U.S. DEPARTMENT OF COMMERCE

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
(NOAA)

HYDROGRAPHIC SERVICES REVIEW PANEL

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PUBLIC MEETING

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TUESDAY
MARCH 5, 2024

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The Hydrographic Services Review Panel met via webinar, at 9:00 a.m. PST, Sean M. Duffy, Sr., Chair, presiding.

HSRP MEMBERS PRESENT

SEAN M. DUFFY, SR., Chair
NATHAN WARDWELL, Vice Chair
MARY PAIGE ABBOTT
DR. QASSIM ABDULLAH
DR. NICOLE ELKO
SLOAN FREEMAN
DEANNE HARGRAVE
KIMBERLEY HOLTZ
CAPTAIN CAROLYN KURTZ
ERIC PEACE
REBECCA QUINTAL
JULIE THOMAS

NON-VOTING HSRP MEMBERS

CAPTAIN (NOAA, ret.) ANDY ARMSTRONG, Co-Director, NOAA-University of New Hampshire Joint Hydrographic Center
BRAD KEARSE, Deputy Director, National Geodetic Survey (NGS), National Ocean Service (NOS)
DR. LARRY MAYER, Co-Director, NOAA-University of New Hampshire Joint Hydrographic Center
DR. MARIAN WESTLEY, Director, Center for Operational Oceanographic Products and Services (CO-OPS), NOS

NOAA LEADERSHIP PRESENT

NICOLE LEBOEUF, Assistant Administrator for Ocean Services and Coastal Zone Management, National Ocean Service
RACHAEL DEMPSEY, Deputy Assistant Administrator, Navigation, Observations, and Positioning, NOS
RDML BENJAMIN EVANS, Director, Office of Coast Survey (OCS), NOS, and HSRP Designated Federal Officer

NOAA STAFF PRESENT

AMBER BUTLER, Office of Coast Survey
ASHLEY CHAPPELL, National Ocean Service
ROBIN CZERWINSKI, National Ocean Service
VIRGINIA DENTLER, Center for Operational Oceanographic Products and Services
DR. RACHEL FONTANA, National Marine Fisheries Service
NATHAN LITTLEJOHN, National Geodetic Survey
AMANDA PHELPS, Office of Coast Survey
MEGAN SCHWINDEN, Office of Coast Survey
GALEN SCOTT, National Geodetic Survey

MODERATORS

RACHAEL DEMPSEY, NOS
SEAN M. DUFFY, SR., HSRP Chair
JULIE THOMAS, HSRP Member
CAPTAIN KIP LOUTTIT, Marine Exchange

SPEAKERS

NANETTE BARRAGAN, U.S. Representative, California's 44th Congressional District (via video)
DR. JAMES BEHRENS, Program Manager, Coastal Data Information Program
CAPTAIN JOHN M. BETZ, Chief Port Pilot, Los Angeles Pilot Services
DEREK DAVIS, Deputy Chief Harbor Engineer, Port of Long Beach
JEFF FERGUSON, California Navigation Manager, Office of Coast Survey, NOS, NOAA
JIM HAUSSENER, Executive Director, California Marine Affairs and Navigation Conference
CAPTAIN TOM JACOBSEN, President and CEO, Jacobsen Pilots
RYAN KITTELL, Oxnard Weather Forecast Office, NWS, NOAA
CAPTAIN KIP LOUTTIT, Executive Director, Marine Exchange of Southern California
KARSTEN UIL, Managing Director, Charta Software
DARREN WRIGHT, Precision Marine Navigation Coordination, OCS, NOS, NOAA

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

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

9:01 a.m.

CHAIR DUFFY: I had to start the webinar on mute. I'm loud now, hopefully. Happened before. I don't think I'm the only one.

Well, I want to make an introduction. There's a lot of work that goes on to the HSRP. This may have been one of the more challenging ones, but we're here. It's game day. I know the panel members and the government officials will show up and make this a great event.

I think it's important to remember the focus of the Hydrographic Services Review Panel, which is NOAA's Federal Advisory Committee. And I am going to read -- is to advise on improving the quality, efficiency, and usefulness of NOAA's navigation-related products, data, and services. The HSRP advises the NOAA administrator about its navigation, physical oceanographic, geospatial positioning, and coastal and shoreline programs, products, and services.

I would also like to say that this

Federal Advisory Committee is made up of experts that all have a very interesting career. There's a lot of knowledge here.

And with that, I'll basically turn it over to Rear Admiral Ben Evans to take over the introductions.

And welcome, everybody. Thank you for being here. Appreciate the sacrifice. It's game day, so our NOAA jerseys are all on. Thank you.

RDML EVANS: Thank you, Mr. Chair, and welcome, everyone. Again, my name is Ben Evans. I'm the director of NOAA's Office of Coast Survey. I'm also the designated federal official on the Hydrographic Services Review Panel.

Before we really dive in, I'd like to ask Ms. Amber Butler, who's one of our HSRP executive secretaries, to come on and take us through some administrative matters right here the first couple slides. Amber?

MS. BUTLER: Hello. Thank you very much.

So, this meeting is recorded today.

You can refrain from using the question box if you do not want your likeness recorded, or you can close out of the meeting. And here is the privacy statement.

For our meeting logistics, the agenda is attached as a resource to your resources in the menu on the right side of your screen today. You can use the questions box and you can submit public comments or questions using this box.

Please contact myself or Virginia Dentler using the emails below for any troubleshooting today to connect to the webinar. For other accessibility today, you can use the phone numbers provided.

All comments and questions will be addressed during our public comment periods, which are scheduled for each day of the meeting.

And I will now hand it back to Rear Admiral Ben Evans. Thank you very much.

RDML EVANS: Thanks, Amber. And I'd like to echo Sean's acknowledgment of the late change to a fully virtual environment. We were absolutely looking forward to our in-person meeting in San Pedro, and we're very sorry that that's not possible.

I'd particularly like to thank our local partners, many of whom are online here today, who worked hard to set up technical site visits, to set up panels, discussions with key stakeholders in the expectation that we would be there in San Pedro, and I hope we can reactivate those plans at another time.

I'd also like to thank the panel members themselves for their flexibility. I know many folks were inconvenienced to one degree or another by that change.

I'd also like to acknowledge the hard work of the HSRP staff, many of whom worked late Friday night and over the weekend to reset this meeting to the virtual environment. Fortunately, our COVID virtual meeting skills are still with us, and I'm sure this will be a productive few days.

Just as a reminder, please mute your

microphone unless you're speaking, and I ask that our presenters and our speakers please turn your cameras on.

And with that, I'll turn it back to the Chair, Mr. Sean Duffy, to officially open the meeting. Sean, the floor is yours.

CHAIR DUFFY: Okay. Sorry. Mute button issue again.

With that, I appreciate it, Admiral. Good to be here virtually and that may be relevant in different ways later on. But I would like to introduce my friend Nicole Leboeuf, who is the assistant administrator for ocean services and coastal zone management for the National Ocean Service.

Nicole, Louisiana has a special place for you in its hearts, and I hate we missed D.C. Mardi Gras. But it's game day, and I know you're ready to roll.

MS. LEBOEUF: Oh, gosh. Thank you, Sean. It's really good to see you all.

Good morning and welcome to the spring

2024 Hydrographic Services Review Panel meeting. Echoing Sean's words and Admiral Evans' words, I really do wish we were all together in San Pedro, but I'm so glad we're able to come together virtually.

Being together, it's good, as Sean has heard me say, in the last couple days. I'm going to miss the handshakes and the hugs, but the most important part of this meeting is hearing from the HSRP, and we're still going to get to hear from you and from our local stakeholders from the broader L.A. and Long Beach area. So I am grateful for that.

I do sincerely appreciate in advance everyone's engagement this week making the most of our time together. I know that we will do that.

And I want to thank Sean as our chair and Nate Wardwell for your leadership of the HSRP. I know you're going to run a great meeting this week. And, of course, thank you to Admiral Evans for kicking us off.

Lots of echoes here. Apologies for the redundancy. But I do want to thank our team for working so hard in the background to make this meeting possible, and I want to just extend my sincerest gratitude to everybody who's going to be with us for the next few days.

It has been six months since we last gathered in Silver Spring, and given that we were anticipating being in Southern California this week, I wanted to go ahead and start off like I was intending to, which was to mention that that region has faced some extreme weather events of late, including those related to atmospheric rivers and, more recently, snowfall and other things. And I extend my gratitude to the north -- sorry, to the National Weather Service for all that they do to predict these historic events, the rain and the flooding, and to share lifesaving information with the public.

Beyond my gratitude for the National Weather Service, it is absolutely foundational that NOAA's data is available for these modeling efforts and predictive capabilities because it's the work of our National Geodetic Survey, as many of you might imagine, that contributes mightily to our understanding of where that rain is going to go and who will feel the impacts of the floods. It's absolutely essential that that data be available for those predictions.

And whether you're in California, or somewhere along the Gulf Coast, or East Coast, or somewhere else, our foundational data at NOS, like the kind that the HSRP is going to be talking about this week, is very important. Not just for operational and near-term predictive capabilities, but also for our long-term preparations for climate change including change along our coasts.

At the last meeting, I shared with you all that I've recently taken on the role of chairing the Committee on the Marine Transportation System Coordinating Board, or CMTS, and I said that I was eager to update the work plan of the CMTS. Well, update the work plan we did, and the CMTS team is hard at work seeing what we can do to increase the climate resiliency of our ports across the country.

I'm really excited to introduce a panel tomorrow on adaptive and resilient ports, and to share with you all what we've been up to, and to get your expert perspectives on where we should be focusing our efforts. Port resiliency is going to take partnerships and a real team effort, and we're going to need private sector, academia, as well as the expertise from across the federal government. I absolutely welcome the HSRP's input on this because you've got expertise and you've got real-world experience that we need to hear from.

Speaking of the HSRP and our partnerships, some of our critical partnerships were highlighted in Dr. Spinrad's recent visit to the Gulf region, where he participated in a number of engagements that furthered NOAA collaboration.

One of the notable visits, although he

missed seeing Sean Duffy, was to the Port of New Orleans -- I don't know how that happened -- where port leadership and Dr. Spinrad got to talk about everything from risk reduction to community engagement to the importance of building out our real-time observation networks. They also talked about things, specifics like current meters and air gap sensors and how important it is, how costly it is, really, when we don't have these observational networks in place.

As a testament to NOAA's partnership with the U.S. Coast Guard, Dr. Spinrad also met with the Eighth District commander, where they talked about ocean observations, marine forecasting, oil spill response, and much more. They committed to getting back together and getting the NOAA and the Coast Guard out on the water more often to share information about ocean science and operations. And so, that's really encouraging to do more with the Coast Guard.

Beyond our work with the Coast Guard, NOAA is looking to enhance public-private partnerships, promoting ocean and coastal-based information services. And I want to tell you about the Ocean-Based Climate Resilience Accelerator Awards that we just issued under the Inflation Reduction Act.

Our IOOS team, just recently in New Orleans, also announced Phase I awards just a few weeks ago and got together with those award recipients. These awards are going to support the development of business accelerators. They're going to provide mentorship and training and other resources to small businesses and startups in the ocean tech space focused on ocean solutions to climate change and climate adaptation.

Current Phase I grants are going to really get these accelerators going. Phase II grants are going to help them implement their plans later this summer. It's really going to help us build a new generation of information and services, and I'm excited about how these awardees are going to bring to the table innovation, a tech savvy, marine-focused workforce, and really just a lot of other cool things that are going to support the U.S. ocean enterprise. So, happy to answer more questions about that later on.

I also want to just briefly shout out the work that we're doing with the Center of Excellence for Operational Ocean and Great Lakes Mapping with NOAA university and private sector partners. This is based in New Hampshire. This year, the center has been working diligently on increasing training and student opportunities. Admiral Evans is going to tell us more about it later today.

Your agenda this week at the HSRP is packed, covering topics from precision marine navigation to geospatial modeling grants to under keel clearance and updates on the PORTS assessment.

As always, I want to thank you for all the work that you do for us in your federal advisory capacity role. You keep us on track, you keep us informed, you help us set priorities, and I really do invite everyone to engage in this virtual setting throughout the next few days. And I'll be dipping in and out to hear those presentations, and again, we'll get to talk tomorrow about port resilience.

Thank you, Sean. I'm going to turn it back over to you. The floor is in your capable hands.

CHAIR DUFFY: Well, thank you. I had to call a couple of audibles along the way as we move forward with the script, so I appreciate the update. I was very interested.

I did apologize to Dr. Spinrad. I was very much in the meeting there because of the Port of New Orleans had a lot of information that came from the Big River Coalition, which -- I forgot to mention my role: executive director of Big River Coalition and, yes, also the chair of HSRP. I was at a meeting with our very entertaining lieutenant governor, and on that day, he outranks Dr. Spinrad. But today, I would take Dr. Spinrad's call gladly.

With that, I'm going to move on. Thank you, Nicole. Excellent. Look forward to keeping up with you over the next couple of days.

And with that, I'm going to introduce Rachael Dempsey, who I haven't known near as long but who has been impressive over the course of the last few months and meeting her. I look forward to getting to know her better.

Rachael is the deputy assistant administrator for navigation, observation and positioning of the National Ocean Service of NOAA, and I wish I had a funny joke to tell you but I don't have that audible available right now. But I know Rachael's coming online.

MS. DEMPSEY: All right. Good morning, everybody. Hopefully you all can hear me okay. For some reason, my webcam is not working anymore, so my deepest apologies.

Sean, thanks for that introduction. We will get to know each other better over time, trust me, and I fear that you will have more stories than I would care to have to manage coming in the coming years.

So, that being said, good morning, everyone. It's great to be here virtually with you and participate in my second HSRP meeting. I wanted to provide you all with a few notes on some progress we've made within the navigation, observations, and positioning portfolio since our last meeting last September.

During that meeting, we heard a lot of discussion about saltwater intrusion. And so, my team and I were able to take that problem and dig deeper during our nav, obs and positioning retreat using that as a case study to identify how NGS, CO-OPS, and OCS work together to address a common issue. This discussion underscored the importance of all the foundational data that our programs bring to the table. We've also seen some success and improvement of our observing systems.

In Hawaii, our work continues on building out a new Pearl Harbor PORTS with an estimated completion goal of the end of fiscal year '24. NOS has also entered into an agreement to establish a Seattle PORTS for fiscal year '25.

In the last several months, we've continued to enhance a number of existing PORTS by operationalizing several new stations. Our NWLON has also had several station enhancements. In 2023, we completed an upgrade and rebuild of the Charleston, South Carolina NWLON station and will be conducting a planned upgrade this year of the Ogdensburg, New York station on the St. Lawrence River, due in part to basic infrastructure law funding.

We further continued installation and transition of microwave radar water level sensor technology at 13 NWLON stations since fiscal year '23 also due in part to BIL. These include Seaward and Port Alexander, Alaska, and Nawiliwili, Hawaii.

Enhancements and expanded capabilities in our Coastal Inundation Dashboard have also been a focus of effort for us. These capabilities include improved usability of tools where users can adjust thresholds and bounds on data sets. This is in order to obtain valuable historical data and information for future planning.

Other recent involvements include refined page layouts for ease of usability and also the integration of National Weather Service coastal flood advisory and warning language, shown geospatially when applicable.

Next, we completed our first phase of the Gravity for the Redefinition of the Vertical Datum, or GRAV-D project, in which our NGS team measured the gravity field from aircraft over the entire nation, including the U.S., Alaska, Hawaii, and all U.S. territories.

Elevation data from the current datum has errors ranging from 16 inches to six feet. This effort ensures that our National Spatial Reference System elevations will be accurate to less than an inch in most areas. We shared our GRAV-D success with the public and with the Hill earlier this year.

Our Class B ships have also now received funding to replace the Rainier and the Fairweather. Since then, a contract has been awarded for the design and construction of the ships, and this is happening at long last in direct response to Congress' appreciation of the value of hydrographic data and expertise produced within the NOAA fleet.

Now, it's really important for us to be able to share this good news, but I won't go without saying that we also face our share of challenges.

Flat budgets are making it difficult for us to maintain the scope of our foundational data collection. Data collection is necessary, but it's not free, and equipment needs to be maintained. This includes everything from sensors to ships. All data requires quality assurance and quality control, and with inflationary costs, a flat budget just can't keep up.

Finally, I wanted to take this

opportunity to thank Ms. Julie Thomas, as well as the rest of the review panel, for your advocacy regarding the importance of developing the geodesy workforce in your most recent letter to Dr. Spinrad.

This is an effort we continue to focus on from a variety of angles. We're launching our first Pathways internship program this summer in the Norfolk, Virginia area for the National Geodetic Survey and the Office of Coast Survey and hope to grow this workforce development opportunity over the coming years.

Again, thank you all. It's a real pleasure for me to be here with you, and I look forward to the great discussions this week.

RDML EVANS: Thank you, Rachel. Thanks for those insightful remarks and for highlighting many of the activities that are going on across the navigation services and hydrographic services within the Ocean Service.

We're now excited to hear from Congresswoman Nanette Diaz Barragan, representing

California's 44th District, which is centered in the in the South Los Angeles and Los Angeles Harbor region.

Please note that this is a recording that was made prior to the change to a fully virtual meeting, so she does reference some of our in-person activities which regrettably will be no longer taking place.

So, can we play the video, please?

REP. BARRAGAN: -- Representative of California's 44th Congressional District. Welcome to San Pedro and California's 44th District. I'm sorry I cannot be with you today to welcome you in person to NOAA's Federal Advisory Committee meeting.

NOAA's work is critical to our response to climate change and other environmental challenges that threaten our economy, natural resources, and public safety.

Last Congress, Democrats and the Biden/Harris administration delivered $6.3 billion in federal funds to NOAA, to the Jobs and

Infrastructure Law, and the Inflation Reduction Act. These funds will advance several of NOAA's key objectives, including habitat restoration, coastal resilience, and climate research.

NOAA has been a great partner in my district. We have partnered to secure federal funds for the research and development of ocean-based climate solutions at AltaSea at the Port of Los Angeles, the rescue and rehabilitation of stranded marine animals led by the Marine Mammal Care Center in San Pedro, and the deep ocean surveys to help us better understand the extent of DDT byproduct and other waste dumped in the San Pedro basin.

I also want to thank the staff and Advisory Committee for your efforts to advance hydrographic services. These services are central to maintain the safety of maritime trade and maritime transportation system. This is especially important to the Ports of L.A. and Long Beach where 40 percent of seaborne imports enter the country.

Finally, thank you to everyone participating today and for your feedback on how we can best utilize federal resources to support our environmental and economic goals.

I look forward to our continued collaboration between the public, private, and nonprofit sectors to advance NOAA's mission and equitably and efficiently as possible.

Thank you and have a great meeting.

RDML EVANS: Thank you. We certainly appreciate the Congresswoman's comments and her support of NOAA through the BIL and IRA bills, recognizing the importance of the maritime transportation system and trade, as well as keeping climate science and coastal resilience on the forefront.

As you may know, the HSRP is engaged in coastal resilience and regularly discusses the data backbone that navigation, positioning and observations the portfolio of NOAA provide to Southern California and, in fact, all the coastal zone of the United States. During the next couple of days, we will look forward to hearing more from NOS about the navigation portfolio and services.

Now, as a designated federal official of the HSRP, it does fall to me to cover some more administrative topics. And amongst those is an ethics reminder, so this is the required ethics reminder for our HSRP members.

When participating in HSRP public meetings, you serve as a NOAA special government employee in your personal capacity as a subject matter expert.

Please remember that you do not represent any group, industry, association or other entity including businesses you may ordinarily be affiliated with.

Please remember to take off your regular work hat and replace it with your NOAA hat as you provide your expertise, questions, comments, and guidance to NOAA and through the NOAA Administrator.

Thank you for your service to

strengthening NOAA's hydrographic and navigation, observation and positioning services portfolio. NOAA and I greatly appreciate your vision and help.

Next, some notes on public comments. Thank you to all the participants who have provided comments in advance. To the stakeholders, staff and others, I encourage your public comments and input.

If you have a comment, please type it in the webinar under the questions box. Your comments will be read or summarized into the public record and are put on the screen if time permits. All the comments from the meeting that are on topic will be included in the official meeting minutes. When comments are received in advance, they will also be shared and highlighted at the meeting as well as become part of the public record.

I welcome and encourage comments from any group directly or individual during the public hearing.

And then, just a second reminder about privacy. These sessions are being recorded, transcribed and posted to the NOAA HSRP website. The speakers have provided their written permission to do so.

Your individual permission is required for the use of your photo, video and voice on audio. The meeting webinar will be maintained -- retained, excuse me, and disseminated on the meeting website and accessible to the public. You can decline by abstaining from speaking or dropping off the webinar.

And with that, I will hand it back to Sean to introduce the HSRP members and NOAA leadership. Sean?

CHAIR DUFFY: Thank you, Admiral. I was worried about pronunciation and learned I've been saying San Pedro wrong. So, anybody wants to challenge me on some Louisiana words, I can say Tchoupitoulas and probably spell it most of the time.

With that, I'm a little bit out of

order in that I forgot earlier to thank Julie Thomas, our past chair. Julie, it wasn't meant on purpose, and had we been in person, it would have been easier to remember. But you set a very high bar I hope to be able to follow.

I'd also mention that I probably have a better vice chair than you did and Nathan Wardwell, who will hopefully be able to join us, may be challenged. And Julie, I know you did a lot to help set up this meeting. I wanted to express my thanks to you for all your hard work.

And with that, you will find in the speaker bios and advanced materials, and we'll go through the members. Mary Paige Abbott, I'm sure with that A you're used to going first, and hopefully I didn't catch you off guard, but if you can start with a quick intro? And then we'll go next to Qassim and go through in order.

MEMBER ABBOTT: Yes, you did catch me off guard. I'm Mary Paige Abbott and a newer member of the HSRP. My forte, if I may use that word correctly, is that of the recreational boater, and I'm here to help and listen and advise from that capacity.

CHAIR DUFFY: Thank you, Mary Paige. The graphic is very helpful.

Qassim, you're up next. Good morning. I guess that's relative to where you are. It may be afternoon.

MEMBER ABDULLAH: Yeah. Thank you, Sean. Hi, everyone. I'm Qassim Abdullah. I'm the advisor, president, and chief scientist with Woolpert, and I also teach at Penn State and UMBC, University of Maryland Baltimore County.

I've been with NOAA -- this is my -- starting my second term, I guess, not announced yet, and leading with Anuj and Deanne the technology working group. I will be looking forward for this meeting. As always, I expect it to be very productive. Thank you.

CHAIR DUFFY: Thank you, Qassim.

Anuj, you're up next and with that Captain Cruz.

MS. BUTLER: Anuj is not on at the

moment, so we're going to move on to Captain Cruz.

And Captain Cruz is not on either. Apologies. Let's move on to Nicole Elko.

MEMBER ELKO: Good morning. My name is Nicole Elko. I am the executive director of the American Shore and Beach Preservation Association, and I am delighted to be here today. I sit just outside Charleston, South Carolina, and I'm also the executive director of the South Carolina Beach Advocates. So we are excited to bring to you concerns from the communities and share with you new resilience challenges that have popped up even just in the last six months.

So, I very much look forward to this week's discussion. Thank you.

CHAIR DUFFY: Deanne, I'm having trouble. I'm muting in and out, so if you can start, please? And Nicole, I'm sorry but I love seeing the surfboard.

MEMBER HARGRAVE: Hi. Nice to see you. Thanks, Sean.

Hi. I'm Deanne Hargrave. I'm the geoscience manager for Atlantic Shores Offshore Wind into my second term on the HSRP panel. I'm looking forward to another great session. I really miss seeing everybody in person, but I know that we'll pull this off successfully as we have in the past. Dealing with adversity is something that we thrive on.

I'm based in New Hampshire and, yeah, looking forward to bringing kind of the geoscience data acquisition management and benefits perspective to how we can really optimize that for our Blue Ocean Economy. Thanks.

CHAIR DUFFY: Thank you, Deanne.

Next up alphabetically, we have Tuba.

MEMBER OZKAN-HALLER: Good morning, everyone. My name is Tuba Ozkan-Haller. I am a faculty member here at Oregon State University. My area of expertise is in coastal oceanography and coastal engineering, so that's the lens with which I engage in this work.

Right now, I'm also the dean here of the College of Earth, Oceanic and Atmospheric Sciences at Oregon State University and look forward to a productive meeting. Thank you.

CHAIR DUFFY: Thank you, Tuba.

Next up, Eric Peace. Good morning, Eric. I think you're on the same time zone.

MEMBER PEACE: Greetings from Cleveland, Ohio.

So, I'm Eric Peace, vice president of Lake Carriers Association, which represents the U.S. flag fleet here on the Great Lakes. I'm heavily involved with everything Great Lakes, whether it's shipping, the marine transportation system, or environmental issues and things like that that we deal with.

So, again, looking forward to a great meeting. Thank you.

CHAIR DUFFY: Thank you.

Julie, great to see you.

MEMBER THOMAS: And great to see everyone else. And thank you, Sean, for that acknowledgment of being past chair. We're going to have an echo here.

I'm very fortunate -- I'm probably extremely fortunate because Captain Louttit has still offered the Marine Exchange to take this call from, so I'm actually in San Pedro. And the under keel clearance panel will be joining us here this afternoon, most of them, so I am fortunate.

And usually, I sit in San Diego. I worked for many years at Scripps Institution of Oceanography, managed the CDIP Wave Program, and also was executive director of SCCOOS. Thank you.

CHAIR DUFFY: Thank you, Julie.

Next up, we have Nathan listed, but I don't believe he's with us.

And with that, we would move to introduction of the nonvoting members and Captain Andy Armstrong. Andy, you're up first.

Well, hello, Andy. I'm not sure if it's morning or afternoon anymore, so hello.

Good to see you.

CAPT. ARMSTRONG: Well, I'm not sure either, Sean.

Hi. I am Andy Armstrong. I'm the NOAA co-director of the NOAA University of New Hampshire Joint Hydrographic Center, and I've also recently been tasked with bringing the new Center of Excellence that Nicole mentioned online and making it a reality in NOAA.

So, I'm very much looking forward to this meeting. Thank you.

CHAIR DUFFY: Thank you. That's wonderful news. Capable hands, Andy, and I see your cohort Larry is ready to go.

Good morning. Hello, Larry. How are you?

DR. MAYER: Hello, I'm fine. Yes, I'm Larry Mayer. I am Andy's cohort. I am the director of the Center for Coastal and Ocean Mapping at the University of New Hampshire and the co-director of the Joint Hydrographic Center.

And I've had the pleasure of watching

Andy really work hard to bring this new Center of Excellence to fruition, and we're very, very excited about it.

CHAIR DUFFY: Thank you, Larry.

Next up -- and my New Orleans pronunciation would be Marian Westley, and I am not going to try to say her title because I would mess it up. I don't have written down.

My friend, Dr. Marian Westley.

DR. WESTLEY: Thank you, Sean. So, I am the director of the Center for Operational Oceanographic Products and Services, or CO-OPS, here in the National Ocean Service. We basically do tide gauges and currents.

I'm really delighted to be here. The HSRP has been a great source of advice over the years. Happy to be with you this week.

CHAIR DUFFY: Great to see you. On my script, I have Nicole Leboeuf and Rachel Dempsey, who we've already met. And I see Rachel Fontana also listed, and if she doesn't pull up, I guess we would just move on.

And, again, thank everybody for being here set up as we work through the agenda. Looking, I believe Admiral Evans is up next, maybe, if we don't have any more intros.

Okay, there he is. Good to see you, my friend.

RDML EVANS: Thanks, Sean. And I was just going to propose that we go back and introduce Mr. Brad Kearse, the deputy director of the National Geodetic Survey, who I believe is our senior NGS representative here today.

MR. KEARSE: Yes. Good morning to folks, and I guess we're afternoon for some of those folks on the East Coast.

So, Sean, Julianna regrets she couldn't be here. We are trying to cover many tasks. There's the MAPS federal meeting going on. Also, there's a CAC, the Civil Application Committee meeting, so we're trying to tackle both things from West Coast to East Coast this week.

So, I'm the deputy director here, and I've been around for a while. I haven't participated in a lot of HSRP meetings, but I am well aware of HSRP. And in my past life, I used to attend when they first started up, so I've got a long history around NOAA.

So, look forward to the discussions, and really look forward to updating you on all the great things going on with modernization of the National Spatial Reference System and the crisis in geodesy.

So good to see everybody and look forward to the discussions.

CHAIR DUFFY: Well done. Thank you. I didn't mean to skip your earlier.

Admiral?

RDML EVANS: Thanks, Sean. I'd also like to recognize the NOAA staff at our meeting.

The Ocean Service and NOAA have a variety of staff who provide subject matter expertise and program and administrative support to the HSRP. There's about 20 NOAA staff that follow the work of the HSRP year round and they can assist you with their expertise throughout the year.

I'd also echo Sean's thanks to the staff who are helping with this meeting as well as the others providing ongoing HSRP support. A small selection of those include Jeff Ferguson, Ashley Chappell, Amanda Phelps, Amber Butler, Virginia Dentler, Galen Scott, Robin Czerwinski, Megan Schwinden, Melanie Colantuno, and Nathan Littlejohn.

In addition to those names, there are a few experts from my office, so the Office of Coast Survey. With us today, we have Ms. Lorraine Robidoux, who's the deputy director; Captain Sam Greenaway, who's the chief of our hydro surveys division; Mr. Darren Wright, our precision marine navigation program manager, and I suspect several others have joined us as well.

So, I encourage the panel members and attendees to engage with not just the Coast Survey experts, but the experts across NOAA who are who are participating and available.

I'd also like to share some exciting

and somewhat last-minute news that we have for new members that are slated to begin their terms on the HSRP at the fall meeting. However, we did just receive their confirmation letters, and I believe many of them are joining us here today.

And as was previously mentioned, I do particularly want to also congratulate Qassim Abdullah, who has been reappointed for a second term on the panel. So thank you, Qassim, for sticking with it and continuing to support this important work.

If any of our new members are online and would like to introduce yourselves, just a quick intro with your name, your organization, your job title, and where are you from, I'll just work through the list that I have.

Sloan, are you with us?

MEMBER FREEMAN: I am. Can you hear me okay?

RDML EVANS: Yes.

MEMBER FREEMAN: All right. Hi, everyone. I'm Sloan Freeman. I'm a co-founder and CEO of Geodynamics, which is a hydrographic survey firm that has specialized in shoreline mapping and coastal chart updates for clients including NOAA, Corps of Engineers, et cetera.

We're based on the East Coast. I'm in the southern Outer Banks, and as part of a larger NV5 geospatial I'm helping integrate our vessel-based fleet services with aerial topobathy lidar.

It's great to be here. Thank you very much.

RDML EVANS: Thank you, Sloan.

Kim Holtz?

MEMBER HOLTZ: Hi, I'm Kimberley Holtz. I'm the director of surveys for the Port of Long Beach. I'm a professional land surveyor and a professional geologist, and my expertise is in geodesy. I've worked really closely with the California Spatial Reference Center in the state of California on our coordinate system.

So, I'm very excited to be on this committee and start working with you guys. Thank you.

RDML EVANS: Thank you, Kim. It's great to have you.

Captain Kurtz, nice to see you again.

MEMBER KURTZ: Hi. Good morning. Good morning from Tampa, and I have been a Tampa Bay pilot for the past 28 years. Recently retired but not not working. Still doing lots of things.

