U.S. DEPARTMENT OF COMMERCE

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

(NOAA)

HYDROGRAPHIC SERVICES REVIEW PANEL

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PUBLIC MEETING

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WEDNESDAY

SEPTEMBER 16, 2015

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The Hydrographic Services Review Panel met in the NOAA Science Center, 1301 East-West Highway, Silver Spring, Maryland, at 10:30 a.m., Scott Perkins, HSRP Chair, presiding.

MEMBERS PRESENT

SCOTT R. PERKINS, HSRP Chair

WILLIAM HANSON, Vice Chair

DR. LARRY ATKINSON

RADM KENNETH BARBOR

DR. LAWSON W. BRIGHAM

RADM EVELYN FIELDS

ED J. KELLY

DR. FRANK KUDRNA

DR. GARY JEFFRESS

DR. DAVID MAUNE

JOYCE E. MILLER

CAPT. SALVATORE RASSELLO

NON-VOTING MEMBERS

ANDY ARMSTRONG, Co-Director, NOAA/University of

New Hampshire Joint Hydrographic Center

JULIANA BLACKWELL, Director, NOAA/NGS

RICH EDWING, Director, CO-OPS, NOAA

SPEAKERS

DR. KATHRYN D. SULLIVAN, Under Secretary of

Commerce for Oceans and Atmosphere and NOAA

Administrator

JEREMY WEIRICH, Clerk, Subcommittee on Commerce,

Justice, Science, and Related Agencies,

Senate Committee on Appropriations

STEVE BOWEN, Associate Director, AON Benfield

Analytics

J. ANTHONY CAVELL, President-Elect, National

Society of Professional Surveyors

CHARLES (BUD) DARR, Senior Vice President of

Technical and Regulatory Affairs, Cruise

Lines International Association

KURT NAGLE, President, American Association of

Port Authorities

STAFF PRESENT

RADM GERD F. GLANG, HSRP Designated Federal

Official

MICHAEL ASLAKSEN, Chief, Remote Sensing Division,

NOAA/NGS

CAPT. ERIC BERKOWITZ, NOAA/OCS

TIM BLACKFORD, NOAA/NGS

W. RUSSELL CALLENDER, Ph.D., Acting Assistant

Administrator, NOAA/NOS

ASHLEY CHAPPELL, NOAA/OCS

MICHAEL DAVIDSON, NOAA/OCS/NSD/NRB

RADM SAMUEL P. DE BOW, JR., NOAA

CHRISTINE GALLAGHER, NOAA/NGS

MICHAEL GONSALVES, NOAA/OCS

TIFFANY HOUSE, NOAA/NGS

BRETT HOWE, NOAA/NGS

EDWARD KINGMAN, NOAA/OCS

MICHAEL JARVIS, NOAA/Legislative Affairs

PATRICK KEOWN, NOAA/OCS

GARY MAGNUSON, NOAA

LYNNE MERSFELDER-LEWIS, HSRP Coordinator

PERRY A. PACHECO, NOAA/OCS

TRACY PARSONS, NOAA/OCFO

RUSS PROCTOR, Chief, Navigation Services

Division, NOAA/OCS

SASHA PRYBOROWSKI, NOAA/IOCM

ADAM REED, NOAA/IOCM

ALSO PRESENT

DR. QASSIM ABDULLAH, Woolpert, Inc.

JOHN FERRELL, U.S. Arctic Research Council

EPHRAIM FROELICH, Senator Murkowski's Office

KIM HALL, CLIA

JOHN HERSEY, Survice Engineering

JONATHAN KEMMERLEY, MAC

STEPHEN MALYS, National Geospatial-Intelligence

Agency

AMY McELROY, Senator Murkowski's Office

TODD MITCHELL, Fugro

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

(10:34 a.m.)

CHAIR PERKINS: Okay, good morning. My name is Scott Perkins, Im director of federal programs of surveying and mapping and it is my honor to be elected as the chair of the Hydrographic Services Review Panel. If we would, if you would all please stand and join me in the Pledge of Allegiance as our first order of business.

Thank you, please be seated. Well, welcome to the 29th meeting of the Hydrographic Services Review Panel. While the members have changed since 2004, the panel continues to provide independent and expert advice to NOAA on its hydrographic survey and related programs, products, and services.

Im pleased to report that earlier this morning, the panel had an engaging discussion with Vice Admiral Manson Brown. Manson Brown is NOAAs assistant secretary for Environmental Observation and Prediction, responsible for NOAAs integrated mapping, water, and ocean of observations and forecasts. One of the reasons that we chose Washington D.C. for this panel meeting was to have the ability and the opportunity to meet with NOAA leadership. NOAA leadership has responded by being available and meeting with us, to this end, we look forward to hearing from NOAA administrator Dr. Sullivan, and acting assistant administrator, Dr. Callender this morning.

