequent updates. We hope that can happen. Extend coverage for shoreward, like 500 meters to account for changing shoreline, eliminate existing coverage gaps and convert airborne and vessel LIDAR shoreline coverage.

Incorporate river gradient datum such as Mississippi Low Water Reference Plane and Columbia River datum. Geospatial community concern over new geospatial data datum epochs and TD, impact on the VDatum. Adequate funding, we hope, for simultaneous update of all models on rollout, and the next point really relates to it.

There is a little bit concern about whether we are going to be ready to roll out the NTDE with the 2020, the new datum, the reference frame rollout. We just mention it, just probably
there is more going on than we know, but we just putting it before you so somebody will take note on it.

Extend coverage to Alaska, especially major ports and coastal community. Current NTDE is 1983 to 2001. We'll be updating to a new 19 years period soon. Some tidal datum reference modified five years epochs. Perform more robust GNSS ties at temporary tide station. Current RWS single for our observation of single tidal benchmark. Two simultaneous observation of two marks with improved ties between tidal datum and global reference frame.

Tidal datum and ellipsoidal height information for many tidal benchmark used in development of VDatum grids, reference different epochs. The reference epochs for the current NSRS is 2011, as we know, and the center for the current NTD is 1992. Combining tidal datum and ellipsoidal height referencing different epochs and to reduce errors, especially in a region with significant vertical land motion.
The coast is a great problem for the National Geodetic Surveys, and heavily used by the geospatial industry. Enhance funding to support and expand. This is very important. This is vital to our industry definitely.

Consider adding CORS station co-located with CO-OPS tidal station, where practical extend CORS network to offshore platform island to support ellipsoid reference surveying.

For a new installation, select coastal site suitable for both positioning and measuring water level via GNSS reflector metric. Precision navigation. Kudos to the Office of Coast Survey's visionary program. This is a great thing. I get a lot of praise for it for improving the safety of maritime commerce in key harbors like Long Beach, lower Mississippi River and New York.

Kudos also to CO-OPS for port support of dynamic under keel clearance need to be expand and obtain federal funding and fast for industry partner ships similar to CORS. Visionary use of
mobile mapping system. That was a great move
definitely, and hopefully this experiment will --
and experience with grow into more places.

That's vessel LIDAR, we put it on
LIDAR, and imagery for harbor asset management
and charting, bridge and overhead wire clearance,
precision positioning of future -- the LIDAR is
the best way to trace the scene, I mean in
surveying and mapping.

So using, using LIDAR for this, for
bridges, clearance and wire is a great move
definitely. Obtaining fund to expand the
precision navigation projects to all deep draft
ports to support increasing demand of maritime
commerce on ports, harbors and approaches.
Improve water level forecasts and near shore
bathy around Arctic community.

National Water Level Observation
Network, great program by all means by NOAA
Center for Operational Oceanographic Projects and
Services -- CO-OPS -- and widely used by the
geospatial industry. Enhance funding to support
and expand published relationship of NAVD 88 on tidal datum page for all published station.

Extend offshore observation biodiversity platform, biomound gauges and others. Consider expanding network through GNSS reflectometry, especially in challenging coastal environments such as Alaska. Improve GNSS ties at NWLON station by leveling ties between the NWLON station and nearby CORS, and through more robust GNSS observation.

Consider using modified five years epochs for all ties station to improve more consistency between tidal datum and ensure currency of tidal datum. That's all I have. I mean, I have -- still have two minutes for discussion.

MEMBER KELLY: You know we're going to leave lots of time for questions and answers. Okay, thank you. Our next speaker is Mr. Chris Edmonston. He's the President of BoatUS Foundation for Boating Safety and Clean Water. Chris is the Vice President for Government
Affairs of the Boat Owners Association of the United States, better known as BoatUS and President of the BoatUS Foundation.

He's been with the organization for more than 20 years, and in the marine industry for more than 30 years. He works with a wide range of external partner organizations and companies to promote safe and clean boating, as well as boating in general on behalf of the organization's over half a million members.

Chris has served on numerous boards and councils, including recently serving as the Chairman of the National Safe Boating Council. He is a graduate of the Virginia Military Institution. Mr. Edmonston please.

MR. EDMONSTON: Thank you. I've got a great job. I am just a boat guy and I get to play around with boats all the time. I am very happy. Glad to be here to talk to you about boating. What a great topic for me.

A little bit about BoatUS. We are an organization made up of recreational boaters. We
1 actually have over 600,000 members now and there
2 are 600,000 dues-paying members. We have over
3 500 employees across the country and have offices
4 in California, Florida, Virginia and Maryland.
5 We are the largest boat-only insurance company in
6 the country and we have the largest magazine.
7 There are some copies outside if you're
8 interested in having one.
9
10 We're also the largest provider of on-
11 water and online boating education for
12 recreational boaters. I've been teaching boaters
13 online for over two decades, and we have over one
14 and a half million people have taken our boating
15 safety course.
16
17 Our second most popular course is
18 navigation. We teach people some basic
19 navigation things online. I think it would be
20 safe to say that our start came from being an
21 advocacy organization, government affairs. Our
22 founder had a little beef with the Coast Guard in
23 the mid-60's and that started a long and
24 contentious relationship with federal and state
agencies, which goes on today. Yes.

(Laughter.)

MR. EDMONSTON: We do a lot of consumer affairs advocacy for our members and non-members alike. We intercede with boaters on their behalf with manufacturers, state and federal agencies and so on and so forth. Let me see here. And we use NOAA's resources quite a bit. I have a little screenshot there of our BoatUS app, which is something that I recommend all of you download right now if you don't already have it, and we highlight weather data, buoy data and tides.

Buoy data and tide data is actually from you directly, and we are in the process of switching over to NOAA Weather this year. It's taken us a bit because we had a little bit of difficulty of getting your data. But you guys have done a wonderful job of updating your APIs, your interface outlets and we are now able to successfully use your product on our app.

This is a very popular boating app.
We get about 10,000 new users a year. We just
launched this version last year, and we also use
your services for our towing dispatch. We have
the largest fleet of on-water dispatch in the
country, and if you look at our dispatch center,
they all have very sophisticated mapping
programs.

If you happen to hit that little
button at the top there, that you can see -- call
for a tow -- and it transmits the data and it
relates graphically on the mapping program to
show where the boaters are. Not underneath the
cloud by the bridge, but actually the lat and
long of the boat.

What products or services do we wish
we had? Be great if we had an API library for
all your products. You do have some great APIs
for your products, but they're here, they're
there, they're kind of hard to keep track of
where they might be. If there was one central
spot for them, that would be wonderful.

My programmers helped me write this
one. Buoy data as an API rather than a text file. Right now, we have to import your buoy data as a file and then convert it into an API for us to use on our system. Love the nowCOAST website. I wish that was in an app all by itself. I've got several NOAA apps on my phone right now, and I think nowCOAST would be a decent one to turn into an app also.

You guys also have river stage data and lake water levels, but it's kind of hard to get the data from your websites. You can get your websites referred to the locations and the stations, but not the data itself. It would be great if there was a way to get that data as a -- or through an API from your site.

I'll also say that we do have -- we probably have 150,000 members in Florida and we hear quite a bit about how they want better mapping for the Bahamas. Lots of our boaters go to the Bahamas, and our towers also go over to the Bahamas and they have a -- they struggle with getting good charts. It would be great if we
could overlap a little bit with what they use or
if we could send some boats over there to do some
basic charting in several of the islands.

As I already mentioned, bridge heights
and air draft of bridges would be a good thing.
We get lots and lots of calls of people saying
they're going to this location or that location,
and they don't know if their sailboat will go
underneath the bridge. What is the air draft of
it? And probably a lot more bridges than what
the commercial guys would need.

Working with your sister agency, the
Coast Guard, we have some concerns about their
push for synthetic and e-aids to navigation and
how they're going to be portrayed on charts,
either on paper charts or electronic charts. We
too would like some more information to be pushed
through AIS.

We think that's a very valid system,
robust system that would help bridge a gap
between cell phone and other services, satellite
services and it's under-used.
We also see a lot of companies promoting their new fish finders, depth sounders, and their bathymetric data capabilities and how I as a boater can take my chart plotter out there and essentially map the bottom contours of where I might happen to be and upload it into a chart.

That's great. It's not so great if I have never been to a particular area. It would be wonderful if we could get some updated bathymetric data in the government charts.

Corporately, we use -- I would like to see us get to the point where can use your geodetic data, your emergency response imaging and your weather data to help us look at particular harbors, locations where marinas might happen to be or boaters might like to congregate, to see if that's a safe place for them to be in a hurricane area.

It would be great if we could let's say look at Galveston and say you don't want to be in that marina, or if you're in that marina, it's going to cost you more for insurance because
that's not as safe as this place across the bay.
That's something that we would like to be able to
do down the road.

        For me personally, I am a boat guy.
I live on the Chesapeake Bay, and I use your NOAA
Chesapeake Bay buoy system app all the time,
except for right now because my local buoys are
not live. So it would be great if you could turn
those back on thank you.

        (Laughter.)

        MR. EDMONSTON: What I use those for
is dissolved oxygen. I know that if the
dissolved oxygen is higher, the fish are more
likely to be active and hungry. Salinity, sea
nettle probability, water temperature, wind
speed, things like that. I know that if I am out
and teach people how to drive a boat, I want to
be able to tell that the wind speeds are going to
be such that I can be in a particular area or
not. It's hard to teach somebody how to dock a
boat if it's blowing 15 to 20.

        That is really, I think, all I have.
I do, would like to say that the Office of Coast Survey has been a huge help to us over the last few years in particular. I've seen a great increase in interest and care for the recreational boaters, and the products you're putting out are vastly improved over what we had traditionally seen. So thank you very much.

Thank you.

MEMBER KELLY: Thank you, Chris.

CAPT CROCKER: Thank you, Chris. Next up will be Mr. Will Fediw, president, Industry and Government Affairs for Virginia Maritime Association. Will Fediw is part of the leadership team of the Virginia Maritime Association. He plays a key role to promote, protect and encourage domestic and international trade through Virginia's dynamic ports.

He's charged with developing and implementing strategies that improve the maritime business climate for VMA member companies, and keeps VMA stakeholders advised of industry-related, regulatory and legislative developments.
He is a recognized industry advocate, insuring open and timely representation and has been involved in maritime operations, stakeholder relations and industry advocacy, working closely with federal, state and local governments.

He helps orchestrate maritime infrastructure permitting, maritime transportation initiatives and maritime economic development solutions in multiple U.S. ports.

He's previously served as a commissioned officer in the United States Coast Guard, working in maritime safety and security, concentrating on regulatory compliance.

Will specialized in petroleum and chemical facilities and vessels, while also overseeing waterways, management activities such as waterway suitability, assessment and the establishment of regulated navigation areas.

He's a graduate of Old Dominion University, with a degree in maritime supply chain management and holds a master's of Business Administration from the University of North Carolina's Kenan-Flagler
MR. FEDIW: Thank you. Well good afternoon everyone. My name is Will Fediw. I'm happy to be here and excited just share on this panel as far as the commercial considerations from the industry, about how important several of these hydrographic services are to commerce, and how to drive and increase economic development not only in our state but also nationwide.

So I'm the vice president of Industry and Government Affairs for the VMA. We serve effectively as the voice of port industries, as you will, in the Commonwealth, promoting, protecting and encouraging commerce through Virginia's ports since 1920.

What's very exciting is we're coming up on our 100 year anniversary, representing over 450 membership companies throughout the Commonwealth, representing a full spectrum of maritime logistics and related companies. So when you think of your typical steamship lines, your towing and barge operators as well as your
terminal operators, but also rail, over the road trucking, logistics and distribution centers and manufacturers across the Commonwealth.

In 2014, William and Mary put out an economic impact study of Virginia's ports, showing that the port-related industry brought in $88.4 billion in spending, 27.4 billion in wages, and almost 531,000 port-related jobs. That's a little over ten percent of our state GDP, with 2.7 billion in state and local taxes generated, and almost 80 million tons of cargo moved.

Since 2016, we've had $3.7 billion invested, with close to 15,000 jobs created and almost 10 million square feet developed for port and logistics infrastructure. Also for both 2017 and 2018, we had over 2,500 vessels calling on our port, and we're the second largest port on the east coast as in tonnage, as well as third largest east coast port in terms of volume.

Now what that really means in the context of this discussion is that Virginia's maritime industry relies on the accurate real-
time data and services, the hydrographic services that NOAA provides. Primarily, we look at PORTS. That's something that our partners at the Virginia Pilot Association use all the time.

But it's not just the pilots who rely on this data. It's also economic developers and steamship lines that are determining what kind of vessels can call on our port and what type of opportunities can be realized. We also love our digital charts, as well as services from the National Weather Service and NOAA's waterborne assets.

That really helps us with heavy weather planning and recovery, and when you think about what goes into opening and closing a port with the Coast Guard captain to port in times of emergency, and how do you safely turn off and then back on the economic engine that is the port?

I want to talk to you just really briefly about what we're doing currently, with our widening and deepening of our channel. We
call it wider, deeper, safer and we have
authorization and funding to take our Norfolk
Harbor channel to 55 feet, and our southern
branch to 45 feet.

Now the Corps' 2018 Chief's report
recommended authorizing an additional two feet of
depth for our Atlantic Ocean channel to 59 feet,
an additional foot of depth to 56 feet for our
Thimble Shoals channel. But more importantly is
the widening of our Thimble Shoals channel to
1,400 feet overall, and the Chief's report did
support that recommendation, as well as giving us
FY19 work plan funds of $3.5 million for pre-
construction, engineering and design, which is
currently underway and our dredging project is
scheduled to begin construction in January 2020.

Now what that means for us to have the
widening and deepening of our channel, is to
allow two-way simultaneous traffic 24-7/365 in
all but the worst weather between our ultra-large
container vessels or ULCVs, and our large Naval
assets.
Also with taking the channel down to deeper depths, it allows us the potential of realizing a potential larger boat carriers for coal, so the cape-size class vessels. And between these ULCVs and the cape-size vessels, that accurate real-time data is crucial for the safe navigation for our partners, the pilots.

This is just a graphical representation again of what we have going on.

WRDA 2018 did authorize the 59 feet for the Atlantic Ocean channel, as well as the 56 feet for the Thimble Shoals channel, and that widening to 1,400. Now these infrastructure projects drive growth. For the Commonwealth and not just for our state, but also for the mid-Atlantic region and the heartland corridor, if you will.

But when you think in terms of growth, growth also brings challenges that have to be overcome. It's no secret that vessels are getting bigger and bigger. They're continuing to be built bigger and bigger, and that creates different hydrographic type conditions that our
vessel operators have to deal with, that our pilots have to deal with.

We never believed that we would have 14,000 TEU vessels calling in the port of Virginia, but in 2018 alone we had 160 of them. So now that is very common. We have this three to four times a week, and it shuts down the channel for one-way traffic for three to four hours at a time.

Right now, we're currently modeling 18,000 TEU vessels. We're going through the simulations so that when the channel is deep enough and wide enough to be able to bring in these vessels in the future. When you look at companies such as CMA CGM building their 2,200 TEU vessels, currently they're not scheduled to come to our port at this moment.

But when you continue to widen and deepen, who knows the possibility because that is what these commercial carriers are looking at. Again, I'm going to sound like a parrot because it all ties in here, is when our partners at the
pilots, they're coming in and they're bringing in these vessels, they're dealing with these in the simulators.

They're simulating what these crab angles are going to look like, what the different hydrodynamics are going to look like. It's one thing to have things modeled; it's another once the vessel actually shows up and they have to deal with these real-time conditions.

Therefore, it is just imperative that through our PORTS program, we continue to have this accurate real-time data, to aid them in this decision-making for the safe navigation of these vessels in and out of our port.

So what does that really mean for us? In order to bring in these larger vessels in the Commonwealth, we need a fully funded federal PORTS system. We're happy with the infrastructure that we currently have, but we need the funding to be in place to have it properly serviced and maintained with an assurance that this level of service and the
maintenance will be there in the future.

Because when you think about commercial development, these companies that are making these decisions, these investment dollars, they're thinking five, ten, twenty years down the line, and so they need to be able to depend on having these services in place in the future.

Other items that we need or that we've discussed further down on our list, an improved Cape Henry wave buoy. This allows us, especially in consideration of the cape class vessels, getting an idea of really where that tide is going to be, and so that they can start that inbound approach is crucial for getting those coal vessels in and out.