Big fan of NOAA and a very enthusiastic user of all the PORTS products. And really looking forward to participating on the committee, so thank you for having me.

RDML EVANS: Thank you, Carolyn.

Rebecca?

MEMBER QUINTAL: Hello, everyone. Rebecca Quintal. I'm with SEACORP, coming to you from Rhode Island. I also have a background in geology, which led me to geological oceanography, which led me to ocean mapping.

I've spent the vast majority of my career supporting NOAA's mission, the Naval Oceanographic Office, and the Army Corps of

Engineers, all dealing with safety of navigation products. Thank you.

RDML EVANS: Thank you. And I just have to say, once again, I'm incredibly impressed by the quality and experience and expertise of these new panel members, as I am with all of our panel members.

And I really am deeply appreciative that these folks have taken the time to provide their expertise and advise us on hydrographic services. We appreciate your engagement and support of the mission and look forward to learning more with you.

So, we have a great meeting planned, and I'm going to just jump ahead a little bit. I look forward to coming back later this afternoon and providing an update on the goings-on in coast surveys since our last meeting, along with the other directors. But before we do that, we have a number of -- a couple of panels lined up.

First, we'll hear from a panel of

local stakeholders and experts who will share their perspective on the application of NOAA's navigation products and services, the challenges in the region of Southern California, and how we can expand this to meet national requirements.

And then, later, former HSRP chair Julie Thomas and Captain Kip Louttit will moderate a panel and discussion on under keel clearance. This subject is increasingly important, particularly there in the L.A. and Long Beach region. As ships continue to grow, the ports become more congested, and every additional inch of draft adds tens of thousands if not hundreds of thousands of dollars in additional cargo.

We'll also hear from Mr. Darren Wright, who is Coast Survey's Precision Marine Navigation Program manager, who will update us on NOAA's next-generation navigation products and services.

And then, after the directors' updates later at the end of the program today, tomorrow, we'll spend the first part of the morning focused on the concept of adaptive and resilient ports in an era of accelerating climate change. And then, we'll have a kickoff from Nicole, followed by a panel discussion moderated by Nathan Wardwell, our vice chair.

And then, Thursday kicks off with another staff panel discussion on NGS' geospatial modeling, addressing the geodesy crisis. And as Brad teased just a moment ago, he'll be leading that.

And then, our last major session will be a panel of regional experts on non-navigation applications of ocean observation and mapping data, led once again by Julie Thomas.

We'll then round out the meeting by finishing our discussion on issue papers, the priority matrix, and drafting the recommendations.

So, with that overview complete, I'll just turn to a couple last housekeeping items.

As you know, the HSRP is required by

law to meet twice a year. We appreciate the time dedicated to this, and the chair, vice chair, and I intend to honor your time and promote collaboration by running the meeting as efficiently as possible. This will ensure adequate time for robust discussion among the panel members and with the guest speakers, and then comments from the public.

I look forward to discussing issues of national importance, recommendations for issue papers, and the members' advice for the NOAA administrators. I encourage all who are listening to consider making public comments to the HSRP to enhance this dialogue.

So, Sean, I think next up is a break, but I'm turning it back to you for any last comments.

CHAIR DUFFY: I will just say well done, everybody, and I hope we can enjoy our quick break. Lots of work here. We'll slow down a little bit. Enjoy your break, and we'll be back shortly.

I believe we have about 15 minutes scheduled, and then we'll start with our next panel.

RDML EVANS: Great. So, I think we do have 15 minutes scheduled. We're slightly ahead of schedule, so I'm going to propose that we come back at five past the hour, and I'll let you guys decide which hour that is because we're all at so many different times. So, just shy of 20 minutes, five past the hour.

CHAIR DUFFY: Excellent audible, sir. Thank you. Thanks, Sean.

(Whereupon, the above-entitled matter went off the record at 9:47 a.m. and resumed at 10:07 a.m.)

RDML EVANS: Hello again, everyone.

Sean, are you available to come back online and we'll get this kicked back off?

CHAIR DUFFY: Yes, sir, I am. I think we have one change. I believe we're going to -- Nathan Wardwell, our excellent vice chair, the brains and looks of the operation, should be able to join us soon and introduce himself. There he is.

VICE CHAIR WARDWELL: Yeah. Hello. Thanks for that introduction, Sean. Brains and looks. All right. I guess you'll be keeping me around.

Let's see. So my name is Nathan Wardwell. I'm managing partner of JOA Surveys and I'll keep the introduction short but passionate about Alaska water levels, vertical datums, and NOAA. So, thank you very much and looking forward to today.

CHAIR DUFFY: Thank you, Nathan. Good to have you. I was going to start our first panel on local, regional, state stakeholder and partner perspective, opportunities and challenges for NOAA's Navigation, Observation and Positioning programs.

I'll say a lot on the Mississippi River team. Mississippi River includes our government partners. We rely heavily on them and I'm sure that's the same everywhere.

So we have some of our excellent government partners from California: Mr. Derek Davis, deputy chief engineer for the U.S. Army Corps of Engineers at the Port of Long Beach, Captain Ryan Manning, the sector commander from U.S. Coast Guard, Captain John Betz, the chief port pilot of the Los Angeles Pilot Service -- always great to have pilot representatives. I deal with a lot of them on the Mississippi.

Then a friend I've known for a long time, Mr. Jim Haussener, executive director of California Marine Affairs and Navigation Conference. I've known CMANC a long time. I don't know that I've ever read it all out. But just for you, Jim.

And then another old friend, Kip Louttit, executive director of the Marine Exchange for Southern California.

And with that, I will turn it over to Rachael Dempsey and move forward. I look forward to the panel.

MS. DEMPSEY: Thanks very much, Sean,

and I want to say hello again. Glad to actually see you all this time now that I got my technical difficulties out of the way just in time for our panel.

Welcome to our panelists today. I'm really looking forward to our discussion here. I will tell you since my time reporting in to NOAA as the Nav, Obs, and Positioning DAA I've had the opportunity to tour a number of different ports.

Each port, as you all know, has its own set of challenges. I recently visited Pearl Harbor in Hawaii back in January and I found it fascinating because the DOT harbors in Pearl is in the process of planning for a pier restoration and construction, and they're using NOAA data right now on which to base the height at which they're going to build this pier and they're experiencing some challenges on how to use our data because if they build it too high, they build it too low, it's going to have negative impacts with reference to projected sea level rise to communities and industries that are immediately to the north of that area.

So I appreciate the fact that they're using our data, and we have some work to do to help them with that interpretation because we want to make sure that we help you get it right the first time.

So, you know, whether that is considering rising sea levels or extreme weather events, you know, when planning for infrastructure in port it's important to have that right information.

NOAA and National Ocean Service and the Nav, Obs, and Positioning portfolio can provide foundational data and information that will help you get it right.

So since I have not yet had the opportunity to tour L.A. and Long Beach I'm personally eager to hear about the challenges and concerns that these stakeholders are facing because we want to be responsive to their needs as they arise.

So with that, our first panelist is Mr. Derek Davis. Derek, I'd like to turn it over to you for your perspective.

MR. DAVIS: Good morning, and thank you very much. My name is Derek Davis and I'm a deputy chief harbor engineer in the program management division at the Port of Long Beach. It is my pleasure to present before you today, and I apologize for the technical difficulties with the camera not being able to work through our webcam. So I'll go ahead and go through my presentation.

My talk will address collaboration between the United States Army Corps of Engineers and the Port of Long Beach to construct navigation improvements that will reduce constraints and increase transportation efficiencies.

The Port of Long Beach is the nation's second busiest seaport, moving more than $200 billion in goods each year. Working together, the United States Army Corps of Engineers and the

Port of Long Beach completed the Long Beach Deep Draft Navigation Improvements Feasibility study. The Army Corps and the Port of Long Beach have had a long-standing relationship that has developed over the years.

Our partnership has not only helped the port to improve navigation within the harbor, it has also helped the port to achieve environmental goals through the removal of contaminants on the ocean floor and the construction of infrastructure to promote clean air as well as the creation of new and leasable land.

The port's deepening project has been in the works for many years and is an essential component of the port's master plan. The feasibility study identified improvements in navigation safety and efficiencies for national commerce.

These improvements are needed to address some of the existing channel depths and widths that do not meet the draft requirements of the fleet of vessels that currently call, and are expected to call, at the Port of Long Beach.

The study identified the following navigation constraints and operational inefficiencies. Tide restrictions, weather conditions, light loading where shippers limit the number of containers that are loaded on the vessel at the point of origin, and lightering, which is when liquid bulk vessels unload product to a smaller vessel before entering the port to reduce the vessels' draft.

The focus was on improving conditions for current and future container and liquid bulk vessel operations in regards to safety, reliability, and waterborne transportation efficiencies.

The study recommended widening and deepening portions of the harbor and approaches. I see we've already moved on to the next slide. So features on the Deep Draft Navigation Improvement Feasibility Study include deepening the Long Beach approach channel from 76 to 80 feet, easing bends in the main channel by widening the main channel to a depth of 76 feet, constructing an approach channel and turning basin to Pier J South to a depth of 55 feet, deepening portions of the West Basin from 50 to 55 feet, deepening the Pier J South slip and berths to a depth of 55 feet, performing structural improvements to the Pier J South breakwaters, and to be in compliance with the port's green port policy.

The study includes the construction of a new electric dredge substation to facilitate electric dredging. Dredged material would be deposited in either near shore sites for reuse or federally approved ocean disposal sites. I apologize I don't have a pointer to point out these areas I'm going through.

The design vessel for containerized cargo is a EEE generation four cargo ship with a maximum draft of approximately 52 feet and the ability to transport 18,000 to 19,020 foot equivalent units, or TEUs.

Navigation improvements for container vessels include deepening the Pier J South approach turning basin and slip and deepening the West Basin area. The West Basin Pier J South approach and Pier J South slip will be dredged to a depth of 55 feet which will provide approximately three feet of under keel clearance for container vessels drafting 52 feet.

The design vessel for liquid bulk product is a very large crude carrier, or VLCC, with a maximum draft of approximately 70 feet, length overall of 1,100 feet and dead weight tonnage of 325,000.

Navigation improvements for liquid bulk vessels include deepening the main channel -- that is, the area within the port's harbor -- and a two-mile stretch of the Long Beach approach channel which is outside of the Queens Gate.

The main channel will only go bend easing to a depth of 76 feet and the Long Beach approach channel will be dredged to 80 feet. So why 80 feet? Several years ago, the Port of Long

Beach participated in Charta's PROTIDE study, along with several other key stakeholders, and learned that pitch and roll has been experienced as vessels enter the Queens Gate from the Long Beach approach.

For a 1,100-foot long oil tanker, one degree of pitch results in an approximate increase of 9.6 feet in draft. If the oil tanker is drafting 65 feet and the water depth is 76 feet in the main channel this leaves only approximately 1.4 feet of under keel clearance for these liquid bulk tankers.

During the feasibility phase port pilots went to the Marine Lab at the Army Corps of Engineers Research and Development Center in Mississippi to simulate navigating oil tankers into the port's harbor. For the simulation, the marine lab was modeled to match the geometry of the port's harbor.

The simulation determined that smoothing out the sharp edges along the existing main channel is needed to facilitate safe navigation of the very large crude carriers calling at the port.

The port pilots were returned to the engineer research and development center during the design phase to validate and/or refine the proposed channel geometry.

Potential benefits identified in the study include operational reduced lightering of liquid bulk vessels and reduced light loading of container vessels, results in increased transportation efficiencies which reduce transportation costs.

Safety -- there is enhanced safety with improved ability for vessels to maneuver, and environmental -- improving navigational efficiencies reduces the emissions of air pollutants and greenhouse gases by facilitating the newest and cleanest vessels calling at the port fully loaded.

Less time waiting for tides means less idling while not alongside a berth which could help reduce air emissions.

Finally, as an economic and environmental benefit, there is an opportunity for beneficial reuse of the dredge material in port landfills.

So where are we today? Approval of the Army Corps' chief of engineers report occurred on October 14th, 2021. The record of decision was signed on July 6th, 2022.

The Board of Harbor Commissioners approved the environmental impact report on September 12th, 2022. The deep draft navigation improvements project was included in the Water Resources Development Act of 2022 and was signed by the President, and on March 27th, 2023, the Board of Harbor Commissioners approved the design agreement with the Department of the Army for the preconstruction, engineering, and design phase and authorized funding for the port's cost share.

The design phase is expected to take approximately two years to complete. The deep draft navigation improvements project will widen and deepen portions of the port's harbor and approaches and is expected to generate approximately 7.4 million cubic yards of dredge sediment.

The current estimated costs for the project cost share between the Army Corps and the port is approximately $200 million. Construction of the deep draft navigation project is forecasted to start in 2028 and is expected to take approximately three years to complete.

Consistent with the Army Corps' focus and directive for beneficial reuse of dredge sediment, the project will identify opportunities for use of the material.

There are three opportunities currently in consideration for beneficial reuse. First, there is an opportunity to place approximately 2.5 of the 7.4 million cubic yards of the material dredged for the deep draft navigation improvements project into the Pier G South slip field -- South slip, excuse me.

The Pier G South slip provides a disposal site within the port's harbor for potential unsuitable material and also provides for the construction of a new port landfill.

Work to construct the containment dike for the landfill is forecast to begin later this year. Second, if the quality of the dredged sediment meets the required criteria, the port and Army Corps will evaluate beneficial reuse of material for beach nourishment here in Long Beach.

Also, there is a potential opportunity for beneficial reuse for construction of the proposed pier wind facility. Dredging for this facility may start in 2027 and is currently being evaluated and the EIR is currently under development. Next slide, please.

So thank you very much. That concludes my presentation, and thank you for your attention. I'm happy to address any questions that you may have.

MS. DEMPSEY: Great. Thanks very much, Derek, for that. I think we're going to hold our questions to the end right now but, you know, really informative information regarding your plans for the Port of Long Beach. Thank you very much for sharing that.

MR. DAVIS: You're welcome.

MS. DEMPSEY: Next we're going to go over to Captain Ryan Manning at Coast Guard Sector.

Captain Manning?

CAPT. MANNING: Thanks so much, Administrator Dempsey, and we definitely will look forward to giving you a tour when you're able to get a trip out here to San Pedro. I would have liked to have shown you all around the port area. It's a great place to serve, and I'm privileged to be able to be the sector commander here in Los Angeles/Long Beach.

So thanks to the HSRP and NOAA leadership for extending the invitation for me to be able speak to your group. As a past DFO for FACA I know that the input that you get from those members is extremely valuable and so thanks to everybody for their service in this committee.

So if we can roll to the next slide on -- one more slide down.

So here at sector Los Angeles/Long Beach we've got about - a crew of about 550 active duty, reserve, and civilians. We also employ a volunteer workforce of about 750 Coast Guard Auxilirants.

They handle our recreational boating safety programs. In addition to the sector personnel here in San Pedro we have 454-foot fast response cutters, four 87-foot coastal patrol boats, three small boat stations staged along the coast, an Aids to Navigation team, a marine safety detachment, and a team of vessel traffic specialists that are going to be here. Kip Louttit is going to speak later today and in many other things here throughout your panel and you'll hear about the services that they offer here in the Corps area.

So all these personnel and resources are gainfully employed in our area of responsibility that spans about 350 miles of coastline, three commercial ports, countless harbors, and out to 200 nautical miles of open ocean.

So as sector commander, I'm responsible for wearing five different federal authority hats, so to speak, in my role as sector commander. And so the first one being the Captain of the Port, probably the one that I'm using most often on a day to day basis, that authority that's extended to me as Captain of the Port.

The other four include the Federal Maritime Security Coordinator. That's the one that's kind of depicted as the police officer hat there. I would say that, you know, kind of came about as part of the after post-9/11 and then Marine Transportation Security Act that was passed.

I co-chair that committee with a partner from the FBI. The federal on scene coordinator, which is depicted by the firefighter's helmet there, is really our role as the lead federal agency by the national contingency plan as the oil spill response organization for the coastal region whereas the EPA as the inland areas.

The OCMI, the Officer in Charge for Marine Inspections, that's depicted there by the hard hat, that's -- rather than being the building inspector on land we've got a team of inspectors that inspect the ships that arrive here into the port complex whether it's these, you know, 1,200-foot container ships all the way down to the 45-foot passenger vessel that we do inspections on.

And then the last one is the Search and Rescue Mission Coordinator, the SMC, and that's -- just consider us to be the 911 of the sea as we take those calls for folks that are in need.

So we actually participate in 10 of the 11 Coast Guard statutory mission areas and these includes, you know, search and rescue, counter drug, migrant interdiction, vessel safety inspections of pollution response, and much more.

There's only one of the Coast Guard statutory missions that we don't do and had we had this in person I would have thrown a command coin out to the person that could tell me which statutory mission we don't do.

I'll give you a hint. I think we had a Lake Carrier Association member on this panel. As you know, it doesn't really get below freezing very often here in Southern California so that the ice-breaking mission has yet to appear in Southern California. I'm hoping it never does. We can roll on to the next slide.

So as is apparent from our previous slides, we and our port partners here in Los Angeles and Long Beach are responsible for the safety and security of a very large, complex and ever-changing port complex.

So we provided some kind of summary statistics for the port complex here in Los Angeles and Long Beach, primarily dealing with the container focus, and if you would have had the opportunity to travel here to San Pedro it would have been undeniable that when you drove into the port complex and you started seeing the stacks of containers sitting around, you knew that this really is a very massive container port complex.

But it's not the only type of cargo that happens here. We also have lots of cruise ships arriving in both the Port of L.A. and Port of Long Beach, patrolling the chemical tankers, auto carriers, break bulk, commercial fishing, and countless other commercial entities here locally.

So you layer in kind of the recreational boaters, the sailing regattas, the swimmers, countless other waterways users and it further adds to that complexity of our marine transportation system. We can roll to the next slide.

So not only is the traditional waterway usage increasing in scope and complexity but we're also coordinating major events using our waterway.

That first picture that you see there Sail Grand Prix brought national attention to Los Angeles for a multi-day, multimillion dollar sailing race for the first time this past summer and I can imagine that it's probably going to be coming back given that the success that they had.

Fleet Week also brings similar attention annually here to the port with our DoD partners and then the Pacific Air Show, the largest air show in the United States, just restarted again off of the coast of Huntington Beach after a couple of year hiatus due to COVID, and then I think the biggest event that we're probably coming -- you know, starting out in four years here which will be here before we know it is the Summer Olympics are being hosted in L.A. in 2028.

And so certain that there'll be lots of on-water activities, as well as close to the waterway activities that we'll be coordinating with all of our partners on.

So you can also find the latest and

greatest and technological use of the marine transportation system in our AOR. SpaceX launches out of Vandenberg, which is about three to four hours north of here just more and more frequently and other commercial spaceflight commercial companies are continuing to increase their usage here in the in the port area as well.

We've got some mariculture projects that look to increase sustainable food products and research opportunities, and the picture on the lower left is a fully operated container terminal -- fully automated container terminal, the Long Beach container terminal -- over at the Port of Long Beach where Derek just gave you a kind of a brief about and, you know, that terminal if operated at full capacity has the throughput that would rank it as the sixth largest container port in North America, the container terminal in itself. It's, you know, 18 ship to shore container cranes, so quite the marvel over there and pretty amazing to see that operation run.

So all these events and technological advances create opportunities but they also require increased care, coordination, and facilitation with our port partners which brings me on to the next slide.

So although I've got a huge team here at the Coast Guard I'm very thankful for the federal, state, local, and private industry stakeholders and partners that we have.

We've got great partnerships and some of them may be called out by either statute and policy as well. You know, we have the Area Committee that we chair that was established by the Oil Pollution Act of 1990.

That assists us in our role as I was telling you about oil spill response in the area for the coastal zone. EPA is obviously lead on the inland areas. The Area Maritime Security Committee that I mentioned about being a co-chair with the Federal Bureau of Investigations on as well as I think a committee that probably you're going to hear about in the next panel member.

Captain John Betz is our chair of our Los Angeles/Long Beach Harbor Safety Committee which really helps us have a really, I would say, safe waterway around this area.

So I'm not going to steal any of John's thunder. He is a great chair on that committee and I'm glad that I have the opportunity to work with him and sure I'll be seeing him in a couple of weeks with some of you, I think, at the National Harbor Safety Committee. So that will be an interesting event we go to.

Another couple of partnerships that we have here is that there's one called the regional coordinating mechanism which helps us get after some of the cross-border smuggling issues that we're dealing with as well as a number of search and rescue councils that we participate along the coastline with those that are involved in the search and rescue mission.

For federal partners, just even within the Department of Homeland Security, primary dealing with Customs and Border Protection, Homeland Security Investigations, TSA, Secret Service and FEMA -- we work with FBI, DoD partners. I will highlight, you know, in this panel anyway, the most important federal partner we have is NOAA.

And then the last of the federal partners that we deal with quite frequently, especially we did during COVID and really any pandemic that's happening throughout the world as we get international seafarers and ships arriving here into the port area, is the Center for Disease Control. So definitely an important partner.

For the state agencies we deal with, you know, California Highway Patrol, the California National Guard, Department of Fish and Wildlife. An organization within that is the Office of Spill Prevention and Response, OSPR, that we deal with quite frequently.

California Office of Emergency Services and the State Lands Commission, and then the, you know, kind of local entities that we're dealing with. As you can imagine, huge components of both L.A. and Long Beach police and fires, you know, the port authorities.

One of the ports I didn't mention in the previous slide is the Port of Hueneme which is just a couple hours north of here and kind of a unique port up there that is a naval port and a commercial port kind of all in one, and it's kind of a unique presence for the Navy.

It really is the only -- you know, between San Diego and Washington State, really the only place where you have a Navy presence. So that's a unique port up there.

And then, obviously, the Sheriff Department's Public Health, Baywatch, and City Emergency Managers. I think the joke is if you're in my position at the end of your assignment of two or three years that you're here, if you've met all of the partners that we work with you've succeeded and, hopefully, it's always in a positive environment and not a you're responding to a casualty or an emergency of some sort.

So the idea is that we meet those folks before we're in that type of an environment. So but we just have great partnerships through and through so it's fantastic. So if we can go to the next slide.

So speaking of all those partnerships, without the partnership with our NOAA colleagues as well as the products and services that NOAA provides, our mission to keep life, property, and environment safe and secure in our area of responsibility would be all but impossible.

The navigation chart products provided are constantly in use with our command center that's running our search and rescue mission operations.

Our emergency management and ports readiness as well as our waterways management divisions are using those products for marine planning and event permitting processes. And then, obviously, those cutters and patrol boats that I spoke about and our boats are using the

NOAA products every day in their missions.

So something else to talk about would be the, you know, kind of these recent heavy weather events that we've been seeing increasingly in Southern California to include, you know, the first hurricane since, I think, 1939. Last August when Hurricane Hilary made its way up the coast.

So we have a port coordination team which is another partner and stakeholder committee that we chair that's used episodically for events that receive daily weather briefings from NOAA to -- it really kind of shapes the way that we are responding to that weather incident that came up the coast.

And then the last thing is we've got -- and I'm sure that Captain Kip Louttit is going to be talking about this in some sense or fashion -- is an anchorage regulation that we've got in the works for basically the anchorages outside the harbor entrances.

As we've been seeing and as you heard

Derek discuss, the ships that we're getting here in the last 10, 20 years have greatly increased in size, requiring not only larger depths, as he talked about in the dredging projects, but also larger watch circles in the anchorages because the size that they are right now, we just can't fit really the amount of ships that we have designated for those ships to anchor.

I'm sure that's something we'll be using in NOAA and they've been engaged on the project. I'm sure they've provided input and they'll be helping us as we move forward, you know, given the new charts that will be, you know, established based on that rulemaking.

So I think, if we can roll to the next one. I'll just kind of close out with saying, you know, the partnership of our port partners and specifically NOAA's support and services, the Coast Guard's -- we wouldn't be able to do our job without it, and so just thanks again for HSRP and NOAA for having us be part of this.

I would really like to see you all in

person but, again, we'll catch you the next time you're out here. So that's all I got. Thanks so much.

MS. DEMPSEY: Thanks, Captain Manning, very much. Greatly appreciate it. You know, I have a lot of sympathetic feelings when it comes to the heavy weather that rolled up the coast last fall having almost gone through it, and I know that we, the San Diego community, is not always prepared for that kind of weather unless we want to use it to find out where the leaks are in our roofs. That's how mostly we normally figured that out at that time, right.

But I think we are going to get to see each other here at the end of March at the Harbor Safety Committee meeting. So I look forward to seeing you there. Thanks.

CAPT MANNING: Sounds good, thank you.

MS. DEMPSEY: All right. So next I want to go over to Captain Betz. Sir, over to you.

CAPT BETZ: Thank you, Rachael. My

name is John Betz. I want to thank you, Rachael and Sean, for inviting me to serve on this panel. I guess I qualify as a local stakeholder.

I'm a chief port pilot with the Los Angeles Pilot Service. I'm also, as Captain Manning said, the chair of the LA/Long Beach Harbor Safety Committee.

Today I'm going to talk about Port of Los Angeles and our pilot service and our port partners, such as NOAA, and how they help us operate more efficiently while maintaining our safety standards. Next slide. Actually, maybe two slides, I think. Yeah, next one. There we go.

First, I'm going to talk about something near and dear to my heart, which is the Los Angeles Pilot Service. We were founded in 1907. The L.A. Pilot Service is a team of 30 dedicated professionals, pilots, dispatchers, deck hands, boat crew.

Our mission is to move vessels safely and efficiently in the Port of Los Angeles. The service works around the clock piloting, roughly, 4,000 arriving and departing vessels per year. NOAA is a big contributor towards our mission, towards us being able to accomplish our mission of moving these vessels safely and efficiently. People ask me what we do.

You know, nobody knows what pilots do and I always tell them we're like valet parking lot attendants on the waters. So that kind of puts everything in perspective. But next slide.

Port of Los Angeles, as Captain Manning said, is the seventeenth largest container port in the world. Hardly anybody that lives here in Southern California really knows that, and a more interesting fact I think is when we combine with Long Beach, because we're really just one port complex, we're the tenth largest container port complex in the world and the only ones that are bigger are in Asia.

The Port of Los Angeles, we're the primary gateway for international commerce and business in the Western Hemisphere. We feature passenger and cargo terminals including cruise, container, automobile, break bulk, dry and liquid bulk. We manage billions of dollars' worth of cargo each year. Next slide.

You know our top dollar volume varies. It's upwards of $400 billion annually in total cargo moved through the port. Our biggest trading partners are China, Japan, Vietnam, Taiwan, and South Korea.

It kind of breaks down -- there's the dollar amounts there. I think that's from 2022. But, roughly, 43 percent of our through-put is from China, 12 percent from Japan, 10 percent from Vietnam, and about 6 and 5 percent from Taiwan and South Korea respectively. Next slide.

Benjamin Franklin -- we'll talk about the Ben Franklin. It was kind of representative of what people have been talking about, bigger ships and bigger ports. As Captain Manning said, the trend over the last decade is towards bigger and bigger container ships, and this is a picture of the Ben Franklin alongside the AP Moller terminal in L.A. Harbor.

This picture was taken in 2015. The Ben Franklin is 400 meters long, which is 1,300 feet. It's longer than the Empire State Building, is tall and it dwarfs the largest aircraft carrier the United States Navy has.

When it first came to Los Angeles in 2015 it was the largest container vessel to have ever called at any port in the Americas, North or South. It's 18,000 TEU 20-foot equivalent units which is 20-foot containers.

Now it's getting almost a little small but we're up in the over 20,000 TEU now as far as container ships. They're, roughly, the same dimensions, the same length, a little wider. But the capacity keeps going up and up as they find more convenient ways to store containers on deck.

And so why bigger? I mean, the carriers, they want to realize scale economies. They want to maximize capacity and minimize slot cost. The end result is better efficiency and that's what supply chain economics is all about was moving things more efficiently at less cost.

These ships have typically been designed to maximize capacity and you can see on this ship here that the house, if you can see in the picture, it's been moved forward.

The reason for that is so they can stack containers 10 high behind the house on deck without obstructing visibility from the conning station and the wheelhouse. This is kind of the trend these days.

With older ships the more you stack containers higher on deck in order to maintain visibility you had to taper the stack, and that meant you had to keep pushing the wheelhouse up and, of course, then you couldn't fit under the bridges.

So this is the smart way to maximize your deck load without increasing your height and maintaining visibility.

But when these ships -- they keep getting bigger, they start creating some issues with infrastructure and navigation. Some of the infrastructure issues are water depth, crane height, fendering capacity at the berths, and, of course, waterway dimensions.

Some of the navigation issues are sail area. The bigger these ships get the more sail area they have, the more the wind acts on them, the more wind force we have and the more tugboats we need to safely manage them. And also restricted visibility.

Whenever we say restricted visibility people think we're talking about fog, and we are. But we're starting to realize or encounter restricted visibility just from the design of these vessels because the container stacks are so high from the conning station you can't even see the waterway anymore and that's another form of restricted visibility because being able to visually see the waterway is one way pilots can visually ascertain where the ship is in that waterway.

So that's a problem in and of itself. Next slide.

So when thinking about solutions to these issues we got to keep in perspective what our overarching objectives are. We want to be busy, we want to run a clean operation -- I mean environmentally clean -- and we want to, above all, maintain safety. Busy, clean, and safe, which leads to safely efficient operations. Next slide.

I'm going to talk about clean first and the biggest thing with clean when we talk about clean is clean air. Clean air is a huge issue in California. Towards that end the port's implemented programs to reduce pollution from ships' exhaust.

Lots of you have heard about the AMP program. It's an acronym for alternative marine power. It's a system where ships when they come in to dock they plug into a shore connection and that allows them to basically access the shore power grid, and they can shut down onboard power generation equipment, which is typically much dirtier and rely on the grid.

That way the ship sits idle at the dock pulling power off of the shore grid and emitting -- basically, it has no exhaust -- into the air. It's a good system but one of the problems with -- or a couple of problems with it, one, it requires a tremendous retrofit on a ship. Some ships have spent upwards of a million and a half dollars to retrofit their systems aboard so that they have the capability of plugging into the shore grid. That's a lot of money.

I mean, if you're in liner operations, you know, you got 20 years of running to L.A. and Long Beach you can justify that expense. But if you're a tramp, you know, a ship that might come here once in a while -- a tramp carrier, as they call it -- it's hard to justify that kind of capital outlay just to plug in at L.A..

Some other problems with the AMP program is it relies on the shore grid and that can overtax our local shore grid, which is already overtaxed with all of our home air conditioning use in the summertime. So that's another issue.

But it is a good system and it does contribute tremendously to clean air. In fact, I'm looking out my window right now and I can see the mountains, which 20 years ago was a rarity in Los Angeles. So we are making progress.

Another system is the one pictured here. They have a different acronym for it. They call it AMECS which is alternative exhaust capture system. So it's a different approach. Instead of shutting down the ships' power generation equipment and rely on the shore grid, a barge comes alongside with some processing equipment aboard it that basically has this big arm that reaches up to the stack and back ends the exhaust out -- as this exhaust is emitted it basically captures it, pulls it down onto the barge, and processes it.

There's some advantages to that. It allows the ship to just continue using its own equipment and you don't have the problem with having to stop and transfer over to the shore grid.