On Thursday morning, well be meeting with Dr. Holly Bamford, NOAA acting assistant secretary for conservation and management. And during our lunch on Thursday, we will hear from Rear Admiral Anita Lopez, Deputy Director of Operations for NOAAs Office of Marine and Aviation Operations.

We have a full three days of meetings on this agenda, including many interesting speakers and presentations, updates from the HSRP working groups, and updates on NOAA programs related to navigation services.

A particular note of interest is the presentation by Mr. Jeremy Weirich of the Senate Appropriations and Commerce Subcommittee, and two special panel sessions that will be moderated by Dr. David Maune to obtain the views on nonfederal associations and federal agencies regarding the value of the NOAA products and services. So thank you, Dave, for organizing those.

Lastly, on Thursday, we will have an opportunity to make a field trip up to Linthicum, Maryland, and tour the Maritime Institute of Technology and Graduate Studies, known as MITAGS. So thank you to NOAA staff for making those arrangements for the panel to do that field trip.

We have got much to do together, so without any further ado, lets get started. Its my privilege to introduce Rear Admiral Glang, Director of NOAAs office of Coast Survey and the designated official for the HSRP.

RADM GLANG: Thank you, Mr. Chair. Good morning, everyone. Welcome to our Hydrographic Services Review Panel federal advisory committee. Just some important details, theres a sign for the restrooms, and theyre through the curtain and just down the passageway a little ways. And in the event of an emergency, there are exits out that way, but probably more immediately up back the way you came in through the glass door.

Let me just summarize real briefly what the purpose of the panel is. As Scott indicated, Im Rear Admiral Gerd Glang, Im the director for the NOAAs Office of Coast Survey, and I serve as the designated federal official for this panel. In summary, the Hydrographic Services Review Panel is a federal advisory committee established to advise the undersecretary of commerce for oceans and atmosphere, the NOAA administrator, on matters related to the responsibilities and authority set forth in section 303 of the Hydrographic Services Improvement Act of 1998 as amended, and such other appropriate matters that the undersecretary refers to the panel for review and advice. So the matters to be considered broadly, national and federal partners, and stakeholders will present to the panel on issues relevant to NOAAs navigation services.

Navigation services include the data, products, and services provided by the NOAA programs, and our activities, which undertake geodetic observations, gravity modeling, shoreline mapping, bathymetric mapping, hydrographic surveying, nautical charting, tide and water level observations, current observations, and marine modeling. This suite of geospatial data, products, and services support safe and efficient navigation, resilient coasts, and communities, and the nationwide positioning information infrastructure for America.

Thank you, Mr. Chair.

CHAIR PERKINS: Great. Well turn it over to Dr. Callender for opening remarks.

DR. CALLENDER: Youll be glad to know that these will be brief opening remarks. The bad news is there are a few visuals that I will be showing. So the last time we met at L.A., Long Beach, I posed several questions to the panel. So I think the team has been pretty active here in a variety of working groups, very briefly I want to thank the Emerging Arctic Priorities Working Group, I know that theyve done a lot and Im really looking forward to hearing what theyre coming up with based on the challenge moving on. Clearly, as we talked about this morning with Vice Admiral Brown, there is a lot of activity in the Arctic.

As you know weve had a couple of NOAA ships up there, theres Fairweather, theres science going on, weve got Shell engaged in its projects so there is a ton of activity in the Arctic as we all are probably also aware the president was up there, well, fairly recently and did make some statements. So I wanted to make sure you're hearing that the Arctic Working Group is going to report back on issues. So I'm going to report on the coastal intelligence, that working group is looking at the coastal intelligence foundational observational models and mapping and coastal resilience. And we think of resilience as the ability to prepare for and recover from storm-related hazards. We sometimes focus on the bouncing back but what were really talking about is the need for communities to bounce forward.

Id like to share a few thoughts of consideration by the working group looking at this topic. I call these cartoons because theyre pretty simplistic. One of the things that is of value, we talk about the value of storytelling. And so theres some questions out there that relate to resilience on the left. How do we best prepare, how should we evacuate, these kinds of questions. How do we recover? How do we rebuild our homes? How do we navigate in and out of the port? The punch line is not so much the questions, but the foundational data and information that we provide the coastal intelligence side of the house, in terms of bathymetric work that we do, just relevant to actually obstructions, you know water depths, measuring both elevations and shoreline characteristics times, you need more modeling work dealing with storm surge, measuring tides and sea levels. And what it basically is, is here that there are a lot of aggressive images between local intelligence that NOAA provides, and that this group, this panel is examining, and a question of resilience.