Also, trustworthy PORTS data informs in the way of CORMS. I have a story later on, it's actually pretty interesting, relating to that. Some of my colleagues had mentioned before, consolidated bathymetric data, both inside and outside of the channel. When you think of the work that the Corps does, when you
think of the work also that NOAA does, it's having a consolidation of all that data in one place, up to date, real time, accurate to drive these decisions.

And finally as mentioned before, consolidated dashboard for PORTS-type data. It's no secret if you go to the National Buoy Center, you know, that data is over there. You have tides and currents over here. If you're like me, you might have four, five, six, your own PORTS page. You have six tabs open and you're going through the Internet, checking all these pages.

So we know the data's there. It's just an easy fix, we believe, to have that data consolidated in one type of central dashboard to aid in that real-time decision-making. And really all this, as I said before from the commercial standpoint is this allows the safe facilitation, excuse me, of economic growth.

So just a few stories here as it relates to why this data's important, not just to the pilots, not just to the port authority, but
to the actual users and stakeholders of the channel.

The first one is easy. Our pilots and pilots nationwide use this data all the time, and they need it to be real-time, accurate and vetted. My friend here who likes the CBIBS buoy, we actually had -- we had a story as far as our CBIBS buoy, where there was an incident where there was a report that a 17-foot wave was coming towards Hampton Roads, and it caused a little bit of mild panic.

It was information from the CBIBS buoy. But basically we were able to call CORMS and they said no, that is not happening. That is not the case, and it was discussed that kind of looking at the design of that buoy, that it had possibly gotten sideways with its accelerometer and then a wave hitting it and it appearing to have this large surge of 17 feet.

That's a real concern for our stakeholders, in that if that data exists, that it's 100 percent okay. But it needs to be
clearly delineated out from what is CORMS data, what is accurate data and what is data that has not been vetted.

As a prior Coast Guard office as well as when I was doing economic development, port storm recovery. When the captain of the port is sitting there looking at making decisions on whether to open or close the port and he has the stakeholders call all around, being able to look in real time and see what the data is, what's happening with the Metocean data, what are some of the forecast conditions to really aid in that decision-making and when vessels need to be kind of kicked out of the port, if you will, and then when can they be brought back in.

Especially with we're the second largest port on the east coast, and with the largest Navy base in the world and the entrance to the Chesapeake Bay, it is vital for us to get our approach opened up, you know, when you think of the capes and when are we officially opened and closed for business.
And finally as I said before, companies that are looking to invest dollars nationwide, they look at this type of information on PORTS data. I was in the Gulf Coast where my friend Sean and we were developing these shoreside infrastructure projects for terminals.

When we were doing site selection and vetting sites, we were on the PORTS page. We were looking at these different conditions to know not only what the depths are, but also what are the tides and currents like, what are the different factors that are at this specific location.

So a real encouragement is that these investment dollars, a lot of case in our waterfront infrastructure, both on the private and public side, rely on this type of data to make sound business decisions. My friend and probably a friend of many of you, Captain Bill Cofer of our Virginia Pilots Association, he really wanted me to translate that, you know, we'd be lost without our PORTS page, and we need
to be able to rely on its being fully funded and
there for the long run, driving economic
development in the Commonwealth and our nation.
Thank you.

MEMBER KELLY: Thanks Will. Our next
speaker is Ms. Susan Monteverde, Vice President
for Government Relations, American Association of
Port Authorities. Susan joined American
Association of Port Authorities in 1999 to serve
as the head of the Government Relations
Department.

She's responsible for planning,
developing and conducting AAPA's legislative and
regulatory affairs program, in cooperation with
AAPA president, AAPA committees, the AAPA
Legislative Policy Council and other government
relations staff.

Prior to joining AAPA, she was
department head for Environmental and Public
Affairs for the American Chemical Society, where
she determined the strategic direction for the
Society's government relations program and
managed part of its implementation.

Susan also worked in the government affairs operation of the National Solid Waste Management Association and the Miller Brewing Company. Hmm. Now there's a liquid management. She holds a B.A. -- if you need a help in research, you know, if you have any contacts, we're okay.

She holds a B.A. in Political Science from the George Washington University in Washington, D.C. and she'll speak to us about NOAA Navigation Services and PORTS. Susan, the floor is yours.

MS. MONTEVERDE: Thank you. Thank you for inviting me today. As you can tell, we have a variety of people who are real experts in this area. Me, I'm a registered lobbyist in D.C. So I help NOAA get their money in addition to other things.

How many people here are familiar with AAPA, other than we said it 20 times in my -- I'll have to revise that. I realize that when I
got here, I was traveling and so as some of you know who, you know, and I said oh my gosh, did somebody at work send something? But I realized I need to update that. A few less AAPAs, and APA.

MEMBER KELLY: I used up a year's portion of A's.

MS. MONTEVERDE: Anyway, well you can tell from my bio that I've worked in a variety of government relations programs, from scientific research, which is what the national, you know, I worked for scientists. Even though it's the Chemical Society it's mostly Ph.D. chemists, and worked for beer, you know. You gotta get your first job out of college. Get that under your -- but that was kind of fun.

Anyway, AAPA is a little older than Will's group. We are over 100 and we're located in Alexandria, Virginia. We do a lot of work. We are public port authorities. I represent our U.S. members, although AAPA has members throughout the western hemisphere.
We do a lot of collaboration with our members. We do best practices and exchange. In fact, last week I was just in Miami for our cruise seminar that brings together members from Canada. Lots of Canadians came down, as you might imagine, and U.S., Caribbean and Latin and South America. So we have a real variety of things, but in the -- in the government relations space, we only work for our U.S. members.

And so in addition to education and training and networking, we have a variety of expert committees. I work and head the legislative policy support, and then we do a lot of outreach. So let me tell you a little about PORTS, and how we are involved with what NOAA's doing.

I've worked with NOAA for as long as I've been in the AAPA, which is over 20 years, and we are really excited to show our joint support for the fact that we're a maritime nation. When I first came, because I came not from the maritime community, and I worked for
industries such as chemists, which aren't exactly something people in Washington want to hear about, but they do want to hear about scientific research, you always take what you're talking about and put it in the way they're talking about it.

So when I first got here, we were talking about dredging. Let's go to sleep and snore. Let's talk about infrastructure, let's talk about safety, let's talk about fun for you guys. We pay for it, but you get to have fun. So things like that that are important, you know, we really have tried to work better and work with NOAA on trying to not just --

Of course we're always talking about money, but we want to do it in a way that's important to other people. So we spend, I spend a lot of time on that. As you heard from our other speakers, we work just in the commercial navigation area, just the public port area where the big ships all come in, a lot of the cruise.

You heard a little about some of the
cruise ships can't come in as well. So that's something that we work a lot on. Almost all the cruise facilities are our members in the United States, or almost all of them, and we do a lot of the big ships.

We spend a lot of time educating Congress. For NOAA for example, we are concerned that you've heard here that the PORTS program pays for the installation, but even though Congress originally at one point said it should pay for everything, that has been the difficulty and often port authorities are actually paying the bill for a lot of the PORTS program, and I'll get into that in a little while.

But that is one of the challenges, because some ports might have some deeper pockets than other ports, and is it really fair to a pilot to say oh, we don't really have the money. You guys just go under that bridge and hope to God you get through. I mean that's, that inconsistency is really a problem.

So as I said, we do a lot of work on
educating people about the maritime industry.

You probably know a lot of these statistics, you know. Hopefully when you get up today, you had something that affected you that came through global trade and came through a port. It might have been the coffee, it might have been clothes you put on.

If you have a foreign car, that might be one of the things. Some of the gasoline might have come, been imported into the United States. So there's a lot of stuff we don't think about.

We also are big on exports. You know, everybody wants exports. 95 percent of the world population and 80 percent of the consumption is outside the U.S.

Many times our exports really depend on a very efficient and inexpensive system. So the more that we can do to make it inexpensive for those exporters, the better they'll do, and the PORTS program is an essential part of that.

In the maritime industry, our estimate is 26 percent of the GDP is related to maritime
So there's a lot of maritime infrastructure. I'm happy today to talk a little about the PORTS infrastructure because -- P-O-R-T-S, not our ports. I'm sure many of you have been to a port I hope, or maybe you've driven by one. My kids really hate when we drive to -- my family's from Philadelphia, and every time we go by they're like oh, there's the cranes. Yes, it's Baltimore. Yes, it's Wilmington.

The big cranes actually have been good, because the general public sees it more, especially in the coastal area. But we're normally in urban areas. We often have things like bridges that we have to deal with. We have congested roads. We have to get that cargo in and out often.

People kind of think about the water side, but not really okay, the land side, what do you do once it hits the port? So we spend a lot of time in Washington talking about that as well. But we are here today to talk about the water
side, and how to make it more efficient and how to make it safe.

        Sorry, this is -- again, safe and efficient freight movement is both our priority and NOAA's priority, so we're happy about that. We look for timely arrival and departure of ships at the dock. We'd love to say that all ships are on time, not true. Weather can be a big part. Key components are the nautical charts, the hydrographic surveys, safety and efficient, as I said the NOAA PORTS program, which is what we primarily work on when we do a lot of the advocacy up on the hill.

        But we also talk about these other areas, and then the Weather Service. That has become, as we've had extreme weather events we, our members have become much more involved in storm response, and trying to figure out not only how to, you know, whether they have to move. For example on the land side, there was an example in New York with Hurricane Sandy, that a lot of the trucks actually had electronic starters, and
after the salt water came in, when they went to start them, they blew up.

So all this -- all these trucks that would have left the Port Authority of New York and New Jersey weren't able to do that. So the question is how do you make sure you have the equipment protected in the right area? So we do a lot of that with the Weather Service.

And then dredging for depths and widths. When -- you heard a little about the deepening in Virginia. We have to make sure those navigational lanes are put back in a timely manner when those things occur.

So let me give you an overall view of the PORTS system. There's 33 PRTS systems serving 76 seaports, and this is a map of it. Most, you know, most cargo comes through this ports, these ports in the United States. So I went and I put an email to some of our members, all our members, U.S. members, and said well what do you think of the -- I was doing this presentation, what would your recommendations be?
Some of them actually came through the pilots, even though we have a pilot here and I'd like to submit for the record something I got from the Lake Charles ports. But the challenges are maintenance of an aging system. As I mentioned, maintenance is a huge issue. It's inconsistent.

Will and I were talking, and if I misspeak, please let me know. In Virginia, the Navy pays for it, correct, in the whole port area in Newport News, or is it all of the port of Virginia?

MR. FEDIW: I believe yeah, they're covering --

MS. MONTEVERDE: Okay. So the Navy pays for it, your tax dollars. In other areas, let's take in Baltimore. The Port Authority pays for it. Their estimate is about 400,000 a year, not a small amount of money. In other ones, it's a consortium. Some places they run out of money. As I said, smaller ports, that can be a problem. So as we look at these older systems and how do
we, you know, we all have our smartphone that we
didn't have before, you know, all these new
technologies, how are we going to pay for those
and how are we going to get new services with a
flat budget?

We also, as I said, post-hurricane
navigation channel surveys are really important,
and we want to make sure we do that. And make
sure the nautical charts are up to date.
Sometimes the paper ones seem to take a little
more time than the others. So what I heard, a
lot of kudos. People love the PORTS system,
although some say the liability that we heard
before is a bit of a problem.

They thought perhaps look at, have
NOAA look at in each of the ports areas which
ones are the biggest safety issues and
reliability issues. For example, ship clearance
often is a big issue for folks, and there might
be some -- there's a lot of sensors out there,
but there's certain ones that should be a higher
priority for safety and for use if we know who's
using those.

Anyway, we also want to accept and share data from non-PORTS sensors. We've heard a little of before about the importance of trying to make NOAA information available, but also integrate it with others. If we switch to towers, to satellite signals, how are we going to pay for that? What's the system to do that?

And then we also got in the government shutdown some of the PORTS staff is not considered essential employees. And so if you have a problem or maintenance problem, you just have to wait until the government's open. Now that didn't used to be a problem, but in this day and age it seems to be a little more of one.

So in summary, let me first say that we're excited and to continue to partner with NOAA. We will continue to be a strong advocate in Congress about the need for NOAA's services. We want to partner with you and folks to continue to tell people that America's a great maritime nation, and we just hope that the cost issue.
Washington's a tricky place and there's a lot of competition out there. As port authorities, while we do often help pay or sometimes solely pay for the PORTS system, there's a lot of pressure on ports as well.

So we need some insights into how much is this going to cost not just today, not tomorrow, but you know in a month, in two months, in five years, so they can build it into their budget and figure out how can we focus on the most important things. Thank you for your time.

MEMBER KELLY: Thank you.

CAPT CROCKER: Well first I'd like to thank the panel members for taking their time and providing a lot of really insightful information. At this time I'd like to open up to general discussion and start off with the HSRP members, if there are any questions that you would like to ask any of the panel members. Captain Kinner. Mic.

MEMBER KINNER: Sorry, I forgot. My voice doesn't carry either. It kind of relates
to a comment I made this morning about getting
information out to basically my constituency,
which is the little guys.

There's a constant reference to
putting information out by AIS. I happen to have
one on one of my boats, so I can show it on the
radar, I can show it on my plotter. What I get
is the typical information. Who is he, how big
is he, where is he going, how fast is he going?
Is there some specific format, I guess there's
two parts to the question.

One is there some specific format when
you're putting out the safety information through
an AIS system, and two, is there some sort of
mechanism for receiving it for somebody who
doesn't happen to have an AIS transponder on
board? It occurred to me maybe this exists,
maybe not.

I've got apps on my phones for buoys,
for the nautical flags, for the rules of the
road, for BoatUS. Is there some kind of an app
that has been or could be developed to receive
AIS information, and if so how do we get that information out to your and my constituents?

CAPT VISO: I can speak to that.

Specifically, that information is coming through AIS' binary message. You have to have a receptor for it, some way to receive it, which I think is where you're driving at. Right now, that's currently in portable pilot unit softwares that are also being used.

Rose Point, for example, which is used across pilot organizations and a lot of tug and barge operators are using Rose Point, and that will receive that information and present it graphically or in text. But it's out there, but you have to have a method to receive it.

You can also -- you get it on an app. I can show you. I have a CIQ on my phone.

CHAIR SAADE: Can we just have a moment? We have the app right here.

CAPT VISO: Yeah.

RDML S. SMITH: So it is possible.

MEMBER KINNER: I'd like to get that
app, and then I'd like to know how we can get the
word out to the small boat fleet that they don't
necessarily have to install an expensive AIS
transponder, but that they can in fact when they
have cell phone available, get that information
real time.

MR. EDMONSTON: Speaking as a small
boat guy, I do have that app and I think for most
of the country, it's probably not relevant right
now. Most of the country, you're not going to
ever need AIS. It's in the places like around
here, Annapolis, Baltimore, that you're going to
need it and when I happen to turn AIS on my chart
plotter, it blots out the entire screen. So that
kind of defeats the purpose of it to a large
degree.

DR. MAYER: I think it goes beyond
just the AIS information. It's the fact that
this becomes a mechanism for two-way transfer of
information.

MR. EDMONSTON: It is and it -- it
is. You can use it for that.
DR. MAYER: And that's the key, is
that other pieces of critical information could
be transmitted that way, and hopefully in the
future with a little more flexibility.

MR. EDMONSTON: Right.

CHAIR SAADE: Okay. We have -- hold
on. We have a comment from somebody online
that's one of the HSRP members.

RDML S. SMITH: Anne, if you can hear
us, we're trying to unmute you.

CHAIR SAADE: Go ahead and try Anne.

MEMBER McINTYRE: As APA president,
you interface on an operational level with almost
all commercial ports in the U.S. Could you
please give us your perspective regarding funding
and ongoing operational support of PORTS funding
and operational support examples.

CHAIR SAADE: We're going to ask you
to repeat that. Just a second.

MS. MONTEVERDE: I think I got it, and
I think it was for AAPA, but it might be APA but
I'll take it. So the question is the funding for
PORTS and funding for navigation. As I mentioned, it's a hard time in Washington. Sean spends a lot of time up there. We sign letters. We go up to the Hill.

I have to say though, there is a coalition that works on it, but there needs to be more of a coalition, because if I look at AAPA, we have a lot of other priorities as well. While we want to be supportive of NOAA, we have dredging, we have land side, we have infrastructure, we have security, we have environment, we have a lot of things.

I do think those who scream the loudest in Washington do get attention, and Washington is very interested in hearing, I think BoatUS is a very, a great place, you know. They have a lot of members. You can bring this issue up and maybe you could talk a little about that as well.