It's also a little quicker to connect than trying to connect to shore power. So we anticipate we're going to be seeing more and more of these barges in L.A. and Long Beach. Next slide please.

Another part of operating a little cleaner is electric yard automation, which kind of goes hand in hand with automation.

As they switch over to automated yards, electrification eliminates a lot of the old fuel-driven yard equipment and so we realize some clean air objectives that way.

Trapac Terminal in L.A. is a fully automated except for the shore cranes. Same thing with the AP Moller terminal out in L.A. outer harbor. Next slide, please.

So how do we address these navigation issues? Here's a picture of a ship going up L.A. main channel and, as I mentioned, this gets to the point where you really can't see the water anymore.

The port spent years making infrastructure improvements in anticipation of these very large container vessels. They've dredged, made deeper water. They brought in bigger cranes. They've upgraded the wharves. But what do we do about the waterways?

I mean, the waterways are the waterways. What do you do about the increased sail area of the ship and the increased windage that we have on these bigger, larger vessels? And what do we do about large ships meeting in these narrow channels? That's another issue. You know, do you want to go to one-way traffic or do we have to develop ways that we can actually meet inside these channels with these bigger ships?

For many of these issues, we're not able to easily engineer our way to a solution. It requires a different sort of approach. Next slide, please.

We need to modify our operating practices, and we'll talk a little bit about how we're doing that. But before I do, about 10 years ago someone asked me what our ships -- we started to see these bigger ships.

Someone asked me if we could take a bigger ship, a ship bigger than 300 meters, above the Vincent Thomas Bridge in the Port of L.A.. I thought about it and my answer was we can do it but we can't do it the way we've been doing it.

We've got to find new ways to do it and, of course, now we're taking 365-meter ships above the bridge and someday we're going to be taking 400-meter ships above the bridge. So but we need to find different ways of doing that.

And the operational solutions required for these bigger ships take contributions from many stakeholders. The U.S. Coast Guard is one of them. Thank you, Captain Manning.

The Vessel Traffic Service is another. A lot of the effort comes together in the Harbor Safety Committee where we have a harbor safety plan that addresses best practices but also builds stakeholder relationships and engagement that provides a forum for discussion. So when we have problems around some of these operational issues, the Harbor Safety Committee becomes a very good forum for working out solutions.

And we also have partners like NOAA that can provide a lot of the data that we need to implement some of these best practice solutions. Next slide.

So how do we work through this? This is nothing new. Environmental occurrences have always negatively affected navigation, things such as fog and wind, but with these bigger shifts these negative effects are magnified. What was a small problem is now a big problem. So what do we do when we're navigating one of these behemoths through a combined waterway and we encounter fog?

In the past we would either decline to enter a port if it was foggy, which caused delays, affected efficiency. Obviously, risk was elevated, sometimes beyond acceptable levels.

So the question becomes, what's the

solution to remain safe and efficient? I see my one-minute sign here.

The solution is to create best practices and we call on the Coast Guard and the Harbor Safety Committee and VTS to do it. Next slide, please.

I'm going to go fast here. So one of the ways that NOAA helps us is through our PORTS system where we obtain real-time information about wind, and that helps us understand how much force is acting on the vessels and how to effectively mitigate that through using more tugboats, things of that nature. This kind of information is critical for us. Next slide, please.

I'm going to zip through this quickly, this is a picture of basically the old school way of piloting where we just use our eyeball. You can see up there the leading lights, a light from a buoy. Next slide, please.

And this is the exact same picture using a pilot's carry-on unit which displays navigation information right at the pilot's fingertips.

This is the exact same picture. You can see the ship on its user-drawn track line entering the Port of Los Angeles. You can see there's a lot more information available here than there was in the previous slide.

This is kind of the new way of piloting ships and when we encounter things like fog and restricted visibility, basically we can just keep operating, and we couldn't do that without the information from NOAA. Next slide, please.

So when this happens we are able to maintain our levels of safety and meet our goals to operate efficiently and we couldn't do this without help or the information provided by partners such as NOAA. It's a huge partner, or it's a huge help for us. Thank you, Jeff Ferguson. Next slide, please.

Sorry to rush through that but thank you, everyone. I want to thank all of our partners, thank the Coast Guard and VTS, and thank you, NOAA, particularly, for keeping our ports safe and efficient, and I'll be happy to answer any questions later on in the program. Thank you.

MS. DEMPSEY: Thank you so much, Captain Betz. A picture is worth a thousand words, right? You could go through -- many of us have a great appreciation for exactly, you know, what you're talking about and, hopefully, our public audience can reference them as well.

You know, these are very descriptive of exactly why we need to put PORTS wherever, you know, our audience and particularly our harbor pilots need them. So thank you very much for that description. Much appreciated.

CAPT BETZ: Thank you.

MS. DEMPSEY: Okay. So our next panelist is Mr. Haussener. Mr. Haussener, over to you, sir.

MR. HAUSSENER: Good morning or good afternoon, depending on where you are. Thank you, Sean, earlier for the nice comments you made about me.

I was looking at my notes and I spoke before this committee in 2008, then in 2015, and now 2024, and wondering maybe you guys forget what I'm like at each time and then you invite me back. I appreciate the courtesy.

CMANC is a regional port organization out here in California that has -- everybody that has a federal navigation project is a member of so break waters, dredging from Crescent City to San Diego from San Francisco to Stockton, and California is unique. There is no state port agency and generally the state does not help fund any of the capital projects.

Up until last year the state had a great deal of money and provided $1.2 billion to some of the port programs. Maritime trade through California touches all 435 congressional districts.

As most folks know, California is one of the largest economies. Thirty-five percent of the nation's water board trade by dollar amount goes through California, which creates 4.3 million jobs, generates $30 billion in personal income, and provides federal revenue of over $10 billion annually. Last year 21 million TEUs, 20-foot equivalent containers, went through California.

Currently the ports are investing over a million dollars per day on their capital infrastructure. Captain Betz commented about the ships are getting bigger.

They're getting bigger faster than the ports really expected them to and that's why we're having to do crane raises, raising cranes by 17 feet, strengthening wharfs and doing some of those programs because of the growth in the size of ships.

We also need a lot of partnerships and collaborations. Captain Betz talked about the plug-in ships. The ports of Long Beach/Los Angeles for over two decades now have been working towards that program even before the IMO developed standards for vessels to do that and we're working towards zero emissions to allow all cargo and passengers to be in a zero-emission framework as well as making sure all the harbor craft are zero emission as well.

You heard Derek earlier today talk about electric dredging and we're working that way to get to zero for everything we do.

There's a dredge that's currently down in Santa Barbara, one of our members, that's electric and plug-in and it dredges twice a year for the Santa Barbara entrance.

Our recreational boating components is $17 billion economic impact, 600,000-plus registered boats, 300,000 industry businesses supporting 45,000 jobs, and our commercial fishermen land over $200 million worth of fish per year and our aquaculture production is really growing as well, over 10 million pounds of oysters annually and kelp and seaweed farming is the fastest growing form of aquaculture in California.

Just going back a little bit on Captain Betz's comments, in San Francisco Bay where I'm a member of the Harbor Safety Committee as well we have navigation channels that were designed pre-World War II. So you start thinking about how large ships are today versus what they were back in the '30s.

I want to talk a little bit about our system, what we call interdependent ports. We have two major deep draft container locations -- San Francisco Bay, the Port of Oakland, and San Pedro Bay, Ports of Los Angeles and Long Beach. Large volumes of cargo.

Land is valuable so the cargo owners want to make sure that they're getting a bang for the buck, which then causes other products, automobiles, agriculture, petroleum, bulk, break bulk cargo to go elsewhere and so we have Port of Hueneme, Redwood City, Richmond, West Sacramento, San Diego, and Stockton doing that, which then leaves the smaller guys handling fisheries, some recreation, maritime support, security, search and rescue research, and we have an integrated transportation system in the agricultural system.

Fertilizers imported -- 90 percent of the fertilizer for the Central Valley comes in through the Port of Stockton. Then we export food and wine through Stockton, West Sacramento, Oakland, cotton as well, those sorts of things.

And I talk about how interdependent -- so recently the Port of Hueneme has now entered into an agreement with the Ventura Port District to take on the squid landings from Hueneme because land is so valuable. You heard the Coast Guard captain talk about that's a constrained port with both the commercial port and the Navy and as a result there's not enough room.

They were looking for places 10 miles away to bring automobiles into down there. They're having great growth. Port of Stockton is another story of great growth. About 20 years ago Rough and Ready Island got transferred from the Navy to the Port of Stockton.

They've doubled their throughput and

with the new tenant they got last year they're expecting to double their throughput again and they will be in the top 50 ports in the United States here by the end of this decade.

Significant amount of petroleum product is moved by ship and barge. An example is gasoline is moved by barge from San Francisco up to Humboldt Bay. One of the things that we're looking at here in California is moving away from petroleum products.

When we have talked to the refineries is that they believe they're going to be moving the same amount of cargo as they currently are by ship. It's just going to be a different type of cargo.

It's going to be things like animal feedstock, and we already have two refineries in San Francisco Bay that have made that transition, which is creating a little bit of a regulatory problem for us as we determine what sort of tug escorts they need and what sort of non-point source pollution permits they need and some of those sorts of things.

One of the things that -- because one of the other groups I work on for the Harbor Safety Committee is care of the dredge working group and there's a desire to support more zone of confidence, the CATZOC, on more channels.

NOAA with the COR about three years ago to get the COR to achieve a CATZOC I category on the Pinole Shoal channel which reduces insurance costs for the cargo owners and some of the cargo owners have been asking the COR and NOAA see if they can't work on doing that again for some of the other situations.

Similar to the Port of Long Beach's presentation on granting clearance the same issue takes place entering San Francisco Bay, resulting in some tidal delays for vessels coming in. We've got a 50-foot channel and you got a 10-foot swell behind you and that means that ship cannot come in and has to sit out and wait as they come in.

We've had some incidents inside San

Francisco Bay where a ship will have to wait for low tide to go under a bridge and then high tide to get into a port, and currently some of the larger container ships like Captain Betz talked about can only come in and out of Oakland at slack water.

So that's a real plug for ports. We certainly need to know what's going on instantaneously especially in those years when we have a lot of water moving and we're going to see snow melt going on probably into July this year. So that's a crucial thing.

I want to touch a little bit on offshore wind. BOEM has awarded some leases here in California. Offshore wind is -- we're looking to meet the state goals.

We're going to be looking at 1,300 offshore wind towers that are approximately 1,100 feet tall and that wide as well. Draft of 50 to 75 feet, anchored by three one-mile long roads, attached to 80- to 100-foot anchors. Nobody's ever built these before. So this is all speculation to a certain extent but we certainly are moving forward with that.

The state has a goal of 25 gigawatts by 2045 in order to achieve this. The state says it's going to require now $12 billion in upgrades to existing port infrastructure.

We had a recent start with the Biden-Harris administration where they provided over a $400 million grant to Humboldt Bay for the construction and maintenance of a terminal for offshore wind and offshore wind is going to be engaging the ports from Long Beach to Crescent City and within San Francisco Bay.

The Port of Long Beach is looking at a $4.7 billion terminal tied to their wind program. The Ports of San Francisco, Oakland, and Richmond are all looking at being a partner in this.

Some of the smaller harbors, Port San Luis, are wondering what's their role going to be. The city of Morro Bay, Crescent City Harbor District, Noyo Port District, all very small harbors and what's their role going to be as they do that.

California is also looking at more leases than what BOEM has and it's going to probably require more dredging places like Humboldt Bay. A few years ago, the COR contractor wasn't able to dredge Humboldt Bay in June. It was October.

As a result ships could not get in to Humboldt Bay. There was actually shifts that couldn't get in because of the breaking situation.

And we have lots of coastal harbors like that in California. I remember stopping in Morro Bay one time, thought I'd sneak in and have dinner. Well, they closed the harbor while I was in there and three days later they finally let me out.

We're going to have major spatial issues in the maritime sector as we move forward. Channel Islands northward NOAA is working through the process for a fifth National Marine

Sanctuary off of California.

The state has a system of marine protected areas, about 17 percent of state waters currently, and it's pursuing a conservation goal of 30 by 30 which includes state waters, and so we'll be including more no-fishing zones, we assume.

The military has extensive use for coastal waters. There's aquaculture, commercial and recreational fishing, ecotourism including whale watching Native American cultural uses, offshore wind, potentially marine kinetic energy, as well as commercial traffic.

It's going to be a crowded ocean out here as we do all these things. I'm a recreational boater and I've cruised on my own boat on all four coasts of the United States. About eight years ago I commented on the value of pocket charts and how I carry one of in my sea bag when I go out, and now we're all going electronic.

I found there's a steep learning

curve. I take a lot of folks out sailing and I've got a rule. You can either drive the boat or you can look at your electronics but you can't do both because generally folks can't steer when they're doing something else and they can't keep a proper lookout when they're doing something else.

So I want to applaud the committee's recommendations regarding the electronic navigation charts and paper charts. That's a good step. We've got to do an awful lot to educate recreational boaters as we move forward.

The thing that I have talked before about is the centralized data depository for depth data. I'm glad to see NOAA is starting to embrace the concept of crowdsourced data for depths and that sort of stuff.

We have recreational areas in San Francisco Bay and other places that don't get surveyed because there's not enough time, not enough equipment.

But if we were able to start getting

some of the crowdsourced data from some of the navigation companies and others we might be able to provide that to somewhere and that'd be an interesting thing for NOAA to see if we can't figure out a way to capture some of that and provide it to the public to collect, process, use, and share the data.

I also want to give a plug for high-frequency radar. We're going to be expecting changes to upwelling and surface currents with all this offshore wind and certainly need to know more about what's going on in HF and what the surface currents are, especially for some of the slower boats that are doing six or eight knots. California is very unique.

We have hundreds of miles between harbors of refuge, if you can even call some of the harbors actually harbors of refuge because of breaking bars.

I'm a supporter of the creation of dashboards, and I know NOAA can't necessarily do that and we leave it to the private sector. But certainly having buoy data, HF radar, surface winds all in one spot makes it pretty nice. The picture Captain Betz had was pretty nice.

Coastal buoy network -- the West Coast is much different than the East Coast. I was talking to a captain the other day who was stuck up in Puget Sound and asking for my advice as to how to get down the coast because every time the captain wanted to leave it was good here but it's bad there and didn't have the legs to make it down.

So we really rely on the coastal buoy network and right now we have numerous buoys on the Pacific coast that are down and TBD in terms of when we're going to be able to get them repaired.

I'm a firm believer in knowing what swell height is and what the period is between swells in order to make a decision as to whether we're going to go or not go.

Sediment. Sediment has always been one of my big issues. Dredging is part of sediment. But from a larger perspective, I encourage the panel to be more aggressive in stating there's other beneficiaries of your hydrographic surveys, and Jeff Ferguson had done some work for sediment management with some of the NOAA resources a couple of years ago in north San Francisco Bay.

California has an eroding coastline. You got some other speakers that will probably speak on that tomorrow. But our knowledge of sediment transport, especially fine grade sediments, is woefully lacking.

Similarly, I mentioned that there's a need for better understanding of upwellings. They're going to probably be changing as all this floating wind -- offshore wind goes into which create highly productive biological areas and how to replicate them.

NOAA helped fund something called the multi-decadal estuarine sediment program called SEAMLESS, which support decision needed related to resilience planning and coastal management, estimating future sediments and dredging within the sediment basin. You did this for Newport Bay and it'd be really nice to be able to expand that for other places.

We have an awful lot of places in California where the natural environment is going to sink. It's not going to get enough sediment in time and as a result the wetlands are going to go underwater.

We need to do something to protect them. We also have communities that are of lower income than others and they don't have any way to get out of the way or retreat and we need to do something, and sediment is what we're going to need in order to protect both the natural and built infrastructure as we move forward. So anything you can do to help will be greatly appreciated.

Thank you for your time.

RDML EVANS: Hi, Rachael. I'm not sure if you can hear us but you're muted.

MR. HAUSSENER: I got your last

second. Nope.

MS. DEMPSEY: Okay, there we go. Can you hear me now? All right.

MR. HAUSSENER: Yes.

MS. DEMPSEY: My apologies. Something's going a little wonky and my sound is not working properly. My apologies.

Jim, I took a ton of notes and I actually ran out of room on my note paper. I want to say thank you, though, for mentioning the equity piece because that is certainly something that we have been looking at on how we can, you know, make those considerations for our partners and the communities that we work with. So thank you very much for that.

I also appreciate you mentioning the Port of Stockton. Shortly after I arrived last year I did have an opportunity to go up there after the previous years' snows in the snow melt that transported all that sediment and cut off the Port of Stockton for some ships.

And so, yeah, definitely a huge

concern because, you know, not necessarily something that everybody that deals in the maritime industry thinks about, you know, those upstream, so to speak, effects on how that's going to impact the shipping and the timing and when you get stuck in port and how quickly you can get a dredge there.

So I appreciate very much you bringing that up. Okay. So with that, let's move ahead to Captain Louttit. Captain Louttit, over to you, sir. Thank you.

CAPT. LOUTTIT: Good morning, Administrator Dempsey and members of the HSRP. I'm here with Julie Thomas who was mentioned before, Captain Kevin McCloskey at the L.A. Port Police, and Wendy Louttit who's project manager for the new queuing system for labor that helped solve the backup in the Ports of Long Beach.

So here is our beautiful building on a hill, and I'm not going to talk much about the marine exchange itself because I got some fabulous other input from other partners. Next slide, please.

So you saw this picture before but I just quickly wanted to point out in the lower left hand corner of the satellite image is where the marine exchange is. It's right near where you should have been, where this meeting was in person.

But I'll also point out just the blue line that I drew down the middle of the slide, Los Angeles on the left to the west, Long Beach to the east on the right.

And so while the two ports are side by side it's important. The old memory aid you've seen one port, you've seen one port -- there are differences even though they are side by side and connected. With that, next slide, please.

So this was the input that I got when I said, hey, I've got to brief the HSRP, does anybody have any input. So I got input from the Battleship Iowa Museum, the Los Angeles Pilot Service, the Chevron offshore marine terminal in El Segundo, Jacobsen Pilot Service, and the Los

Angeles Port Police, and Captain McCloskey of the of the Port Police is here with me today. Next slide, please.

So Captain Manning mentioned the fact that the ships were getting bigger and that we're going to have a -- or there's a project in progress now to expand the anchorages. So the image on the left is the current configuration of anchorages.

The circles are on the chart, and because we now have ships that are 400 meters long in anchorages which are 600-yard radius that doesn't allow enough space between the ships.

So if you see the ones that are shaded purple that's what we're calling the checkerboard. So with the permission of the Coast Guard and the Harbor Safety Committee we're not using the purple anchorages. We're basically spacing the ships out by using only half of the anchorages.

The image on the right is from the survey that was done in 2013 of the anchorages.

Thank you, Fairweather and, thank you, Rainier for coming back in 2018. If we're going to be anchoring ships as deep as we are to 69 feet we need to know where the bottom is. So thank you, NOAA, for that. Next slide, please.

So the next two slides go together and my talking point is thank, NOAA, for having electronic charts that can input into a variety of different geographic information systems.

So in this case it's the Kongsberg system that we use for the vessel traffic service. The image here was in the height of the backup. You can see the blob of white in the upper right hand corner -- that's the 55 anchored ships at the time -- and all the circles were the 62 drifting ships.

So a total of 114 was the maximum that we had under our care and thank you, NOAA, for having accurate charts that could plug into a Norwegian system that we could keep everybody safe. Next slide, please.

So here's another image, again, with

NOAA's electronic charts plugging into what's called the Pacific Tracking 2.0 system. It's primarily used by the marine exchange of Alaska but in this case for the audience that we needed for this image we needed the depths turned on. So it's basically the same thing you saw before but into a different geographic information system.

So my just request in NOAA, my recommendation to NOAA, is as you move forward make sure that all of your electronic systems can be integrated into a variety of different geographic information systems. With that, next slide.

So this was the input that I got from the Battleship Iowa which is here moored in the main channel and they thank NOAA for the information that they have already in terms of tide.

But what the Battleship Iowa needs is improving the current and/or surge measurements in the main channel. Apparently the surge back and forth impacts the mooring system that they have for this 900-foot World War II battleship.

And so I'll leave that NOAA, if you can do anything about that, but that's the input we got from the museum ship. Next slide, please.

So Captain Betz already spoke so I won't spend much time on this slide. I'll just go down to the bottom where it says "a happy pilot" and I'll point out in the image -- the picture on the right this is actually Captain Strong of Jacobsen Pilot Service I was riding with.

That's an example of the portable piloting unit that Captain Betz mentioned, which is brought aboard by the pilots for them to use to help calm these huge ships and, as Captain Betz mentioned, the fog and whatnot.

So basically as Captain Betz said he's happy with what NOAA gives for the pilot service. Next slide, please.

So this was an interesting one where you can see the circle up the coast from the ports of Los Angeles and Long Beach is the Chevron offshore marine terminal in El Segundo. Here's where they bring in the big tankers. They anchor the bow with the ships to anchors.

The stern ties to a ring of buoys and there's a flexible pipe that goes ashore. So basically Mr. Selga is saying that they are getting what they need in terms of tide charts and whatnot that are critical to their operations and under keel clearance for this terminal up in El Segundo.

But it's interesting down at the bottom where he says charts are now considered antique. NOAA should show distinction between the use of the terms and functionality of ECDIS or ENC with respect to the safety of navigation. So I thought that was an interesting comment that you could do with what you want. Next slide, please.

So the next half a dozen slides go together and I got them from Jacobsen Pilot Service. Captain Betz mentioned when Ben

Franklin arrived in 2017 it was the biggest ship to ever come into the ports.

It then got eclipsed by MSC MIA, 23,000 TEUs coming in on the 1st of April 2020. Next slide, please.

So I thought it was important here to show just how tight the tolerances are. It may look in the image on the left that there's lots of water for that ship to float in.

But the image that you could see on the right is when the pilot has put in the depth of the water so you can see how close the shoal is to the bow of the ship and you can see how close the rock dike is to the stern of the ship and how the pilot can get the ship into that berth with those tight tolerances using the portable pilot unit and the NOAA charts. Thank you for the accuracy of those. Next slide, please.

So Captain Betz briefly covered the visibility issues and I'm going to just touch on that one more time. So here's a big container ship with the house forward where you can see the Arrow and the smokestack back aft. This is what they've done with the bigger ships so you can actually see over the bow. Next slide please.

In the image on the right you can see what the pilot is actually able to see when they're looking aft. So you can see the smokestacks sticking up but basically just this huge array of containers, the image on the right with the ship going into the Long Beach container terminal.

So this may be the newest container terminal that was built. It was optimized for these types of ships. But notice how close the tolerance is on the port side there where there's a tugboat circled and on the starboard side there how close it is to the adjacent ship.

These moves can only be done because we have the accurate NOAA charts and the equipment to display it. Next slide please.

So here's a tanker going into the Port of Long Beach inner harbor. Again, the picture on the right makes it looks like there's lots of water on either side of the ship but the image on the left from the PPU you can see how tight the tolerance is between the ship and the shoal and the water that's deep enough to float the ship. Next slide please.

So next half a dozen slides go together, these from Captain McCloskey of the Port Police, and what I'm going to do here -- up to now we've been talking basically about latitude and longitude of the ships moving horizontally on the surface of the water but what Captain McCloskey and I encourage you to read the slides later with all of the words is what they often are doing under the water to conduct proper port operations in the Port of Los Angeles.

The last bullet is also interesting regarding datum. When landed survey markers are moving as they are in the Palos Verdes area who and how decides whether to use the moving survey markers to say where things are or ships to GPS. I thought that was interesting input from the Port Police. Next slide, please.

So this was a case during the backup where you can see in the image where it says lost anchor. A ship pulled up its anchor one day and said the anchor was missing and had been left on the bottom. The chain broke.

Unfortunately, this is one of our prized anchorages and you can see the image there where we colored it red when the anchor was still in the anchorage and on the bottom and, unfortunately, it was a prized anchorage.

Thank you to the Port Police for having the right underwater robot to go out and find the anchor and then have the sensitivity to know where it was latitude and longitude plus the height off of the bottom. Gave that information to Mr. Ferguson -- thank you, Jeff -- who was able to put it on the chart, and then working with the Coast Guard you can see the image on the right with the green circles where it says lost anchor obstruction.

We move the anchorage so that an

anchor that's left on the bottom is outside the circle and we could again get that anchorage back so we could use it for the ships that are waiting off of Los Angeles and Long Beach for a berth.

So, again, here the fact that the chart was able to be used by the Port Police and as it says their success even working off of common charts, depth tide, and weather data and you'll hear that theme through the next couple slides. Next slide, please.

So Captain Manning mentioned Sail Grand Prix. These are 50-knot catamarans. They go around the world and it was the first time they'd ever come to Los Angeles in 2023 in July. So next slide, please.

One of the challenges is they want this to be a spectator sport so you can see on the left side where in little blue box where I put grandstand.

So originally this is where they were planning to have the sailboat races so you could have a good spectator sport. But -- next slide, please -- the problem is if you look at the chart, and I know it's kind of hard to see but there's a rock dike right where they were thinking of having 12-foot draft catamarans when they are not foiling in 12 feet of water over this rock dike and so being able to use the chart they were able to reorient where they put the racecourse and make it in a safer place.

The other thing that's interesting is there were these day boards as you can see in the picture, which in one way are supposed to be an aid to navigation to show mariners where the rock dike is but you can see in the one on the right with the yellow arrow people, unfortunately, whack into them and that's part of why they had to move the race course because these aids to navigation would have actually been a hazard to navigation to the racers. Next slide, please.

So another big challenge is you have high-speed racing in a busy commercial waterway. When they were having the races they didn't want to disturb everything else that's going on plus event control was bifurcated, as it says, between Los Angeles and London. But the action taken was essential tug and barge traffic was adjusted out of the normal channel and they slightly altered the large ship traffic schedules. But, again, the bumper sticker success due to working off the common charts, depth, tide, and weather data. Next slide, please.

So the next two slides go together. This was a case, unfortunately, of a mid-air plane dates -- back in 2016. So where you can see the big arrow where it says one reporting source fishing boat that fishing boat reported to us, reported to the Coast Guard, they just saw a plane crash in the water where you see where it says first plane crash.

So first responders went out to try to get the plane and the people off the bottom. There was loss of life. But we didn't know at the time because nobody saw the mid-air collision and nobody saw the second plane go in the water until Torrance Airport called and said, we're missing a plane. So then we knew there was a second plane but nobody had seen it go in the water.

So for several days the port police and others basically mowed the lawn looking for the bottom -- the plane on the bottom. What my vessel traffic people did was say we saw the first plane go in the water because of the reporting source and actually the radar was sensitive enough to see the splash.

So they looked around and found someplace else where they had that green image which is our radar showing a splash. They said look here and the port police was able to find the plane on the bottom of the ocean.

Again, because of the latitude and longitude in the accurate chart they were able to do that. So next slide, please.

So here you can, again, see the images of the two planes on the bottom from the port police's equipment and the latitude and longitude of the two planes on the chart so they could recover them with proper equipment, again, successfully working off of common charts, depth, tide, and weather data. So just two more slides for me. Next slide, please.

So this being an important outload port for the Navy, one of the things that happens periodically is the Navy coming up to do minesweeping exercises. So accurate charts with objects on the bottom helped the Navy and the port police determine what's new.

So by mapping everything every now and then they can determine what's down there today, for example, a refrigerator, a 55-gallon drum or a second boat. So then if they come back to an exercise six months from now they already know what's on the bottom. They can then just check what's new, which saves time checking what's old. So next slide, please.

So this was a tragic case that you may have heard about with the dive boat Conception which experienced a fire and loss of life back in 2019 and there are a couple of points on this.

One is this was 80 miles from where the port police normally does business so they took their dive boat up there.

They had the proper equipment so were selected after this vessel sank to do the survey of the bottom and to find where the debris field is.

They were working with multiple partners in unfamiliar waters but the port police remotely operated vehicle was able to map the wreck location and the debris field. So you can see the image on the right in Platts Harbor with going back and forth, the mowing the lawn analogy.

But they were able to work with multiple partners in unfamiliar waters due to common charts able to integrate with different navigation systems, depth, tide and weather data. And that's my piece.

So just in closing, in the Port of L.A. and Long Beach the challenges are the huge ships getting bigger that was mentioned before, the deep draft tankers to 69 feet we'll talk about this afternoon -- narrow channels, tight schedules, bad weather, everybody working together.

The image on the left is the Port of L.A. and Long Beach on a busy typical morning and we talked about before we've got the high-sided container ships mixed with the deep draft tankers and the vessel traffic service record of success, more than 800,000 safe transits in actually 30 years as of last week of operations.

And that's all and I'm ready for your questions.

MS. DEMPSEY: All right. Many thanks, Captain Louttit. That was a fantastic brief and really comprehensive when talking about, you know, all the other issues that LA/Long Beach is managing external and in addition to the major shipping coming into the port. So we really appreciate that perspective.

Now it's time that I want to open this up for questions. I would ask a little bit of housekeeping here just briefly, that if you have a question please come up online for our panelists and I'll go ahead and call on you.

We, unfortunately, in this venue don't have a hand raising but if you don't mind coming up online and putting your hand up we'll go ahead and call on you. We have about 20 minutes for questions. So with that I'll open the floor.

Okay. So I'll go ahead and break the ice. Then I have a couple more questions. I want to go back to -- let's see, I want to go back to Captain Manning.

So I have a -- you know, you mentioned that you're wearing five different hats at different times. I have a great appreciation for that and I just wanted to ask you, you know, it must be really challenging to meet all your partners' needs there.

You know, you're dealing with different time scales. You're dealing with different spatial scales. You're dealing with different authorities. What is your biggest challenge in supporting your mission when it comes to that, the environmental side of the house?

CAPT. MANNING: So I think my biggest challenge is I need more than 24 hours in a day. But from all of the challenges that we face, like I said, our team is comprehensive. We have lots of capabilities.

But in the end, as you just heard a number of folks from this port community, it's about collaboration and really engaging the stakeholders so that you're getting all of the information that they're having and using in their daily operations.

You know, from our operators of the cutters in the small boats, I think the things they're using with the NOAA tools provided to them are just one element of their risk management and so, you know, it's a number of things that go into making sure that they have a safe evolution and I think that's probably one of the most important is to engage with the stakeholders and other port and waterway users to make sure that they've got the whole picture because things happen here quickly.

If you're not staying in touch with everybody something could probably happen that you didn't know within the port complex and which leads to accidents. So I don't know if that sufficiently answered your -- or scratched your itch of your question there. But --

MS. DEMPSEY: No, thank you very much. I appreciate that. So now that we've successfully broken the ice I understand Mark Manes has his hand up. I'm sorry, I don't see you, Mark. Go ahead, please.

CAPT. MANES: Hi. Mark Manes with the San Francisco Bar Pilots. I actually had three different questions but I'll start with my biggest one first, the one that I think for us, and that is we've had several meetings now with Scott Humphrey at the Marine Exchange here in Northern California in regards to -- and I believe, Rachael, I think you were at a meeting with me at our office if I'm not mistaken maybe a year ago.

We're looking at increasing our NOAA PORTS system significantly in San Francisco Bay. As some others have mentioned here we have the Port of Stockton and the Port of Sacramento, which (audio interference) now and we have very little data up there.