The National Geodetic Survey has actually been working with a team from the COMET program developing a video describing the importance of geospatial infrastructure to inform communities as they adapt to sea level rise. Its a short video, its about four minutes long, Im going to key that up. Keep in mind that the point of these types of videos is to communicate a fairly complex suite of information in plain language.

This morning we talked about the importance of storytelling. It is a fairly straightforward story talking about the value of what NGS provides in terms of the CORS, in terms of data, in terms of the National Spatial Infrastructure and how its very plainly and clearly closely tied to these fundamental resilience questions.

So what Ill do, is Im going to make available to the members of the panel, Ill share with you the web link for this video, its pretty short, its absolutely worth seeing, and its really been a great partnership. Its a pretty complex topic.

So Im going to move on and talk briefly about actual stakeholders, so Question No. 6 was a question about how we could better connect, strengthen our relationships with the stakeholders, Im pleased to see some of those stakeholders in the room as well. And then one of the topics the panel's been working on and discussing this engagement document, and really working with the panels, just putting some thought into not only who we intend to reach with this document, but how we want to actually use this engagement document so they can actually be more effective, per some of the conversations that we had this morning.

One of the other things that we have to do is to take a look at the value of NOAA products and services. And were looking forward to some of the panels that we have, representatives from industry. Understanding the value, to be able to articulate that value for navigation products and services is critical. Its critical within todays budget climate. Theres some great studies that have been done out there today. For example, a 2009 study shows the National Spatial Reference System provided more than 2.4 billion in potential annual benefits to the U.S. economy.

Providing and modernizing the system for measuring elevations has the potential to net an additional 522 million in annual economic benefits. In 2011, the Continuously Operating Reference Station network provided over 1 billion in direct economic benefits.

A 2012 study showed that for every dollar American taxpayers spent on the NGS Coastal Mapping Program, they received more than $35 in benefits, thats a huge return on investment. The economic value of coastal intelligence extends to resilience as well. As the video would have showed, decisions to reduce disaster risk, for example, disasters related to floods cant happen without knowing where the waters going to go. Theres a recent study in September of 2014, the Zurich Flood Resilience Alliance found that flood disaster risk reduction investments paid off, with an average of $5 saved for every dollar spent.

So as you consider the economic valuation, Im sure you can take into account studies that are out there, theres studies to be produced, and if you have some ideas of additional studies that weve been doing that will be useful as well.

Theres several other working groups that well be hearing reports from over the next couple of days, Im really looking forward to more of those conversations. I want to thank you for the time that youve invested and that youve given us.

This is an iterative process that weve talked about this morning, we need to do collectively a better job of regular ongoing serious engagements versus the back and forth of letters. With that, Im going to go ahead and stop. Again, I want to thank you for all the time and effort that youre putting in, and have put in, and will put in, and I look forward to the conversations among us the next couple days. Scott? Do we have time for any questions?

CHAIR PERKINS: I didnt mention. We have 101 people registered to try and participate with this HSRP meeting remotely via the WebEx. So lets take a moment to try to work out the audio technicalities there. But I do want to start the next session promptly on time because at our prior meeting in L.A. Long Beach, as the chair, I did not manage to control the schedule very well, and we compressed the reports from the three Tri-Services severely at that meeting. So I do want to give the allotted one hour for the Nav Services reports this time.

DR. CALLENDER: So Ill be available, Ill be happy to chat, thank you.

CHAIR PERKINS: Okay, great. Thank you, Dr. Callender. Good point, Joyce. Well take this moment while staff works on the technical issues for the dial-in and lets go around the table and do our self-introductions for everybody on the panel. So as I previously mentioned, Im Scott Perkins, Im director of federal programs with surveying and mapping headquartered out of Austin, Texas. And with that, I think well jump down to the end of the table to Admiral Barbor.

MEMBER BARBOR: Ken Barbor, Im the director of the hydrographic survey, Hydrographic Sciences Research Center at the University of Southern Mississippi.

MEMBER RASSELLO: Captain Salvatore Rassello, Im director of system navigation for Carnival Cruise Lines.

MEMBER JEFFRESS: Dr. Gary Jeffress, Im a professor of geographic information science at Texas A&M University, Corpus Christi.

MR. EDWING: Rich Edwing, director of the Ocean Service Center for Operational Oceanographic Products and Services.

MEMBER MILLER: Joyce Miller, Im recently retired as director of Seafloor Data Services at University of Hawaii.

MEMBER MAUNE: Im Dr. Dave Maune, Im a senior remote sensing project manager at Dewberry Consultants in Fairfax, Virginia.

MR. ARMSTRONG: Im Andy Armstrong, Im the NOAA co-director of the NOAA/University of New Hampshire Joint Hydrographic Center.

RADM GLANG: Gerd Glang, NOAA Office of Coast Survey.

DR. CALLENDER: Russell Callender, Acting Assistant Administrator of NOAAs Ocean Service.