We are holding our own, I guess I would say, and maybe Sean you'd like to, because you probably spend more time than I do and AAPA
MEMBER DUFFY: So as you know, I'm in trouble all the time. I'll be careful and simply say that as Anne mentioned, Big River Coalition looking at full federal funding for the PORTS system is something that I do outside of the panel, and we believe that is very, a very important effort.

I'd rather make sure that we're on the same page by sharing that letter privately to try to not step on that next mine below my feet. But I do think it's very important and something that we talk about.

Of course, maritime operations eat a lot of the federal budget, and one of the challenges as we all know is that pie has to get bigger so that the slices can get better, or we're robbing one project to fund another, and I think that's where we remain right now.

But definitely would be willing to talk more offline, and hearing the discussion, I realize that it's probably a good time to touch
base and circle back with APA and AAPA to hit
that, and also with Virginia Maritime. I'll be
very quick.

So Ed Kelly and I and Will are both,
all three on the National Association of Maritime
Organizations, and in that effort I can say that
we will be trying to push for PORTS funding and
trying to help solve that problem.

MS. MONTEVERDE: I'm not -- I would
say it's aspirational for us and we'll continue
to ask for maintenance funding. But we really
haven't made headway on that issue in Washington.

MEMBER KELLY: And we would agree.
That's why at the NAMO Sean and I and several
other people with the NAMO organization have
spoken offline about bringing back a ports
collection that had about 40 or 50 members at one
point. It was truly national, with various port
authorities, maritime interests, etcetera.

We're going to be back here in D.C.
next Thursday and Friday. It's getting to be old
home week, and we'll start launching that again
and we'll be sure and reach out to the whole list of people that we can think of, including certainly APA and AAPA.

CHAIR SAADE: Okay. We're going to try to get Anne again on another comment.

MS. DENTLER: I'm going to speak for Anne. Can you guys hear me okay? She wanted to ask Captain Viso to comment on the specific set he has encountered. Is that clear enough?

Please comment on specific set he has encountered, specifics.

MEMBER McINTYRE: Just more specifics.

CAPT VISO: Of what? I'm pretty sure Captain McIntyre's asking about funding. Is this still echoing here?

(Off mic comment.)

CAPT VISO: Yeah. I wanted to bang on the nail one more time here, and many of you may have read a book that came out about six years ago called, written by Rose George called Ninety Percent of Everything. It detailed basically how everything you come in contact with, and a couple
of people on the panel mentioned it earlier, that
what you come in contact with every day came by
ship.

When you think about all the stuff
that we deal with every day and it goes across
the country. It's not just at the port. The
port's just a landing spot.

From there it goes across the United
States, that something so critical as that, that
when it gets to PORTS funding that we should be
looking at the federal level and a lot more
support for something that is used by virtually
everybody in the country, but is focused in
specific locations. I just wanted to beat on
that one one more time. Thank you.

MS. MONTEVERDE: This is Susan
Monteverde again. You know, one of the
challenges, and I think as an advisory committee
that's a question for you, is when the President
puts his budget out and NOAA comes up with their
recommendation, we don't see maintenance in that
budget.
So Washington's a baseline. It's hard to get an increase from the President's budget. So again, if maintenance is important or the inconsistency in maintenance, who pays, who does this, and as I said right now port authorities are willing to pay for part of it. But if this gets really expensive, that's not going to continue. You know, that's going to be a bit of a challenge for port authorities.

So I think looking at that system is one that I think maybe this advisory committee might want to look at. Is it inconsistent, is it fair? Who's paying, who's using, things like that.

MEMBER KELLY: I just can't help myself. I always have to chime in on federal funding for ports. The issue is not just that the port authorities can pay for, but the system is getting more robust. We need to expand the systems. The cost of doing that and moving towards more precision navigation style products in more and more ports is going to continue to
push the cost to do that up.

It not only affects every citizen of the United States for our maritime trades and the business that moves and the economic engines, but the reality is that some of the biggest users of the port systems are not the large commercial operators that the port authorities are primarily representing.

They also, this port system is used by recreational boaters. It's used by academics, the National Weather Service. The Department of Defense is a huge user. So there's so many people that use this data, it continues to come back why do the deep sea commercial vessels seem to be the only people that have to pay for it. So there's an equity issue at stake here as well, and I think it is something that, you know, has come before the panel before and, you know, at least for as long as I'm sitting in there will continue to come up at every meeting.

I think it's something we should strive for and we should look for. Money in
federal budgets, we understand, is a difficult thing to find, but it is something that I think we're hearing universally in every place we go, is that that is an end goal that needs to move in that direction.

CHAIR SAADE: Julie.

CO-CHAIR THOMAS: I have two quick comments. One is Chris, I will talk to you if you have a minute afterwards, because I can -- there is an API to grab some buoy data that might help you out. Will, if I could maybe touch base with you, because I think it's very specific. But you have expand capabilities for the Cape Henry wave buoy, but then you mentioned that you wanted to know about the tidal data more precisely.

So maybe we could talk about that, what exactly is going on there, okay. Thank you.

CHAIR SAADE: Kim, go ahead.

MEMBER HALL: Thanks. This question I guess kind of falls to the whole panel, because we've talked about it a little bit, but I think
to Chris. Specifically, I've always -- it's been a long-going problem with AIS and what information is set out there. People think it should just be the ship data and nothing more than the ship data.

Where currently is the hiccup? Where is the stopping point? Is it still IMO deciding things, IMO being the International Maritime Organization, on what data can how -- talking about the SOPs for doing that and the process for doing it? Well what's stopping it? Because I know the Coast Guard has some issues, I know that other folks have issues or it's just -- it could be way too much data. How do you --

MR. EDMONSTON: Well, the ship data's fine. If you're using it for other purposes, then you come into some potential legal issues, yes. Yep.

MEMBER HALL: So where is the current sticking point? Do you know, because I mean it's been -- this is not a new problem.

MR. EDMONSTON: Well, it's --
MEMBER HALL: Pointing fingers.

MR. EDMONSTON: Yeah.

MEMBER HALL: Okay. So for the panel's perspective, and we write something up if we're looking at recommendations or bringing it to attention. Not that they wouldn't know, but it always helps sometimes hearing from a panel like us. Where could we kind of expand --

MR. EDMONSTON: It would be defining what goes on there, I would say or what kind of data, how much data. If you could silo the streams or something like that. I would imagine I'm not the technical person to answer that question. I know that there are some legal issues with adding new data streams onto it.

MEMBER KELLY: Folks just -- and we'll jump off from the panel right here. Ed, we'll give you two minutes. Captain Ed Page is pretty much every day up to his eyeballs in AIS-related stuff, and Ed, please try to keep it to about two minutes and just shed some light on that situation.
MEMBER PAGE: Ed, you know that's impossible.

MEMBER KELLY: Try it.

MEMBER PAGE: Real quickly, I mean IMO just came out with a document that's encouraging for the use of eNav and going on this road of using AIS. So you know, some of the complications are just the software technology, as far as being able to like CTIQ is triggered at IO Coastal Explorer or Rose Point, as you mentioned there Captain.

So you know, the technology, some is the cybersecurity issue. The Coast Guard has concerns that this is an open architecture, where they have a kind of closed bubble and now they're transmitting information, and so they're trying to find how to do that.

And but everyone's going on the track light. It's a matter of changing technology. AIS was designed with this capability, but it initially just looked at tracking the vessels, and later on they started building these systems,
and some of that capacity as far as the -- if you put too much data out, that's why the Coast Guard has to control the data going out. Otherwise, you overwhelm the system and they can't have the capacity of doing it.

But it's moving in the right direction, and there are more and more solutions coming online. But we've built 30 transmitting stations in Alaska. We transmit in virtual buoys, we transmit aids to navigation, weather information, you name it. Other ports have done it around the country.

So it's happening. It's just not totally institutionalized. It's developing software, hardware, policy. It's all developed. So it's moving in the right direction. It's complicated. Is that two minutes?

MEMBER KELLY: I think maybe even less. Congratulations. It's a first.

MEMBER PAGE: Okay, Ed.

MEMBER KELLY: So we don't want to beat one issue to death, but we just have to
remember that when AIS first came out, it was a
evessel collision avoidance system. It just
became so robust that all these new possibilities
have opened up. So it's going to continue to
evolve I'm sure.

What I'd like to do, I know we oft-
time neglect geodesy, and that's an extremely
valuable portion. Dr. Abdullah gave out kind of
a hit list of things he thinks could be fixed or
opportunities. Juliana, perhaps you could
address a couple of those.

MS. BLACKWELL: It's quite an
extensive list for all of our program offices.

So thank you, Dr. Abdullah. That was very
thoughtful and I appreciate the work that you did
with your colleagues to provide us that feedback.

I'll take some of the easy ones and try to
address them, and let you know that we're working
on -- we're working on many of the things you
mentioned, but we're at different levels of
completion and we're going to continue to work
down that path.
One in particular, the first that I wrote down had to do with the CO-OPS and the NGS benchmark data, and I know that we are working together and our database people are working at how we can exchange that data and make it available seamlessly, so that that information isn't in two different places and different.

Now whether or not the benchmarks will have NAVD 88 heights on them, I can't answer that right now. But I can follow up with you and others to give you that information, because I'm not quite sure what the status is of all of the CO-OPS data.

But we do have a team that's working together. They updated us in December on progress, and so hopefully I don't have an estimated date for that, but that is something that we're working on. As far as the tidal datum epoch, well I'll leave that for Rich to answer, as to when that would be available.

And then I think one of the other ones that I noted down was related to the CORS, and
I'm not sure exactly how it was framed on your slide, but in thinking about PORTS and some of the other things and maintenance and what it takes to support a system, really a crowdsourcing user-contributed system is CORS.

If there's 1,800 stations approximately in the NOAA-managed network, NOAA owns very few of those. By few, somewhere between 40 and 60, depending on how you count them. Most of those stations are from our partners, and there are over 200 groups that have those available.

But at some point you reach a capacity internally of what you can manage, and I would say in order to grow that, you know, we're at that point right now where we've been holding about to 1,800 stations for a while now, because we've kind of maxed out what the personnel that we have and the network that we have, the IT network, the redundancy, that, you know, the baseline that we have internally to enable that to grow and to modernize it so that it's truly
GNSS-capable.

Not just GPS U.S. system, but how do we -- how do we improve it and how do we reach out to our partners, do that we can not only have upgraded equipment at those sites, that they upgrade and we give them guidance on it. How do we update our software and how long is it going to take so that we can incorporate all those different types of satellite system data?

When you do that, you're even going to be able to improve your positioning even better when you've got multiple satellite constellations that you're integrating into one, into one receiver, one antenna. So we are working on that. It's going to take a number of years, and of course it's based on the resources that we have available.

But at this point, I would say we're just trying to maintain what we have, and I think, you know, when you're talking about ports and funding for that, I mean there's an expense to building in a new area and outfitting it with
the right sensors, but there's also an expense on
the other side of the personnel that are
required, especially if you make them, you know,
essential, which was one of the great comments
about what happened during the shutdown and any
feedback that you had for our products and
services that weren't available.

So there's different ways of looking
at the cost of that as well. So I know that
doesn't answer many of things that you brought
up, Dr. Abdullah, but I hope that you realize you
touched on a couple of them, and we're continuing
to work through our strategic plan, through our
outreach efforts and through building support to
continue to build out the resources and the
products that we need to make it even a more
robust system for positioning in the future. So
I'll hand it over to Rich and see if you have
anything you want to add to that.

MR. EDWING: Yes. Rich Edwing, and
again I very much appreciate it, your multiple
slides of I think very specific and insightful
comments. I stopped writing down, because I figured I'll get your -- too much to write down. But all I'll say is I think the good news, as Juliana said, many of the things you mentioned we are already working on, and actually we just came out with the new strategic plan. A lot of the things you identified are in that strategic plan to work on. So it's a good validation of some of the priorities we've set out. So I really appreciate it.

DR. ABDULLAH: Thank you.

MEMBER KELLY: I'd like to draw attention perhaps to NOAA's first responder units. Perhaps I could ask both Will and Susan to make any comments regarding the NRT, the Navigation Response Team. You both have experience with port disaster situations, and the NRTs are kind of like the ambulance drivers and the fire people. You hope they never have to come to your house, but when they do, you're thoroughly pleased with how professional, efficient and how
helpful they all actually are. I just have nothing but great things to say for our recovery after Sandy and other storms.

But perhaps, you know Will, any experiences in Hampton Roads and of course, you know, Susan perhaps overall.

MR. FEDIW: So again, I'd like to just reiterate how important it is to have both in not only just the pre-storm type of preparedness but the post-storm recovery. When, like I said, when you have vessels sitting offshore, whether it be container ships, petrochemical carriers and the millions of dollars that are sitting offshore waiting to get in, and especially if you have critical facilities that need certain products or supply, again thinking about the petrochemical industry.

But not only that, but when you think of national defense, like Hampton Roads and Norfolk Naval Base, the biggest in the world. So to have teams that can come in immediately and survey an area, make sure things are safe for
navigation, and to again turn the economic engine back on, it's millions and millions of dollars daily, as well as keeping just that continuity and flow of goods and assets and also national defense.

MS. MONTEVERDE: Recovery is really important for our members, and as you've heard from Will, on getting folks up and going as soon as possible. It's kind of something you don't hear about. You hear about FEMA all the time, but you never really hear about NOAA or the Corps of Engineers going out and making sure that those channels are safe.

So that's really important. It might be something that this group needs to highlight more, that this is an important component. It needs to continue to be, have strong funding and it really is essential to getting our maritime system up and running after a disaster.

MR. FEDIW: And I'll just add one more comment on that. You don't realize how important it is until you're the port that after a storm is
told that the nearest survey vessel is two days away, and then it really starts to cause an impact and a hurt. So you definitely want those assets in place, so you can appreciate them before you need them desperately.

CHAIR SAADE: Anuj, go ahead.

MEMBER CHOPRA: Thank you. Two questions actually, one for Captain Viso and one for Susan. Captain Viso, we've been facing a massive amount of fog days in the Gulf and other areas, which is hampering traffic. When we look at Europe, Europe is now able to manage traffic with fog. If you had a dream board, a white board, a white sheet, what do you think we would need to have traffic working 100 percent during fog?

I'm sorry, I'll say the next second question as well, and that's for Susan. Susan, looking at the AAPA, what's your policy on the ocean rise? How do you see it? How do you tackle it and what's your strategy towards expected ocean rise, as most of the scientists in
the world are saying that?  Thank you.

    CAPT VISO:  White board starting, I
would start with an air heater and a big fan.
No, well and we were talking about this before
the panel started, how the ports are set up in
Europe are certainly different than they are in
the United States.

    So it would take a shift in how the
overall picture is put together, and it would
take a coordination of a lot of pieces.  There's
a lot of moving parts here.  You've got the
technology to do some of this work.  You need the
infrastructure from the shore side, so that comes
from the port authorities or whatever the
facility is, and you've also got a regulatory
framework to work with with the Coast Guard.

    Across the board right now where I
worked in Tampa, the fog issue was always the
pilots call for many years.  Then it was
structured after the Cosco Busan.  So right now
in Tampa, the Coast Guard decides when the port
is going to open and it's taken us, as pilots,
out of the loop.

Now they have -- they have a criteria that everybody knows, but it's structured. But to answer your question, it's going to take coordination between a lot of stakeholders. If you want to facilitate, you know, a particular industry that has time-critical movements because of passengers, you have to get buy-in from the other people that are working in the port, who will also make a case as to why theirs is just as important or more important than the other people.

So everybody in a big room with a white board would be a good start to answer your question, and it would probably need more infrastructure from the shore side too, and regulatory. That's another piece with the Coast Guard. They handle like pilots do kind of it depends where you're at and what the conditions are.

As I always say as a pilot, every port is different, you know. The concerns in one
place are secondary in another, and those are geographical, geographically driven or, you know, weather conditions for that particular area. So there's not a one-size-fits-all for any place. But I think one group can learn from another, as I've seen in the last couple of years. Thanks.

MS. MONTEVERDE: I got so enthralled with the whole issue of fog I kind of forgot the second question. But just to -- let me talk fog for a minute, because we did -- I did hear when I surveyed our members, that a lot of the fog sensors are not working.

But it might be that there's certain areas where it's really important, and in other ports as we just heard, there's other priorities. So I think it's really important to make, you know, decide how important is it. Maybe on the Mississippi, but in other areas it might not be as important. I'm sorry. Your second question?