As a matter of fact, we have zero harmonic NOAA station. We have no NOAA station in the Port of West Sacramento, which is where the ships are. The NOAA station that is referenced is actually on the other side of a dike that is closed off on the old Sacramento River. It's not actually connected to the port whatsoever because the port is on a cut.

So we've asked -- the time is now for NOAA to add a NOAA harmonic station within the port for us to use to figure out drafts for ships, max draft loading and things like that. Port of Stockton same issue.

We don't have a harmonic station there

either. The nearest harmonic station is about eight miles away from the port and it can vary pretty significantly because that's where the river runs in to the port and that's when we had all that problem with the dredging, with the sediment coming in.

So what we're trying to do, and I had a meeting maybe a few weeks ago with Scott and several other big players within the system. We want to try and set up kind of a port district where we have sort of all of the ports in a way contributing into a fund to help us pay for ports, systems, ports' maintenance, improvements, maybe security cameras, maybe -- visibility cameras for us is really important and we're wondering if -- we know that there's some ports in Texas that have already done this type of thing for security and we're looking for help in coming up with ideas on how to get the port players involved to sort of contribute to almost like an HOA or a fund to basically pay for the port sensors and the increase in the ports.

And as far as the harmonic stations that's a NOAA issue and we really need your guys' help, Rachael, getting some proper NOAA stations and I think that getting the port sensors would help you also get the harmonic station accurate. I'll get at that one for now. I've probably taken up too much time.

But the other two, real quick, are --

MS. DEMPSEY: Mark, are you still there?

MS. DENTLER: So we need to make these be just questions from the HSRP members only and not from the public. Mark, if you would like to submit a question to us as a public comment please email us and we will gladly read your comment into the public comments during that time. Thank you.

MS. DEMPSEY: Okay. I just wanted to jump in. Mark, your question is appropriate. I really do appreciate it and, you know, this is something that has not fallen on deaf ears for sure.

We are very sensitive to the needs. So I do appreciate the comment regarding the PORTS district that we discusses. So happy to have that conversation with you and appreciate any input you provide to the panelists.

So with that, I want to go ahead and go to Julie. I believe Julie had a question.

MEMBER THOMAS: I do. Thank you. What great presentations for everybody. I'd really like to thank them all, and I have a couple comments, questions so -- but I know others on the panel probably do, too. So I'll go for first and then, Mary Paige, I see you on there, too.

Captain Betz, good to see you, and several years ago I think I heard one of your presentations in talking about automation of vessels within the ports. Can you just comment on that? Like, is that still a thing or what's happening there?

CAPTAIN BETZ: Automation in what sense, Julie?

MEMBER THOMAS: I think these were vessels coming into the port or, I don't know, self-driving vessels. What was -- there was something you were talking about.

CAPTAIN BETZ: Well, you know, we had theoretical conversations about that in anticipation of, you know, we keep hearing about vessels that are going to have basically self-driving capability and, you know, we haven't seen anything like that yet.

Nothing like that I know of is actually on the drawing board. Crowley just had delivered and that eWolf, which is an all-electric tugboat down in -- I believe it's in San Diego right now -- that will have that capability, as far as I understand, to be controlled pretty much in an automated sense. Now, whether it can operate with no one aboard I'm not sure.

MEMBER THOMAS: Okay.

CAPTAIN BETZ: I think it's got that capability designed into it But I don't think they're going to be actually using it that way.

MEMBER THOMAS: And I'll ask one more real quickly. There was a lot of -- you commented on the ENC -- the transition chart now to the ENC.

We've had a lot of discussion within the HSRP too about this and how best to get the word out to navigation in the maritime community on the ENCs and, I guess Captain Manning, Captain Betz, I wouldn't mind just your two-second comment on that, if you feel it's really going well and if these are really -- like, what are you feeling as far as the integration of the ENCs now?

CAPT. MANNING: I'll go first and then I'll let John give you the correct answer. So just from feedback from our, you know, boat operators and our ship drivers, one of the inputs or requests kind of they had was with the updates if it was on an understanding that they're going to be kind of episodically based on those things that change.

But if there's a update that's on a periodicity that they could kind of put on the calendar to say, hey, I need to go in and make sure that all the updates are on there and working that would be something that would be nice.

I also got some input from our cutter COs that said that they're working perfectly and I think for the generation of folks that we have operating our equipment it actually is welcome.

I would say there's still some old school folks out there that wouldn't mind having a paper copy in the back of their pocket. But definitely ENC is definitely worked for him. So that's the input I'm getting from my team.

MEMBER THOMAS: Thank you. Do you have anything additional, Captain Betz?

CAPTAIN BETZ: Yeah, Julie. I guess one of the biggest things that, you know, there's some hand wringing over is the phase-out of paper charts. I don't know if that's part of your question or not.

But Jeff Ferguson has been doing a very good job of keeping the local stakeholders apprised of the phase-out as it's occurring and the move to full, you know, electronic charts and we've done a little informal poking around and talking to people about how they feel about this and most of the feedback we get is positive.

I haven't heard anybody express too much consternation over the fact that paper charts are going away and I originally had the most concern about the rec boat sector because I thought, well, what are they going to do.

And I did a little bit of informal surveying amongst my contacts in that sector and found that most people weren't concerned about it at all. They're already relying off mostly exclusively on electronic charts and I think part of that is when you're on a rec boat or a fish boat or something else you don't have a chart table big enough to fold out a paper chart. So a lot of them weren't using those products anyway. So but so far I think it's going well.

MEMBER THOMAS: Okay. Thank you.

Rachael, I'll turn it back to you and let others talk on the panel.

MS. DEMPSEY: Thank you, Julie. Qassim, over to you, please.

MEMBER ABDULLAH: Yeah. Thank you very much, and a great panel definitely and thank you all for highlighting NOAA ENC role in the ports' navigation and the incoming vessels, and I think my question really relates to what Julie just brought up for Captain Betz, John Betz.

You showed a slide about the fog and the precision navigation and that's a topic we've been tackling for a couple years now and HSRP is very dear to our heart and I was wondering what seemed to you suppress we know the area. I got the impression maybe some boats are coming and using the precision navigation instrument role we call it in the aviation.

So but in your opinion all of you like Captain Betz and others what do we need to make it happen? I mean, is the PPU not ready for it? I mean, we have a great ENC.

We have a great GPS and navigation now. How close are we from kind of driverless boat, like, with a precision navigation tool? Thank you.

CAPTAIN BETZ: Well, I mean, I think there's two issues there and the way I understood Julie's question was, you know, are we seeing fully automated, you know, ships that have the capability to operate without a person on board and the answer to that is no, not yet.

And the other question is are the people that are on board the ships right now using these precision products to be able to navigate a ship, say, in restricted visibility with comfort and confidence and I would say a qualified yes because for it's going to depend on the pilotage ground and the geography and environmental circumstances.

So I don't like to speak for a pilot, say, in a different pilotage ground. Now, in Los Angeles our issue is not so much current because we don't have a lot of current. We do have wind at times.

But the real issue we have is big, big, big, big ships in small, smaller and smaller places and as the Captain Louttit showed you some slides, some of the tolerances are getting very small.

And the answer from my perspective is yes, we can use these precision products on our PPUs to drive these ships in and out of these areas with a very, very, very small tolerances just as Captain Louttit showed.

And depending on pilot comfort and captain comfort -- master comfort -- some captains don't like it when they can't see. But we do have the capability to bring these ships in all the way to the dock in very restricted visibility conditions using these precision navigation tools, the charts, and the PPUs.

We've been doing it in Los Angeles for a long time. They've also been doing it in Long Beach. So the answer to that question is yes, and we couldn't do it without those precision tools.

We have to have -- there's two things. We have to have the precision position and the precision chart and then we have to have a software and, you know, a PPU system that is reliable. Then if we have those three things, and I feel that we do, we're fine.

MEMBER ABDULLAH: Thank you.

CAPTAIN BETZ: I hope that answers your question.

MEMBER ABDULLAH: Yes. Yeah. Thank you very much.

MS. DEMPSEY: Okay, everybody. I'm going to jump in here real quick. We have three more questions. We're going to go Kim, Mary Paige, and then Nicole, and then we're going to have to wrap things up.

So, Ms. Holtz, over to you, please.

MEMBER HOLTZ: Hi. Thank you.

Captain Betz, so I was curious has the Port of L.A. switched over to using precise navigation for bringing all their ships in yet? Are you in the process of doing that?

CAPTAIN BETZ: The pilot service we've got we have PPUs for each pilot and now -- you know, when you say precision equipment, we have not put the S-100 charts on our PPUs at this point.

We have the capability to do that and at some point we probably will start doing that when we see a need for it. We've got one area that we're looking at right now that's extremely tight, for lack of a better word, and it's a slope that's underwater that we're dealing with, a grounding line that's underwater that you can't really see. And so we're probably going to bring in the S-100 charts and put them on our PPUs just for that particular piece.

But, you know, if we're driving a ship into, you know, like we like to say most drafts in the Port of L.A. being a dredged channel there's not too many places you can go aground. You can just bump into the dock since it's deep right up to the fender line.

So having very precise soundings is important to a few areas in the port but not everywhere.

MEMBER HOLTZ: Okay. Thank you.

CAPTAIN BETZ: And it's available if we want to use it.

MS. DEMPSEY: All right. Captain Betz, thank you very much.

Next over to Mary Paige.

MEMBER ABBOTT: All I can say initially is wow, just wow. The information that all of you shared was kind of frightening. As a recreational boater you also showed me then and informed me that the commercial side is very similar to the recreational side and it depends on where you are doing your boating.

Mine is on the west coast of Florida so 20 feet is deep so I can't imagine what you're going through. At the same time, the pictures that you showed told us a lot and looking at across the forward on one of those large container ships and seeing the waterways and it all looked good. I had to remind myself if you see a bird standing there it doesn't mean that it can walk on water. It's shallow. So I assume that there's similar things that you have visually.

But my question is not with regard to depths and such. It goes back to Derek Davis, if he's still available.

MR. DAVIS: Hi. I am still here.

MEMBER ABBOTT: Yay. In today's -- I mean, we're such an instantaneous society and our expectations are now for work that you have been working on and getting permits probably and input and feedback and approvals and whatever. You're looking at maybe 2031 for a project to be done. Data is changing, as we heard. Equipment is changing. What tools do you need to make your job more efficient and safe?

MR. DAVIS: Well, it's a great question and as I mentioned, we're currently in the design phase working, collaborating with the Army Corps of Engineers and they actually are going to be doing the design for the deep draft navigation project and will be doing the work as well.

So we'll be coordinating with the port pilots and the port survey staff as well as Army Corps' hydrographic surveys to complete the work but it is going to take some time to complete the work and do all the predredge and postdredge asymmetry surveys and create the maps.

So if the port survey team as well as the Army Corps survey team brings in any new equipment or any new techniques that may be employed in that time to provide the actual surveys but the time it will take to complete the work will be about three years. So you're correct, about 2031. I don't know if I can answer the question exactly but, hopefully, that information can give you some idea that we do have the flexibility and the time to make adjustments and refinement to work on the design.

MEMBER ABBOTT: Okay. All right. I feel for you.

MR. DAVIS: Thank you.

MS. DEMPSEY: Okay. And, everyone, our last question goes to Nicole.

MEMBER ELKO: Thank you. Thank you all for the excellent summaries. Really interesting information.

Captain Manning, I too don't deal with ice-breaking missions, as you can probably tell from my office background here, but really enjoyed it.

I am the executive director of the American Shore and Beach Preservation, as I mentioned earlier, and my good friend Jim Haussener said a word that I don't think any of the others have said which is sediment and, you know, it's very important for us how that relates to resilience.

So, interestingly, when you look at California's performance in terms of managing sediment California has placed more sand on their beaches than any other states over the last hundred years as we've been managing beaches and shores and I mention that because it's directly related to Mr. Haussener's comment which is most of that sand came from the development of these harbors, right, back in the '40s and nowadays we use sediment from maintenance dredging in other ways to increase resilience, building marshes, placing it in the near shore to restore beaches.

So my question is just do you have any comment on where California and your ports in particular are going with that and how it might impact resilience and how you might work with NOAA in terms of, you know, understanding where that sediment is, measuring it, and then monitoring where it's going. Thank you.

CAPT. MANNING: Was that question to Jim or was it to me? This is Ryan.

MEMBER ELKO: It was -- well, I think Jim and I know what we think about that so it's more to the other panelists, yes.

CAPT. MANNING: I'm not sure I have an answer at all to that or where we're good from the Coast Guard's perspective is but it's certainly something I could get back to the committee with, and, you know, checking with our program officers from the local operational commander I don't have a real good call on that.

CHAIR DUFFY: All right. Well --

MEMBER ELKO: I see Derek -- oh, sorry.

CHAIR DUFFY: Go ahead. It's okay. Sorry, Nicole. I didn't mean to speak over you. I'm just going to wrap up the panel and I will say beneficial use is really critical to Louisiana.

Jim, your comments about height and relative sea level rise and the impacts we've seen on this -- the last couple of years we've seen a lot of saltwater encroachment related to relative sea level rise. There's a lot of threats.

I really appreciate all the presentations. A great panel. I have a bunch of questions. I'll say that I'd like to compare some numbers because Louisiana has been doing a great deal of beneficial use. But it's great to see us, hopefully, moving toward General Spellmon's directive to try to reach 70 percent of beneficial use by 2030.

With that, I thank everybody. I really think it was just an excellent panel. I think we've challenged the American Sign Language interpreters with some fast talking and Cajun words thrown in here and there. You know, it might be time for some beignets as we have some lunch coming up.

But I don't have exact time references in front of me. If somebody more in tune with the schedule would comment. I see it. There you go. What excellent timing.

So with that, excellent panel. We're going to wrap up the morning session, break for lunch, and I'll turn that over.

Admiral, good to see you. The play by play is yours, sir.

RDML EVANS: Thank you, Sean, and thanks to all the panel members. I'll just echo the comments as an outstanding local perspective on the requirements of the community in the L.A. and Long Beach region and the utilization and opportunities for NOAA data products and services. I have lots of questions too but I'll hold those.

And I'll just note that we're going to take a quick break here. The main session will reconvene at -- where's my schedule? The session reconvenes in an hour and 15 minutes, I believe, but the HSRP panel members coming back on the Google Meet link at 1:15 Pacific time so in, roughly, 15 minutes from now.

Again, on the Google like not this -- not this session for our working lunch. So take a break, stretch your legs, grab a bite, and then we'll see you on the Google Meet in about 15 minutes. Thank you.

(Whereupon, the above-entitled matter went off the record at 11:58 a.m. and resumed at 1:19 p.m.)

CHAIR DUFFY: I thank everybody for an

excellent morning. Great sessions. A lot of really good information. Happy to have everybody back. And I'll work on the tech issue but I'm going to turn it over to the very capable hands of Julie Thomas and Captain Kip to take over the under keel clearance panel.

And thank you, Julie.

MEMBER THOMAS: Thank you, Sean. Great to be back after lunch here.

So I am very honored to present this panel, these esteemed people in the next panel. This is for this under keel clearance presentation that we're going to have now, and this is really an ongoing project that was started in 2016. Went through many test and validation years and I think went operational in 2019.

So let's just go through the people. Captain Kip Louttit is executive director of the Marine Exchange. Captain Louttit handles all the finances for the project and I think he's like the glue that holds us all together and is really the liaison between a lot of the entities.

And what you're going to see is how this partnership of federal, academia, industry has come together and I think we can have the next slide. I'm just going to flip through the people. Can you go ahead and -- yeah.

So, Captain Tom Jacobsen, I know you're a third generation pilot here -- company and Tom is also a prior member to the HSRP. I think he was the one that first introduced me to it many years ago. And, of course, this project really is to provide them with the best information for safety and to keep their operations going.

And next we have Mr. Jeff Ferguson, who is NOAA. He's part of the Ocean Coast Survey and a lot of the local stakeholders rely on Jeff as the California navigation manager.

And then Ryan Kittell is with the National Weather Service. He sits in Oxnard. The Weather Service is a key player here because there is a wave forecast called the near shore wave prediction system and Ryan really customizes that with the local winds and for the local conditions so that's a very important piece of the puzzle.

And going on to the next slide we have Dr. Jim Behrens. Jim sits at Scripps Institution of Oceanography in San Diego and he also provides wave observations and wave forecasts with very high-resolution wave buoys.

And then Karsten Uil, of course, is the managing director of Charta Software. He sits in Rotterdam. Thank you, Karsten, for flying over from Rotterdam with your co-founder also is here, and Karsten is really the one that handles the integration and distribution of the data and the information.

And we want to thank Marathon for allowing us to work on this project. As you will see, it's really in support of bringing in their deep draft vessels.

So with that said, I'm going to go ahead and turn it over to -- is it Kip or --

okay. Captain Jacobsen is the next person here.

CAPT. JACOBSEN: Great. Thank you, Julie, and good afternoon, everybody. It's good to be back with the HSRP.

MEMBER THOMAS: Next slide.

CAPT. JACOBSEN: There we go. I'll just touch on the partnership right here of our dynamic under keel clearance project. Again, you're going to hear this throughout the presentation but it's a wonderful partnership and that's what makes it work.

We have state of California, OSPR, Port of Long Beach, our company. We have Marathon and the Marine Exchange and, of course, we have CDIP, NOAA, Army Corps, everyone working together to make this project work and I'm happy to report that it's successful. It's still working well. And let's go to the next slide, please.

So the whole project is about bringing in the deep draft VLCCs and these ships are, roughly, 1,100 feet long, 200 feet wide. Some of the ships are 230 feet wide.

There are over 300,000 deadweight tons and we're bringing ships in now at 69-foot draft. So these are the largest VLCC's that come into the United States into a port. Next slide.

So it's important to note 50 percent of California's oil comes through Port of Los Angeles and Port of Long Beach and we only have a five day supply of oil ashore. So this means that we have a lot of oil tankers on a steady and regular basis that come into the ports to feed the refineries.

Long Beach berth 121 is the only VLCC berth in the West Coast that can handle ships of this size and, again, mostly it's the draft of 69 feet that stands out.

What you see on the right hand side of the chart here -- critical area -- is the approach channel of 76 feet. That's a dredge channel of about two and a half miles long of 76 feet. So we board the ships -- pilots board the ships five miles off shore and we get lined up, and once we're in the two and a half mile 76-foot deep channel there's no turning around.

There's one place we can go and that's berth 121, and that's why this project is so critical is we have to know that the ship in any sea state won't touch bottom and that's what we've accomplished.

And so the approach channel is critical. The turn at the breakwater and just inside the breakwater is all critical. And then once we get inside we're protected by the breakwater and it's calm water to the dock.

So I'm going to pass this off to Captain Louttit and you can take over.

CAPT LOUTTIT: Thank you, Captain, and I'll put on my moderator hat. Just a moment. So if you don't care a bit about tankers or you don't care a bit about oil or you don't care a bit about the Port of Long Beach I'd encourage you to listen to this presentation about how to organize a complex project with federal, state, local, and industry partners and how, as Captain

Jacobsen said, we were able to organize all these people into the successful project today.

So Derek this morning mentioned the deepening project that the Port of Long Beach is thinking of doing and talked briefly to the math that's on this slide. So I'll just explain it one more time so you now have the picture.

But the problem is that Captain Jacobsen was talking about bringing these ships in the last two and a half miles to the Port of Long Beach is the pitch problem in a long period southerly swell. So you're going basically north into the port so this is the following sea that would lift the stern of the tanker and cause it to pitch.

So until this project started there was a gentlemen's agreement between the Captain of the Port and the pilots and the court to only bring in ships up to 65-foot of draft into the Port of Long Beach in a static condition because the channel is 76 feet deep 11 feet under the keel. That's great.

The problem is -- if you can do the trigonometry in your head, but I'll do it for you here -- with one degree of pitch in that 1,100 foot tanker you get a 10-foot increase in draft. So 65 feet would go to 75 feet and you'd only have one foot under the keel.

If the pitch pitches two degrees you'd be in the mud. So how can we predict this pitch motion and ensure a safe passage is why this project was born.

And the reason that we want to bring in the deeper draft tankers is the channel was originally dredged to 76 feet with the idea of bringing in 69-foot draft tankers.

So for every extra foot 65, 66, 67, 68, 69, it's 30,000 barrels of oil basically for free. You're bringing in the ship anyway so you can get more cargo per movement if we can predict the pitch motion to ensure a safe passage. Next slide, please.

So before we had this project the go/no go decision was made by the pilot and the ship's captain using CDIP's swell warnings, and Dr. Behrens is going to talk more about the CDIP buoys, the CDIP buoy reports, experience, seaman's eye, and observed pitch and roll far enough offshore to permit a bailout before the channel.

And so before this project the only thing the pilots had to go on was an email that they got from CDIP which when certain parameters for height of the swell and direction of the swell and period of the swell were met they would get an email warning and I cut pasted here an example of one of those warnings from February, and there are different sites outside of the harbor where you can see the green and the red boxes of where this forecast is of this swell condition that could result in significant pitch, which could result in significant under keel clearance problems.

What you don't want in these cases is for the pilot to go out to the ship, to get lined up and say, oh, no, no, no, we don't feel comfortable with this. So it's a waste of time for a pilot, it's an extra movement, and then the ship has to bail out and go to anchor when everybody was expecting it to go into port. So next slide, please.

So the present, which has been mentioned, has been in effect for about the past six years, is we have PROTIDE and that's the name of the software product that Karsten's company created so we have safer and more efficient ship movements based on precision science and technology.

So if you can see in the upper right hand corner of the slide is a pilot boarding the ladder. What we're trying to do is make sure that pilot only has to board the ship when it has a reasonable expectation of going into port and eliminating those bailout situations that they used to have to do.

So Jacobsen Pilot Service even before this project had team piloting procedures to enhance safety and this is one more tool that the pilots have to take to the ship's captain to enhance safety and that's what PROTIDE does is enhance both safety and efficiency, which I'll get to in a moment.

So PROTIDE provides input to the pilot and the ship's captain for the go/no go decision. Again, this is input. It doesn't have the throttle. It doesn't have the steering wheel. The decision is still by the captain or the pilot.

It reduces or eliminates the number of aborted runs because as we had over the past couple of weeks with storms PROTIDE would predict several days in advance that the ship would be out of limits. So the ship's captain could be told, you're going to be out of limits from this time to this time.

You got two choices, slow down and arrive at the right time or be prepared to go to anchor. But you don't have these aborted runs that they used to have to do.

The other thing, as Captain Jacobsen

mentioned, with only a five-day supply of oil ashore so if you can't bring in one of these very deep draft tankers the oil companies can bring in a smaller tanker with a shallower draft in these unfavorable conditions for the big ship. Next slide, please.

So the three goals of the project were started at the very beginning, and as I mentioned if you're ever going to do something like this with multiple partners get the goals straight and contribute to success.

So the first one was to increase safety by reducing the risk of an accidental drowning caused by the pitch or roll of a large vessel causing it to impact the bottom.

Second is increased efficiency by enabling ship owners and masters to adjust their arrival times based on the pitch and roll program being able to predict when the pitch and roll will be out of limits to enter port due to unacceptable under keel draft clearance.

And third is to reduce emissions by

enabling the larger ships to carry more cargo to enter the port, which could reduce overall stack emissions per ton of cargo arriving in the port.

That's the notion that for every additional foot of draft there's 30,000 extra barrels of fuel -- not gallons of fuel, barrels of fuel -- that come in, in a sense, for free. Next slide, please.

So more benefits to industry and to the public is reducing the overall risk of transporting oil on the West Coast. What was going on more than now has to happen is what's called lightering.

So you can see in the pictures there's a big tanker that's too deep to enter Long Beach. Comes alongside a hundred miles or so off of San Diego. They moor the two ships together out at sea and they pump enough oil off of the big tanker to a smaller one but the big tanker can enter port.

But now that we can bring the tankers into Long Beach with up to a 69-foot draft we're doing less of this lightering operation offshore.

So number one, that increased the safety, reducing personnel exposure in industry or, rather, injury such as to the line handlers tying up the ships and reduces the hours that the crews are in these demanding operations.

Second is economics, a more efficient use of the port infrastructure and tugs. Again, a big tanker is at a limits standard port you can bring in a smaller tanker using the berth and using the available tugs.

And third is to the environment, reducing the risk of oil spills. So there are fewer oil transfers because you can bring in these big ships and eliminate some of the lightering.

Second, the transfers are in protected harbors rather than offshore lightering. The ship just gets in and, as Captain Jacobsen said, ties up to berth T121 in Long Beach, and third, reduced emissions due to less loitering and more barrels per ship movement. So next and my final slide.

So as of last October 139 tankers with a draft rate of 65 feet have entered the Port of Long Beach. You can see the math there in terms of the 66-, 67-, 68-, and 69-foot draft.

You can kind of see that 67 and 68 are kind of the sweet spot because in addition to the under keel clearance because of the team piloting and the risk averse nature of Jacobson Pilot Service and the oil companies they only, for example, do these movements in the daytime.

So by having less draft than the max of 69 it gives a bigger window that you can get the ship in. So, again, to recap, this goals of the project from the very beginning and today, increasing safety, increasing efficiency and reducing emissions, and the goals of the success of this project continued to be demonstrated.

With that, I'll turn it back to Julie.

MEMBER THOMAS: Thank you, Kip. Okay. So, Jeff Ferguson, you are next on the line there. Thank you. And once again, Jeff is the

California navigation manager for NOAA.

MR. FERGUSON: Good afternoon, everybody.

MEMBER THOMAS: Next slide.

MR. FERGUSON: So I'm here to talk about NOAA's role in supporting this project so I'll be talking about some of the NOS products and data we're providing and then I'm going to pass it off to my NOAA colleague Ryan from the National Weather Service who will talk about the wave forecast and wave models, which is critical to this project. Next slide.

Just want to throw up the simple equation. We're here to compute the under keel clearance of a vessel. It's pretty straightforward. It's the depth of the water minus the draft of the vessel.

Static drafts are real easy because we usually have numbers painted on the side of the ship. So if those are in the right place we know what the static draft is.

When we start talking about dynamic

draft things get real complicated real fast, and this project is especially interesting because we're computing and estimating a dynamic draft for a point in the future, and so there's a lot of data that's needed and Karsten is going to spend the bulk of our presentation talking about all the magic he does to compute those dynamic draft estimates for future points in time.

But what I'm going to talk about is we can't do any of this without knowing the depth of the water so I'm going to spend a few minutes talking about that variable in this equation. Next slide.

So if we want to know what the depth is, of course, we conduct a hydrographic survey. Back in 2013 specifically to support this project we sent the NOAA ship Fairweather down here to come to conduct a complete survey of the port area. That included the entrance channels, the anchorages offshore, and all the berths and areas inside the breakwater.

This was just a standard NOAA survey

with high-resolution multibeam. And whenever we're done with a survey, of course, the next question is how good is this data -- how long will this data be good for, right.

So how often does the bottom depths change, how stale does this get over time, and we're lucky in L.A. and Long Beach the bottom is pretty stable but to check it. Next slide.

We sent the NOAA ship Rainier back in 2018 and she didn't do the whole port area but we did enough to get -- we redid the entrance channels and some areas inside the breakwater and we confirmed that the bottom doesn't change that much. LA/Long Beach is pretty stable.

But after big storms you can get some shoaling in the channels from the steep core channel edges sloughing into the channel, and so we need to come up with a system where we can ensure we have accurate depths over time and if we can accept different data sets from different people then we don't have to send a big NOAA ship down here every few years to check on the depths.

And so the process we developed to do that is using a National Bathymetric Source. So next slide, please.

So our National Bathymetric Source, or NBS, is when it's built out the NBS is going to be a national database of all the latest and greatest bathymetry in an area and that right now has three different outputs.

If you look on the right hand side starting from the bottom there's a public facing website which we call Blue Topo, which isn't suitable for navigation because the vertical datums are not chart datum and then maybe some surveys in there don't meet specs. But it's more than good enough for modeling and other public uses.

And then we have an internal access to that database and sometimes we receive surveys that are sensitive or we're not allowed to make publicly available but they're good for us to use for internal planning purposes and, of course, for this case most importantly up on top we have our navigation products, which is our ENC and our S-102 dataset.

If you've never heard of S-102 before just for right now know that that is high-resolution gridded bathymetry that can be used in conjunction with an ENC and as part of our precision navigation products, and Darren Wright will be giving his precision nav updates after the break this afternoon and he'll explain all the S-100 layers and S-102 and how we're rolling that out.

But for right now you just need to know that's a high-resolution bathymetry. Next slide.

So this is kind of showing the same thing with a few more boxes. The database in the middle on the left shows all the different sources of surveys that we can get.

Obviously, our NOAA surveys including our NOAA contract surveys are designed from the ground up to meet NOAA's specs in deliverables and be in the right format that they can be easily sent into the NBS.

But we can get surveys from a lot of other places too, he Corps of Engineers being our biggest source of surveys. Every time they do a post-dredge survey or a condition survey that data becomes available to us and they go in the NBS.

Other government agencies may be doing surveys, universities, and all other sources. If it's a non-NOAA survey those surveys have to go to our external source data group so they can validate those. They usually have to work with the person who did the survey to get more metadata and get the data in a format that's suitable for the NBS since they may have done the surveys for a lot of variety of different reasons.

For this project specifically that other box includes surveys from the Port of Long Beach survey department. The Port of Long Beach has a great survey team who has spent a lot of time and effort the last few years to make sure their surveys meet NOAA specs and deliverables and meet our CATZOC A1 quality control. One of your newest HSRP members is Kimberley Holtz. She's head of that department. So at a future meeting I hope she gives you a good briefing on the work they're doing in that space because I think it's unique to the ports I deal with on the West Coast.

So, again, we get a lot of good data from the Port of Long Beach survey department and all these other sources. Goes into the NBS, which we can update and then we can extract quickly and easily data to update the ENC or provide precise navigation products. Next slide.

So if you want to know where the NBS is built out right now you can go to nowCOAST and then click on the Blue Topo button and you can see where it's built out and right now it's built out down in the Gulf of Mexico and Southeast. You can see there's data there in the Northeast.

We're working on filling in the mid-Atlantic right now, and once that's all done we'll move to the West Coast, Great Lakes, and then finally to Alaska and the Pacific islands.

Now, for this project you're probably looking at, well, but there's nothing on the West Coast yet. Next slide.

If you were to zoom in to LA/Long Beach you would see specifically to support this project we set up a little tiny piece of the NBS so that we could accept surveys from multiple sources and then output these high-precision math products. Next slide.

This is showing the multiple sources of data we have now in the NBS for LA/Long Beach. The dark blue is the areas that are still from the original Rainier and Fairweather surveys. The light blue are all the Corps of Engineer surveys for all their channels and areas of their responsibility that have been conducted since those NOAA surveys. So they're now newer and have superseded the NOAA survey.

Off to the right you see a little green area. That's a Navy survey. That's the

Seal Beach Naval Weapons Station. The red along the shoreline is topobathy lidar from the Corps of Engineers.

The magenta in the middle is topo lidar from the Port of Long Beach they provided to us so that helped us better define the shoreline and supersede some areas that have since been filled in due to development at the port.

And then that orangey area is a survey from the Port of Long Beach survey department. So, again, we get surveys from all sorts of different users. It goes into the NBS. We have supersession rules and newer surveys of higher quality supersede the older stuff and then we can easily extract navigation products from that NBS. Next slide.

And so what that allows the pilots and folks to do is if you just look at the ENC and if I wanted to draw a safety contour at 42 feet the ENC just has basic standard contours. It has a 30-foot contour and a 60-foot contour and those are kind of hard coded in the ENC and drawn by a cartographer.

And so if I want a safety contour at 42 feet the nav software has no choice but to draw it at the next deepest contour, which in this case is 60 feet. Next slide.

But if I have an S-102 file that I use in conjunction with the ENC now I have that high-resolution gridded bathymetry so when I ask for a 42-foot contour it can draw the line at exactly 42 feet on the fly because it has the data.

If I want to see contours every foot it can do that. If I want to see contours every meter it gives the user a lot of extra flexibility.

Now, the land area, the breakwater, the buoys, that's all still coming from the ENC. The S-102 overlay just replaces the contours and depth areas.

And so now Jacobson Pilots can load the S-102s into their portable pilot units and now they can navigate this higher resolution detail as they need it and when we update the S-102 Karsten can take a look and if there's a new shoaled spot in the channel he can now use that depth when he computes his under keel clearances. Next slide.

So that's all the depths in terms of surveying. But, of course, we have tides and water levels that affects the depths of that water and here in L.A. and Long Beach we have a great PORTS system -- Physical Oceanographic Real Time System.

For any information they need in the future they use predicted tides but as that feature gets closer and closer to real time they can check the PORTS to see if there's any difference between the real time water levels and the predicted and apply that difference if they need to. Next slide.

So this is an overview of the ports in the area. All the yellow buttons are just weather stations. The red is the tide gauge on the Los Angeles side. There's two air gap sensors, one on the Vincent Thomas Bridge on the L.A. side and one on the new International Gateway Bridge on the Long Beach side, and then the three blue pins offshore are the wave buoys that Dr. Behrens will talk about later. Next slide.

And there is also an operational forecast system in the area if you want to see what the water levels will do in the future based on weather effects and so on. I just wanted to let you know.

So I think that's about it. Next slide. So that's what I had. I just always like to remind people that wherever you go in this beautiful country near the ocean there's a friendly neighborhood nav manager to help you out if you have any questions.

And now I think I'll pass it back to Julie or on to Ryan to talk about the National Weather Service. Thank you.

MR. KITTELL: Well, hello, everyone. My name is Ryan Kittell and I am a forecaster and the marine program manager at the local National Weather Service office in Oxnard. You can go ahead and go to the next slide.

So, first, talk a little bit about our part of NOAA. We are the National Weather Service. We fall under NOAA and -- but we are not all of NOAA. We're just the weather side of the house, pretty much the part of NOAA that keeps their heads above the water and in the clouds.

We have over 120 offices throughout the country. Our local office is in Oxnard. We cover Los Angeles County, Ventura County, Santa Barbara County, and San Luis Obispo County, which includes the San Pedro/Long Beach area. We also are responsible for monitoring and forecasting the coastal water areas out to 16 nautical miles. We are open 24/7. That is a view of our operations area there on the bottom right, and our mission -- the whole purpose of our existence is twofold. One, it's for the protection of life and property, and secondly, it's for the enhancement of the national economy.

And as we talk about the under keel clearance program and really on informing and helping recording our marine partners you can see how really both of those aspects are clearly handled in port and marine partners in both the protection of life and property and enhancing the national economy.

And our strategy -- the way we do that is to really give the decision makers best information possible that they can make the best weather-related decision possible.

We have a buzz term called Integrated Decision Support Services, IDSS, that kind of encapsulates that vision, that strategy for our mission. And go to the next slide.

So we do this through routine forecasts, so, general forecasts that talk about the weather coming up and marine conditions. We also do as-needed routine forecasts, email briefings, webinars, we even directly, with all partners and key marine users, whenever there's an impending weather coming up and sometimes we'll also deploy if there's any big events.

And part of the nonweather period work that we do is developing relationships with these decision makers, which includes a lot of people on this conference today, and one of the big goals that we have to predict the future especially when we talk about waves is something called the Near Shore Wave Prediction Center, or NWPS.

This is a computer model that is very high resolution, especially as you get close to the coast. It's run by our national NCEP, National Centers for Environmental Prediction, back east.

They're kind of our main group, our main part of the National Weather Service and NOAA that does projections and modeling for both the atmosphere and the water and this NWPS system is really critical for -- talking about what we use it for we use it for our forecasts.

It is the main driver for our official

marine forecast when we talk about waves and it guides our messaging on any kind of wave-related impacts and what people can (audio interference).

When this first came out it was all locally modeled and run at our local office so every local office would run this computer model locally but has since moved to the supercomputer back East and it's run at a national level. So it has inputs from the local offices as well.

So NWPS is not only a tool just for us to provide that information to decision makers but it's also tool available directly to our decision makers and one such example is the whole under keel clearance program. And you can go to the next slide. Sorry, if you can go back one more slide.

I'll explain our process and how NWPS kind of comes and -- the data comes out of NWPS. So the local weather office has a part in the whole wave prediction system in that we provide the data for the local winds.

So winds are the driver for swells and

waves and a lot of the big waves that we get are from storms well off the coast. But there's a local wave component that drives local waves and we are the main source for that especially in the local area here.

And so we provide the wind data that goes -- with that we ship back east that will -- we have the near shore winds for the wave prediction system and then the global models, the GFS wave system which includes WaveWatch3 drives the global waves and the winds offshore.

And so all those come together to produce the output for this near shore wave prediction center.

And so it's very high resolution, as I mentioned, as it gets closer to the coast and then that's where we get to the next slide. The wave data is freely available to anyone -- to the public. But for a port side system and the under keel clearance project it was needed in a different format. This would be in a spectral file for point based forecasts.

And so since the inception of this project we have been producing special output from this model for the PROTIDE software and the PROTIDE team.

As I mentioned early on, the project was produced locally at our office but now it's all done from the national supercomputer output and it really -- this whole project really supports, again, our mission.

We are providing this information to really help those decision makers like the pilots and the captains of the ship to figure out when it is safe to enter port and this is a big part of that, that whole equation that Karsten will expand upon later.

And so our local office now is involved with this project primarily as, again, the wave source that goes into the NWPS model, which is then used by the PROTIDE software for the wave input into their calculations.

And then we also function as kind of the local liaison and local contact for the whole

NWPS system and so whenever there are issues we can kind of provide some support to them as we have in the recent past.

So if we go to the next slide.

There are some changes coming to the NWPS system. So it's been around for about 10 years. The original developer who really developed this whole system, Andre, left our agency for greener pastures a couple years ago and the development of the system has been on hold since last year, and the main reason for that is that there's a new vision for NWPS and it's called the Regional Wave Prediction Center.

And the big change for this future wave system and wave modeling project is to expand it to not just cover the near shore, which is what this kind of system does -- it really just covers the waters near the coast -- and the regional wave prediction center will expand that to the entire ocean domain which NOAA and the National Weather Service or national centers have responsibility for.

It really expands the coverage while still maintaining the highest resolution near the coast. It's still in its early stages in development and planning but the goal is to have it ready at least for parallel testing for it running side by side with the current and the NWPS system sometime in 2025 or 2026.

And there are some advantages to end users which includes ourselves but also for the under keel clearance project and PROTIDE in that it will increase its update times.

Right now NWPS updates every six hours but the goal for this new project, this new model, is for an update every three hours, which will refresh all the PROTIDE calculations, which is really good. So and there are some unknowns in that, you know, the goal is for this model to be at least as good as the current model and, hopefully, better.

So that's certainly a standard that everyone is hoping for and really needs -- want the new system to be better than the current and we do see some potential advantages which we're definitely hopeful for.

So I think this is the last slide I have and then we'll move on to Julie and whoever is next.

MEMBER THOMAS: Thanks, Ryan, and yeah, we are going to move on to Jim Behrens now -- CDIP. Are you there, Jim? Yeah.

DR. BEHRENS: Hello. Thanks for having me. And as I mentioned I am the program manager for the Coastal Data Information Program. I'm also one of the principal investigators, and we observe the waves in California as well as other parts of the country and we generate models to forecast the wave activity both on short and longer term scales. Next slide, please.

If you couldn't tell that was one of our yellow buoys on the back of a vessel heading out of the Golden Gate. Over there on the top right is one of them floating near the Port of Long Beach.

The program was established in the

1970s with initial funding from the Army Corps of Engineers and the state of California and has continued and we are now up to nearly 90 stations across U.S. waters worldwide.

The map on the right shows the extent of the array these days. We have about a 15-person team at Scripps Institution of Oceanography. We're employees of the University of California, San Diego.

The partners, in addition to Army Corps of Engineers, the Navy, and the state parks of California involve many high use regional associations.

This is a direct connection with NOAA and some NOAA priorities for observing needs around the country and then many of our stations are funded through collaborations with ports and industry.

The green exchange -- obviously, Marathon is behind some of that funding. Chevron is a long-standing partner at the port area, and going up the coast the Columbia River Bar Pilots and PG&E at their Diablo Canyon plant. We also work with agencies like the Department of Energy's National Renewable Energy Laboratory as they look to install testing and production locations for offshore energy. Next slide, please. Back one, please. There we go.

And then just a little -- I guess some of the wording gets rearranged while converting from PowerPoint but the gist of this is that we reach a wide variety of stakeholders with our wave observations.

And the coastal engineering aspects are directly related to port planning and improvements. We provide the real-time conditions for operations, and then there are aspects of nuclear deterrent and national security which rely on the high-precision wave data.

The climate record is now being accumulated over the decades of persistent observations at many of these stations. We're going on 30 years of half hourly high-precision observations that are research grade and useful for meaningful operations. Next slide, please.

The instrument of choice is the Datawell Waverider. They provide the wave energy spectrum, the direction of the waves. We measure a displacement path of the buoy which gives wave by wave information. The water temperature, the air temperature, and the surface currents are now also being measured. Next slide, please.

Wave motion circular -- as you can see on the left over there the waves far from shoaling move in circular patterns that these buoys are designed to couple to with high fidelity and then when the waves approach the shore we have concerns about run up, erosion, infrastructure damage. Next slide, please.

The application here at the Port of Long Beach, which has funding through the years from NOAA's Southern California coastal ocean observing system as one of our industry partners and U.S. Army Corps of Engineers backing buoy information about the current wave conditions are used to predict the conditions at the entrance to the Port of Long Beach.

The bathymetry around the Southern California bight is more complex than many coastal regions around the world with all of these islands, shoals, and basins and these all affect the longer period waves in particular, which we'll see soon. Next slide.

Just a glance at the nuts and bolts end of the job, keeping the stations instrumented is a major focus of our day to day efforts. We also calibrate the instruments when they're at our facility to verify the high precision in both height and direction.

We anchor them in place. We use acoustic releases to remove the materials when we're finished. Next slide.

We distribute the data through NOAA's National Data Buoy Center seamlessly with the NOAA-managed and other partner observing platforms.

We provide the data through our own

web portal, up to date as well as full archives. We provide the data through the PORTS system in many locations around the country too.

And then for the quality control aspect we calibrate our instruments. We set up automated messaging for malfunctions that are detected to keep our team appraised and respond to problems quickly. Next slide, please.

The wave data -- over on the left the spectrum is a measurement of where the energy is as a function of frequency and/or period, however you want to look at it. This is an example from yesterday at San Pedro buoy. We have some energy at around seven seconds, six seconds. That's typical for the wind chop. And then there's a little bit of a longer period swell component there at about 13, 14 seconds.

The directional spectrum is provided in this radial plot in the center and if you look at these for a few minutes you can start to understand intuitively how the swell and the wind chop are represented here.

The individual waves can be teased out of the displacement path information and this is a popular product especially with our pilot friends so they understand the sizes of the largest waves coming through. Next slide, please.

The wave model that we run combines with the symmetry of the California coast with data from the buoys themselves, both ours and the reliable ones from the Weather Service -- the NOAA observing stations there as well. Wave physics is then used to predict the conditions along the coastline. Here's a representation from our website with a zoomed in version of the Southern California bight. Next slide, please.

Here's an example of how waves of different periods are affected as they pass through the Southern California bight from different incidence angles.

Now, here's from the south. We're looking at wind chop on the top left and sort of gradually transitioning to long period swell on the lower right.

Red areas are where the waves are focused and wave heights are larger, greater than they would be otherwise, and then the shadowing is evident in the darker images. The Port of Long Beach area -- let's take a close look on the bottom right as this now swings through. There are strong gradients in the wave activity which are wave observations and modeling in particular from the south here where they will have a strong impact on decision making. Next slide, please.

We provide a display of the wave observations at these three stations near the port entrance along with model forecasts from NOAA and WPS in green there and our CDIP wave model which is a forecast run off of the European model these days. We switched to that about two years ago and just published a paper on the update in Coastal Engineering Journal so hot off the press. Next slide, please.

Over time the comparison between the buoy readings and the CDIP model have been analyzed. Here's an example looking at the full spectrum for a year of data up to the present, essentially.

The data don't fall on a perfect line there and so there are events and conditions where the model and the data won't necessarily line up exactly and this is where the interesting stuff happens. Next slide, please.

On the top right this is an example of in May 2023 a southern long period swell. I think this was Hilary -- maybe the remnants of Hilary coming through -- and the buoy station in the top center there 215 is the Long Beach Channel and we see the intense focusing there, right.

Stations 092 and 213 to the southwest and south don't have as intensive wave activity at this time. This is not typical of plainer, more "boring," quote/unquote, coastal region. But here in the Southern California bight these high gradient effects are dominant.

Over on the lower right we see what

happens when we have a strong west swell and the banding, the intense wave activity into Huntington Beach over there on the right.

Also, one last thing to notice is when you look at the top right image where there is the breakwall there is not a reflection coming off.

And so the attempt here was to use the buoy data to make real-time adjustments to the wave model at points nearby. But the punch line here is that this needs to be done with a lot of care as observations at one location in this area don't necessarily help you if you adjust to other locations by that amount and so that's what we're showing over here on the left.

Now, the next slide. We're getting close to the end here.

This is the significant wave height at that San Pedro station dating back to 1997 or '98, I think, we are to start there every half hour and the thing to notice is that in recent years we've measured the most intense wave activity events across that period of time. One reason to continue to make observations the wave climate reveals itself over decades. The next slide, please.

When wave events of significant infrastructure impact or historic energy come through we issue these bulletins, and maybe some of you have seen them. Here's an example of an El Nino type long period strong wave event. This is what caused all of the coastal impacts that were in the news in late December.

This is available for analysis and review on our website and we provide these as a portal into these significant events. Looking over on the right hand side you can see the time series comparison between the buoy and the model for San Pedro there, and close to the shore in the bight the global NCEP model is obviously not particularly helpful and so we need to provide some of these added value modeling products to better understand the situation. Next slide.

I think this is my last one. There

was mentioned earlier about the lightering in Kip's presentation. We work with Chevron to help them understand when conditions for lightering are unsafe, similar to the warnings for a long period in the area off of the port entrance. Next slide.

And that's it. Please visit us at our website. We have this new button here for extreme wave events that will take you to the most energetic buoy readings in the country in recent days and takes you also to our analysis of significant impacts. Thank you.

MEMBER THOMAS: Great. Thank you very much, Jim. Nice presentation.

Karsten, are you ready?

MR. UIL: Ready.

MEMBER THOMAS: Got it?

MR. UIL: I am prepared with the -

MEMBER THOMAS: Okay. Got it.

MR. UIL: I'm Karsten Uil. Thank you for having me. Thank you for the panel for addressing this topic and thank you, Admiral

Evans, for an invite of talking here and to talk a bit about this beautiful project we've been doing here.

It's about dynamic under keel clearance and my topic is the data and modeling with PROTIDE. PROTIDE is the application. Charta is the company.

To start with something a little bit different or maybe the challenge we're looking at is we're actually building a model based on the best data we have. But recently I was in the public speaking of a dear friend of mine and the topic was all models aren't wrong.

Some are useful, and I think that's the challenge we're looking at today with this model. So the challenge is how can we actually use the data, use a model, and prove that it works and constantly improve the model to make it work in real life and that's a challenge we're facing.

So I don't think all models are wrong but at least we have to know how precise they are and work towards making them used in practice. Next slide, please.

A little bit about the company. As I said before, we're a Dutch company based in Rotterdam where also the biggest ports of Europe is. That was actually also our first client. The company contains mainly of mathematicians and computer scientists would like to build models for the domain and maritime logistics domain.

PROTIDE is one of our biggest applications and we started in Rotterdam with this program, and we customize it for all the different ports we work with. Next slide, please.

So the challenge actually is pretty clear. We've heard that the industry wants, of course, the goods coming into ports. They come in big ships and they get bigger and bigger all the time.

The traditional ways of looking at if it's safe or not safe at some point that just doesn't work anymore. You can work around it by saying get more safety measures like less deep ships. Maybe you could lighter to smaller ships or you can have blackout periods of time.

But our challenge is here how can we actually use the data and model that ships can come in more often and that can, of course, like we've heard before today reduce waiting times bringing bigger vessels, make a port more efficient, and use the resources that the port already has available to bring in bigger ships in a more efficient way and that's a challenge we're working on. That's what we've tried to do with PROTIDE.

I underlined a few parts that we're looking at here today. So the minimum dynamic under keel clearance PROTIDE is made to do a lot more than just keel clearance.

We also look at overhead clearance, maneuvering maximum crosscurrents winds. But the topic we're addressing today is dynamic under keel clearance. Ships are planned up to two to 24 hours before the actual transit.

That's the focus point of the presentation today. Of course, you can also look at it to make more strategic decisions about your ports. Maybe look for months ahead.

Also optimize safety, maybe increase draft, reduce waiting times. Everything on the right here of the slide are the bonuses. I think it's a good idea to do it this way and share the data that we have available, show the output of the program, discuss it with the experts to make sure that we're all on the same page in such a complex domain that we're looking at to make sure that the experts know what we're doing and if that's safe and actually that way improve what we're doing.

The continuous evaluation is the heart, I think, of the presentation. We use the data, we have the modeling, and it's our job to prove that it actually works.

So we evaluate the data we're getting in and we want to prove that it works in a day to day basis for ports. Next slide, please.

So what is PROTIDE? On the left we have the inputs for PROTIDE. In the several presentations we've been seeing today we already discussed the input we're using.

We, of course, need to know the route, which route will a ship take going into ports or going out ports, and we need the best available data to work with it.

So the tides, currents, winds, waves, possibly salinity that might affect the circumstances we have to work with. We have to decide what actually is safe so we need a kind of minimum under keel clearance we think is safe, and discussing with industry and looking at other ports, looking at maritime safety regulations we came to safety restrictions here.

So the minimum dynamic under keel clearance we looked at is 1.5 meters so just about five feet as the ship will never have less under keel clearance than that coming into port. The final input is not just the circumstances but an actual vessel coming in.

How big is the vessel? What type of vessel are we looking at? How deep is it, of course, but also its loading conditions. A ship with certain length and a certain beam and draft can behave totally different if it's loaded a bit differently.

So we asked the captains, we asked the agents, to give a copy of their loading computer to show us how it's loaded and that gives us trust that we know that we modeled that ship correctly coming into port.

So that's on the input side and that's the majority of what we're talking about today. What PROTIDE does is to consider for a certain time window for every location during the transit or every time during the transit what will happen.

Model the circumstances, simulate the circumstances, and calculate what the ship will do at that point. So we're looking at drifting, squat, roll, pitch, heave and finally determine what that dynamic under keel clearance is. If we know the dynamic under keel clearance then we can also show when it's safe to do this particular transit.

The results that you see in PROTIDE is mainly tidal windows -- that's the safe window in time that you can use to come in with your vessel -- and we test the actual planning of the ship coming in.

To give the pilots insight of what possibly can happen we give insight into calculated roll, calculated pitch, and resulting dynamic under keel clearance.

By using the system the planning can be made and just before the actual transit we use the best available actual data to give the final goal to our decision to make sure we're doing it safely. Next slide, please.

Going briefly through the inputs, we're very fortunate here to have a lot of data sources available and one we just showed by Jeff Ferguson was the tides and currents that we import. This is the domain on the right that we're looking at so it's the ports in the blue highlighted circle is the area we're interested in.

In a little bit darker blue you see the channel contours. The red little flags are the model output point for waves that we have in the system and we have one tide gauge in this area which is on the L.A. side of the region.

We use the astronomical predicted sites but, of course, they can be wrong. They by definition are wrong with the current conditions. So what we do is we monitor the differences of what we see at the tide gauge with the actual predictions and we constantly correct what's happening there so they could try to get the actual tide of every transit coming in. Next slide, please.

So in the top right we see a tide graph. The dark blue is the predicted side and the light blue is what was actually seen at the tide gauge and the right lower graph shows how PROTIDE uses it.

So we use the predicted side but we correct for the differences between the two and that's why we can come up to a certain accuracy. We think about two centimeters to 10 centimeters accuracy during each transit.

We still use a 15-centimeter standard deviation so an error margin around our predictions in a simulation because the simple reason is we don't have an actual tide gauge in the channel. So we have to make sure that we use the water level with a certain error margin to correct for the -- per use of different location.

In the future what would we like to have? Yeah, better equipped model so a hydrodynamic model. That could certainly improve the tide and current information around the channel. Output points closer to the channel. Finally, then data simulation to make sure that the sites that we use are constantly corrected for the measurement in the neighborhood. Next slide, please.

Next to tides and currents the main

inputs is waves. We are very fortunate that we have a lot of different wave inputs here and we have a lot of local knowledge of what's actually happening.

So we just saw the presentation of Jim Behrens from CDIP. They have a lot of local information what's actually going on here in this region. They made sure that we have the best buoys available here to look at to measure what actually the wave conditions are, and we have the NWPS model discussed also earlier today which give a long-range forecast, six hours up to 144 hours or up to six days. We have an estimated or projected or predicted wave field in our relevant domain.

Based on those six hours to 144 hours prediction we can make our tidal windows for the next half a day to six days ahead. So the graph in the lower end we see a five-day or six-day period and in the colored bands we see three transits being planned. So there were two planned just January 15 and we see one planned on

January 19, which is the yellow band all the way on the right. That actually is the tidal window that PROTIDE calculates the wave conditions, the tide conditions for that transit that's supposed to come in on January 19.

If we look at the January 15 that -- maybe this screenshot was made on January 15 so those transits will be a lot closer. So these are -- those are the pilots almost planning to go on board for those.

In that case the whole model switches to the CDIP buoy-driven forecast model, which we also saw in the previous presentation, and with this buoy-driven forecast model the -- we actually have the opportunity to based on buoy readings look into the future one or two hours to see what's going to happen based on actual buoy readings and this gives us a very reliable final check to see if this transit will come in.

After the buoy-driven forecast you also, of course, also have the actual buoy observations. So when the buoys jump up and down in a matter that we do not see in the models we still have the final build at moments and that's to use the actual buoys. Next slide, please.

And this has proven to be a challenge. So we have all those inputs. Great data, great modeling. But the challenge is to find out how good is this data. Is it good enough to use for dynamic ship motion modeling? What can we do to improve it?

So these are a few things -- a few challenges we've been working on. So in the left top graph we see the tide level, of course. We see three other lines. There's one of the NWPS forecast model, the lowest one. We have one line of the CDIP short term forecast model and we have the top line that shows the actual buoy reading, which is very erratic.

You might notice that the buoy observation here is a lot higher than the two models. In this case, even one to two feet of difference between what the buoy shows and what the model thought would happen.

This is something we have to work with. We model the ship motions based on the wave motion so any error in the wave motions or the wave predictions will also be in the output of the ship motions. That's why we calculate certain error margins.

So on the right lower end we see an output of PROTIDE. The output of PROTIDE is the red area and the blue area. So not the lines but the areas. The blue is the pitch during the transit and the red is the expected roll during this transit.

It's not a line -- it's an area because we have an error margin. So the lower end of the band is the expected roll and the top and high end is the maximum roll we expect during this transit.

So we tried to give insight in the pitch and the roll but we also have an error margin around this and during our evaluations we tried to fit this error margin around what's actually happening.

If we have the roll and pitch on the right lower end the left lower ends will give us the dynamic under keel clearance. This has three areas. The right or the yellow one is the static under keel clearance.

So in the simple formula of having a water level, the available depth of the channel, and having a drop of the vessel then you have the static under keel clearance. Then you get all these dynamics coming in like the ship squatting, maybe it's trimmed -- the roll, pitch, and heave and that's what gives the dynamic under keel clearance which is the lower blue area of this graph.

In this case the lowest dynamic under keel clearance is about two meters. When we think about these vessels being about 20 meters deep this is just, roughly, about 10 percent. You see that PROTIDE also has a dashed blue line in the left lower end. That is the minimum dynamic under keel clearance we would like for this vessel.

So with all the uncertainty in the model, with all the best data and all the modeling we calculate dynamic under keel clearance and we cut it off as being as the -- that every vessel should have at least 1.5 meters of dynamic under keel clearance. So the last 1.5 meters is our hard depth safety margin to make sure that we are always on the safe side of our calculations.

The right top two graphs are also the wave plots that we've also seen today. The left one is the model that shows that the wave field is coming from the south. The right one is from the buoy at the same moment and it shows the same wave field coming from the south.

But we also see waves coming from the north and that's actually the reflection of the waves that reflect against -- that hit the breakwater and come back and also affect the ship motion. This, again, is something we have to look at in this constant evaluation. Next slide, please.

The other input is the depth of the channel like we've seen from -- that we have these from the high-resolution surveys. We import them. We check if the channel is up to date as we expect it to be. Next slide, please.

The input of ships -- so we receive a data sheet of the ship we're expecting and also get a snapshot from the loading computer to know how it's loaded. We check them. The pilots enter them into the system and then we model how the ship will respond in the wave conditions that we expected to have in this area.

So move forward again to the next slide. I'm going through these slides a bit faster because I want a little bit of time for the final validation.

So we have the wave models which we use as inputs. We have an error margin. So we know that the waves are not perfect. We know the tides and we know they're not perfect. We know the channel. But how do we know that what we model is actually going on and that's what we do with the final step is that we put an onboard motion sensor. The pilots take it onboard.

They put the motion sensor on the vessel for the transit and it actually measures what the ship is actually doing. So it measures the roll, the pitch, and the heave, and that's the final lines you see in the graphs on the lower end and this gives us the comfort that what's actually measured on board is within the error margins that we used.

And this is the final check of our model and this way we constantly improve what we are seeing. One last slide.

A bit about the lessons learned in this project. So, yes, models aren't always wrong but I think we showed them that by using data, modeling it and constantly validating it, and taking time to improve it we can actually deliver a system that operations can depend on and is constantly available.

It could only work with the partners we have here. So we give the model but we make use of the NOAA expertise in the region, the CDIP expertise in the region, and expertise in industry here and bring that all together and made it possible to deliver this product and also take the time to make necessary improvements.

So I thank you all for the time and then I'll go back to Julie.

MEMBER THOMAS: Thank you, Karsten. You know what? We have one more slide. Do you want to put that up? The very last slide. We kind of brainstormed yesterday about some requests to NOAA and I just want to put it up here and go through it real quickly if you have it. Yes. Okay.

So I'm going to go ahead, and this is really to Captain Evans, or Admiral Evans, and Marian Westley and Brad because these were items that came up in the discussion after their meeting yesterday under the under keel clearance. So one is how important that channel bathymetry is and, really, I think, Captain Jacobsen, you were saying that there are some sloughing at the edges and you're concerned a bit?

CAPT. JACOBSEN: Yeah. We have to keep up with the soundings of the channels so when we do have storms coming through this area it will slough off the sides of the channels. And so right now we've reduced the channel depth to 75 feet -- from 76 to 75. So we take that into account for the deep draft tankers coming in.

MEMBER THOMAS: Right. Thank you. So even though -- yeah, there are -- as we saw, and it's great how many different opportunities there are for getting surveys in this area. I think that high-resolution NOAA channel survey is just gold to the whole project.

I'm just going to zip through these. The current meter installation there is -- what we don't have are currents for this project and there is a current meter, an RCS-1, which is on one of the docks.

Possibly that could become available in the future and then it would be to figure out how to install it near the breakwater and ideally they would like to integrate it with PORTS system once that is done.

This one, Marian, I did give you a heads up on this. Of course, they would like a tide gauge right there at Long Beach and any hydrodynamic modeling that can be done along the channel entrance there, the two-mile channel. And I don't know about the OFS system there. I know that there is a tidal output but I'm not sure it's for prime time in this area. So maybe if you have any comments on that.

But let me just also say that the very last one was to improve the accuracy of the Nearshore Wave Prediction System. But as Ryan very nicely pointed out that system is in transition now to a regional wave prediction system and the whole program, I think, is kind of frozen until that regional one comes online. So that would be the time to really assess the accuracy and the resolution of it.

Marian, do you want to comment on the

tidal questions there?

DR. WESTLEY: Sure. So the potential new instruments to be integrated in PORTS so number two. Number three, those would be fairly standard PORTS requests.

Chris DiVeglio, the PORTS program manager, is on with me. But, again, that would be a sort of standard PORTS request to add to.

I was just looking at the PORTS system in LA/Long Beach. There's a lot of net sensors. There's a lot of -- we integrate the wave buoys. There's air gaps. That would just be adding new sensors to that system.

I will say the model that we run operationally on the West Coast, West Coast OFS is not designed to go into the navigation channels at all. So it's kind of an offshore. It's a large domain. The innovation with that model is its data assimilating so that was a first for us.

But we don't have sort of a navigation suitable or a navigation focus model there and so, again, that makes it difficult for us to provide services. We can predict the tide based on the sun and the moon and gravity, which are very well known, but what you actually experience in a nearshore environment is going to be largely influenced by weather and other things and we don't have a way of capturing those in a model simply because we don't have an OFS that serves that specific need.

But, again, you know, there's a requirements process. You could work with your local nav manager and kind of get that in the requirements list as a future of OFS or a different OFS that would serve that navigation need. West Coast OFS is a very large domain and it wasn't designed to do that.

MEMBER THOMAS: Okay, great. Thanks, Marian, for clarifying that. Okay. I'm going to open up questions to the panel now.

PARTICIPANT: Kim might have something to add.

RDML EVANS: Julie, can I -- Julie,

I'm sorry. Can I jump in for a second? I have a clarifying question --

MEMBER THOMAS: Of course. Of course.

RDML EVANS: -- regarding point number one here.

MEMBER THOMAS: Yes.

RDML EVANS: If I may. So 2018 -- I think my name is probably on those surveys because I was seated over here at that point. But as I recall, much of that entrance channel is an Army Corps -- it's a federal channel and I'm curious about where things stand, if I'm remembering that correctly, and if so where do things stand with periodicity and the techniques with which Army Corps is surveying that and how do we -- what's your recommendation for how we integrate a potential NOAA survey into the Army Corps program there?

MEMBER THOMAS: Kim, do you have a comment on that? I can tell you do.

MEMBER HOLTZ: Yeah, I do. I do.

So like, you know, we -- the port --

you know, we have done bathymetry surveys on that main channel. It's 2020. Our contractor is going back out there in the next two weeks do the main channel again and we're going all the way out past the buoy.

We're going to go much further out than we ever did because we -- for the whole main channel. So and we are going to meet with the Corps of Engineers to ask them because they just came in in 2023 and did their survey after we did ours. Ours is a little higher quality. I mean, it's a CATZOC A-1. Theirs is a CATZOC B.