MEMBER CHOPRA: Sea level rise.

MS. MONTEVERDE: Sea level rise, oh yes. Okay. So whether you believe in climate
change or not, we all know the sea is rising and
a more important thing often to ports is the
extreme weather events that are affecting us.
Now ports are used to tidal rises and falls.
That's pretty common.

So we -- when we do infrastructure
improvements on the water side, I'm sorry, on the
land side, we normally now our engineers do look
at sea level rise. A lot of the problem is the
connecting infrastructure, which we don't
control.

Now the good news on sea level rise is
your ship, maybe you don't need as much dredging.
But we don't talk about that that much. So but
on the land side, for example the Port of New
Orleans had a problem where they were ready to
open, but the roads coming into the port and the
railroad coming into the port weren't ready to
go. We don't control that.

So that is a big issue for us. We are
planning for it in our own facilities. But
again, the federal government or the state
government that owns that connecting -- if you recall, I had a little visual about that. A lot of that connecting infrastructure is not ours, and hopefully we are seeing some improvements in certain areas.

But it is a concern, because we do want to make sure that we can -- we can deal with that. The extreme weather events were a problem with getting your personnel back. The facilities themselves in most ports in extreme weather events, we haven't seen big problems. Where we've seen problems is we can't get electricity, so we can't open the port.

But, by and large, and that's going to be more of an issue, too, the grid sustainability, as we move more to electricity, encouraging ports to electrify. What happens if the grid goes down in extreme weather events? So they're all tied together. We're interested in it and we're talking about it, but we don't control a lot of the, you know, we certainly don't
control a lot of the connecting infrastructure
coming in and out of ports. But ports themselves
are looking at this from a structural point of
view, depending on, again, if they're in a place
that high/low wave and tides, they're kind of
used to that and take care of that now.

    MEMBER KELLY: Yeah, Susan, I'd have
to agree. Lessons learned post-Sandy included
the fact that we've had the maritime and the
ports recalibrated for the grid, to get the
electricity back at the same level as hospitals
and other emergency criteria.

    We found that they took a look and it
was said that there was no fuel in the port. We
had more fuel than we knew what to do with,
gasoline, but we couldn't get electricity to pump
it to put it into the trucks to deliver.

    So you know, it was really taken and
looked at, and I think that has to be done for
every port, to be pre-prepared to change your
status for service recovery issues, and we've
done an awful lot with that with the states. I
think all ports really -- if we had done that
before Sandy, we would have had a lot less
trauma.

CHAIR SAADE: Nicole.

MS. LeBOEUF: Yeah, sure. Glad you're
thinking about sea level rise. I was just in San
Diego at Oceanology International last week, and
folks were saying oh, we're just going to design
floating ports. Great, okay. So that's one
idea. But I will reiterate. I think this is
going to be in everyone's lane here pretty soon.

What I did want to address is your
comment about getting the word out about our
emergency response capabilities. We've been
working really hard with FEMA over the last
couple of years to just even make them aware of
NOAA's capabilities.

It's a bit of a double-edged sword.
NOAA is relatively small, so I don't want to -- I
don't want NOS to turn into an emergency response
agency. We do a lot of other things. But those
conversations are including getting a broader
NOAA representation on the regional committees that FEMA has.

They have regional councils that talk about issues and typically NOAA has a Weather Service person on those committees, and we're educating the Weather Service person how to talk about NOS-related issues. We also for the first time just had all of our mission-essential functions deemed as prescribed mission assignment by FEMA.

That was a big achievement for us. That means we're not going to take it out of hide when we do respond to emergencies, and as I mentioned earlier, we're also leaning into the supplemental fund requests, so that people understand or that Congress understands how much we do have to do and are called upon to do after disasters.

The yin and the yang of supp funds and prescribed mission assignments is pretty important to get that legally correct, because there are appropriators that watch those things.
But we are leaning into that pretty hard, and hope to really be more of a player.

CHAIR SAADE: Sean, go ahead.

MEMBER DUFFY: So I just wanted to make one comment on fog. It's been one of the challenges for us recovering the channel, the Mississippi River Ship Channel this year. Because of the fog has been so extreme, survey vessels were unable to run and dredges were unable to run, and ships were trapped offshore. Where many vessel operators were voicing that they wanted ships to move in the fog and nothing else will be out there. At that same time, Corps hopper dredge Wheeler went into Anchorage and overnight was struck by a lift boat, and a fisherman off the main channel lost his life in the fog.

And I think that's one of the complexities as we have non-commercial maritime users, the fishermen, recreational boaters and, you know, can we really control whether they're out there or not. If there's nobody else moving
in the channel, then it makes sense that it would
be easier to deal with.

But how could we guarantee that.

Because of that, of course we don't want to have
survey vessels not able to perform their duty or
dredges not able to dredge. When you're trying
to recover your channel, you want all your
dredges going 24/7. So the fog issue is really
complicated, and again that's 256 miles of ship
channel.

So it's very different. I know a lot
of the fog sensors have -- I want to say I
remember about 20 to 30 miles of visibility. So
looking at predicting how to change that is going
to be a challenge. Right now, I think it's just
safer that they not move until we figure that
out.

CHAIR SAADE: Dave.

RDML S. SMITH: And Sal.

CHAIR SAADE: And Sal, yeah.

MEMBER MAUNE: I think the time will
come that America's vulnerability to the GPS and
GNSS system always being there is going to be challenged by enemies of the United States and even by local guys that have their own reasons for jamming the GPS signals. I understand that truckers in Germany, for example, use jammers to jam GPS systems so that they don't get charged for tolls on certain roads they drive on.

If it's so easy to jam GPS, does our maritime industry have backup plans on what they do in the event GPS isn't there for them?

MEMBER HALL: I can answer that one. No, no. Maritime is one of the ones that's farthest behind when it comes to cybersecurity issues, like significantly behind the track and are just trying to catch up in response. We're in full response mode, not in planning or even countering.

So it is a well-known -- we have the one. My favorite is Teterboro Airport. There was a gentleman who would come -- well, they didn't know why. The airport kept going out, the GPS would go out. So they were really curious
what was going on, couldn't figure it out, like
at three o'clock on a Thursday afternoon every
week.

    Well, it turned out was it was a
gentleman in a truck and there's a no-name motel
at the end of the airport, and he would meet up
with his lady friend, and he didn't want his
company to know he was there. So he bought
himself a GPS jammer and it shut down that
airport every Thursday at 3:00 p.m.

    So something as dumb as that is still
quite a problem for the industry, and it's not
just -- obviously that's not a maritime example,
but that is something that the Coast Guard's very
curious about.

    IMO's been working on it and it's a
well-known problem. It's just not a well-known
problem on how to get your hands around it. But
when it comes to GPS, they're well aware. I'm
not sure how many strides we're making at this
point, though.

    CHAIR SAADE: Sal.
MEMBER RASSELLO: I have a question for Captain Viso and also for Dr. Qassim. Related to fog, we are going around the government for years now, and there is force that operates with fogs, operates also to traffic, not just passenger ships. One of the questions for Captain Viso is what kind of infrastructures do you foresee to mitigate this problem in navigating with low visibility from the port?

CAPT VISO: Well, as I've indicated today and always do when we get to this discussion, I leave the operational part of how it's going to happen in the current situation to the local experts there, which I consider the pilots in that port.

The infrastructure-wise, you know again sort of what I touched on. It's going to take a coordination between entities here. I think radar is one of the things that is least vulnerable, and operationally understood, and could help the situation.

I think radar is one of the things
that is least vulnerable and operationally understood and could help the situation. The geographic layout is sometimes a problem, and you know, just as quick example, the Mississippi River is one thing. I've seen that operation with cruise ships operating in restricted visibility.

But in Tampa and in Houston, for example, a very narrow channel, buoyed and the shoreline is very far away. So radar navigation is not precise enough to absolutely nail your position where you are.

You can sort of go up there by Braille to an extent. But you can do that, and I'm glad somebody mentioned GPS vulnerability, because everybody, especially in the marine navigation side of it, is totally dependent on GPS at this point, absolutely.

You really can't argue that, that everybody, everything is tied to GPS, whether it's AIS, whether it's ship positioning, everything is tied to the GPS signal. The Coast
Guard authorization bill has directives to the Coast Guard to act on eLoran. Whether that's going to happen, we'll see. But at least at this time.

So to be more precise, I think it's going to take infrastructure. Radar would be the obvious one and something more bulletproof than what we have right now, because GPS is very brittle in the sense that it's very vulnerable. It doesn't take much to disrupt GPS, and everything is linchpinned on GPS right now.

MEMBER RASSELLO: So connecting now, Dr. Qassim said before about the technology on the market now to be able to see to the millimeters from the sky. Do you foresee any kind of technology that can be applied on the ships, to navigate into fogs that can overcome the problem with GPS, because that would be only visual, right, and also the, you know, the reliability in navigating in fog with your technology.

DR. ABDULLAH: Yeah. Unfortunately,
if it's really thick fog, LIDAR, it will affect
the laser of the LIDAR, you know. Like I
mentioned, the problem with the LIDAR, if we're
talking about the problem with GPS, is we rely on
the GPS. Without the GPS and location and geo-
location, we cannot get data from the LIDAR
itself.

So the LIDAR will probably in bad
weather, it won't be a good solution definitely.
I mean your option here is really the LIDAR, for
example you know. But for the navigation, for
the former discussion, I think -- I mean taking
GPS into consideration as the way we navigate, I
think the GIS geospatial, you know, Geographic
Information System for the ports, you know.

A smart geodatabase now. It could be
the way. It will be like driving your car now on
Google Earth or Google Map, for example. But
that's really the way to do it now. I mean if
you have a good GPS in the boat, and you have all
them for structured map to an accurate
gecedatabase, where we know every coordinate
within centimeter, that you can navigate clearly
using because the map should show you how far you
are from any wall or corner within a few
centimeters.

I mean without having sensors, because
if you look at the autonomous car now, they think
about the sensor, you know, the LIDAR and
infrastructure sensor to feed back. But I think
we have a solution with a GIS database, where you
map it once and then it can be loaded to all the
boats, and they know exactly where every hard
object in the port, you know where within a few
centimeters.

MEMBER RASSELLO: And underway.

DR. ABDULLAH: Under what?

MEMBER RASSELLO: And also underway.

DR. ABDULLAH: Yeah. Oh yeah, yeah,
definitely, yeah. That's the way you need to do
it, the smart way.

MEMBER KELLY: We're going to do our
best to try to stay on time. We've got about
three minutes left. Maybe one more quick
question. Anybody have one?

CHAIR SAADE: Gary, go ahead.

MEMBER THOMPSON: Yeah. The Captain already kind of covered. I was going to ask the Coast Guard this morning what the status of our backup GPS plan was, but we ran out of time. But you're right. We need to -- this country needs to realize that GPS is vulnerable and seriously look at a backup plan for GPS.

DR. ABDULLAH: Can I just have a comment, I mean if there is time, or no time?

MEMBER KELLY: Yeah sure.

DR. ABDULLAH: I just want to recap. I finished two minutes early, so I want to comment. I mean, I mean you guys, you should be proud of what NOAA in general, NOS, the Office of Coastal Services. I mean for us, the way we see it as a government at this space, you know, as best performing. I mean this is not only for the services they provide, you know. I'm dealing a lot with NGS and Juliana.

I mean the quality of people we're
dealing with, the scientific breadth they have, whether Rachel, whether Drew, whether Mike, you know, I mean they have the right formula for us. So the services done by NOAA and NOAA offices is just amazing.

I mean I don't think anybody replace it. Private's not going to be able to match it or do it, and we have a critical list, but that's just for improving the work so we move forward.

So we really like just to say thank you for all that you do and give them the support they need as much as you can. Ask for funding, because this is not a waste of taxpayer. This is the right use for it. Thank you.

CHAIR SAADE: Well said.

MEMBER KELLY: We couldn't find any better way to close than that.

CHAIR SAADE: I agree.

MEMBER HALL: Can I just have thirty seconds?

MEMBER KELLY: Thirty seconds.

CHAIR SAADE: You're going to steal
that great closing.

MEMBER HALL: I am, because I agree with you. But I also want to thank the panel. But I want to give AAPA some credit because I did not just a second ago, and I think it's really important. When it comes to cybersecurity, they are the most advanced in the maritime. Working with their members, they've got one of the best experts in April Danos from Port Fourchon. So I don't want to ignore that people are -- and it's coming from industry, not from government in that case. But I'm sorry to take your thunder. I do appreciate the comments. We've worked, I've been on the panel for four years now and as I see here, that we'd like the icing on the cake, but we'd like the cake because cake's good. Thanks.

MEMBER KELLY: I like Qassim's ending better, but you know. That's okay. So with that, I'd like to just thank all of the members of our panel. Did a great job and also to Captain Jim and Captain McIntyre, who helped to
put this all together. Really, I think it shows
the value of the services that NOAA is producing.

There's always room for improvement,
but it is appreciated and it's a well-done job,
and we hope to continue to build on improvements.

So with that, we'll close. Thank you.

(Applause.)

DR. ABDULLAH: It's nice to meet you.

Good job guys.

CHAIR SAADE: Okay, break time.

We'll get back here in about 15 minutes. Thanks
everyone.

(Whereupon, the above-entitled matter
went off the record at 3:00 p.m. and resumed at
3:18 p.m.)

CHAIR SAADE: So I'm going to stand
up here because at this time, it's public comment
period in the room and on the webinar, and I just
didn't want my back to all you folks that are
going to be commenting. So who's first?

Don't be shy. Go ahead. We have to
get you a mic. Hold on.
Before I hand off the mic, I've got a couple of quick announcements. Bill Hanson and Helen Brohl are both with us right now, both former Chair/Co-Chairs. So it's nice to have you guys visiting with us here.

(Applause.)

CHAIR SAADE: Go ahead, and if you'd introduce yourself please.

MR. BARLOW: Good afternoon. My name's Roger Barlow. I'm with the U.S. Geological Survey, National Geospatial Program. We are the topographic mapping portion of USGS. A topic I want to address this afternoon is large scale shoreline mapping, which dovetails with the previous conversation.

Current mapping practice with USGS is to display shoreline with our U.S. topo product at the 1-to-24,000 scale, and the typical scale at the high end of depiction for NOAA charts is 1-to-20,000 scale. I'm talking about a scale commensurate with 1-to-2,400 scale.

Lidar's capable of producing data at
1 to 1,200 scale. We are producing about $30 million of LIDAR nationwide a year in topographic LIDAR through the 3D Elevation Program. NOAA's collecting topobathymetric data in a number of areas and JALBTCX is collecting topobathymetric data in a counter-clockwise fashion around the country. Last summer, they collected the Atlantic coast ocean-facing.

So there's a lot of data out there, and I am interested because of a number of use cases, to begin to show shoreline at a much larger scale. So it becomes relevant to a number of new users that aren't able to key into the smaller scales of 1-to-24 and 1-to-20,000 scale. So the number of use cases I'm going to go through now, just to give you a brief idea of who those users might be.

The first group would be infrastructure and stormwater. So I'm working on a project right now which will be delivered in just a couple of days, where the D.C. stormwater network is going to be into the National
Hydrographic Dataset.

That's important because where does stormwater go? Well, it goes into water that (microphone disruption). So in this case, the Potomac and Anacostia Rivers. So it's important for them -- I'm sorry. Thank you. So it's important to understand where shorelines are in terms of the zero contour, and how that relates as shoreline changes, sea level changes to where the outfalls are into the water. Other infrastructural items of course are transportation networks, mass transit tunnels and power stations, substation stations, all those types of things that are located near water.

It's really important to understand where the shoreline is. That's not adequately represented at 1-to-20,000 or 1-to-24,000 scale.

Another issue that -- use case that requires public safety and emergency response is down at the local level, they need that accurate larger-scale shoreline data.

Integration with parcel data is part
of that, so that landowners, individual landowners can understand where the shoreline is and how the inundation modeling might affect them based on short-term events, in particular storms, but also in the longer term sea level rise scenarios.

So that also impacts recreational users for water access such as boats and kayaks and canoes and such.

Regulatory functions also require a larger scale shoreline. In Maryland, you have the critical area. You also have living resources such as shellfish and submerged aquatic vegetation, and the relationship to shoreline is very important there for regulatory purposes.