So we're going to ask them can we just -- we're going to repeat that main channel every two years. Can we just give them the data so they don't overwrite our little bit more precise data?

RDML EVANS: That's great to hear, Kim. I didn't realize that the PORTS surveys were going all the way out of the gate, you know, through the breakwater --

MEMBER HOLTZ: This will be the first

time we go all the way out. We're going to -- and then we will do that from now on.

RDML EVANS: Okay. And that's great to hear, and as you know we have established and are really started to grease the process for ingesting that data into our external source data pipeline, ultimately being portrayed in the National Bathymetric Source, which Jeff highlighted in his presentation, once we have that built out on the West Coast.

So I think a lot of the pieces are coming together here that will enable that to improve that situation. That said, if there is a requirement for a NOAA survey in the area, you know, we can certainly enter that into the prioritization system. Jeff can handle that. But if there isn't an explicit requirement for a NOAA survey and there are other assets available that allows us to dedicate our very limited ship time and other resources to other places.

So I would just ask that we think about the totality of assets available, opportunities available when we make those requests.

MEMBER THOMAS: Thanks, Admiral.

MEMBER HOLTZ: Yeah, because the port definitely -- sorry. The port definitely -- to change some of the processes we're doing so everybody would feel comfortable with what we're doing we're more than willing to. You know, we've been working with Jeff pretty closely or I should say our consultant DEA has. So anything we need to change we will do, you know, right away.

RDML EVANS: And then lastly, Julie, just one last note. On the requirement for modeling I think we need to dig into this a little bit further and, again, I'd point to Jeff.

But we do also have the STOFS model, the Surge and Tide Operational Forecast System model, which is due to be upgraded to 3D status, if you will -- a 3D model this year and that -- again, I wouldn't want to make any promises but it's conceivable that that could provide the hydrodynamic coverage that's desired under point four. We need to dig into that a little further. I don't want to promise that but we do expect to have a major upgrade for that model this year.

MEMBER THOMAS: Perfect. I'm writing that down to follow up on because I think that would be really helpful. Karsten, I know that those points along the channel there sometimes can vary quite a bit.

MR. UIL: Yeah, indeed. I think having an actual hydrodynamic model. So test STOFS that could be a very good idea so that sounds like good news, and also having insights in the expected currents in the region.

RDML EVANS: Yeah, I would suggest just working with Jeff we can get you connected with the subject matter experts in our modeling shop to -- again, I don't want to promise that that's going to meet your needs but I think it's conceivable.

MEMBER THOMAS: Great, thank you. Thank you. Okay. Let's go to panel questions.

I think the process is just to put your video on so I can see you and if anybody has any questions.

Tuba?

MEMBER OZKAN-HALLER: Hi, y'all. Can you hear me?

MEMBER THOMAS: Yes.

MEMBER OZKAN-HALLER: Yeah. What an excellent set of presentations. Thank you so much. I felt like I've learned a lot and this was a very, very excellent representation of what it looks like to really do engaged research that's inspired by a real need.

And so I congratulate you for pulling it all together like you did because there are a lot of pieces here that have to come together to do what you did.

You know, I'm familiar with this problem from just working at the mouth of the Columbia River which has some additional complications, you know, in addition to what you all have to deal with, including things like very rapidly changing bathymetry, very strong currents, lots of wave-current interaction, things of that sort.

But my question, and maybe you covered this and maybe I missed that detail. Tell me a little bit more about how the funding came about for this work -- you know, how it all kind of came together, who provided the funding, how much funding we're talking about to stand up a system like this like you have.

MEMBER THOMAS: Well, we're going to turn it over to Kip for that.

CAPT. LOUTTIT: So if you rewind in time to 2014 visionaries at the Port of Long Beach and up at California OSPR each gave $25K and at the time the question was can a company in Rotterdam that designed a system for Rotterdam, North Sea, short period waves take inputs from CDIP, take inputs from NOAA, and the concern about a long period south swell.

So that was the first study that was done. The study was successful that then, yes, you can take NOAA and CDIP inputs into a Dutch model and, yes, what was the short period wave that they have, the long periods we have, yes, it works.

So then the funding for the buoys came up for it. There was only one buoy when they started. NOAA funded a second buoy for a while. Now Marathon -- at the time it was Endeavor -- funded the third buoy and then over time now Marathon is funding two buoys plus they are completely paying for Charta software. I don't want to quote. We pay you basically by the year now for a subscription, if you will, to X number of transits that they will perform the calculations. Then we have a second contract with Charta for the validation.

I remember the first time that came up. I'll say NOAA was a little offended -- that may be too strong -- that you're going to hire this Dutch company to validate our models, to validate our wind. But everybody said, no, this is a good idea if we're really going to trust the system. So we're paying that by the subscription. We're also paying for the validation.

The third piece, as Karsten mentioned, is I believe that the motion sensor is, roughly, a hundred grand. It's the size of a one-pound coffee can the pilots bring aboard. It hooks to a laptop. So that's what records the actual motion of the ship coming in so you can compare it to the forecast. So we had to both buy that thing and do the implementation and, in fact, now getting ready to recapitalize that motion sensor. So hundreds of thousands of dollars but the simple answer is to begin with OSPR and the Port of Long Beach put up the money to see if it would work. When that was successful now Marathon is paying the complete rest of the bill for Charta software and for two of the buoys.

MEMBER THOMAS: But I notice you've been really involved with Captain Jordan on the Columbia River and they're running the OMC from Australia, more or less the same thing.

But I thought about this because I'm kind of on a lot of those emails too and one thing that's really different is that Marathon, the crude oil tanker, is coming in here to Long Beach and it's so crucial, of course, because nobody wants a spill.

And in the Columbia River I think it's mostly bulk that comes in and so it's a little bit different because there isn't, like, one company that really is passionate about funding it up in the Columbia River.

By the way, Tuba is a world class wave modeler herself and you've done incredible work up there.

MEMBER OZKAN-HALLER: Thank you, Julie. But, again, I feel like this is a really great example of a public-private university partnership. So thank you all for giving a presentation that's so nicely coherent.

MEMBER THOMAS: Captain Louttit mentioned the funding for those wave buoys but we also have to give the state of California credit because that San Pedro buoy that's been there now for 27 years or something has consistently been funded by Cal Boating in the state of California.

Okay.

MEMBER OZKAN-HALLER: Even better. State, federal, university, public-private. Thank you.

MEMBER THOMAS: Exactly. Does anyone else have a question on the panel? My goodness, you are quiet today.

Nathan?

VICE CHAIR WARDWELL: Well, I figured I asked one since it's been so quiet today.

MEMBER THOMAS: I know.

VICE CHAIR WARDWELL: Yeah. I mean, so I was just curious. You know, so this is a lot of precision navigation, elevation determination. CO-OPS is going through and going to be updating the National Tidal Datum Epoch here soon and NGS is modernizing the spatial reference system. Do you see any advantages or challenges with those updates that will benefit the navigation in this region?

MEMBER THOMAS: Do you know what that is, Karsten? Explain it a little bit more for Karsten.

VICE CHAIR WARDWELL: Ma'am, it might be NGS' place to better describe the modernization that they're doing but redefining the horizontal and vertical datums that are used to define positioning in the U.S. and then on the CO-OPS effort it is redefining mean lower low water and tidal datums based on a new 19-year period, and some of those things might have real small changes in this region. It may not matter. But I'm just kind of curious if it's something that you are thinking about as an input.

MEMBER THOMAS: Yeah. You know what? Thank you, Nathan, for actually bringing that up because, Brad, do you -- you know, when -- Brad is the director of the National Geodetic Survey and do you know about the changes?

I know that the amount of change that we're going to see is different throughout the whole coastline. Do you know anything about Southern California?

MR. KEARSE: Yeah, I do, and what I would recommend is our regional advisor to work with you all closely and I know Dana might be on the line -- Caccamise. We have regional advisors throughout the country who know the local issues. Kim, I'm sure that you probably know Dana and he could tell you any particulars. He's well aware of that region and anything.

I think he is supposed to give us an update on some of the challenges here. So I'll make sure that -- I'm not sure he's on right now. But any particular interest in -- our regional advisors are there to support anything that's going on. That's what their role is.

So I would recommend that we get Dana involved in this and at least to respond to any local questions or concerns. He's well aware of the whole modernization effort. He's actively involved in all that and that's what I would recommend.

MEMBER THOMAS: Dana, are you on?

MR. KEARSE: I don't think he is. I just looked.

MEMBER THOMAS: Okay. Okay. I was talking with him this morning. We were going to carpool at one point. But, Kim, do you want to say something here?

MEMBER HOLTZ: So basically horizontally and vertically has always been tied to passive physical monuments in the ground. The new system is going to using GPS satellites, which we've been doing for a while but for the vertical and horizontal.

And so it's moving more away from passive monuments and that's the biggest deal. Vertically the West Coast or at least, I should say, Southern California will go back to an elevation that was very similar to the 1929 mean sea level elevation. So it's going to change, like, 2.7 feet in, like, Long Beach. We changed when we went to NAVD 88 and now we're going to change back.

So that's just some of the -- you know, so those are concerns that are going to have to be dealt with. I mean, then you convert it to mean lower low water, obviously, for anything with the shipping industry. But it is definitely going to be a challenge.

I mean, I work really closely with Dana all the time and we both sit -- well, he sits at Scripps, but with the California Spatial Reference Center, these are things we're all talking about, California Land Surveyors Association, different county agencies. So it's going to be a big change at least for the surveying industry.

MEMBER THOMAS: Thanks, Kim, and I'm glad you brought that up, Nathan, because that is an important piece to the puzzle.

VICE CHAIR WARDWELL: Yeah. I mean, a couple things. I mean, if it's going to, you know, improve in determination of the under keel clearance or reduce some of those uncertainties at all and be able to bring in more cargo than that's a big advantage, and then in one of the presentations earlier today there was that question of like, hey, are we using control or GPS, right, which was are we using passive or active control, right. So it was a question that one of the panelists brought up earlier, and so thanks for bringing that up, Kim.

RDML EVANS: Yeah. And I'd like to -- Nathan, thank you for bringing that up because what we're trying to really emphasize in the modernization effort is everybody is connected to the new reference system, right, that everything is. So when we get to modes of transportation and like Nathan was saying under the keel, bridges, everything in DOTs are all tying to it.

Now we got a consistent reference system that we can take out any of those biases from passive control and whatever. I mean, we've spent a lot of time modernizing the foundation of the georeference system and it's going to be as accurate as we can get, and I'll talk about that when I give my presentation real quick -- I mean, later on here this evening.

But that's what we're truly trying to push, that folks understand what it means and folks are moving in that direction and help you transform even your current data to get it to that new reference system.

MEMBER THOMAS: Okay, thank you. You know what? I think we're out of time. It is 3:00 o'clock here anyway. Let's see. Sean, back to you.

CHAIR DUFFY: Thank you --

MEMBER THOMAS: Thanks to all for the panel. I just wanted to say this has been a fantastic experience over the last several years working with this panel and I just always appreciate their attention to detail and their focus on safety, and it couldn't be more of a pleasure working with you. So thank you all very much for your presentations.

Okay, Sean.

CHAIR DUFFY: Thank you, Julie, and reiterate. Another excellent panel. We do have a break and as it shows on the screen we'll reconvene in just under 15 minutes -- 3:15 Pacific. Thank you.

(Whereupon, the above-entitled matter went off the record at 3:01 p.m. and resumed at 3:16 p.m.)

CHAIR DUFFY: So I'd like to introduce Darren Wright for the next presentation. I've known Darren for a long time. He's now manager of Precision Navigation Program. I do not think he needs much introduction to the members of the panel and look forward to listening in. Darren, the floor is yours, sir.

MR. WRIGHT: Thank you, Sean. Next slide.

Yeah, I think that the last time I addressed this panel was right when I was switching jobs from the national marine program manager to this position about a year and a half ago. So it's good to be back.

Again, I'm Darren Wright. I'm the Precision Marine Navigation program manager for the Office of Coast Survey and -- back one slide, please.

So we've heard the term precision marine navigation thrown around a lot today. I always like to start off with a definition of what I consider precision marine navigation and it's really what the pilot and other mariners do on a daily basis. It's the ability to navigate a vessel in close proximity to other vessels, the sea floor, bridges, narrow channels and other marine hazards like weather. Next slide.

The maritime economy is continuing to grow, as you can see on the graph on the right, and what that means is more goods and services, which means increased traffic. And, of course, the ships are not getting smaller. We've seen several examples of that this year, and I might hit up Captain Betz for the image of the Ben Franklin to replace this one because I think that one is even bigger than this one. Next slide, please.

So because of that the waterways are

getting more and more congested. We're having clearance issues under bridges and, incidentally, that picture in the upper right I got to do a ship ride with NOBR pilots -- New Orleans pilots on the Mississippi River -- and, you know, we were bringing a tanker southbound and there was a tanker coming northbound on our right and a barge on our left and we went right between them. But they were both moving. So and I'm sure this is not just common on the Mississippi River but in other busy port areas as well. But because of this we need to integrate environmental information that NOAA provides to help mariners navigate more safely. Next slide.

And NOAA's got great data. You know, we've seen a lot of that today. You know, water level information -- we got weather information, electronic navigation charts, high resolution bathymetry. But at the moment it's all over the place. You have to go to different websites to get it and it's on different platforms and different formats. Next slide.

So this is what the Precision Marine Navigation Program at NOAA is trying to solve. We want to take NOAA's great navigational information, put it in this international standard format called S-100, which we'll talk about here in a minute.

Putting it on a dissemination system in machine readable language and the dissemination system we're using is the Amazon cloud and we have a website, marinenavigation@noaa.gov where you can go and find out more about this program and also how to get access to this information and I'm going to talk about it here in a second. Next slide.

So these are the data products that we plan to offer up NOAA in this S-100 data framework. I'm going to touch on each of these as we go through so you'll see what I'm talking about. Next slide.

So we're going to kick things off with S-102, or high resolution bathymetry. Jeff did a great job of going in depth with this so I'll just breeze by this.

But this is an electronic navigational chart under ENC where you can see the soundings throughout the channel there and I intended at this point to just point out the window and say that this is the entrance to the Port of Long Beach right out the window in that direction -- but I can't do that because I'm in Maryland -- if it had been in person.

But anyway this is an electronic navigational chart and that picture to the right is a ship that's about to make that entrance, and thank you to Tom and the Jacobson Pilots for that image. Next slide.

So this is an image of the portable pilot unit, PPU, called SEAiq that the Jacobsen Pilots use and it's overlaying the S-102 data, and as Jeff mentioned, it's gridded data so you can not just see the soundings but you can do depth contours and you can adjust those to whatever contour you want, and that shift to the right is a specific depth. You can set your safety contour which is what you see in red and you can design that specifically for that particular ship, not just the canned ones that you get in a regular ENC. Next slide.

Now, here's where it gets good. So if you take that safety contour and you add in a water level forecast, as the tide is going in and the tide is going out that contour is going to change based on the depth of the water and on this particular waterway you can see at certain times during the day that particular vessel is not going to be able to make that transit. So you can utilize this dynamic information to plan your transit so you can make sure you navigate safely. Next slide.

Now, if you integrate surface currents on top of that now you're starting to get a complete picture what's going on environmentally when you're transiting to help you better navigate safely. Next slide.

So here's another screenshot from a portable pilot unit -- again, SEAiq that the

Savannah pilots use -- and this is a turning basin where you see an ENC and it looks like, hey, no problem. Next slide.

But if you do an overlay of the high resolution bathymetry at a chart depth where there's mean lower low water that particular vessel is going to have trouble making that turn because they're kind of outside of their safety contour. Next slide.

But the portable pilot unit manufacturers are actually getting ahead of the game because NOAA is not providing its water level forecast information in the S-100 format yet.

But they've built in the ability to do a tidal adjustment in their software. So it's manual at this point but in this particular case they added two meters, which better represents what's going on at that time, and you can see that vessel is now going to be able to navigate safely. Next slide.

As I mentioned, all this stuff is

configurable in the PPU software. You can set your safety contour. You can set how many contours you want. Jeff talked about you can set up a tidal adjustment. All that is configurable in this software. So this is how people are already starting to utilize some of this S-100 information. Next slide.

We also plan to offer weather information as well, though we're initially going to focus on the weather and wave warnings in the upper right. Next slide.

So this is a weather chart of what it would look electronically. Next slide.

Now, if you take the wind warnings and overlay it for gale force, storm force, and hurricane force based on that weather system that's going on there you get to see what the conditions are surrounding that weather system rather than just having to interpolate that weather map. Next slide.

So this is wind and then this next slide is waves. So now you're beginning to see with the bathymetry we're making decision making easier. You stay between the lines, right, for the bathymetry and then for this information you just stay outside of the circle of the conditions that you don't want to deal with.

So if you don't want to deal with 14-meter waves you stay out of that circle and I don't think there's many people that do want to deal with 14-meter waves. Next slide.

So now you're beginning to see if you utilize this environmental information together and it's all integrated you now have the ability to potentially bring in larger vessels. Next slide.

So the Korean Hydrographic and Oceanographic Agency has begun to quantify the utilization of some of this information. So S-102 is bathymetry -- 104 is water levels. They have a ship route.

You can see in the top part of that graphic on the right is the normal route that they take and transit during nice weather. But if there's bad weather they used to take that route to the south on the bottom of that image and they, through utilizing water level information and high resolution bathymetry they determined that even during bad weather they can hold to that route and just alter the end of that route, making it 55 percent shorter, saving them $124,000 a year. Next slide.

So here's another study they did with the transect that they operate where on the left they just put the vessel on a fixed speed to get from port to port and on the right they utilized an optimal route utilizing currents and weather information and, again, they were able to save 14.6 percent fuel consumption and emissions. Next slide.

So how do you get access to the information? You can go to marinenavigation@noaa.gov, again, and that will point you basically to this interface and this is nowCOAST and many of you are familiar with this.

Jeff showed this and showed getting

access to where we have Blue Topo. But we also have S-100 product availability here as well. And if you turn on that tab this is what you will see. Next slide.

And if you zoom down into an area of interest and click on it it'll give you a legend of what information is available and it will give you links that will point you to the Amazon cloud where we have this information.

A lot of the PPU manufacturers and other electronic charting system manufacturers, you know, once they figure this out they go straight to the Amazon cloud and get the information. Next slide.

We've also built in something called discovery metadata. So if you know what your transect is you can set up to only download the tiles of information that you need because bandwidth is a big issue when you're at sea. So rather than doing a big data dump you see on the left you can really customize it to just the information you need. Next slide.

So where are we with all this development? So S-102 we've already seen some examples of how that's being used in LA/Long Beach. We also have and, again, I'm going to say testing evaluation data because that's what it is at the moment in New York, New Jersey, and most recently, Boston, Charleston, and Savannah. But you'll notice it's Edition 2.1 with another edition coming out here shortly. I'm going to touch on that here in a second.

We hope to offer up water level forecast information so we can start to utilize or start testing that dynamic capability later this year. Surface currents, we actually have it in most locations where we have an operational forecast system around the country. Again, it's in a version -- not the final version yet, which we'll talk about here in a minute.

The weather information that's actually not going to be coming out for a couple years. Now, the polygons I showed you were derived from some of the weather models but the ability to disseminate data in a polygon format that infrastructure is not in place yet at the Weather Service. They're working towards that. That's going to be a couple of years.

And then the ENC we have a plan in place to transition from the old standard S-57 to S-101. But that's going to, again, take us a while to get there and we hope to have S-101 data available for the major ports by 2026. Next slide.

There it is. So this is the (audio interference) I was talking about. All the data standards I just showed you that we've done all this development work towards these standards are not finalized yet.

These are international standards and they're still working to put out the final versions and I'm told they will be finalized by the end of this calendar year.

So because of that we're not going to do any further testing and evaluation S-102 high resolution bathymetry data in other locations until that standard is finalized. Next slide.

So here's kind of a time line. That column on the left is 2024. That big red line you see that's when the S-100 standards for all those data types are going to be finalized. You'll see the ones that NOAA plans to offer, the bathymetry water levels and currents. We hope to have our version of that done pretty quickly because we've done a lot of development work to get us close and this final version is just going to be a tweak.

So we hope to offer that data early in 2025 in the major port areas and as you can see the weather information is going to be a little bit further down the road, and then the electronic charting system, again, 2026 is when we hope to have this data available.

And why does everything point to 2026? Next slide. So this is why we're doing what we're doing. We're building to this deadline here. The International Maritime Organization has amended their Electronic Charting Display and

Information System, or ECDIS, which you see an image of on the right and this is the charting systems that are aboard the major ships. They've updated that standard to leverage that those S-100 layering capabilities I was just showing you earlier and starting in 1 January 2026 the ECDIS manufacturers can start to utilize these capabilities. So we need to have this data set ready for that and 1 January 2026 is less than two years away. So it's not far away.

And then starting in 1 January 2029 any new ECDIS system manufactured is going to be required to utilize these S-100 capabilities, which I just showed you. And I think that is it. Next slide.

So thank you very much, and I don't know if you're doing questions, Sean, or not or whether we're doing them later. I don't know.

CHAIR DUFFY: I think we'll hold questions later so that we can move on the time. As you know, the Mississippi River is going to be challenging. I will say if we were not on a tanker that was the only thing I heard you get wrong that I knew of. But you know somebody from NOBR is going to let you know you got that wrong. So heads up, be prepared.

All right. We're going to move on now to the directors panel and have questions for Darren later in discussions. I'm going to introduce once again Rachael Dempsey, deputy administrator for navigation and observation to lead the directors panel, if I got that right hopefully. Thank you.

MS. DEMPSEY: Thank you, Sean. Good afternoon. Good evening, everyone. It's good to see you all again. I'm happy to bring to you the second panel this evening that I'm hosting, which we're going to discuss opportunities and challenges for the National Ocean Services' navigation, observations, and positioning portfolio.

So just as a recap for those of you who may not be familiar with the offices that are in this portfolio, it consists of four offices, three of which are represented and advised by the HSRP.

Those offices would include the National Geodetic Survey represented by Mr. Brad Kearse today, the Center for Operational Oceanographic Products and Services represented by Dr. Marian Wesley, and the Office of Coast Survey, of course, you all know represented by Admiral Ben Evans.

The fourth office is actually the U.S. Integrated Ocean Observing System, or IOOS program that many of you are familiar with. They do not fall under the HSRP but they are certainly very great, solid partners for us both internal to NOAA and external in reaching HSRP goals.

So I wanted to round that out for you all. Now, it's been a real pleasure being able to participate in getting the larger audience both inside NOAA and external to NOAA familiar with what we call the Foundation 4 programs.

The reason we call them Foundation 4 is because they're, in fact, what NOAA was founded on, honestly, and so bringing this observation information to the public is extremely important to us.

Right now we've done a little bit of shifting and focusing on our strategic goals and largely because our administrator Ms. Nicole Leboeuf has published our strategic plan for NOS and so we're focusing on the meaning of those strategic goals, meeting our fiscal challenges and how we're going to, you know, make sure that we continue to provide the stellar products and services based on our observational data in the near future and the way that we get to do that is really by telling our story.

And so I want to tie that in with the panelists from this morning's group with our local stakeholders who did such a beautiful job in helping us with that.

So that all being said, I would like to introduce Dr. Marian Westley who is going to give us an update on CO-OPS programs and an outlook for the future.

Marian?

DR. WESTLEY: Thank you so much, Rachael.

So just a warning to everybody, I'm in my office and there's a -- the light is managed by a motion detector that's very far away. So if I'm suddenly in the dark don't take it personally. I will keep talking. It's more important that you see my slides than you see my face.

So with that, let's go ahead and get started. So this is just sort of routine annual/biannual update that we provide you on achievements and accomplishments coming out of the Center for Operational Oceanographic Products and Services, or CO-OPS, and for those of you who are new to the HSRP or new to this kind of meeting we are the national authoritative reference source for tide gauges and tidal currents and tidal datums.

So that's just to give you some context. So let's go ahead with the next slide.

So the updates I'm going to provide to you today are where we are with the National Tidal Datum Epoch Update and Nathan Wardwell mentioned this at an earlier conversation today.

I'll give you an update on our tidal current surveys program, the National Current Observation Program -- again, one of our mandated observation programs.

I'm going to show you a new tool we're about to release called OceansMap that is a visualization tool that combines coastal forecasting where we have forecast models with observations.

I'm going to give you some updates on what we've been doing with Coastal Inundation Dashboard. For those of you who are not familiar with Coastal Inundation Dashboard it's our kind of main entry point to our data for resilience purposes.

So it's where we go when we're watching a storm coming in. It's where we go to visualize flooding and I'm going to mention some of the observing system improvements we've been making not exclusively but largely with funding from the bipartisan infrastructure law, and then I'm going to give you an update on the PORTS program.

So PORTS stands for the Physical Oceanographic Real Time System. This is a public-private partnership program that we've been running since about 1990 where we partner with navigation entities and add sensors to a region with their partnership, those sensors that are needed specifically for the navigation gates at that port.

Okay. So let's go ahead with the first one so the NTDE, the National Tidal Datum Epoch Update. So those of you who are tide geeks will know that there's an 18.6-year tidal cycle that's kind of the longest of the gravitational cycles that we pay attention to and so we really try and update -- we define that as a tidal datum epoch.

So the sun and the moon and the

Earth's tide system have gone through their full range of motion in the 18.6 years so we try and really update all of the title datums. So whereas, you know, mean higher high water, mean lower low water, mean sea level, all of those, we try and update those every 20 to 25 years to acknowledge that we've gone through another tidal datum epoch.

So the current tidal datum epoch is based on data from the current one that we're in. The current update that we're doing is based on data from 1983 to 2001. The new one will cover data from 2002 to 2020 so the next epoch, and that will be released after 2026.

It involves analyzing over 2,000 active and historic tidal stations and kind of recalculating the tidal datums in all of our locations. We will be doing a lot of outreach and rollouts.

If you are interested we've developed some training videos. We're doing regional webinars. I believe Eric Peace is going to help us. That was with the lakes version, IGLD, which is related.

So we'll be doing a lot of presentations and, again, if you as a stakeholder group would like the presentation please let us know. We'd be happy to include you in that rollout.

And this will have big impacts any stakeholder that needs to know where mean sea level is or chart data or any of those. It'll affect navigation. It will affect our port systems. We will update all of our water level web pages and then NOAA Sea Level Bureau will be updated as well.

So I think I'll go from there, move on. So every year we try and make progress on NCOP, which is the National Current Observation Program. So these are very intense field campaigns where we'll go into a tidal estuary or tidal area and case tide gauges -- not tide gauges, current meters on the sea floor all around there, leave them in place over the summer, collect them again, and then analyze all that data.

So we're done with Delaware Bay. We finished the field work for Columbia River, this very long river with very violent currents. So very important to keep that one up to date as much as possible.

We think we'll have the predictions completed for that in 2025. We've started working on Savannah River. So we did some observations last year and we'll start the analysis soon and that's an area that pilots have been requesting updated current information for over 10 years.

Our next one coming up is Charleston Harbor so the survey has plans starting this summer in May and continuing through September. Again, the requirements for these are largely based on navigation needs, as you're well aware, as harbors change and evolve over time and the way the tide interacts with that. Bathymetry changes over time and the currents really need to be updated and reanalyzed.

We also provide this data for model validation and just general physical oceanography. So that's where we are with the NCOP surveys. Next slide, please.

So this is a new tool we're about to roll out. It's in sort of final testing right now. It's going through all its IT security checks. This is a tool we've developed in partnership with IOOS, or IOOS has helped us bring it into operations over here and this tool basically is a visualization tool that allows you to look at all of our OFS data -- ocean forecast system data -- as well as the observation data sort of together in one place and a sophisticated user can make sort of curated views.

So you can decide that you're really interested in the Chesapeake Bay operational forecast system and all the observations there. You can create yourself a webpage that will just update that for you.

So I think it'll be a great tool for

people to really look in sort of real time, have sort of that environmental intelligence of what's going on between both the centers and the ocean forecast systems and those regions where we have a mature ocean forecast system running.

So that's oceans map. We will probably send notes out to the HSRP when it's finally fully public. I have a beta version so I play with it a lot. We should have this over the finish line by the end of this month. Next slide, please.

So as you know, Coastal Inundation Dashboard is kind of the main way into our website for when you're looking for that situational awareness if a storm is coming or something unusual is happening in your area. We really developed this product very much in collaboration and coordination with the Weather Service.

So we show our tidal data with the Weather Service minor flooding, moderate flooding, major flooding thresholds that are in the same regions as our tide gauges. So the things that we've added -- because this is a place where people -- it's often their sort of first port of entry, so to speak, on the web for an incoming storm so it's very important to us that we have all the National Weather Service texts associated with those active flood watches, warnings, and advisories.

The website also directs you to the Weather Service for that actual kind of forecast, you know, life and property guidance from the Weather Service. We've also improved the layout just to make it easier to sort of move between these different products and sort of more seamless navigation between the Coastal Inundation Dashboard and our just basic tide gauge pages home pages.

So I hope you take a look. I'm sort of addicted to this website. I look at it on my phone a lot. We did have it optimized for phone viewing a few years ago. So it's just a great way to kind of refresh and update, you know, situational awareness if you have a storm coming to an area that you care about. It's a great place to go look at it. All right. Next slide, please.

Okay. So this is showing, you know, how we will have the pop-up of that National Weather Service kind of authoritative text, you know, when there's a situation coming. Okay, go ahead. Next slide.

Great. So here are some of the observing system improvements we've been able to make thanks to the bipartisan infrastructure law. We have a budget to do recapitalization and also modernization of some our NWLON gauges. This isn't just for standard annual maintenance.

This is for kind of upgrades and evolution of our gauges. So we have totally rebuilt the Charleston, South Carolina station. I believe it had been hit by a ship at one point. So we've moved it. We've also put the wind gauges for this station, they're up on top of the pilot house so they're up out of the way. This was an area where cruise ships will come next to the wind gauges and then cause a wind shadow so your data's kind of useless.

In partnership with the local weather service station we've added a custom rain gauge to this, again, because we've already built the platform. We've built all the communications equipment that goes with these platforms.

We usually look for opportunities to add meteorological systems to them as well. So one thing that we've been doing that's -- oh, and then what we've done for the pilots here is we've hardwired the wind gauge data into a wind unit inside the pilot house so they can look directly at the wind gauge as opposed to looking at the wind gauge data as it's come, you know, through the GOES satellite back to our website. So that was something that they requested and we were able to handle that request for them.

Another thing we've added to the station is a high-resolution WebCOOS webcam. So WebCOOS is a kind of R&D program that IOOS is running to put web cameras in different places around the country, you know, for situational awareness.

This one is looking at Charleston and we initially just had a single view. Now it has six different viewing angles. So it every minute will go around and look at these different viewing angles. So next slide, please.

One of the reasons we really like reliable webcams and why we're often looking for webcams in areas where there's been a storm is for that situational awareness.

So these two images, the top one shows what was happening. There was an East Coast storm in December and so we were all watching, you know, that big system come through and watching as it went through those Weather Service thresholds of minor flooding, moderate flooding.

And then the bottom one, I believe, is Hurricane Idalia as it came through Charleston. What we find really helpful with these is we can show you a tide gauge plot and for sophisticated users like yourself that's perfectly meaningful. But for your sort of average member of the public it's really helpful to be able to match when the plot looks like this, this is where the water is on the ground.

So, again, we've done a few of these in different parts of the country as opportunities arise kind of on an experimental trial basis just to really enhance the communication ability of a tide gauge. So if this is what it looks like on the tide gauge, this is what we've measured, and here's what it looks like in real life. Next slide, please.

So another real benefit of having a webcam there is for visibility. So a lot of our harbors, a major hazard to navigation is fog, and so again, this gives our Weather Service partners just a real-time view. This is what's going around the harbor. This is what it looks like right now. This isn't a visibility sensor, per se, but it gives them that situational awareness as they're making those marine safety forecasts.

So this is just some testimony from Jonathan Lamb in the Charleston meteorology at National Weather Service office just saying, you know, we're monitoring for sea fog. It's been an enormous impact on shipping traffic. It's always been difficult to find high quality reliable webcams with good views of Charleston Harbor. We absolutely love the NOS webcam and use it regularly on the forecast shift.

So, again, not a visibility sensor but it gives that extra situational awareness to our Weather Service partners of what it really looks like on the water when they're making their marine forecasts. Okay. Next slide, please.

So another thing we've been focusing on is just website improvements. We do have some BIL money to hire IT help and so we've been looking at high and low water conditions. We know that in many parts of the country low water is a major hazard to navigation. So it used to be kind of subtle and you'd have to go looking for the low water.

We have a page for high and low water conditions. But now we actually kind of put the same sort of banner that we put when there's a big storm or there's flooding, we now put that banner when there's low water conditions.

So that's kind of one upgrade just in the web design. The other thing that's an upgrade for low water is instead of having our CORS watch standards manually figure out when there's no water and put it in, now it's all automated and so that gives us the ability in the future of maybe developing custom thresholds for when, you know, a group wants to determine that this condition is low water and there needs to be some hazard warning about the low water there.

So the low water criteria right now for tidal stations is 18 consecutive minutes where the water drops below one and a half feet below mean lower low water, and that's just a general definition across the board. But, again, that can be tuned or altered if that's not a meaningful definition in that region.

For Great Lakes also low water is a critical navigation hazard in the lakes and so the criteria there is 12 consecutive hours below low water data. Again, this is just, you know, not a major change in our website but just an upgrade to make that information easier to find and more visible. Next slide, please.

Okay. So the PORTS program I introduced earlier in the conversation. So PORTS stands for the Physical Oceanographic Real Time System and this is a program that we stood up after the Sunshine Skyway Bridge in 1980.

I think around the '90s we started this program and it's a partnership with various maritime entities where an entity will come to us and say, you know, we like your tide gauges, we like your current surveys but what we really need to navigate safely in our harbor is a visibility sensor, an air gap sensor, a current meter, some combination of those.

So we have, I believe, 38 active PORTS systems right now and these are the enhancements we did this year. These are not new systems. These are just, you know, adding sensors to an existing system so we added visibility and wind to Fort Morgan, Alabama. We added a water level station in Kalama, Washington. Port Everglades, we put in two current meters and I think we just finished that in January.

Jacksonville there's a current meter. Mobile Bay there's another current meter. Port Fourchon we upgraded the water level station and Chesapeake Bay Bridge we have added a second air gap sensor on the same span.

Initially, we were looking at putting the air gap sensors on the different spans but when we surveyed the bridge we realized there was one span that was always the lower span so now we have two kind of fully redundant systems on that one span.

New PORTS kind of in the works. We will hopefully get Pearl Harbor over the finish line by the end of this fiscal year. So the Pearl Harbor PORTS system has a partnership with the U.S. Navy and there they've integrated the Honolulu NWLON.

They've added a water level station inside Pearl Harbor I think at the NOAA facility there. There's a meteorological station, two current meters and we're also integrating in the nearest CDIP buoy so that will be the new one coming out this year.

And then we're working with Seattle, so a new PORTS in Seattle, which will be in partnership with the Northwest Seaport Alliance and will integrate the existing NWLON, add a current meter, and put a standalone on that station. So that's what we've been up to with PORTS this year. Okay. Next slide.

Okay. That was my last slide. Terrific. I will go ahead and hand it right over to Admiral Evans.

MS. DEMPSEY: Well, before we move on, Marian, thank you very much. I want to make one correction because I realized in the introduction that I failed to acknowledge Larry Mayer, who is here supporting us. He is the director for the Center of Coastal and Ocean Mapping at the University of New Hampshire. We are very happy to have Larry here and appreciate his attendance. I think Larry's been here with us all day.

So, Larry, we look forward to talking to you and hearing from you about unmanned systems. But for now we're going to go to Admiral Evans to talk to us about OCS strategic planning.

RDML EVANS: Well, I'd be happy to just go straight to Larry because I'm sure particularly for those of us on the East Coast where it's getting a bit late, everything that Larry has to say will be much more interesting than anything that I have to share.

But you'll have to suffer through -- suffering through me and Brad is the price of getting to Larry's presentation.

So again, panel members, thank you for the opportunity to speak to you today and for your continued engagement. There continues to be a lot of incredible work going on in Coast Survey since we last met and it's going to be a challenge to fit it all into 10 minutes so I'll dive right in. Next slide, please.

So we are in year two. We're moving into year two of our new 2023 to 2027 strategic plan. I spent a fair amount of time in our last update in the fall talking about this but I encourage those of you who may not have had a chance to look at this to hunt it down on our website.

Our strategic plan in Coast Survey aligns well with the new NOS strategic plan which Nicole mentioned in her remarks earlier today, and really as I mentioned in our last meeting in September, our new plan in Coast Survey lays our course to complete the transition from a solely product-based organization to one that is more focused on data and the products and services that data enables.

The plan lays out how we will meet that fundamental challenge to deliver our data, products, and services to the users who need it in the right format in a timely fashion.

So, again, for those of you who haven't heard me rant about this previously I encourage you to take a look. But really, completing that Coast Survey strategic plan was just one of our many accomplishments last year. You may also want to take a look at our year in review story map -- there's a QR code there on your screen on the left side -- to dig a little deeper into our accomplishments in 2023 and, you know, feel free to take a look at the beautiful pictures and read some of the vignettes to learn a bit more.

As we continue to move out on this plan, I'd like to take a moment to highlight some changes in our leadership team since we last met. First of all, Captain Sam Greenaway has reported as the chief of our Hydrographic Surveys Division, taking over for commander Bri Hillstrom, who will retire from the NOAA Corps later this spring. Sam is here with us today.

I encourage you to pick his brain over the next few days.

I'm pleased to announce that Captain Hector Casanova will be reporting to Coast Survey in June as the chief of the Navigation Services Division. He's currently finishing his assignment as CO of the NOAA ship Rainier.

Matt Kroll continues as acting chief of MSB until Captain Casanova arrives. He's supported by Mr. Mike Annis as acting deputy chief. Lieutenant Commander John Kidd is reporting as our chief of our Navigation Response Branch. That's the branch that's responsible for our Navigation Response Teams, which many of you interact with.

I also would like to acknowledge that Mr. Craig Winn, a longtime Coast Survey employee, has been selected as the deputy division chief for the Marine Chart Division, and Dr. Ed Myers is taking over as acting deputy chief of our Coast Survey Development Lab.

So as you'll note, there's still lots

of acting in folks' titles. We continue to see a steady changeover in leadership and look to solidifying that team here shortly. Next slide, please.

So just to remind you of our strategic plan, I've grouped our updates this evening according to the elements of our strategic plan. So first up, we have our goal one, which is to expand and strengthen U.S. capabilities to acquire high value ocean and coastal geospatial data.

So to start with we'll talk a bit about our 2024 field season. Project discussions are still in work and discussion with contractors have begun but we do anticipate another exciting year in fiscal year '24. You see the areas that we're planning to have survey projects there in the graphic.

We expect to have NOAA ships Thomas Jefferson, Ferdinand Hassler, and Fairweather working this season. OMAO has made some significant progress toward addressing the staffing shortfalls we experienced last season and our new Center of Excellence for Operational Ocean and Great Lakes Mapping, through that we've trained a cohort of new hydrographic survey technicians working with OMAO.

So we hope to have a better staffing situation than we did last year in the NOAA fleet. But it does remain a challenge industry wide.

Some of the other highlights include surveying a transit corridor from the Bering Strait to the Canadian border following the route identified by a Coast Survey port access route study. We have a contracted project in southern Lake Michigan, a mix of contractor NRT and NOAA fleet work planned along the East and Gulf Coast. We'll have more to share on this when our hydrographic survey storymap is released later this spring and to some degree this is a function of getting a final appropriation, which we are hoping for in the next couple of weeks and at that point we'll be able to nail down what we're going to be able to support with our contractors and what the NOAA fleet is going to be able to support. So we'll have more details at that time.

One thing that is a major update that I wanted to share is that we do expect that the DriX uncrewed system will be returning to the hydrographic survey fleet this year. That's very exciting.

You may recall that that vehicle operated from the Thomas Jefferson in Lake Erie in summer of 2022 and last year that vehicle was moved over to the Fisheries fleet where it supported trial Fisheries acoustic surveys in the Bering Sea from the Oscar Dyson.

But we will be getting that -- we do have it back aboard TJ this year to resume hydrography, which is pretty exciting.

Rachael also mentioned the contract for the award of the Class B ships to replace Rainier and Fairweather. Those ships are currently operating in their fifty-sixth field season.

You may recall that last fall we discussed a major fire that Rainier suffered at sea in the vicinity of American Samoa and we're pleased to share that after a rigorous cost effectiveness analysis supported by Coast Survey, NOAA determined that it did make sense to repair Rainier and return her to service.

So that contract is moving ahead and is on track to have the ship ready to operate again early this fall. Next slide, please.

So on the national ocean mapping, exploration, and characterization front the major news is the release this week of the fifth annual report on progress toward mapping the U.S. ocean, coastal and Great Lakes waters. We'll share the link when it's out. In fact, you can follow the link to the IOCM webpage there and it will be updated as soon as that report is officially released later this week. But the big news is that we've gone from 50 percent unmapped in 2023 to 48 percent unmapped in 2024.

This is a significant improvement and represents a substantial amount of mapping work. But it's still slow going when you remember that our goal is to finish waters deeper than 200 meters by 2030 and shallower waters by 2040, and as I mentioned earlier we're working with our interagency partners to increase the understanding of the urgency of this effort.

And we're having some success with that messaging. For instance, members of the Michigan congressional delegation have introduced a bipartisan Great Lakes mapping bill which would authorize about $200 million in Great Lakes mapping funds through the end of the decade. This is an authorization, not an appropriation, but it does indicate that Congress is beginning to understand the importance of this work.

And in another positive news, the House Natural Resources Committee staff, as I mentioned earlier, requested a briefing on Coast Survey which we gave last week and we anticipate further intersections with our mission and member actions. We hope to be able to focus more on the Great Lakes at our next HSRP meeting in the fall.

Regional mapping campaigns are one of the NOMEC focus areas that we strive to support and map and chip away at our goals. I mentioned Lakebed 2030 for the Great Lakes. Also, Seascape Alaska is the regional mapping campaign in Alaska and as you see, Alaska remains a significant area of unmapped waters.

And we'll hear from Jeremy Potter on Thursday of BOEM about the EXPRESS regional mapping campaign off the West Coast, and Ashley Chappell was just at the Great Lakes -- I'm sorry, the Gulf of Mexico Alliance conference to build support for our regional mapping campaign in that area.

Another NOMEC update is the release of the final version of the Standard Ocean Mapping Protocol. My NOMEC co-chairs and I are giving the SOMP, as we call it, one last look before it goes public in late March. We're also putting energy into crowdsourced bathymetry as another way to fill these gaps. Coast Survey and NOAA are supporting multiple facets of the crowdsourced bathymetry effort including the IHO Crowdsourced Bathymetry Working Group and its work to establish crowdsourced bathymetry guidelines globally, also developing services like the bathy coverage report tool which can tell you how much gap area you fill as you transit. Also, working with our academic and private sector partners on crowdsourced bathymetry acquisition technologies, and finally engaging with different communities to increase crowdsourced bathymetry submissions to the International Hydrographic Organization Data Center for Digital Bathymetry. Next slide, please.

This brings us to goal two, which is to deliver products and services that advance safe navigation, increase coastal resilience and support data-driven decision making.

So, first, some updates on our nautical chart offerings. We remain on track to cancel the last of our paper charts by the end of this year. At the last meeting we discussed the NOAA Custom Chart Tool upgrades in 2023. We're continuing to build on these enhancements, expecting a possible -- well, aiming for a possible version 3.0 release later this year and the tool is getting better every day.

We continue to work closely with the Coast Guard and the pilots associations to support transition of pilots licensing to the Custom Chart Tool output as well as mariner training and certification in general.

Again, we don't see the Custom Chart as a replacement for our traditional paper charts but rather as a valuable tool to augment and complement our official electronic navigational charts.

We've been heavily engaged with stakeholders over the last few months, discussing products and services with a particular focus on the lower Mississippi River including the Coast Guard Army Corps and the Crescent and NOBR pilots around a range of issues including charting bridge heights.

These issues are not unique to the lower Mississippi River and we'll be applying what we've learned there to other locations.

Coast Survey Development Lab has also been turning out product updates. One of those implemented was a new open source cloud-based version of NOAA's nowCOAST. Those of you who attended the modeling session in our September meeting may recall that nowCOAST is a modeling visualization for coastal meteorological, oceanographic, and hydrologic observations all in a single picture. With the service running in the cloud it's now more reliable, reducing response time for users.

We also are now offering a new mobile friendly web app for the nowCOAST tool, and I just wanted to highlight as shown in the picture on the left last month, Dr. Westley and I had the opportunity to visit the Weather Service's Tampa Bay weather forecast office and as soon as we walked onto the forecast floor we saw nowCOAST in prominent use -- it's circled there on their biggest monitor -- and they promised us that that wasn't just because the Ocean Service folks were there. This is a tool that they use every day to combine and visualize data from a range of NOAA sources. Next slide, please.

So another focus area for Coast Survey Development Lab is the Surge and Tide Operational Forecast System. I mentioned this earlier. We currently have STOFS 3D Atlantic in operation. We expect STOFS 3D Pacific to be operational in 2024 and STOFS 3D Alaska is in development. And as part of our ongoing engagement on modeling, six of our modelers presented their work at the recent American Meteorological Society meeting in Baltimore and the American Geophysical Union Ocean Sciences meeting in New Orleans. So that was very exciting.

It really is exciting to see how these models which are rooted in the navigation mission really have broader application to a range of coastal resilience requirements. Next slide, please.

Goal three in our strategic plan is to sustain and enhance a highly skilled, diverse, and thriving workforce prepared to adapt to changing mission needs.

We have a lot of activities in this space but for today the main thing I want to focus on is the standup of the Center of Excellence for Operational Ocean and Great Lakes Mapping.

Once again, I'll just pause and emphasize that this is the Center for Oceans and Great Lakes Mapping. Folks often hear Great Lakes and skip over the oceans part. So it is across U.S. waters, inclusive of the Great Lakes but not limited to them. The Center of Excellence will be a NOAA focal point for transitioning new mapping concepts and systems to operations including uncrewed systems, providing technical support for mapping and survey operations, developing and diversifying our mapping workforce, and throughout all of that leveraging partnerships with public, academic and private sector partners.

Now, it is the NOAA focal point, not just Coast Survey or NOS. That means we're doing this work in close collaboration with partners across the agency including the NOAA fleet and the Office of Ocean Exploration.

We received funding in fiscal year '23 to begin this, stand up this center and it looks like we'll be able to -- we're very hopeful that we'll be able to continue that with support in fiscal year '24 and beyond.

We have a phased approach, adding staff under the leadership of Andy Armstrong, who is serving as acting director of the center in addition to his regular full time job as co-director of the Joint Hydrographic Center at the University of New Hampshire.

As we shared last fall, we've awarded a three-year construction grant to the University of New Hampshire to begin building a facility that will ultimately house the center and other partners.

But I want to emphasize that the Center of Excellence is far from just a building. We're moving out on programming right now, focusing on workforce development to start because that's an area of critical requirement.

We're transitioning and expanding our training offerings to the center. We've just wrapped up a three-week basic hydrographic training program which taught a cohort of students from Coast Survey, from OMAO, across NOAA.

We also had students from the National Geospatial-Intelligence Agency and the Marine Corps. Thanks for the reminder on time. I'm probably going to go a tiny bit long but I'll keep this moving.

Another Center of Excellence activity we will be expanding is the successful training cruises we had last summer aboard the NOAA ship Nancy Foster, which for the first time we dedicated ship time to focus on training undergraduates in ocean mapping. We expect to expand that under the center this year.

We have a full business plan under which we'll continue to expand the center's activities and we expect to build the center's work with other academic institutions and the private sector to expand our reach and success. Next slide, please.

And that brings us to goal four, which is to evolve Coast Survey systems and processes to improve timely product development and delivery, and a big part of this is external engagement.

Since last I met with you, the Coast Survey team and I have engaged with many critical partners including in the international sphere as hydrographic offices worldwide work toward finalizing and implementing the S-100 standards. This S-100 transition is the focus of every international meeting and engagement that we have, whether it's well established hydrographic offices such as the UKHO or the Japan Hydrography and Oceanography Department, and you can see some pictures from our recent engagement with JHOD, which took place a month ago there, or the smaller nations such as those that we work with through the Meso American-Caribbean Sea Hydrographic Commission which met just before Christmas.

Looking ahead, this work on international standards will continue at the Canadian Hydrographic Conference, the U.S.-Canada Hydrographic Commission meeting and the IHO Inter-Regional Coordination Committee meeting, all of which are coming up in May and early June.

And these meetings are the way in which we coordinate our work and our requirements with our international partners to ensure that our vendors are receiving a clear unified signal, and it's also the way that we build capacity to ensure that all nations progress down the path to electronic navigation to ensure worldwide coverage without leaving any country or region behind. Next slide, please.

Also on the product development and delivery, this has come up several times so I'll breeze over this fairly quickly. But the National Bathymetric Source --

(Audio interference.)

PARTICIPANT: I think we're frozen.

MS. DEMPSEY: Ben, you're back up now. Ben, we can see you. Can't hear you.

RDML EVANS: Can you hear me now?

CHAIR DUFFY: Yes, sir.

RDML EVANS: Okay. Apologies, Sean.

The National Bathymetric Source is our seamless, authoritative high-resolution model of the sea floor of U.S. waters compiled from the best available data.

We have that built out now on most of the East Coast. Frankly, we expected to have the mid-Atlantic complete by now and be moving on to southeast Alaska.

We have funding to do so under the bipartisan infrastructure law, and to be perfectly frank we've run into some frustrating delays bringing personnel aboard to do this work. And so we do expect to have the East Coast and Gulf Coast completed by later this spring at which point we'll move on to southeast Alaska, the Great Lakes, the West Coast and the Pacific.

On the right you see our progress toward transitioning our ENCs to a regular grid. As folks may recall, when the ENCs were first built about 20 years ago they were tied to the footprint and scales of the paper charts.

That made sense at the time but with the paper charts in cancellation status we are now transitioning the ENCs to a regular grid at five regular scales. This will make our system much more efficient.

And we're also continuing to build out the S-100 suite. As Darren mentioned we have S-102 test products expanded from LA/Long Beach and New York/New Jersey to Charleston, Savannah, and Boston. Next slide, please.

I think that brings me to our last

slides. So I'll just conclude by saying -- actually, can we skip that one because that I think it just covers what Darren covered. And I'll just say I appreciate the opportunity to share these updates with you.

I think we've had great, really outstanding panels today tying the local perspective to the products and services that NOAA and Coast Survey are creating. So I'm proud of what we've accomplished. Super exciting time in Coast Survey. We're not slowing down. I look forward to our discussions over the rest of the week. And with that, I will hand it over to Brad.

MR. KEARSE: All right. Can everybody hear me?

MS. DEMPSEY: Yes.

MR. KEARSE: All right.

MS. DEMPSEY: Can. Can. Go for it, Brad.

MR. KEARSE: All right. Thanks, Rachael. Thanks, Ben, and to follow all this up and continue the conversation, one thing that Galen told me when putting these slides together is I only have 10 minutes. So I'm going to keep to my 10 minutes and if I need to do it sooner just to get us on track I'll do that. So let's jump right into this.

I'm Brad Kearse. I'm the deputy director of the National Geodetic Survey. You can go to the next slide. All right.

So what I want to go over is our modernization efforts that are ongoing. Everybody's heard about it. Give you some quick updates. GRAV-D, as Rachael said, we've made some great milestones with that this year. Foundation CORS update, which will be the backbone in the National Spatial Reference System moving forward.

VDatum updates, which is a collaborative among the three organizations here with OCS and CO-OPS and ourself.

Coastal mapping updates, which really mostly supports OCS and a lot of other things, give you an update on where we are and moving out on geodesy crisis. We have a new strategic plan and we've got leadership transition underway. Next slide.

So let's jump in to the modernization effort that's ongoing. If folks don't know and they are new to HSRP, we've had this modernization effort ongoing for many years. The reason is, as somebody said earlier, the current datums were defined before GPS technology and so now -- we've relied on old techniques and the way we did things, you know, basically with physical survey marks in the ground.

Now it's based on GPS, continuous operating reference systems for building up Foundation CORS.

It will be better alignment with all our geospatial data in the future and we hope everybody is aligned with that. It'll improve accuracy, access, and alignment of positioning systems, and then it's just going to be better as we move forward to enable better alignment of

NOAA's data to support Climate Ready Nation, really about where is water flowing, and it will give us a way to be more equitable or give equitable access across a fourth of the Earth.

When you look at the area that we go from the United States on the CONUS side all the way out to the Pacific that does cover about a quarter of the Earth. Next slide.

So let me give you some quick updates now that we're getting closer to this finish line of modernization and the time line.

So there's a lot going on. Our teams are still heads down. But the great news is we're getting closer, and so like we've said, there will be a beta release of the National Spatial Reference System modernization data and sets of tools in mid-2025, next year. So we're going to test that for six months. Once we get those tools up there we will test them to make sure everything is working, will work with all our users, and then we will go to the Federal Geodetic Control Subcommittee, which is under the

Federal Geographic Data Committee, FGDC, and making sure that we get approval there and adoption for 2026.

So these are the time lines that we're running on right now. We expect there won't be any issues or concerns to get there by that time frame.

The biggest thing is getting out and really talking to our constituents, working with all our federal agencies and private firms out there to move forward.

So this is great news. We're getting closer and, like I said, we're getting really excited about what's going to happen next year and then the real work to make sure this is going to work and explaining to all our folks out there about moving to the new datums.

So in 2024 we just released a new research plan which will plot the course for us moving into the future. We do have a alpha release of our new GEOID and a lot of that is as we've collected all the data related to GRAV-D and I'll go a little bit more into that.

By this mid-summer we'll have a beta release of our CORS Station Pages with the Data Delivery System. We're going to have a beta Reference Epoch Coordinates adjustment, the first set of new coordinates on 100,000 marks this summer and then we will have dynamic heights from GNSS tools that will be available and they will be great tools to be able to use for water management. Let's go to the next slide.

So let's get into a little bit more details of the things that are going on in the time line so mid to late 2024.

ITRF -- as folks know, our modernization system and our reference system will be aligned to the International Terrestrial Reference Frame. As we talked about all these different acronyms that's what that means. Our coordinate, or CORS -- CORS is Continuous Operating Reference Stations and that's a NOAA Continuous Operating Reference Stations. That is a partnership across the United States with many different organizations, academic institutions, state transportations and many others. We'll have coordinate functions to describe the dynamic nature of how stations in the NOAA CORS network will move over time so this dynamic situation of showing you how those stations are moving with time.

We've got a VDatum release of the West Gulf Coast by this summer. We are doing contract work to build out our new foundation CORS and I'll show you that. That is through BIL money.

GRAV-D reflights, we have collected gravity across the United States and all of its territories including Alaska. Now we're going back and doing some cleanup mostly in the Gulf Coast areas. The reason for that those were collected kind of right from the beginning so we're going back since our techniques and the way we collect that data has gotten better over time.

And then by 2024 and 2025 we're going to start rolling out these beta products and, as they say, in domino style they'll be right behind one another as we build out our beta website. So look for that as things come out.

And then we'll start doing the official testing next summer of the modernization or the modernized National Spatial Reference System. That will continue on for six months. We'll be getting feedback from folks, make any adjustments, any changes we need to make along the way, and then we'll take that -- once things look good, we've made those adjustments, getting feedback from folks we'll take that to a vote and then we'll claim that.

Once that vote and everybody's comfortable with that we'll call that the modern size National Spatial Reference System for the official purpose of that.

That doesn't mean that everything is done in modernization. We will continue on in many different ways to continue modernizing the National Spatial Reference System.

Once 2026 happens we will continue on to the next steps. We'll continue to work with our constituents and federal agencies about what they need.

All right. Let's go to the next slide.

So with that you're going to see us in many different places trying to explain the importance all the way from the National Science Teaching Association so we can start getting in at the grassroots level of explaining it to folks at the high school level as teachers teach things about the importance of the National Spatial Reference System to NSGIC, getting out there among the geographic folks to Utility Engineering and Survey Institute looking at underground utilities and why that should be tied to the National Spatial Reference System.

Also, we'll be working with the folks on all the geo industries, the geo summit that will be taking place in the fall in September. So we're going to be working at all those different outreach events so and there's many more.

So that's going to be where you're going to see us. If you got other ideas and places we should be we've only got so many resources but we're putting together an engagement strategy of where we should be, when we should be there, and making sure we can get with all of our constituents and explaining the importance of the National Spatial Reference System. Next slide.

As I said, GRAV-D, we're excited. We're going to celebrate. Hundred percent complete, like I said, and that's going to help with our new GEOID and updating that. So it is going to go into production here soon.

We have the data we need for that, which is a wonderful excitement, and we're excited about that. But we continue to collect to make sure this product will be the best it can be.

So we're going to refly select regions. We're going to look at a GEOID monitoring service to collect additional information and several terrestrial gravity campaigns including working with our partners in NGA. Next slide.

All right. Foundation CORS update. Like I said, this will be the backbone of the National Spatial Reference System. We did get BIL money to accelerate this and build it out. So 12 of the 15 stations the recon has been complete. We've got designs underway and installations are starting in 2024.

This is being done by a private firm in conjunction with us and we're looking at other ways to get other folks involved in helping us build this out in the future.

So you can see the map of what the new Foundation CORS -- you know, where it's going to be and where those stations are being built out over the next few years. Okay, next slide.

All right. VData models -- like I said, this is a cooperative among all three of our organizations here that are on the line. The VDatum work plan from 2025 to 2028 -- the coverage area is based on marine grids generated from coastal ocean modeling and referenced using tide stations and benchmark observations.

The next releases that we have are in Texas and Louisiana within the west coast region down there, and then that's going to be in mid-2024 here this summer and then Alaska will be in late 2025, and you can see the Atlantic Gulf and Caribbean in 2028 and the Pacific Islands in 2026. Let's go to the next slide.

Coastal mapping highlights. We're definitely in support of the, you know, NOAA ENCs and we have a shoreline -- a lot of our work that's done under coastal mapping is done under an IDIQ contract.

That is a $40 million five-year contract, which renewed in 2025. It's got a recompete that's happening next year. The ceiling was just raised to $114 million so we've been moving out on that, and there's lots of money -- we're using this for BIL work. We're using this for supplemental work after hurricanes, our shoreline mapping piece to continue to help out with OCS, also for GRAV-D collection, and then in '24 this year we'll also be using to help out to build our foundation CORS stations pending on fiscal year '24 appropriations. Okay, let's go to the next slide.

So these are just a lot of projects we have going on being what's planned, acquired, and completed. You can see -- and then we have some of this inland mapping that is going on. I'll explain that when we get to it here in a minute and just for the sake of time.

So everything from outs and completing up in the northwest Hawaiian Island chain to Guam and the Northern Marianas, Alaska areas, American Samoa, and then where we see within the coastal regions domestically. Let's go ahead to the next slide.

Here's some of the acquisition that was done by Woolpert out going along the northwest Hawaiian Islands -- I like pretty pictures -- including all the way up French Frigate Shoals.

All right. Let's continue on. Next slide.

MS. DEMPSEY: Hey, Brad, in the interest of time would you mind jumping to the BIL and then the geodesy crisis real quick so we can ensure Larry's got enough time? Thanks.

MR. KEARSE: I will. Yeah. All right.

So I'm just going to jump to the slide -- let's go to slide FY 22 BIL.

There you go. So you can see under the BIL funds something different we've been collecting is riverine areas and really working with our partners at the National Weather Service and looking to help out with -- this is a new effort by the NGS and OCS which directly supports the next-gen National Water Models and expands NOS products and services across the nation.

So these are some of the areas that have been collected from Florida up to New

Hampshire, Maryland, and Virginia and down to southern Texas. Let's go to the next slide for the sake of time.

And you can see we're also working in riverine areas with even the Ozarks and Harper's Ferry collecting the river areas which will help out in looking at the river bottoms for the new models as we work forward helping out the National Weather Service with their hydrology pieces. All right. Let's go to the next slide.

And then here's some of our hurricane supplemental for Ian, and then also the Typhoon Merbok up in Alaska. So this is in partnership with USGS and leveraging all of our money together to be able to get the collection and really to collect even more using the resources from each of the organizations. All right. Let's go to the next slide.

We are addressing the geodesy crisis. We have a community of practice established. We're going to talk more about the geospatial model grants coming up in the next couple of days and then we do have an undergraduate internship pilot program underway. So let's go to the next slide.

This community of practice is moving out. This is a collective group between ourself, NGA, NASA, and USGS to talk about geodesy issues from everything from data sharing, equipment sharing, software. We are moving out with a -- I'll call it a plan of infrastructure for geodesy across the United States and we've got some meetings coming up.

We've got one in April and then also in October. Let's go to next slide.

You'll see more about this in our modeling grants. We're really excited about this. We hope it continues but Scripps and Oregon State can talk in the next couple of days. Next slide.

We're hiring four Pathways. I know that Rachael talked about this. This is a coordination between NGS, CO-OPS, and OCS. That announcement should be out in a couple of weeks and we're really excited.

The reason for this is we have our three offices down in the Chesapeake area and we hope to get them into our field teams and really at the undergraduate level get them involved in all the different work that we do. So we're really excited about that. Next slide.

MS. DEMPSEY: Brad, this is great because it's going to go then into the new strategic plan that you guys plan to release later this year, right?

MR. KEARSE: Absolutely. So the workforce piece we're really excited about this and it goes along with our research plan. So we're working on that. Should be out at the end of the year, and then let's go to the next slide which is -- everybody should know that Juliana is retiring at the end of March so we're going to have a celebration for her here next week. The selection process is underway for a new director. I will be acting starting April 1st and then Brett Howe, if he knows -- you know, Brett maybe along the way he's going to be the acting director.

And I'm going to call it at that for the sake of time.

MS. DEMPSEY: All right. Awesome. Thank you, Brad.

And last but certainly not least, Larry, we want to hear all about your unmanned systems. Thank you so much for your patience.

MR. MAYER: Oh, it's not a problem. I'm just thrilled that I'm still awake because this is very close to my bedtime, I have to say.

Okay, I'll try to be as quick as I can. This is going to be a little different. It's going to be kind of a philosophical discussion on thoughts about the efficiency of uncrewed systems.