And let's see. Finally, what's good about large scale data is that it can be generalized and brought down to the scale that current charting is used at. You can't go the other way in cartography. You can't take small scale data and make it large scale and make it work. But you can take large scale data and turn
it into the type of small scale data. So it would have that type of utility to use for other charting purposes as well.

In my estimation, the first step is to convene a group of mapping folks, certainly part of it would be NOAA and USGS, and talk about standards, what type of standards would be needed to generate a shoreline at that scale, how would it be done. The process is currently we can do that. We have the data. We have people. What we don't have is funding.

We need to talk about acceptable processes for the types of data that are being used, both topographic, tide-coordinated LIDAR as well as topobathymetric LIDAR. We certainly have VDatum and we have sample specifications that people have generated large scale shoreline for.

And then we would talk about entering this data into the Continuously Updated Shoreline Product, which NOAA hosts, so that it would be a national asset to be used by states and localities and the federal government. That's
what I have.

CHAIR SAADE: Any other questions or comments from anyone, or from online?

MS. DENTLER: We have a comment from someone online that I need to figure out, because he said he sent it to the Hydroservices Panel on Monday.

We will get to that public comment later, maybe tomorrow, or in a few minutes. Does anybody else?

MS. MERSFELDER-LEWIS: I hope that there's more comments from the people in the audience. If anybody would like to make a comment, we'd really encourage it.

MR. DASLER: Hi, Jon Dasler from David Evans and Associates. I guess just want to direct it towards Juliana Blackwell. I mean your comments on capacity in managing CORS, and I'm curious to know if there's any thoughts or efforts afoot on regional networks and some kind of validation process that NGS might be.

I mean more and more, I think NGS
networks are being incorporated even by pilots in some cases to that end. So even integrating some of those stations even though managed by others, in some cases they're being extended to offshore and other areas to that end, and just being able to integrate some of that data or have some kind of validation from NGS relative to those regional network sites.

I know some of them are cooperative, others aren't. But and then second, I think is I guess relative to the gentleman's comment from USGS and use of VDatum in transforming, I think the VDatum models and I think this was addressed in some of the comments, of extending those models further inshore.

So right now a lot of those were cut off on the shorelines. Shorelines have changed. When you're doing subaquatic vegetation, the tidal datums are kind of important to that end. Oftentimes, vessel-based LIDAR, they're working inside the area where VDatum is acquired, but collecting data where the lasers are scanning
beyond that, outside of VDatum.

So to transform those back and forth, just looking at expanding VDatum further to shore side, to account for some of that. Thank you.

CHAIR SAADE: Thanks, Jon. Admiral Smith, do you have any comments you want to make before we go into the next session?

RDML S. SMITH: Ed, I think we have one more public comment from online.

MS. MERSFELDER-LEWIS: This is a long comment. This is from William Nye. We'll enter this into the record, and pardon me that it's not on a slide. He said:

I did not see a presentation on the National Charting Plan in the new ENC format. This should be a subject of interest.

The NCP was published February 28th, 2017 by the Office of Coast Survey. One aspect of the NCP relating to electronic navigation is the new S-101 chart format. The phrase S-101 can be found in the NCP, but there is little else. Concerning what should be a very large and
significant subject and project, considering the
scope of what it touches.

I was told the existing S-57 format
will be phased out, but NOAA will produce charts
in both formats for a period of time. In my
opinion, the NCP is not a very transparent plan.
I requested clarification of the NCP,
specifically certain statements made by NOAA. I
received replies that required yet more
clarification. I still have not received fully
responsive answers, see OCS inquiries X and Y.

It is pointless to ask questions when
the result is a runaround. There were a series
of related inquiries. The first was submitted
about one year ago. Some of the information
provided looks like it should have been in the
NCP.

In the replies I received, NOAA stated
paper charts were derived from survey data, and
ENCs were in turn derived from paper charts.

This backwards, convoluted process was
done for years, and is only recently being
revised. A statement on this matter appears missing from the PowerPoints. The NCP was mentioned at NOAA Industry Day last October 2018. A statement on how NOAA participates with industry also may be missing.

A description, explanation of who did what may be informative. The fact that NOAA holds Industry Day presentations suggests there is participation of some kind. The exact role and influence of industry is not very transparent, and may be channeled through non-U.S. organizations, but likely had an effect on the National Charting Plan. Sincerely, William Nye.

RDML S. SMITH: Yeah, thank you Mr. Nye, if you're online. This is Rear Admiral Shep Smith, the Director of Coast Survey. I will comment on the specific parts of your comment that you mention here in your note. I don't have the references to the inquiries that you submitted. So I don't have those for reference. But I did want to -- I did want to
pick up the question about S-101. S-101 for everyone else is the sort of next generation ENC chart format, replacing eventually S-57, which was developed 25 years or so ago.

S-101 will have some benefits in the richness of the information that is available, some significant improvements to the ability to display the information better, and it is a more modern foundation that makes it easier upgrade, to update the standard with changes in navigation technology going forward.

That said, the S-101 format is just really being issued now as a standard, and no hydrographic office in the world yet has a firm, fixed plan for transition from S-57 to S-101. Given the nature of the global charting system, the transition needs to be coordinated globally because, because navigation systems need to have compatible fuel globally.

That conversation in turn will be coordinated by the International Maritime Organization, IMO. So this -- it is a really
good question and a really -- and in fact is a
topic of international discussion. It is my
intent that NOAA will lead in this effort, this
international effort, but it is not ours to drive
it unilaterally. So thank you for your question
about S-101.

I will also say that there are, you
know, the National Charting Plan that we issued,
really wrote two years ago, issued a year and a
half or so ago, is incomplete in some ways, and
in fact does -- we have recognized a number of
ways that we would like to update it. We have
considered what the sort of update for that would
look like.

In particular, we have plans that
we've developed since that specifically outline a
more -- a more detailed set of ENCs for U.S.
waters, approximately quadrupling the coverage of
our ENCs or the amount of detail of our ENCs, on
average, one step larger in scale everywhere in
the United States.

That's quite a massive undertaking,
and so we're still working on an implementation
plan for that. But that's really the chart suite
that the United States deserves, and what the
United States maritime industry needs, from
recreational boating to commercial ports and
consistent coastal coverage.

I think with that -- oh, the role of
industry. It is a complicated answer. We have
contracts for hydrographic surveys, for
cartographic work, for professional services. We
buy a lot of commercial software for doing what
we do internally, and we leave parts of the
navigation services value chain to the private
sector to accomplish.

For instance, the printing and
distribution of paper charts and the creation of
navigation systems, even ENC distribution itself.
There's a value chain there. The navigation, the
Industry Day that you mentioned is one that we
host at the Annapolis Boat Show, that is really
designed to bring together the providers of
authoritative navigation services from NOAA, from
the Weather Service to charting and oceanography
and all the other components.

Together with navigation systems
providers, to be able to talk about how we
provide those services in a more efficient way.
We had a comment earlier from BoatUS about the
need to unify and improve our APIs, and that's
exactly the sort of insight that we get from
discussions with the navigation systems
providers.

I will close with that. Thank you Mr. Nye for your comments.

CHAIR SAADE: Admiral, do you have
anything else you want to say before we move into
the next section? Okay. All right. Lynne, I'm
going to say that's the end of the public
comment, okay.

HSRP members Julie Thomas and Dave
Maune are up next. The HSRP is reviewing and
taking a deep dive on the priorities matrix.

This will be reviewed in coordination
with the non-voting NOS members and DFO. The
matrix will help guide the HSRP work and the
draft matrix of priorities in the HSRP materials
and on the web. So Julie and Dave, you can take
it away if you're ready.

MEMBER MAUNE: Okay. I'm going to
start off and Julie's going to follow. When I
first joined the HSRP four years ago, we really
left no record of what we had accomplished during
our HSRP meetings. So a colleague named Frank
Kudrna and I came up with the idea that we needed
to identify issues that needed to be addressed
somehow.

And what emerged out of that
discussion was that for a number of years, we
developed issue papers. We have now published 12
issue papers over the years on various subjects,
and right now we are reviewing a 13th one called
NOAA's National Ocean Service Role in the U.S.
Maritime Arctic.

It's in your folders as a draft issue
paper. It is not a replacement for the earlier
one on Charting the U.S. Maritime Arctic. It is
considered to be in addition to that one. So just because they both say Arctic doesn't mean one replaces the other one. We hope that everybody -- well first of all, we've sent this out for comment by a lot of people, but a lot of you have not read it and seen it in its final format.

So you now have it in your folder, and we plan to vote on whether or not to accept this issue paper later on this week during this conference. So I encourage you to read that.

The next thing we did was we came up with the different -- members threw out topics, potential issues for us to address. Whether we address them by issue papers or letters or meetings or a different working groups or whatever, it was left up to us. But we came up with what we call our priorities matrix, and we were trying to decide what were the highest, highest priority issues that we needed to address somehow.

When I sent these out for comments,
the one person that gave me a lot of comments was
Julie, who had also volunteered to be the co-
chair of this working group. So I'm going to --
yeah, she's taken on all kinds of things, been a
very productive new member. So Julie, I'm
passing this over to you to discuss.

CO-CHAIR THOMAS: Okay. We were
trying to get it on the screen because we didn't
have -- let's see here. Okay. So I think you
all have in your -- you got this priorities
matrix this morning, and so there's an advantage
to going over it here because what will come out
of this is a discussion of where we want to talk
about our priorities in the future, and also
maybe an issue paper or two that we can send to
the Administrator.

If it's not an issue paper, is it just
a topic that we want to include? So I actually
went through it again today and what I was going
to suggest was -- I think there's too many here.
I mean there's a lot of -- this is a lot of good
ideas, but I was going to try to suggest how we
approach it. If you look at number 11, it says
USACE/NOAA Partnership, and this I believe is the
issue where the Corps does sometimes not survey
to the resolution of NOAA. Kim no?

MEMBER HALL: I'm sorry, as the
originator of this --

CO-CHAIR THOMAS: Yeah.

MEMBER HALL: It was something we were
trying to build out. So I think that's what we
actually have to do, because this had originally
been a couple of years ago when I started it with
Dave, was throw ideas out there and go from it.
But we did not get a lot of context, and I
consistently asked for context from the group.

I'm sure it's great that we have Mr. Hanson in the crowd, because this is one that's
close, near and dear to your heart. It is
several different issues, which is why we called
it partnerships. Whatever that would fall under,
whatever the current issue of the day with USACE
was.

Because what we had been harping on
back then was there was a partnership issue. Is
NOAA talking to ACE, is ACE talking to NOAA?
What's going on?

CO-CHAIR THOMAS: Okay. So it's not
just the survey.

MEMBER HALL: It is not, no.

CO-CHAIR THOMAS: Okay.

MEMBER HALL: And then, but just real
quick, and then Shep came back and they have a
great relationship now, and so what's next up?
So it's just been one of those ongoing keep track
of type of issues, and what we can or can't do
with it.

CO-CHAIR THOMAS: So is it something
that we can just mention in our letter to the
Administrator then, and not really --

MEMBER HALL: I think the question is
--

CO-CHAIR THOMAS: -- write a whole
issue paper on it.

MEMBER HALL: Oh, I don't think
there's an issue paper right now. But the
question is what is the current issue and is
there something that we can help Shep with as
he's managing that relationship? What is the
update of what's going on with that relationship,
just to keep us in the loop.

   We don't want it to be removed from
the list, we want to make sure -- but it's not a
top priority yet, because there's not a current
issue.

   CO-CHAIR THOMAS: Okay, so yeah
Admiral. You have some comments on that?

   RDML S. SMITH: Yeah. I think I
appreciate the panel's pressure on us on this,
and it was for a while a useful irritant, to
allow us to have, every six months, have to
report back on progress here. And but I think we
have built a lot of relationships and we're
working through a fairly complicated interagency
process that's moving blisteringly fast for us.

   And so I think that more heat right
now isn't necessarily helpful, and there's a lot
of light coming from a lot of places right now.
So I think that's good too. So I appreciate the accountability, and I wouldn't want you to forget that this is important. But I don't know that an action right now is necessary.

CO-CHAIR THOMAS: So is it something that we should, we could mention in our letter to the Administrator, that we are pleased with the progress in the NOAA/Army Corps partnership? Because you are doing --

RDML S. SMITH: One context might be noting the success of the panel that we had, that included senior Army Corps --

(Simultaneous speaking.)

CO-CHAIR THOMAS: Right. But it's also, isn't it also like the Rick Brennan presentation yesterday with the surveying and multibeam, where some of the ports now are -- have multibeams? So it seems like there's a few areas where the partnership has gotten better.

MEMBER HALL: But the other thing is it doesn't necessarily -- just because it's on this list didn't necessarily mean that it gets
mentioned.

CO-CHAIR THOMAS: No, I know. I'm also starting a list for the letter, so that's why I thought I'd just bring it up right now, to see if there was a one line sentence we could put in there, and just say we're pleased with the partnership going forward or something. Okay.

MEMBER HALL: Sometimes we have limited space, so.

CO-CHAIR THOMAS: All right. Then let's skip over to number 18. This is the U.S. Coast Guard and AIS bullet, and it seemed like this was another one that's actually being addressed right now. Admiral Gallaudet is talking actively with the Coast Guard, and I'm not sure that we need to either have an issue paper or do anything with it right now.

MEMBER HALL: I think there's a good mention for the letter.

MR. EDWING: So I just wanted to mention following the Juneau meeting, I met with Mike Emerson. His people and my people met in November, and they committed to, you know, pursuing this.

Where we're at right now is they're taking FY '19 to kind of do some cybersecurity things they have to do, and kind of put together their plan, and then they're going to start kind of building it in '20 and delivering what they call an initial operating capability in 2020.

And the Admiral is getting, you know, regular -- both admirals are probably getting regular updates from their liaisons. So their eyes are on it. So I think this falls into the same category as you know, it's fine to keep on the list and kind of keep tracking. But at this point --

CO-CHAIR THOMAS: Okay. So we can just say that we're pleased with the progress and whatever. So that's a mint. So the ones up here in yellow, I actually had tagged as just as
subjects to mention, a one-liner in the letter.

So now going backwards, because now we want to go to the top. So now I think we should just start at the very top and, you know, and kind of see what I've done. The very first one is the autonomous vessel surveying. I know that in New Orleans, that's going to be a topic. So do you think we should kind of table that one until after the New Orleans session or yes.

MEMBER DUFFY: I would say that makes sense, and I did hit the mic to say something on the NOAA partnership with the Corps. I think maybe that too could be part of the meeting in New Orleans. I think that's the right place for it and their good relationships.

But I didn't want to delay the discussion. We'll start to figure out New Orleans next week.

CO-CHAIR THOMAS: Oh great. Okay, and then so that one we're going to go -- okay. Number two, this is the one that I had a discussion with Ed and Rich over lunch, and I
changed substantially. So just kind of ignore
what's in number two. We were thinking about
changing it to relative sea level rise and high
tide flooding, yeah.

MEMBER HALL: Context again here. I
think we've got to make sure that we include
Larry Atkinson in that discussion.

CO-CHAIR THOMAS: Oh I know. But
Larry's sick right now so --

MEMBER HALL: No, I understand. But
changing it wholeheart.

CO-CHAIR THOMAS: He asked -- he
actually sent me a note, and he said Julie, if I
would wordsmith this better. So I am talking to
Larry.

MEMBER HALL: Well, I just want to
make sure because --

CO-CHAIR THOMAS: And we're not going
to do anything without running this by Larry.

Sorry Kim, I --

MEMBER HALL: No, it has changed over
time, but I just want to make sure we don't lose
track of what we initially, and it might be a
different subject that you're all talking about
that's related. Because we've taken it and had
two different subjects, put it together and now
we're talking about changing it again. So I just
-- context here.

CO-CHAIR THOMAS: Well, so what Larry
and I talked about is really fleshing this one
out a bit with Nicole's emphasis on sea level and
around the room it has come up in today's
discussion. I thought maybe this could turn into
an issue paper, and what I kind of fleshed out
with Rich and Ed at the lunchtime was what would
-- what would we really ask for if we were saying
that attention, you know, should continue for sea
level rise.

And it was number one, continue or
expand geodetic observations, continue or expand
long term observations, the climate and
statistical analysis tools that are being
developed through CO-OPS, to continue with those.
Model coupling I think is important here, and
then how do we -- when I was talking with Nicole, she was saying well how do we get out to the public and really get them to buy into the whole sea level rise topic?

And so there are ways that NOAA, I think the Administrator can advocate through CMTS since all three of the agencies are represented, and advisory committees, et cetera. So this is open for discussion because I thought, out of all of them this might be one.