I think there's been a lot of excitement about the use of uncrewed systems in our business and beyond. We've heard some of it today, and that excitement is often focused on cost savings and other benefits that uncrewed systems can provide.

But I've also seen a lot of harsh surprises as people start to use them and start to see that maybe it's not as cheap as we thought and maybe there are other issues that we haven't thought about.

And I want to just kind of discuss what we're doing in the lab to try to look at these issues. I don't have the answers now but I want you all to -- if I can leave you with a message just have an open mind. Let's not close the case on this one way or another. So next slide, please.

As you can see from this slide we've been using a number of these systems. I'm going to look at a couple of different situations that -- where we're looking at their application and the first is very relevant to Coast Survey even though this example I'll show was out in the middle of the Pacific but it was in shallow water and it's it touches on what Brad talked about, some of the lidar work done out in the mid

Pacific Islands there, and it's really using an uncrewed system as a replacement for a NOAA crewed launch. Next slide, please.

And so here we had a situation where a lidar survey was done around this small island and it didn't cover as much as was hoped, and so we happened to be out there on another mission -- on an OER mission -- with the DriX and we thought this might be a good opportunity to see whether we can really use a mothership and the DriX as an external platform and could we double the collection of data and what would the tradeoffs be. Next slide, please.

There was some early multibeam data in there. You can see some of the data. But the goal was really to cover the white area there -- could we do that in a relatively limited amount of time. Next slide, please.

I'm going as fast as I can here so we can maybe catch up a little time. The problem we faced when we got out there is that the weather was relatively rough and we basically found out that given the launch and recovery system, the heavy weight of the vehicle, and its LARS we could not launch safely the vehicle and particularly not recover it.

And Andy was out there with us and a number of NOAA Coast Survey people and I think they would also say that we couldn't have launched a crewed launch either at that time given those conditions, and so what to do. Next slide, please.

Here's where one of the advantages of the uncrewed system comes in. It's high speed and long endurance, and so what we were able to do is run -- you see the dark area in the upper left area is where the small island is.

We were able to run 120 miles back into the lee the bigger islands to launch the vehicle in the lee of the island and then run back to the survey area and still have enough fuel for three continuous days of survey work and that's something we couldn't have done ever with a manned launch.

So there was a clear advantage there. But, again, what about the manning, what about other issues? Next slide. What about the quality of the data? Next slide, please.

We did find that it was quite straightforward to run the vessel and the launch. We could separate in that case as far as 20 kilometers using what we call a marine broadband radio system, simultaneously collecting data from the mothership and the uncrewed vehicle, and now with Starlink that separation can be even further. We also found that the data was of high quality. Next slide, please.

About 95 percent of it meeting or exceeding NOAA's specifications. And this will all be the subject of a thesis of a NOAA CORS officer in our program with Airlee Pickett and what she'll be looking at -- and this is why I say we don't have the answers yet -- is a real comparison to this kind of operation versus a NOAA crewed launch operation. I'm hoping when she's finished with that we'll have some real hard numbers and hard facts about the relative benefits or not of this approach. Next slide, please.

In an upcoming situation, it's kind of a different and very exciting situation. We are planning now a survey of about 2,400 -- 2,546 square kilometer area in the Gulf of Maine, a totally unmapped area, and we're planning to try to do this with two vehicles simultaneously, one launched from Portsmouth, one from Rockport, Maine.

And this is an effort we have not really tried before, multiple vehicles at the same time and also a shore-based operation from remote operating centers. And we're just going through the planning stages now and -- next slide here or click on this slide, please.

And our approach is going to be to have two teams sitting in each of the remote operating centers. They're going to operate the vehicles 24 hours a day. The vehicles can stay out for about 72 hours at a time, then come back in and need to be refueled. And as we were sitting and planning on this -- again, this is our first time so we're being a little conservative -- we started to think about how many people we need to support this operation and you'll see that list there, what we think we need to run a 24-hour operation like this, and it adds up to 16 people.

And this was just a week or two ago and I show this picture with permission of Bill Mowitt, who is the director of the uncrewed systems operating center. And this is not a picture of him but this was the expression on his face when he looked at the number of people needed to operate this. Next slide, please.

Yeah. There it is. Because he goes, oh my gosh, I thought we were going to be saving people but, you know, it's going to take me 16 people to run through systems.

Well, it may or may not. We're going to learn. We may be able to have fewer people. We may be able to run three, four vessels at the same time. We don't know yet.

But this is, again, these tradeoffs that we're looking at. Next slide, please.

The final situation I want to look at is a little different one. This is now where data is provided as a service, or in this case, the Saildrone people call it mission as a service. Here you just pay a straight day rate for the use of the vehicle and they provide the data.

And here we had some test trips in a very remote area in the Aleutians in some very rough weather and then another one about 30,000 square kilometers off the coast of California. And here we have done a quantitative assessment of the relative efficiency of this effort versus what it would have taken with a crewed survey vessel. So next slide, please.

So what we've looked at is the covers that the Saildrone provided. We've had lots of analysis of the quality of the data. But the most important metric is really how much overlap is there -- how much coverage is there. The more overlap we get the higher the quality of the data.

It took the Saildrones for this particular area 15.25 days to do the survey and it averaged about 3.95 knots and actually that's relatively fast, covering about 26.65 square kilometers an hour, getting about 58.6 percent overlap. Next slide, please.

We found right near the area a kind of comparative area where the Okeanos Explorer, again, a crude survey vessel that NOAA uses in deeper water. The ocean exploration program did a survey. It was not the same size area so I can't compare the time but we can say that it covered 44.2 square kilometers per area, almost twice the coverage rate, and it provided 76 percent overlap. Again, the amount of overlap usually alludes to higher quality data. Next slide, please.

We then did an analysis of what it would take to do the exact same area that the

Saildrone did, and the Saildrone, again, took 15.25 days with 58.6 percent overlap. If the Okeanos Explorer did it with the exact same system it would take it only 7.3 or three days, or about half the time, to do that and achieving 100 percent overlap so the best potential for high quality data. If it would only get the same overlap that the Saildrone achieved it would be 5.5 days, so about a third of the time, and if a 12 kilohertz system had been used the same area could have been surveyed in about three and a half days.

And so it's clearly much more efficient in some ways than using a crewed vessel. But what's the relative costs? And this doesn't address issues of crew safety, carbon footprint, and I can't tell you what it costs for the Okeanos Explorer to do a survey. I'm not sure anybody can tell us. I think there's some internal looking at that.

But just trying to make the point that we just don't know yet and I'm very confident personally that we'll find great efficiencies in the use of uncrewed vessels. But we need to look more closely and need to understand more about where, when, and how to use them in the most appropriate way.

Let me stop there because I know we're just totally pressed for time.

MS. DEMPSEY: Larry, thank you so much. Unfortunately, we're at the end of the time, like you said, but such a rich discussion topic that I think all of us can benefit from because we're always looking at what options we have to get the mission done.

And so really looking forward to what your team finds out. So thank you very much, and thank you to all the panelists this evening for your great information.

We'll try and find some time again tomorrow. We're going to have to cut off the questions short so we can get to the public commentary.

So, Sean, over to you. Thank you.

CHAIR DUFFY: So I'll do a quick handoff over to Admiral Evans so we can get to the public comments. I mean, I really appreciate all the directors' time and reports. A lot of great information. I made a lot of notes. I'm sure other panel members did as well.

And with that, sir, I'll turn it over you.

RDML EVANS: Thank you, Sean. Thank you, Rachael. And I'm just trying to find my notes on this.

So I believe we do have a number of public comments that have been shared already and I'm going to ask Ashley to read and -- well, let me back up a second.

So this is the required public comment period. I encourage all attendees who are not members of the panel to put public comments in the question box. Please do target your comments to HSRP members and NOAA to focus on what NOAA can improve for navigation, observations, and positioning data products and services.

This is not the opportunity to ask the individual presenters specific questions. So I'm going to turn this over to Ashley to read and summarize the questions that we've received. We'll show the comments on the screen and it'll be collated into a document shared with the HSRP members of NOAA and after the meeting the comments will be posted to the HSRP website and included in the public record.

To the extent that we can we may address some of these very briefly or suggest follow up. But my guess is that we will not have time to get deeply into the answers because having taken a quick look at some of these already there's some really good questions here that deserve a lot of time, which we may have to follow up after the meeting.

So, Ashley, could you either pop them up on the screen or -- oh, I see you you've got them up.

MS. CHAPPELL: Yeah, they're on there.

RDML EVANS: And we can walk through

them.

MS. CHAPPELL: Sure. And sorry about my camera. It's like I have a monitor thing happening so it's a little bit different.

But yeah, we've sort of grouped these comments not in the order that they came in but kind of by subject matter.

Mr. Manes spoke -- actually his first comment was during our meeting and we really need to go back to the recording and get, you know, his comment clarified there but that was some thinking on harmonic sensors and the ports district fund in Sacramento and Stockton area.

So we're going to get that question sort of detailed out for you a little bit more effectively. We got some advance comments. You know, when you register for the webinar you can supply comments if you like.

So Ann Kinner, former HSRP member, asked about -- she wanted to hear something about updates on the Custom Chart Tool. So we will wait for the next couple of days and if that question is not answered NOAA can provide a response to her. You may want to factor that in to your discussions later as panel members. That's the thing about some of these questions, actually. Some really are more kind of directed or easily answered by NOAA people and some are really directed at you, the panel members, to, you know, think about these as issues that need or could be addressed by you.

Mr. Manes also commented on vector charts and the what's missing from vector charts versus raster charts. So with scale minimum turned off he notes that we're still missing basic information. How do we get NOAA to please put those details on the vector charts. So something for you to think about and consider?

I'll address that very quickly, if I may, Ashley.

MS. CHAPPELL: Okay. Sure.

RDML EVANS: So there is a -- I want to be clear, there is known issue with some information on geographic features not being fully collected from the raster charts onto the ENCs.

We are working with pilots associations and others to identify those spots and to prioritize those updates, and so I would encourage Captain Manes to connect with Jeff Ferguson. I've already alerted Jeff to this. I think Jeff's going to be up in San Francisco next week, which may provide an opportunity for them to talk further about that.

MS. CHAPPELL: Okay, thank you. Kind of a following on question from Mr. Rabena, Virginia Pilot Association. This question may relate to sort of, you know, human use of products, mariner use, and this is -- the question came in when Captain Betz was talking earlier today. So he refers to the problems on ENC caused by layering. Mariners are not all aware of how to use it.

So we might follow up just a little bit more with Mr. Rabena on that question and, Admiral, I don't know if you want to chime in on this one, too, or we can explore it more with him to get more detail.

RDML EVANS: No, I don't know enough about the source of that question or the context of that question. I'd be happy to talk to Mr. Sabena and certainly would recommend that he and Captain Betz connect.

MS. CHAPPELL: Okay. So we will provide some follow-up on that one.

The next question is from Lindsay Gee, another former HSRP member. So it's so nice that you have been on, Lindsay, and thank you for your really good questions here. This longer one, comment one, came in during the under keel clearance section of the day and he -- if you'll jump to the third paragraph, really, you know, this is where he focuses in relating to timely updates of data and -- on the chart, you know, how are we planning to do this more frequently.

Port expansion in the LA/Long Beach area will need regular permanent updates -- frequent updates over a prolonged period. How do we keep this current for the pilot? Is the plan to receive these updates directly from the expansion project for updating their PPUs? Local notice to mariners will be routed via NOAA to more frequent updates of the ENC, the electronic navigational charts themselves.

RDML EVANS: Yeah. There's a lot here, Ashley, and I would be happy to talk to Lindsay or anyone at greater length. But in very broad strokes I will say that, you know, for the product -- the high-resolution bathy product that the pilots are using in their PPU is what's called the S-102 high-resolution bathymetric overlay, and Darren talked a bit about this in his presentation and highlighted that the international standard for that product remains -- is not finalized yet. So the first thing that really has to happen for this to go operational is for that data standard, that product standard rather, to be finalized which we expect later this year.

And but it should be and it is

possible to produce a S-102 bathy overlay in an automated way from the National Bathymetric Source. So once we have -- if we have an established pathway for that external source data from, say, the Port of Long Beach into the NBS and we've established the Port of Long Beach with a trusted node, which I believe we have, it should be -- it is a very quick process for turning around an S-102 product.

Now, looking more broadly, first, we have to build out the MBS and as I mentioned in my presentation we're working to do that. But that is, to some extent, a resource constrained operation.

I mentioned the requirement to have S-102 finalized, and once those are in place and we have relationships with data providers it should be a very simple -- perhaps not a simple matter but it is automatable to produce an S-102 product on a quick turnaround.

I will add, though, that for other mariners other than pilots to use this they need not only the S-102 overlay but they need the S-101 base chart and those are the next-generation of electronic charts which we expect to begin releasing in 2026.

But to utilize those they will also need a next-generation system. So there are a number of layers there that commercial mariners on large vessels will need to have in place and pieces that we will need to have in place in order to to derive full value from those high-resolution bathy overlays.

But to bring it back for the portable pilot units for the pilots the time line for establishing that is much slower.

MS. CHAPPELL: Okay, great. Admiral, thank you.

And some of what you said may relate to this. The second comment of Lindsay is about turnaround time for new bathymetry data from external sources into S-102 and then scaling NBS up to support all U.S. ports in this way.

RDML EVANS: Yeah. Again, I welcome

the opportunity to go into greater detail with Lindsay or anyone on this.

But I think, you know, broadly my previous comments stand.

MS. CHAPPELL: Yeah. So we got some good questions from Bob Moshiri, Johnson Outdoors, asking what our plans are to survey near shore coastal waters to serve the 50 million-plus recreational boaters and, along those same lines, plans to survey over the next six years in the Great Lakes.

And I actually featured in this question, noting that Bob was at the Lakebed 2030 conference in September, which -- thank you for attending that and listening to what I had to say.

I was talking about the bathymetric gap analysis that the admiral presented on today and the Great Lakes and where we work with the Great Lakes.

I'm happy to report that we're now at 13 percent, not at 8 percent, but still pretty low. So Bob is noting that, contrasting it with other areas and if you want to comment on surveys -- near shore surveys for recreational boaters and then the Great Lakes in general please do.

RDML EVANS: I was actually going to -- is there any way we can bring Captain Sam Greenaway into the conversation here, our chief of our hydrosurveys division. I would love him to --

MS. BUTLER: Sure. One moment.

RDML EVANS: -- to address this one.

MS. BUTLER: Hopefully he's still there.

CAPT. GREENAWAY: Can you hear me? So I'm here. Can you hear me?

MS. BUTLER: Go.

RDML EVANS: We can hear you, Sam.

CAPT. GREENAWAY: Okay. Good.

So I totally get this question. I'm a recreational boater myself when I'm not working. I keep a sailboat in Annapolis and we spend a lot of time out on Chesapeake Bay.

And I think if you look at our current year and recent survey plans and out year survey plans, which are available on the Coast Survey website, and I believe I'm one of those linked to those in this presentation, there's quite a lot of surveys that we wouldn't have done in the past.

For instance, two years ago we did all of Eastern Bay, somewhere I like going sailing. And so I think there's a lot of those -- a lot of us have junctions with or also support the innovation work that we do.

So that has a real -- into those real shallow areas that aren't commercial traffic areas.

A second piece of that is I think in RSD's presentation of all the Topo bathy lidar that we're doing that really fills a gap where recreational boaters really care.

For instance, my boat draws five and a half feet. I'm totally fine sailing in 10 feet of water in Chesapeake Bay. I'm totally fine sailing in six feet of water if I know it's six feet of water.

But, obviously, five feet of water and I'm stuck in the mud. So I totally get that there's a community out there that really cares about that two the 12-foot area that's really difficult to get with traditional hydro methods.

So the combination of the renewed emphasis on some of those areas and the Topo bathy lidar I think is going to make a big difference. Thank you.

RDML EVANS: Thanks, Sam. That's super helpful. And I'll take it -- I'll also address the Great Lakes question just briefly here as well.

You know, I agree, and I appreciate Bob for raising the kind of shocking paucity of up to date modern survey data in the Great Lakes.

I would note that it's not unsurveyed. It's simply not surveyed to modern standards, and so there is data there but, again, not data of the recency or quality that we would like and, you know, now at 13 percent in the 2024 report but certainly very low compared to other areas.

And there's huge demand not only for navigation but the support, management, and other applications in the Great Lakes, which is part of why we've increased the frequency with which we're sending NOAA ships to the Great Lakes.

We have contractors and our navigation response teams working in the Great Lakes. We expect -- you know, plans are still forming but we expect to have NOAA ship Thomas Jefferson back in the Great Lakes next field season so that would be fiscal year '25.

And I mentioned or it was mentioned the Great Lakes mapping bill authorizing up to $200 million by the end of the decade. So that's all very exciting.

I think it gets to the same questions that Bob is raising here and we hope to be able to talk more about this at a future meeting in the Great Lakes.

MS. CHAPPELL: Okay, great. Thank

you. Sorry, I was just chatting. I realize my typing might have been a little loud. All right. Thank you for scrolling down.

So next question. Mr. Manes, again, asking about getting an anchor tree surveyed in San Francisco Bay, and I would just say -- can you hear me? You can you hear me, right?

RDML EVANS: Yea, we can hear you, Ashley.

MS. CHAPPELL: Okay, thank you. Sorry.

I would just say for San Francisco and really any other port area too as Jeff put it earlier get in touch with your friendly local navigation manager and make sure that that request is noted and captured as we collect requirements around the country for this kind of survey requirement -- survey need.

All right. Quickly moving on. Guy Noll was listening to the precision nav and under keel clearance panels and wanted to ask about the funding effort through Scripps for CDIP and the

PORTS work -- is it duplicative or coordinated.

So I don't know, Julie, if you want to jump on and speak to this very briefly or follow up.

MEMBER THOMAS: I'm here. Right.

So let me make sure I understand the question. Is the effort funded through Scripps for CDIP and the PORTS were duplicative or -- well, PORTS doesn't do waves, as far as I understand, under CO-OPS.

So what we do CDIP is -- the main partner is the Army Corps of Engineers with several of the other state and industry and academia funding for individual buoys.

But if PORTS is installed in a port harbor where CDIP happens to have buoys then they will integrate our buoys into the PORTS system. PORTS does not pay for any CDIP buoys but if we have them in that region then they will integrate them onto the PORTS site.

And let's see, if the former -- should CDIP and CDIP like services from IOOS be part of the scaling necessary to break -- so IOOS does pay for some CDIP buoys and we rely on IOOS regions heavily for doing field maintenance in that region.

We coordinate very closely with all of the IOOS directors. They know exactly -- we have feedback from them as far as the location and then whatever support we can get. CDIP does do some of their own field work but we always coordinate it with IOOS too. So I hope that that answers those questions there.

MS. CHAPPELL: Great, Julie. Thank you. So we have two more, one very brief. I'll get to that in a second. One from Mark Manes about the possibility -- this is really a comment -- the possibility of installing weather stations on some new boats that are being built for San Francisco bar pilots for weather data.

They're in the planning stages and they could incorporate that into the installation plan if there is interest. So something else that we might follow up on with Mr. Manes. Very nice offer. Thank you.

And then the last comment -- I put this last because I really think it relates to the discussion tomorrow and just a comment from Kate Nielson at NOAA that she's interested in the portfolio here and then the resilient port session tomorrow.

So that's what we have for our public comment at this stage and we will follow up with more complete answers for some of these comments where we can respond in writing, too.

So that closes out our public comment portion of the day.

RDML EVANS: Thank you, Ashley.

And as I understand it, and please correct me if I'm wrong, we need to bring this to a firm close by half past the hour, correct? Because that --

MS. CHAPPELL: Yes, 5:30 Pacific time.

RDML EVANS: Okay. So what I propose is that we did have planned here a round robin with the panel members to reflect on the day.

What I propose is that we hold back for the morning because I believe we have time on the agenda first thing tomorrow for a round robin as well.

So rather than doing that twice I think we could just -- I propose we all kind of mull over our notes a bit overnight and come prepared to share our reflections on today and our look ahead into tomorrow with the -- first thing tomorrow morning.

So Sean, Mr. Chair, if that is suitable, if that's okay to you, perhaps we could just pause for a moment and see if anybody has anything they'd absolutely like to get in at this point.

CHAIR DUFFY: Yes, sir. I think that's a very good option. If anybody objects or feels like they need to go over anything from today. Otherwise, hold it for tomorrow. Think on it and we'll allow a second for somebody to raise a hand or speak up.

RDML EVANS: I'd also offer that

although we don't have time probably to get all the way around the room now if there were questions for myself or any of the other directors we could probably address some of those in the time that we have remaining because I know that we burned through that pretty fast.

MS. CHAPPELL: Thank you, Ben. This is Ashley.

I think if there are questions for you all this is a great time to do that if you're not doing the round robin. Let's fit it in now.

RDML EVANS: Looks like we have people still on camera so, Nathan, I think you were first.

VICE CHAIR WARDWELL: I got a pretty simple question, Ben. I was just curious is the rescheming for the charts aligned with the gridding for the National Bathymetric Source?

RDML EVANS: Let me make sure I understand the question. So they're transitioning the charts to the grid. It's a separate effort from NBS but the to link together.

Ultimately the NBS will supply the charts with bathymetry. So there's a process linkage there. There's not necessarily a time linkage there, if I understand the question correctly.

VICE CHAIR WARDWELL: Yeah. I mean, so I would look at -- since we're doing this virtually I can snoop around and look at things as people are talking and I'll see in the grid on four in the National Bathymetric Source on nowCOAST and so, like, the bounds for each grid, right, and I was just wondering if that's aligned with the chart. It's just kind of a curiosity.

RDML EVANS: That's a good question. I think that the NBS is intended to cover all U.S. waters. We have chart coverage that in some cases goes beyond U.S. waters so there wouldn't necessarily be one to one alignment there. But maybe we should chat about this maybe because I'm not sure I'm 100 percent following the question and I don't want to answer incorrectly.

VICE CHAIR WARDWELL: Yeah, that

sounds fine. And then while I'm on here I got one other question for Marian and it was about the Coastal Inundation Dashboard.

The dashboard is great. I like to look at it. It has, you know, both NOS water level stations and then other water level stations and as I was looking at that I noticed that there's very few either water level stations on the West Coast, Pacific, and Alaska and is there -- can you speak to the reason for that? Is it the pure water level stations or can't get the collaboration or -- yeah. Yeah. Can you just speak to that?

DR. WESTLEY: So I would have to kind of look into that for you and get back to you with sort of more detail. But you know, I would say what we're doing right now is we're pulling those water level stations that are in AHPS through the Weather Service.

We're just pulling them through those services and the Weather Service. So, again, I think we're trying to access all of those. Those tend to be the USGS gauges that are integrated into the national water model. That was kind of our first foray into partner data.

VICE CHAIR WARDWELL: Okay.

DR. WESTLEY: But I will take this home and do some research on how we could populate the -- I've been very focused on the lower Mississippi River because we're very -- have a lot of interest there. But I will look into the West Coast for you.

VICE CHAIR WARDWELL: Well, you know, I always have my eyes on the West Coast and those remote areas in Alaska. So, yeah. But all right. Thank you.

MS. CHAPPELL: I think Nicole had a question.

MEMBER ELKO: Yes, this is Nicole Elko, ASBPA. Thank you for all those updates that -- they were really -- they were so good that I'm still bright eyed at whatever time it is here on the East Coast. So thank you.

I'll make most of my comments in the

roundtable tomorrow but I did have a question that would be nice to ask now and that was related to -- well, I guess two questions, and be very much focused on driving and improving future performance even though they may sound more like performance review and looking back questions. So I just want to start with that.

So, Marian, the Coastal Inundation Dashboard updates are amazing. Thank you for the updates to the Charleston gauge, and the cameras are super cool.

But the way we're looking at it right now -- the stakeholders that we're getting that information from two different sites sort of like the WebCOOS and SECOORA site and then, you know, the tides and currents, and the way you showed it was fantastic because we use that to engage -- we use the photos a lot to engage with stakeholders kind of in the way that you were saying it's so much more helpful to have a picture.

When we're talking about sea level rise and planning for resilience we'll use those

-- hey, this is what a foot looks like. This is what two feet looks like.

So question number one is where did that come from and can you give us a link. I don't know how to get there and our stakeholders don't. That's hard to find if it exists.

And then the second is related to the tidal epoch update, and I'm curious if you all have a very young maybe staff person dedicated to, like, lessons learned and the how-tos and all of -- everything you're going through right now.

So that the next time this could happen more, like, in real time-ish, faster. Thank you.

DR. WESTLEY: Okay. So I'll start with the webcams. So you're looking for those kinds of graphics that I showed where -- I don't know how many of those are kind of posted on our website yet. We were doing webcams as a kind of fun R&D side project.

So the data is all hosted by WebCOOS. We don't host any of it ourselves. We do have

BIL-funded scientists sitting with my engineering team down -- our engineering team down in Chesapeake whose job it is to kind of play around with it.

So, again, I can have someone like Greg Dusek do some of the better things. But these are all things that we've just been making to sort of demonstrate to ourselves that this is -- has real utility.

You know, Inundation Dashboard is trying to have a collection of impact graphics so that when we say this is what we're expecting, here's a picture of what that looked like the last time it was at that level. But, again, this is all still sort of in the forming and norming stage. But you can ask. I'm sure we have a, you know, pretty lively cadre of data scientists. They love making these plots. There's probably a bunch of stuff kicking around. If you go to a scientific conference you'll see a bunch of them. So I'm sure we could share some with you.

And then your second question was

about the tidal datum epoch update. Yes, I think we're kind of pretty far along in this process. So, you know, we've talked about ways to accelerate it, ways to be more innovative with the data processing. We're close to the end so it's hard to kind of make a big course correction right now.

But I would -- one of the things that our chief scientist Greg Dusek has been leading and we're trying to get him a resource to kind of help him is how we do this with machine learning or you can say AI. Everyone freaks out when you say AI so I like to say really sophisticated statistics for all of our data processing needs because we -- you know, computers are really, really good at seeing patterns. You need a human when the pattern is violated.

So right now, we don't really have -- you know, Greg has done some kind of preliminary work with that. We've done work with -- partnership with others. We're in partnership with the Conrad Blucher Institute. They're very, you know, deep in AI kind of research.

But there's got to be a way to do this a lot more smartly so that our human brains can be used for the things that human brains are really good at and we can use machines to do all the rest of it.

So yes, we are watching, listening lessons learned. We're just at a point where we're too close to the finish to kind of really try new things.

But we can't wait this long. You know we do it on this sort of 20-, 25-year cycle because of the precession of the nodes of the moon and we know that cycle.

We also know that climate change and sea level change is happening at a much more rapid rate and we have to update datums much sooner than just every tidal datum epoch.

So, again, how do we plan for that future that's something we hope to do some R&D on.

MEMBER ELKO: Thank you. Thank you

very much.

MS. CHAPPELL: Julie?

DR. WESTLEY: I'm saying that's kind of a little bit over the horizon with NTDE is then we'll be a little bit ahead of NSRS and so we'll need to go back and kind of update all of the datums to the new spatial reference system. So that'll be a sort of added step as well. But, again, everything needs to be tied together in a single geodetic system that's interoperable between the geodesy and the tides and the whole bit.

MS. CHAPPELL: Great. Thank you, Marian. Julie, do you have a question. Oh, you're muted. Sorry.

MEMBER THOMAS: I am muted. I have a quick question for Larry if he's still on.

MR. MAYER: I am. I'm here.

MEMBER THOMAS: You are there. Okay.

I just -- when you talk about the data quality and then you talk about energetic sea states I know you've actually touched on this, but the quality must degrade with the sea state after a certain point and what I'm really interested in is if it's uncrewed or crewed, like, which one -- if it's a large sea state do you get a better quality in an uncrewed or crewed or does that not really play into that factor?

MR. MAYER: No, it absolutely does and there's not a single answer. If we look at the DriX vehicle it is a wave-piercing hull with a deep keel and so it is not terribly susceptible to sea state to a point.

If you look at the Saildrone vessel it has the behavior of a sailing vessel and this creates a number of issues in terms of its ability to maintain heading. They're all very small, though, relative to a large crewed vessel and so the dynamics are certainly exaggerated.

And so I don't think you can apply a single answer to all systems. You have to take it system by system. But that's part of what we're doing is looking from system to system at the quality of the data they produce too because that has to go into the equation, at the end of the day, about whether they're more efficient or not.

MEMBER THOMAS: Got it. Okay. Thank you.

CHAIR DUFFY: Okay. I believe we're going to wrap up. I'm not sure, Admiral Evans, if you're going to be able to come back on. I'll proceed. There you are, sir.

I would like to just make a couple of comments and then turn it over to you so you have the final say, if that works.

You know, I just want to say, you know, I talked earlier -- I always say jersey. Other people talk about hats, and I don't wear hats. I've worn a lot of jerseys in my day. I was really proud of the team today. Lots of great members.

Some of the things that I thought about were some of the former members have recently left us. I hate to mention names but I did see a question from former member Lindsay Gee and I have to mention my good friend Anne McIntyre. It's good to see some new members, too. So we have some replacements kind of through the draft process, if you will, to fill some big shoes.

Today's been a challenging day for a lot of folks technology wise, time, commitment, keeping things moving.

I will just say I was proud of everyone. I think it was a great effort. I look forward to reconvening in the morning. I know there will be a lot of good comments from the panel members when we do the round robin, and I would just like to say thank you for your commitment to the service today.

And with that, I will turn it over to Admiral Evans.

RDML EVANS: And, Sean, and thanks for your leadership today and you and everybody else who pivoted to the virtual environment.

I will note that I don't like the term former members. I prefer to -- you know, members emeritus, perhaps, is more appropriate.

But we deeply appreciate the engagement of the current members, the former members, the members of the public, all of whom have taken the time to engage on this -- on these important topics.

As you noted, I think we had some really outstanding panels today focused on the local requirements in the L.A. and Long Beach area and the way in which NOAA's products and services can help meet those requirements and in some cases in very innovative ways and so I look forward to that being a continuing theme for the rest of the week.

I think, you know, with that I'll close and just note that we'll be reconvening I believe at --

MS. CHAPPELL: We started 8:30 Pacific time, 11:30 -- earlier.

RDML EVANS: Yeah, half an hour -- right. Okay. Thank you, Ashley.

Half an hour earlier than today so

8:30 Pacific. I'm sorry, 8:30 Pacific yes, 11:30 Eastern and we'll start -- we have an hour set aside for a recap and discussion of day one. So that, hopefully, will be plenty of time for folks to share their impressions and engage in a good discussion before we dive into the session led by Nathan in which Nicole will introduce the concept of adaptive and resilient ports.

So with that, I think we'll close.

Sean, unless you have anything further I think it's up to you to officially gavel us adjourned here for the evening. See everybody in the morning.

CHAIR DUFFY: I feel like you outrank me, sir, but I will be happy to close this session. I thank everybody and appreciate.

Captain Miller often says I'm the play by play and he's the color commentary so we can think about that description later. But thank you. I appreciate everybody's time.

(Whereupon, the above-entitled matter went off the record at 5:25 p.m.)

C E R T I F I C A T E

This is to certify that the foregoing transcript

In the matter of: Hydrographic Services Review Panel

Before: DOC NOAA

Date: 03-05-24

Place: webinar

was duly recorded and accurately transcribed under my direction; further, that said transcript is a true and accurate complete record of the proceedings.

Neal R Gross

Court Reporter