Oh, and also what I was thinking was artificial intelligence and big data are on here as two separate issues, and actually there's areas in sea level and high tide flooding that AI and big data kind of can be used and overlap and are part of the tools. So I thought we could actually wrap those right into this.

Do you want them as a separate one?

MEMBER HALL: I think -- so I am all for advancing this and getting better ideas of what we want, because it's taken time.

CO-CHAIR THOMAS: Yeah.
MEMBER HALL: Each member has a kind of pet issue on this sheet, and again it was me trying to capture during a meeting, so I am happy to have the conversation. I just know that Lindsay Gee, who can't be here today, has some really big ideas and I know Carol I think was AI, that see too it makes sense sometimes to wrap them into other issues. But some -- but to keep it separate because AI is huge, big data's huge, and so we don't want to lose track of what that looks like.

I know, I thought that maybe Ed can tell me, the Technology Working Group had started to look at that, at big data at one point?

CHAIR SAADE: Yeah. I was just going to say, personally I think there's relative sea level rise, full stop, because that's also --

CO-CHAIR: And not include flooding?

CHAIR SAADE: Because that's also going to be what Admiral Gallaudet referenced in terms of the western Pacific and things that are going in the Caribbean.
And then high tide and flooding, which is what we were talking about earlier and what we're going to be, I think, talking about later this week, that's a different topic altogether. I definitely think they're different than big data and artificial intelligence.

CO-CHAIR THOMAS: Okay. The reason -- well, is Neeraj here? I listened to his webinar, and he was talking about it a couple of days ago and the modeling that he's doing is using some of the AI in training the models for sea level. That's why. It's not that I didn't want to also address that.

But it seemed like in that NOAA, Coast Survey, CO-OPS are developing tools that also include this big data and some of AI components. So whether or not we mention them here too.

CHAIR SAADE: Can I make a suggestion that we just go through it real quickly?

CO-CHAIR THOMAS: Okay.

CHAIR SAADE: And see what's on there, find out if there's any redundancies and
find out if there's anything that we -- with a
very, very brief discussion, if want to get rid
of. Because if it turns out to be that there's
22 and we all think they're great, then there's
22 and we all think they're great.

CO-CHAIR THOMAS: Right, and then we
prioritize them --

CHAIR SAADE: Then we can prioritize
them later.

MEMBER HALL: Yeah. I think the point
of this too is to start the conversations,
because again I think we need more information,
because you only have what's on the sheet. I
have what I remember from the meetings.

CO-CHAIR THOMAS: I have -- that's why
--

MEMBER HALL: And so it's problematic,
I understand, especially for our handful of new
members who are trying to figure out what is all
this.

CO-CHAIR THOMAS: Okay. So we can --

MEMBER HALL: That's four
conversations.

CO-CHAIR THOMAS: Then number three, marine and geospatial data infrastructure.

DR. MAYER: If wonder if there's some redundancy with that and number nine, managing data and databases. I think it depends on how you look at it, but there certainly can be.

MEMBER HALL: We did do the issue paper, and I guess it's just follow-up after that. Is there something more that we want to do? We signed that out in May didn't we?

CHAIR SAADE: So let's keep number three in our minds until we get to number nine.

DR. MAYER: Yeah.

CO-CHAIR THOMAS: The next one was stand-alone on education.

CHAIR SAADE: I personally think this is a really good idea, and we still look around the table and there's a lot of gray hairs around here, me in particular. I think it would be really good if we could start to get some younger staff of various types getting involved into
this, as well as promoting hydrographic education. It's not critical, I'll say that. It's just an interesting idea.

MEMBER MAUNE: I'd be interested in hearing from Andy and Larry on this subject. Do you see the need for discussions by this group concerning education?

DR. MAYER: Okay. That's a different twist. Yeah, I certainly saw the need for education.

MEMBER MAUNE: For us to identify an issue paper or something.

DR. MAYER: No, no. Yeah, no, no, no. It's a good question, and I don't think we're in a crisis situation in any way. I think our lab and a few others are training a cadre, or cohort, of young folks, and I turn to the industrial people in NOAA and ask if you think more needs to be done.

I think we always need to be on top of it and make sure that we continue to provide that supply, and that they're educated appropriately.
But I'm not sure that it rises to the level of an issue paper is my --

MEMBER HALL: And the paper does say we want to invite more to be involved more with students.

MEMBER MAUNE: Juliana Blackwell, I have a question for you. How is the supply of geodesists? Are you able to hire qualified geodesists when you need them?

MS. BLACKWELL: That is a slightly different story. But I will say, surprisingly, we have brought a number of geodesists on board in the last couple of years. I know that the panel had supported trying to accelerate the hiring of geodesists in the past, and even though it takes a while to get vacancies announced and get the selections, we've had some success.

However, that doesn't mean that they are trained in the areas and the specifics of what we need. So one of the things that we're looking at internally is once we get people on board, if they don't have the specific skill set
or if they need additional education, is offering part-time or full-time university training to an institute that they could then continue to develop their knowledge on whatever aspect of geodesy we most need.

So I think for the purposes of this group, that within NGS, within our strategic plan and what we're trying to do, I think we're doing okay. So I would recommend that there doesn't have to be an addition to geodesy, that we could focus our attention on some other aspects rather than the educational. I'm not saying that there's hundreds of them knocking at our door, but I do think that we're at an okay place right now with --

MEMBER MAUNE: Does NGS have a program to send some of your promising people for a master's or Ph.D.s in geodesy?

MS. BLACKWELL: We are actually working with one, with other federal agencies. We work with NGA and we're looking at again trying to send people in particular to The Ohio
State University. But that doesn't mean that there aren't other universities that we would consider for other types of geodetic programs or geomatic programs.

CHAIR SAADE: So we have good diversity on this Panel, except for the fact that there's nobody young on this Panel. I know it sounds -- no, no, no, no. I know it sounds a little bit one-sided, but I can tell you from an industry point of view it's a big serious issue. I can tell you from an industry point of view that we need about 25 hydrographers right now, and we can't find any, okay. And also now if that's the old necessity is the mother of invention, we've been able to do hydrographic LIDAR now, where we used to take 14 people into the field, now we take two because we had to figure it out, right?

So but I do think, I personally feel it's important to start to get a younger crowd in here to mix it up with us, because it's -- there's a lot of us that have too much experience
if you want to use that term, because we've all
seen it all together.

CO-CHAIR THOMAS: Okay. So we leave
education in there. We'll have to decide what we
want to do with it.

MEMBER HALL: I think that was the
point of what that last comment said. It wasn't
a matter of writing an issue paper, it wasn't a
matter of even a letter. It's that we include
them in our meetings and we make sure. I don't
think -- I know that we -- that's something Joyce
really harped on too and Susan Shingledecker and
past members.

I don't think we've figured out that
mechanism when we're in each place, how to
actually figure out who's who. Now New Orleans
should be pretty easy. There is a program down
there that is also a center of expertise, Center
of Excellence or something like that, not quite
up to UNH I guess.

That we should be able and we should
attack early and often, and the new Brian Connon
is a well-known person and easy enough to
convince him to come and bring his students. So
I think that's our aim for the next meeting in
New Orleans, is that we get at least one student
in that room.

CO-CHAIR THOMAS: All right. That can
be discussed, and then number five, enhanced
educational navigational assistance. I think
this is -- you've already done an issue paper on
this, so this is keeping track of that and going
forward.

Number six, this is incorporating non-
authoritative sources and I don't know, Rich. I
mean this tied to me into the tiered measurements
that are going on in Alaska. But once again, I
didn't have the background for putting these in
here. So maybe it was something else.

MEMBER HALL: I think Shep can discuss
crowdsourcing. That's something that we were
trying to do for a while, thinking about how do
you do that, how do you ensure that the data is
trustworthy and how do you put it in your charts
if it's not from a tier whatever, Zone of
Confidence.

    RDML S. SMITH: Did you want me to
talk about that right now?

    Well, it's kind of a complicated
discussion. There are a number of things going
on with crowdsourcing or partnerships with
existing crowdsourcing organizations, for
instance Olex, Navionics, Garmin. Both have,
both have some caches of data. There's an
International Hydrographic Organization
crowdsource bathymetric database and working
group hosted out of NOAA in Boulder and resourced
by my office.

    You know, while we're still early days
with crowdsourcing, like other types of data it
doesn't have to go on the chart to be useful, it
may just be consistent with the chart, which is a
useful piece of information in and of itself. It
may show dynamic changes in an area, which is
useful in and of itself, even if it's not itself
conclusive.
So just framing that out, that's how we're thinking about it to start with. Now it may in fact be the best available data, and in some cases both we and the Canadians have used, you know, crowdsourced data. If you look at our charts, you will see REP next to a lot of things, including most sunken vessels along the coast. That is crowdsourced data, right?

We've been doing this for, you know, since Columbus. So this is not new. We have ways of handling this and we do. So the question is what level of awareness does the panel want to be incorporated in some of these thoughts and discussions and there's an international angle to it which is very political, and there's an angle with Seabed 2030, which is a different use entirely of the bathymetric data.

There's a lot to talk about. If the panel wants to be sort of read into those discussions, we're happy to make that a topic going forward. I guess that's the question is what the panel wants, how the panel wants to be
involved.

CO-CHAIR THOMAS: Okay, and this is really focused on the bathymetry then, crowdsourcing, non-authoritative. So and this, these are really issue papers to advise the Administrator. So it's really how --

MEMBER HALL: None of this was ever related specifically to issue papers.

CO-CHAIR THOMAS: Or comments.

MEMBER HALL: It was, it wasn't even comments. It was for us to decide. So we did first what issues are we interested in, how we want to prioritize then what do we want to do next? And so some of it was we want to learn more. We want NOAA to come to the next meeting or have an off, off the public record.

Not off the public record, but off-meeting presentation or webinar. There were about five different options in the Survey Monkey that we had originally used. So, first, what do you care about? Second, okay you care about those issues, what do you want to do? Some
really didn't -- and we realized didn't rise to
the level of an issue paper.

   Issue papers are an involved process,
as you know, and should be used when we really
need to. If it needs to be mentioned to the
Administrator, I don't think it does now. I
think these are also issues we're tracking and we
don't want to lose track of because things are
happening. IHO is happening, others are
happening, and maybe right now at this meeting we
have nothing.

   But do we want to know more? Do we
need to know more or are we just going to table
it for now? And tabling is okay too. So that
was what really the gist, especially for the new
members. The genesis of this was we'd go to a
meeting, we'd have really great ideas and then,
we'd go to a meeting, we'd have really great
ideas, and then right, we'd go to a meeting and
have really great ideas.

   So how do we keep track of those? How
do we do something with it or decide not to, and
it's okay not to. So I think what that, that's where I tried to capture kind of current-future what are we thinking? Okay, we wrote an issue paper. We'll leave that one alone for a while. That doesn't mean that things don't change and we might not want to update the issue paper or write a new one related to the same issue.

Or we say you know what? That one's taken its course and we don't, we're not really paying attention to it because it's kind of an issue that's overcome by events. So that's really, I think, these were -- and I want to make sure it really isn't just for an issue paper. It was just a whole gamut of ways we can learn more, because some of us are dumb on the issues or not quite as up to date as some of our other members.

And so it would be really nice, hey somebody keeps talking about education. What is the problem and what is HSRP's agreement to do that? Probably not much, probably not an issue paper. But again, if we can include people, get them excited about what hydrographic services for
you is and what we do, and that it's part of what
they do, that's great.

So some of them are just little wins,
and some are the bigger issues.

CO-CHAIR THOMAS: Okay. So number
six. We're on seven? Does that -- did you have a
question, Ed?

MEMBER PAGE: Yeah. I just want to
add, I'm not really sure the problem is like I
assume we wanted to do crowdsourcing because we
don't have adequate surveying, and here's another
opportunity to get that done. So I guess the
first we have to get the problem statement. Like
where do we not have this? Where do we have a
problem that NOAA doesn't have the resources to
provide the charting necessary?

I mean we had that thing and the
situation in the rivers and up in the Arctic,
where they're very dynamic and there's silting
and whatever and there's very little traffic.
But in any major navigational channel, I'm sure
NOAA's all over it as the Corps of Engineers is
all over it.

And so I guess if we really want to go down this path, I think we need to identify where's the problem and we need the -- that crowdsourcing may be a solution, and so -- and then if we think -- then we can start going down that path I suppose, so.

(Simultaneous speaking.)

MEMBER HALL: I agree, yeah. No, and I completely agree Julie. You must be in the dark on this, right, because there's not a lot of information, and part of it for me was I'm not always smart on the issue. I hear somebody say it, and my job was to grab an idea.

CO-CHAIR THOMAS: No, no, it's great, I think, for this kind of --

(Simultaneous speaking.)

MEMBER HALL: So yeah. But I think it would be great for members around the table, this shouldn't be your job to try to define.

CO-CHAIR THOMAS: Right.

MEMBER HALL: This shouldn't be Dave's
job to define. It should be our as members. So
if it's your idea, you get to give a little bit
more data. It was like pulling teeth to get
that, so if you have good idea, you've got be
willing to give us the full good idea, and so
that every member kind of knows when they look at
it.

Because I remember some of it, I don't
remember all of it. It's not my area of
expertise or even that I know anything to do
about. So I think that's one thing we need to
ask the members to do, is to help you define
those. What does it actually mean, what does it
look like, what's the problem.

And if it really isn't a problem,
let's take it off. If nobody around this table
or Anne or Larry or Lindsay who aren't here can't
offer more, then we need to -- you're right, we
need to cull, because there's a lot on this and
we're not going to get to it all.

MEMBER MAUNE: And I'm always looking
for a champion who's willing to step up to the
plate and say, this is an issue that I feel strongly about, and I'm willing to start drafting something to identify the problem and what the alternatives are, that sort of thing.

So if you feel strongly about something, please raise your hand and let Julie and me know that you might be willing to start drafting something.

MEMBER PAGE: I'm not raising my hand, by the way. That's the only reason I'm getting on the mic. My hand's not up, though. So no, I just recall in the last meeting in Florida, there was a discussion from the recreational boater about the charting for recreational boats on not normally high priority waterways, and how they're crowdsourcing information and what have you, how they're doing it. So that's -- I think that was kind of how some of this triggered.

All that's interesting, that's something that NOAA can't deal with all the recreational boating where people are going in very, very shallow water and there may be other
ways of getting it. So I think that's how that kind of -- that's what my memory of what this crowdsourcing, which is intriguing but I didn't see it as a real pressing issue, even though I'm a recreational boater.

But in any case I agree, that maybe we -- if someone wants to champion, which is not me, and we get smart on it, then fine. Otherwise, I don't think it's a big, pressing issue.

MEMBER HALL: But I do think it's really important, and Dave we'll probably get in an argument about this, is I think we as a group have to decide that it's issue paper worthy. If there's a champion who wants to champion and says, I want to write this and this is why.

Because doing issue papers is not a quick process on this panel. It is not an easy process, and a lot of folks have full-time jobs. So we have to pick and choose when we're going to do them.

As the person who has been the main writer of the bottom lines upfront of these
papers and gets to be the main editor for the
last three years, I really ask that we make sure
we really want it and we really as a group decide
that.

If the champion can come in and tell
us why they do it and why they really think it's
important, then of course. But I think just to
have issue paper for issue paper's sake, it
becomes very problematic. If we then get
something from Rick or Juliana or Shep that we
need to review, what takes precedence.

But I will say that the issue paper
process is not a quick one or easy one. There's
a lot of, when you have to do it by group
agreement on a paper, and people's different
choices of words. It becomes a lot of work. So
just keep that in mind, especially for our new
members. Issue papers are not just a quick done.

MEMBER MAUNE: And I would add that
the reason we have this matrix configured with
all these columns on the right is because people
were to vote on their three to five highest
priority issues that they thought might be worthy of doing something like that. So if it doesn't get very many votes, and as you may recall, I briefed in Juneau that of all these topics, only three of them and the majority of the members vote in favor of it.

MEMBER HALL: Right, but just because it gets voted for, doesn't mean it's an issue paper that we're asking for. Because what it might be is there's an issue here. So we wanted more information on what satellite-derived bathymetry was.

We weren't going to write a paper on it, but we had a panelist who could give us a presentation and gave us a wonderful presentation. So that when we're hearing people talking about it --

CHAIR SAADE: Let's -- I'm sorry, I'm going to interrupt this. Let's get through this. We're only on number six or seven.

CO-CHAIR THOMAS: Okay. Let's move on to number seven.
CHAIR SAADE: So we need to move through it. Let's see what it is and then we'll come back to it as time permits over the next two days.

CO-CHAIR THOMAS: Right, okay. So disaster response. There's been lots of comments about disaster response. I think right now we just want to know do we want to keep this, do we want to take it off. Yes, because we are going to be addressing that for sure next time.

MEMBER DUFFY: Yes. So I think I would like to see this stay on the list.

CO-CHAIR THOMAS: Okay, and maybe we do it, it would be my -- be a good issue paper after New Orleans.

Okay, all right. Arctic charting, Ed. You want to talk about that?

MEMBER PAGE: Yeah briefly. David mentioned that I suggested maybe that was, could be incorporated in other Arctic policy document, and I'd love -- I'll defer to others on that. But I said yes, but now I'm thinking about maybe
I shouldn't be so quick to say that.

The document we have right now, position paper, goes in great detail and it's all focused on charting. I've got another Arctic policy paper that's coming up about challenges in the Arctic, which have to do more with other information like there's an ocean real time system, oceanographic real time system used, and AIS transmission of dynamic marine protected areas and dynamic coast pilot and they were trying with coast pilot. There were different issues and I talked about charting also.

But they don't put enough emphasis in the charting, so perhaps we'll just leave the charting thing on. This document you have had, which I think Lawson Brigham prepared, and it's a very comprehensive, well-done document.

It gives more attention to charting and just put this other document that I've been preparing and to get rid of the charting that has already been addressed, and just talk about the other issues.
So on second thought I'm thinking this document's a good one. Let's just leave it in place, because they don't talk about a couple of things about charting in the next document on Arctic policy. So I'd say keep this one on hold. It looks good, provide hopefully you know --

MEMBER MAUNE: But you don't want us to vote on this tomorrow?

MEMBER PAGE: Well, we've got to refine it. I think it's got some -- I don't think it's, we got enough input it on this one to vote on tomorrow. We'll see. I mean maybe -- I think it needs some more work and the charting one's fine. This other one probably needs some more work and we'll see. But okay. That's my position on that.

CO-CHAIR THOMAS: Okay. Number nine is the big data one, managing big data sets, and this includes AI also.

CHAIR SAADE: So I say, as Larry pointed out, let's combine this with whatever number the other one was.
MEMBER MAUNE: Three.

CHAIR SAADE: Number three.

CO-CHAIR THOMAS: Yeah, number three.

CHAIR SAADE: And we can refine it, but it is going to be an issue that grows exponentially every single year.

CO-CHAIR THOMAS: Okay. Tech transfer, number ten.

CHAIR SAADE: Wait, he's got a comment.

MR. BOLEDOVICH: Number three was the issue that came up today about information infrastructure being part of a national investment in infrastructure, like the President and Congress proposing a big infrastructure initiative for the country. And to make sure that it's not lost on people in addition to gray infrastructure that was discussed this morning, there's some emphasis on information infrastructure as a policy issue.

This is about how we manage data and that kind of stuff and IT. So they're two very
distinct issues I think, and one of them was more
of a policy issue. There might be, might be
something for you in that area, based on what the
collection I heard this morning.

Say Admiral, we heard a lot about
information infrastructure and boy, if there is
some kind of an information infrastructure
initiative going on, this panel would support the
notion that these programs are an important and
key part of that, right? The geodetic
infrastructure, the tidal datum infrastructure,
that kind of stuff.

So I think they're very distinct,
they're very distinct issues. I don't think you
need an issue paper on infrastructure.

MEMBER HALL: But we already have one.

MR. BOLEDOVICH: Right. Well good,
absolutely that's right. But so it may be the
hot issue, it's the topic right now is that it's
in the news, it's in the press again as a
potential area, you know. The political politics
of it are that it's a potential area where this
administration may be able to work with the other side of the aisle to get something through, because it's an area that they both agree that infrastructure is important.

Wouldn't it be a shame if such an infrastructure of some, you know, a $200 billion infrastructure initiative over ten years left out information infrastructure and data. That would be a -- that would be a bad thing to have happen. That's the discussion the panel has had in the past, and so just to reemphasize.

And I think for that matter, this is something you can relate to the Admiral certainly most directly when you talk to him as well. But that's, I think, the sentiment of the panel that I've heard before and I'll leave that up to you of course, is that boy, you know, we get a lot of return on investment for a very small amount of money from these programs, and they do a lot to support not only information infrastructure but providing information that anything that you're going to physically build along the coast better
be based on a good geodetic and tidal datums,
right?

So if we're going to invest $200
million in coastal infrastructure, physical stuff
for 200 billion, it had better be based on
something good and factual that comes out of
programs here. I think that was the idea.

CO-CHAIR THOMAS: Okay, number ten.

Tech transfer. Thanks, Glenn, for that comment.

Tech transfer. So this is really pushing,
pushing out to industry.

CHAIR SAADE: I have no doubt.

MEMBER HALL: I think we talked about
it at one of our last meetings.

CHAIR SAADE: I think we're fine.

We're going to talk about it tomorrow. I don't
know that it has to be on here, because we never
let it go anyway, so it's okay.

(Laughter.)

MEMBER HALL: Well, I think it's
something we keep track of for people who aren't
at the meetings.
CHAIR SAADE: I will volunteer this one to take it off, so we can get something off of there. But that doesn't mean we'll ever stop talking about it, okay.

MEMBER HALL: Is it necessary to remove things?

CHAIR SAADE: It's only necessary to keep going.

CO-CHAIR THOMAS: Okay, number 11. This is the core partnership, then. We kind of decided that we were going to include a one-liner in the letter to the Administrator. Number 12, hardening of offshore observing sites. I just thought this was really broad was my comment, and I wasn't --

MEMBER HALL: So we ask Larry or whoever brought it to give us more information.

CHAIR SAADE: This was Rich's, I think.

MEMBER HALL: Was it Rich? No, I think it was -- I think it was Larry Atkinson.

CO-CHAIR THOMAS: I mean, I couldn't
agree more that a lot of the offshore
instrumentation needs hardening, but --

MEMBER HALL: But this is the point
where we need members to come in and give us
context, because it's not my idea. It was
somebody else's, but it was something --

CO-CHAIR THOMAS: Okay, we'll move on.
We'll put Larry. Oh Larry or Rich, do you have
an idea about that? Okay.

MEMBER HALL: I think it came from
when we did our first survey, and people just put
in topics with no context. So again, I think we
just ask and if nobody else --

CO-CHAIR THOMAS: I'll send a note to
Larry. Number 13, public-private partnerships.
Russell Callender asked that we look at this at
the Miami meeting. Coordinate, summary of
identify examples and targets of evaluation. So
that's number 13. It sounds like it came from
Russell, which I think we all agreed public-
private partnerships are critical, yeah. I'm not
quite sure what we do with this here.
RDML S. SMITH: Let me just comment real quick. So this was, you know, an administration initiative, you know, a priority at the beginning of this administration and their description of the type of activity that would be like this would be a service that had sort of concentrated federal -- concentrated value delivery, and therefore we could cost share with the private sector that was getting value from that. And we have an example of that which is PORTS, which we all seem to dislike the cost model for.

So it's just a little bit hard for this panel to both promote this and take the one shining example we have of it and say that we don't like that model. So anyway --

MEMBER HALL: Can we ask Nicole to redirect us?

RDML S. SMITH: Your panel. You can decide whatever you want to do. It was a suggestion. I don't think it -- I don't think it has any lasting direction.
MR. BOLEDOVICH: I'll take it for action, to check with NOS leadership and get back to the panel.

CHAIR SAADE: I think yeah, I don't think it needs to be on this list. We've done our due diligence. We've responded to each other. I think it's going to naturally go whatever way it goes. It does not need to be tracked or commented on or anything.

CO-CHAIR THOMAS: All right. Number 15. Sorry. You say that was a Lindsay one? Do we want to shoot Lindsay an email? Somebody want to send him an email or --

MEMBER HALL: Is he around?

CO-CHAIR THOMAS: I don't know. I mean AI is being discussed in so many contexts, through CO-OPS. I think through Coast Survey they're using it. I think Neeraj is using AI and training his models, so --

MEMBER HALL: I mean there's a reason it says related specifically to disaster recovery and I'm not sure why. So we did try to specify.
MEMBER THOMPSON: Yes, it's related to disaster recovery. I know we're currently doing a research project with AI related to disaster recovery. So I think that's what it was related to.

(Off mic comments.)

MEMBER THOMPSON: Yeah, yeah, yeah.

CO-CHAIR THOMAS: All right, so we're leaving it on here. Hydrodynamic modeling and validation, number 16. Yeah. Well, I think that's wrong. My comment is wrong, because Rich told me the total wash and that doesn't -- that comes out. But -- yeah, take out all the red there. But the need for data inputs to hydrodynamic modeling. Well that's definitely true but presentation at Juneau meeting, discussion at Miami. Okay. I don't know about that one. What was it?

CHAIR SAADE: Silence is okay.

CO-CHAIR THOMAS: 17, information dissemination.

MEMBER PAGE: I'll just comment on
this briefly. When a BoatUS representative came, they talked about the APIs and what information is. So I don't know if this is a big issue, but I guess, you know, I see this like this value added. If NOAA provides this information and the value added, BoatUS can put an apps tailored and whatever.

I guess that would be one application. I don't know if this is a real pressing issue or whatever, but I'm thinking this example I just presented a little while ago.

MEMBER HALL: We hear this all the time. One-stop shopping, dashboard, consolidate. I think we've heard that people are trying to do it in some places. It's how do I get to it, there's too many different websites. So we just hear it consistently. Whether there's anything we can do about it, whether just keep talking about it, keep paying attention to it.

But specifically, that was -- it's not so much that they don't have the data; it's how you get it out and how do you make sure people
know where to get it and what to do with it, and
I think today we heard another example of it. We
want a dashboard and we want more APIs. Okay,
that's great and we put that in a letter.

CO-CHAIR THOMAS: Right.

RDML S. SMITH: But we -- just to
know, we do have activities in this that if the
panel wanted to hear about it, we could report
back.

CO-CHAIR THOMAS: Okay, good to know.
And by the way, Lynne said that number 16 with
the hydrodynamic modeling was really after the
presentation in Juneau that we -- and the panel
said we wanted to hear more about that. So I
think that that's true. I mean, we do always --
I don't know. To me that overlaps a
little bit with sea level and some of the other
discussions too. Okay, number 18, USGS and AIS.
This is --

CHAIR SAADE: The Coast Guard.

CO-CHAIR THOMAS: Yeah, I'm sorry,
Coast Guard, yeah. And --
MEMBER PAGE: I think we heard a lot about that today, and I think we're good, right? I mean we just talked about it here a little while ago too.

CO-CHAIR THOMAS: Right. So that is going to go probably into a letter, just say that we're happy about the progress.

MEMBER PAGE: Yeah, a smiley face.

CO-CHAIR THOMAS: Okay, number 19, survey fleet.

MEMBER MAUNE: We've had several issue papers on that already.

MEMBER HALL: That was Joyce trying to make sure that we kept it updated, if we needed to. So it's just staying there.

CO-CHAIR THOMAS: Track.

MEMBER HALL: If we think that it's something that we're going to talk about all the time like transfer, tech transfer and we want to get rid of it, not a problem. But it's something that Joyce was going to -- championing the whole time.
CO-CHAIR THOMAS: Track, okay.

Identify and quantify the benefits of NOAA's Hydrographic Services. Well I think that's what we definitely want to do big time. I'm not sure --

MEMBER HALL: Looks like we'll have something in 2020 to discuss.

CO-CHAIR THOMAS: Yeah.

MEMBER MAUNE: NGS has the ongoing 3D Nation Requirements and Benefits Study going on, which is supposedly going to document the benefits of a lot of what they do. But I'm not sure about the other two offices.

RDML S. SMITH: Yeah. Ashley has been running, running herd on the bathymetric portion of that 3D Nation. The questionnaires have gone out. I think she leaned on many of you to help provide input for the industries that you are familiar with.

MEMBER MAUNE: Yes. It covers the bathymetric part. I'm not sure about Rich's part.
RDM L. SMITH: So we've done a number of port economic benefit studies, but also under precision navigation we're doing some -- there's some economic study work going on there.

CO-CHAIR THOMAS: So maybe we can just say that's in progress.

MEMBER HALL: Yeah. I think what -- she's asked people for information and just ask her real quick, and then in 2020 when the final report comes out, it's something that we could help give feedback on.

CO-CHAIR THOMAS: Okay, number 21, federal versus state licensing. Oh, I think this is Gary. Take it out?

MEMBER HALL: We removed it, yeah, in Juneau.


MEMBER PAGE: That was my first meeting. I didn't know better. I opened my mouth. I'm smarter now.

(Laughter.)
MEMBER HALL: I made sure I put your
name in there.

MEMBER PAGE: Yeah, yeah, I know.

Well, and this is kind of back to this thing we
talked about before on sharing information. But
also I guess if it would be helpful, although it
sounds like you may have already tapped in this
issue, we keep talking about this dynamic
electronic Coast Pilot initiative that I know
Admiral, you're interested in it.

And if we could -- if that was
helpful, we can flesh it out and kind of identify
what that looks like and why we want to do it and
what the benefits would be realized, et cetera.
But we don't want to get to the point where --
we've already done this more or less, or we
finished it. It just hasn't been launched, so.

But I'd be willing to take that on,
but really predominantly on a focus of how do we
get some information out of a more dynamic
nature, and electronic Coast Pilot. That's not
just print it and then just constantly doing pen
and ink corrections or taping things in it or what have you, but actually have an electronic one.

So is that something -- I'm okay with taking that out. If people think it's worth pursuing.

It's machine and machine, but you know, that's kind of like AIS and an information receiver, and then back to a ship. The machines are talking back and sending information back and forth, and Internet things. It's just all the other information like electronic Coast Pilot is the Internet things.

It's out there on the Internet and ships can bring it in or enter it to an AIS transmitter to a vessel when it's relevant to that particular vessel and transmit it over AIS. So these are all new technologies, better dissemination of data versus flipping through a book.

RDML S. SMITH: I think there's a useful thread to pull here and I'd be happy to
talk to you offline about how to refine this and
--

MEMBER PAGE: Yes sir, it sounds good.
I'm on it.

CO-CHAIR THOMAS: Okay, so Ed and the
Admiral for that one.

MEMBER PAGE: I won't volunteer
anything else.

CO-CHAIR THOMAS: 23, Chart of the
Future, supplementary navigation data management.
This was Lindsay and Ed Saade. There you go.

CHAIR SAADE: I have no memory of it.

DR. MAYER: I'll try one here, because
to me this is very closely tied to the precision
navigation effort that NOAA is doing. And I
think if we listened to the panel today, I think
this is still --

CO-CHAIR THOMAS: Relevant?

DR. MAYER: Very relevant, because
it's really what they were asking for.

CO-CHAIR THOMAS: Okay. We do not
have a precision nav bullet here.
DR. MAYER: Well, I think that -- let
the Admiral comment.

RDML S. SMITH: New Orleans, that's
right.

DR. MAYER: Yeah.

CO-CHAIR THOMAS: Go ahead.

RDML S. SMITH: Yeah. It's a focus of
our meeting in New Orleans, and both Integrated
Dissemination and high definition bathymetry for
navigation are a core part of that precision
navigation.

CO-CHAIR THOMAS: So can I just put
New Orleans by this one then? Okay, okay. That's
it. So I think what I'm going to do, and if it's
-- I mean Dave, if it's okay with you, I'll
modify this online and I'm going to put if it's
for tabled until New Orleans, I'll put that. If
it's decided that we're going to table it for our
letter, I'll do that, and then some of them are
just in progress too and some of them may have
specifics to go back to Larry or Glenn.

I'll just put our comments in one of
the columns, and then tomorrow when we're voting
we can decide what to vote on.

MEMBER MAUNE: Did you, did you want
to see us voting on these things, what we
consider important and not?

CO-CHAIR THOMAS: Not today anyway.

MEMBER MAUNE: Any time in the future?

CO-CHAIR THOMAS: What I think, should
we try to vote, Lynne, tomorrow?

MS. MERSFELDER-LEWIS: I think on
Thursday.

CO-CHAIR THOMAS: Or Thursday, okay.
So let me regroup this. It will get handed out
again tomorrow if possible, or we can send it
electronically.

I'm just going to group it by the ones
that we should vote on, because some of these I
don't think we're going to vote on. If it's
tabled until New Orleans, if we have to ask Larry
and Lindsay or something, we're not going to vote
on it.

MEMBER HALL: I guess I still think
that it's prioritization, because some things, like, we can have all these great things that we want to do something with. We need to figure out what our top five we want to do something about. So I think -- but I agree, there's kind of separate columns here.

But if we don't have more information from Lindsay or Larry, we have a hard time saying we want to do something more or not in the time frame. We know what we want for NOLA, we know what we're doing now. But we don't know coming up in the --

CO-CHAIR THOMAS: Could we vote on what we have, the ones that we have and then those that are going out for questions, then we can -- it goes back into the pool?

MEMBER HALL: You could, but then what does a vote mean if all of the sudden something else becomes number one because of that, because we have more information? Sorry, I'm not trying to make it more complicated, but I know that this is one of the things we were trying to do, is to
help us lead through the time between meetings.

What are we going to talk about, what kind of presentations do we want from NOAA. But really because there are 20-some things on here, we needed to know what the group, not what one individual was interested in, what the group as a whole wanted to hear more about and how we move forward. It was kind of an opportunity to get, yeah.

CO-CHAIR THOMAS: No, no, I get that. I would vote on Thursday and just see where we are as a group.

MEMBER HALL: Yeah, and hopefully we'll have more from Larry or Lindsay.

CO-CHAIR THOMAS: If some of them fall off the table completely then, you know, I don't think Lindsay or Larry's or Anne's vote --

MEMBER HALL: I think you would still -- but I still think you would leave the Lindsay and Larry ones in to vote on.

CO-CHAIR THOMAS: Oh yeah. Oh no, definitely.
MEMBER HALL: And say hey but we still want -- and what our next move is we want more information.

CO-CHAIR THOMAS: Okay.

MEMBER MAUNE: By the way as a question of policy, right now I have the voting members on this list with your first and second initials, and I also have Andy Armstrong in here, but I don't have Larry on there, and I don't have the other non-voting members.

CO-CHAIR THOMAS: But he's not a voting.

MEMBER MAUNE: Should the non-voting member -- are you a non-voting member? And you're a non-voting member, and you are. So the only one I have on there right now is Andy. I need to be consistent. Take them all off or leave them on?

CO-CHAIR THOMAS: Take them all off.

If they're non-voting members, they shouldn't vote.

MEMBER HALL: No. The non-voting
members, what happened is we would go back to the offices and say what can you give us, what more information. But no, it's for the panel, the voting panelists to do.

MEMBER MAUNE: So then I'll remove AA off the list.

CO-CHAIR THOMAS: Virginia just did it.

MEMBER MAUNE: Everybody else should recognize your initials there.

CHAIR SAADE: So I think Kim hit on something. I think the vote, the first vote we should take of what's ever on the list is what are the top five things we want to learn more about, okay. That's nice and uncontroversial, and it's educational and it's stimulating. So let's try and do that on Thursday, okay.

CHAIR SAADE: Now in the meantime, we're going to end this discussion and do the wrap-up. So Sal, you want to go first, the wrap-up of today's events? You need your mic.

MEMBER RASSELLO: I think it was very
constructive from the view of the panel members, also from the rest of the NOAA that presented. Something, you know, is keeping repeating is this issues with PORTS. But we need to do something to keep things moving. I don't know if it's coordination of ACE infrastructures.

I still think we keep on repeating things, but we're going to get somewhere some time, especially with this PORTS, where -- my problem is and precise navigation is really something that is getting into a war, because ships are getting bigger and that's everything.

What we heard about all today is ships are big, ports are the same. So where are we going? Are we going to invest in the ports or invest in coordination between that? We have everything. We have the Corps of Engineers, we have NOAA, we have Coast Guard. Everybody was here.

CHAIR SAADE: So let me remind everybody. We're going to start tomorrow with another recap, so let's go through today's
summary like at least kind of points and capture them, and then we'll -- whatever you sleep on tonight and wanted to stimulate or get everybody kicked off with tomorrow, that's okay. So you get plenty of opportunity to comment. Rich.

MR. EDWING: Sal just said every other word I was going to say, and I'll save the other half for tomorrow morning.

CHAIR SAADE: Okay.

MR. EDWING: No, actually I thought that the panel presentations were really, really excellent and actually I thought that the national perspective was really great, because you know we hear a lot of good things in the regional meetings.

But you know, you hear something and it's hard to know how much effort maybe you should put into it, because it just may be kind of a local issue, right. But we heard a lot of really good I think recommendations, and I would just say I was -- again, I was kind of blown away by Dr. Abdullah's recommendations.
He kind of had slide after slide of very detailed and I thought very on target recommendations for us. It really again, I think, reinforced a lot of the directions we're going and probably identified a few new ones as well. So I thought it was very valuable, you know, meeting so far.

CHAIR SAADE: Deanne.

MEMBER HARGRAVE: So a lot of information was shared today. A lot of it was new to me, and I'm taking my perspective on things and trying to figure out how the whole picture comes together. So and it takes me a little bit of time to do that. So I don't have a whole lot of feedback for today, other than the panel presentations were fantastic, and in particular Dr. Abdullah.

CHAIR SAADE: Gary.

MEMBER THOMPSON: So I think today stressed the very importance of geodetic data, and it was a lot of discussion and geodetic data always seemed to be -- to me it stressed to have
all this, we've got to have a good foundation and
good geodetic data.

MEMBER KINNER: I'm kind of in the
same situation as Deanne. It's all new to me in
some respects, but we touched on a lot of
subjects that I have been very interested in the
last couple of years. The dynamic Coast Pilot is
definitely one that gets my attention. The
ability of interagency coordination, so that the
charting that we get and can provide to the end
users is really, really good and that they are
willing then to use it.

And then the whole thing of just
letting people know what's out there and what's
available. I just learned a whole lot today.

CAPT ARMSTRONG: I also thought the
panels today were excellent, and I think helped
us focus our thinking somewhat. One item that I
thought came up a couple of times was the topic,
it came up in Juneau, was the delivery of data.
It was mostly in the context of the AIS system,
but I think that's a broader topic that, that
bears looking at.

There may be many ways to deliver data to the users and AIS may have limitations. It may serve for some things but there may be other ways we should think about that in the near future.

DR. MAYER: I have the opposite perspective than Deanne and Captain Kinner. Andy and I have been around here a very long time.

CAPT ARMSTRONG: A very long time.

DR. MAYER: Yeah. Well, Andy even longer than I. But no, but from that perspective, I think it's probably the most supportive group of stakeholders that I've heard, the most supportive group of senior leadership that I've heard in all these years.

I mean, for the first time I come away really enthused, and I think we're really looking at an alignment of stars, that things can really happen in this community.

So I'm very thrilled about that. I totally agree with Andy that this concept of
delivery of data to the vessels is going to -- I think we heard it yesterday with Juliana's presentation. All these great things are happening in terms of analyzing data onshore, and how do we get that information to the vessel in a very, very timely way and in the appropriate forum.

And I think that will be a -- in my mind, that's why I didn't want to see the Chart of the Future disappear.

CHAIR SAADE: Kim.

MEMBER HALL: I thought I was going to be last. Thanks, Ed. I have a ride waiting for me outside. I really want to stress I've been on this for three and a half years I think, and it really was a great job with the panel. I listened in earlier this morning and then I was here for the afternoon, where it was just a great job of keeping folks on topics.

I think Julie giving them specific questions they needed to answer. I think we've probably done that in the past, but perhaps
getting us involved as moderators also helps to push that and ensure that the panelists aren't just taking their rote topic and coming in and talking to us, that they know, they have some idea of who we are and what we might know, and are giving a presentation that's actually helpful to us and NOAA.

So a great move to have panelists as moderators as well. I know I fought for that my Year 1 and I think it's great.

The other one is I'm reminded now. I've been all over the country, can't wait to go to Hawaii. That would be awesome. I heard that was your choice this morning.

But in some things that we hear, geography plays such a small part, and it's kind of refreshing to know that these problems aren't just related to one area, that probably some small changes can make some exponential benefits to communities all over the country.

So it's not just -- and even when you're in D.C., when you think you're just going
to get policy wonks, it isn't. They're people who really know what's going on in the maritime as well. We do exist inside the Beltway. So I just want to stress that, and would have ideas for the paper or for the letter once we get there.

MEMBER PAGE: Yeah, I'll take it. Anything other than Ed. Just like everybody else, I thought it was a really good panel.

I was impressed by -- what's impressive is that they are very, very supportive of NOAA and their services. The downside is they want more, you know. But that's good. They want you and they love you and they want more of you. So that's good, you know.

And I thought that, you know, the information brokering was a big issue. I'm glad to see that, you know, AIS has been around 15 years. It's finally getting around to try to fulfill the expectation when it was first developed, to provide some other capabilities.

But as Andy had mentioned, that's not
the only way to get information and of course for Anne's purposes, there was another discussion about a cell AIS and other systems, where you don't need an AIS system. You can track vessels, and also the apps and so on.

We could disseminate information. We just do scatter of sometimes it's apps on cell modems. Sometimes it's AIS, sometimes it's computer delivered. So I think many people have different ways of getting information. So while it was good to see AIS tracking and I believe in that and that's what the large ships out there are going to use, but the reality is there's many other customers out there.

So I would agree that information brokering is a key issue and technology is a key issue. I think you're hearing people are moving towards technology, they like NOAA, they want more. Technology is the answer and AIS is one of several solutions. But apps and other tools that people are starting to use will help enhance maritime safety.
So it was great. I enjoyed it. It's good stuff, thanks.

MEMBER MAUNE: I also supported the panel that appreciated NOAA so much. Dr. Qassim Abdullah is a personal friend of mine and I thought he did a fabulous job of putting all that together. I appreciate Julie trying to nail these -- it's like nailing jell-O to a wall, to try to figure out what to do with this matrix, priority matrix.

And I appreciate Ed Saade, because Ed said don't look at it from the perspective of where do we need an issue paper, but look at it from the perspective of where do we want to learn more about this issue.

(Off-microphone comment.)

MEMBER MAUNE: Okay, all right. Well that's a good idea, thank you.

MEMBER KELLY: As we move around the table, of course we get a little repetitive. I also think information transfer and the forms that it takes and what information is relayed is
going to be very important, because just besides NOAA, I can also envision Coast Guard and other people wanting to use this same way to communicate with vessels with new technology.

Whether that's through, you know, electronic charts, whether that's through AIS, whether that's -- there's almost unlimited new opportunities and technology. I think we might have to refine what role NOAA has and how that fits into an overall input and transfer to and from the marine transportation system. So I think that that's really a good thing.

I also think, you know, Jim and Anne did a great job putting that panel together, and the one thing that hadn't been noted so far is how good-looking the two co-moderators were. And I think, you know, that really made the whole thing go. So --

MEMBER CHOPRA: Thank you. First meeting. Thoroughly enjoyed it. I thought highlights from one of the panels, the morning panel, leadership panel was that agencies realize
the issues and they want to work together.
That's a huge, huge positive, and how
appreciative they were of the work being done by
NOAA and everybody.

So I think that's a huge kudos. Yes,
it gives more, they want more. The glass is 90
percent full. They are hoping for that ten
percent or two percent as you define it. I
thought in the afternoon session, some specifics
came out, whether it was APA or whether it was
Dr. Abdullah. So some very good suggestions, and
I think there's some work to be done in that
space.

But overall, thoroughly enjoyed it,
learned a lot, so thank you.

MEMBER DUFFY: So throughout the day,
I thought this is a very good session, and
reminded of something an old boss said to me many
years ago, was the customer always wants more and
he is willing to pay less for it.

And I'm reminded of that as I walk
around from office to office on Capitol Hill and
pass the hat and talk about whether it's dredge
funding, funding for NOAA projects, that you
know, the federal funding aspect of everything we
do. I can advocate for the funding, but kind of
trust in the panel to direct us to the best use
of funds.

Some of the potential for the New
Orleans meeting really came to mind. That's what
I got from today. Thank you.

MR. BOLEDOMICH: So I would just go
through the list of the priorities that Nicole
raised this morning, because she's my boss.
Modernization, you've got our all over
technology. I don't think that's an issue at
all, so that's great. The emergency response is
on your list, that's great.

Sea level rise, you're having a panel
on it tomorrow. That's great. What you learn
from that I think will be where you next step
might come from. I think the helpful thing in
sea level rise would be an articulation from this
panel on the importance of these programs in
informing the nation about it, right.

What is the role of these programs? In other words, I don't need the technology piece here. It's more the fluff piece about the important roles these programs play, to articulate that from an independent source like a panel would go a long way.

Kind of the conversation we were having about communication, about this panel's role just so we articulate it and it's on paper written by somebody good. An independent group would be good.

MS. BLACKWELL: So for the Navigation Services panel, the one thing in particular that I focused on and hope that the panel continues to focus on is the need for accurate, 3D mapping of onshore as well as underwater information, so that you can truly build a precision navigation system.

And I know that we use that term differently, depending on where we sit. But to envision transport of vessels or landing of
aircraft or whatever it is, the need for that	hree dimensional, very accurate three
dimensional positioning of all things in that
area, in addition to the real time information
that's changing around you is really critical to
have this, this system.

And I know we're going to talk about
that some more in Louisiana. We'll continue to
talk about it. But as we do that together, I
think it's important to keep in mind what the big
title is for precision navigation.

The other small thing I want to
mention is Glenn went through a number of acts
and legislation that are impactful to this group.
One thing that we'll hear about tomorrow is the
Geospatial Data Act, and I just want to make sure
that that gets clumped in with the other
legislation that we talked about today, and the
fact that we are beholden to that and that is
something that is evolving.

So we'll hear more about that
tomorrow, along with the office updates. So
we'll repeat that in the morning from my here's what's coming next. So thank you.

CO-CHAIR THOMAS: Thanks Juliana.

Geez, so much has been said already. Real quickly, all the way from starting with Glenn's talk through this afternoon, it really did highlight to me the power of these partnerships and the coordination, and you know, how we can bring the observing and the mapping and the geodetics, geospatial together.

And I thought that the panels, they were really excellent, but it was so nice because I thought they kind of validated what the three areas are doing and also validated a little bit what we're doing as a panel, because so many of the topics were already being discussed and addressed either through our priorities or through some other mechanism.

And I loved Nicole's breakdown of the modernization and the emergency response and sea level, because once again I think that those are all topics that we're already talking about.
And lastly, I thought it was -- I liked Admiral Nadeau's comment about the superpower, you know, being that the U.S. being a superpower, and a lot of that is due to our mobility of vessels around the country. That just kind of drives home, you know, why we are really focused on navigation and trying to put it all together.

RDML S. SMITH: So a lot of great comments from all of you. The one thing that struck me and I thought was really great was the discussion about fog, because it was a different problem and it's not necessarily one that this panel or even these programs can directly solve. But I think it's a different sort of -- it's a different problem statement that may cause us to think about the services that we provide and the coalition we need to assemble in a different way.

And you know, I did want to -- I think Anuj had a role both in the break and during the discussion in getting that going. And so I did want to -- I did want to thank you for that, and
I think it's the type of example of a fresh perspective of what it is that we're after. If the ports are shut down for 20 percent of the time because of fog, that's a really big deal with national scope and, you know, economic importance and strategic importance. It means we've lost 20 percent of our mobility.

And so I think -- so I think that big picture thinking and narrowing in on a new problem that may potentially now be solvable with some of the assemblage of precision navigation type tools and thinking. So thank you, Anuj, for raising that.

PARTICIPANT: And we're going to start the anti-fog research.

PARTICIPANT: I think the heater and the fan is the best plan but --

CHAIR SAADE: Okay. You guys, I think you've wrapped it up really well. I think you've brought up some good points. I'll just say one more time that comment about they want more, I think that's a great affirmation that
it's a good thing. I think it's a great
affirmation that it means we're all doing, we're
doing a good job, and even more importantly
definitely it means that Juliana and Rich and
Shep and their teams are really doing a good job.

So don't leave yet. We're going to --
I'd like everybody to give yourselves a hand,
because I thought it was a great day and the
panels were dynamite.

(Applause.)

(Whereupon, the above-entitled matter
went off the record at 4:52 p.m.)
CERTIFICATE

This is to certify that the foregoing transcript

In the matter of: Hydrographic Services Review Panel

Before: US DOC/NOAA

Date: 03-05-19

Place: Washington, DC

was duly recorded and accurately transcribed under my direction; further, that said transcript is a true and accurate record of the proceedings.

[Signature]

Court Reporter