VICE-CHAIR HANSON: Im Bill Hanson with Great Lakes Dredge and Dock Company, and also vice chair of HSRP.

MEMBER BRIGHAM: Lawson Brigham, Im a professor at the University of Alaska Fairbanks.

MS. BLACKWELL: Juliana Blackwell, the director of NOAAs National Geodetic Survey.

MEMBER ATKINSON: Larry Atkinson, Old Dominion University, Norfolk, Virginia.

MEMBER FIELDS: Rear Admiral Eveline Fields, retired, NOAA.

MEMBER KELLY: Ed Kelly, executive director of Maritime Association of the Port of New York and New Jersey.

MEMBER KUDRNA: Frank Kudrna, Im with AECOM and I serve as the chief engineer of the Port of Chicago.

CHAIR PERKINS: Great, thank you. Just as a reminder, there is a court reporter capturing the proceedings. So when members of the panel, if youll please introduce yourself before speaking, that will assist the court reporter with being able to accurately capture that. For members of the public, when there are question-and-answer sessions, if you would do the same when you come to the microphone, please identify yourself so that then that information can be captured in the official record. For those of you that are interested in participating in the Hydrographic Services Review Panel, the panelists are volunteers, they apply for these positions, notices of vacancies on the panel are published in the Federal Register, and then theres a formal application and review process for that. So I believe August was the last announcement about upcoming openings on serving on the Hydrographic Services Review Panel.

So we are four minutes ahead of schedule to start the briefings from the three Tri-Service offices. So I feel pretty good about that.

RADM GLANG: Scott, the suggestion was made that for the program presentations, well, the basic problem is the microphone at the podium is not inside the system. So we can either present the programs reviews from our places here at the table, or we can go to the front of the room. I would leave it up to the directors. The microphone's up at -- on the dais there. The push-to-talk mics are inside, the microphone at the podium is not.

MR. EDWING: Testing. Okay, it works. All right. So good morning everyone, Im Rich Edwing, Im the director of the Center for Operational Oceanographic Products and Services. Since Im the first director up here to talk, for our program updates, for this session, we decided to talk about and given the time of year it is, its a good time to talk about what weve accomplished this past fiscal year. And Im sorry, Russell, but we each took our top five accomplishments we submitted for the NOS Annual Report so theyre getting a sneak peek at the annual report. And then were going to talk about, give you a preview of what our planned FY16 accomplishments are.

And certainly, I hope youll be impressed with what you see, not just from my presentation, but the other directors in terms of the breadth and impact of the coastal intelligence we provide to the nation.

So the next slide. So for our first accomplishment of FY15, we were able to establish two new PORTS systems both down in Louisiana, one in Morgan City, and one in Port Fourchon. The picture here is from the Morgan City PORTS. This is a small to medium-sized port, so water level station, a MET package, and it has a current meter. Morgan City is kind of upriver, if you will, up in inland Louisiana, and these are out near the entrance from the Gulf. And Morgan City has been doing a lot of investment to establish itself as a foreign trade destination as this is part of their planning to become that type of destination.

Port Fourchon is at the single water level gauge, but they have put in for funding to fairly dramatically expand this to a number of other centers, well see if they get that funding. Port Fourchon is a very critical port in the gulf in terms of a major -- most of the energy supplies for the nation really come in through Port Fourchon. And theres a whole other kind of coastal resilience story on the backside of Port Fourchon, which I dont have time to get into in terms of where NGS and colleagues have helped them address highway elevation, theres only one highway that comes down there and they were looking to get that highway elevated.

MEMBER JEFFRESS: Can I ask a question?

MR. EDWING: Sure.

MEMBER JEFFRESS: Rich, Im really impressed with what you guys are doing with PORTS, and I know it fairly intimately. You keep on expanding it, and Im just wondering how far can you expand this system with the limited resources that you have?

MR. EDWING: Well, were actually starting to look at that issue now because were seeing the day coming when we wont have the capacity to take on more, so were looking how do we deal with that? Do we put a moratorium on new PORTS or do we stop something else? These are discussions Ive been starting to have with Russell. Theres not a perpetual motion machine here in terms of endless resources, and time. So, thanks, Gary.

So, next slide. So again, under the Precision Navigation banner, if you will, coastal intelligence, we do tidal current surveys each year to update tidal current predictions around the country. We try to do surveys in two different locations each year, and this past year we did one in Casco Bay, Maine, and were actually beginning a three-year effort in Puget Sound, and thisll probably be the largest tidal current survey weve done in many decades just in terms of geographic scope.

Youve heard coast survey use the lead line example of kind of the old technology, and old data for charts. Well, theres a similar situation on the current side, in a lot of cases, were updating very old data, data was only collected for a week instead of the month we collected two nowadays using something called pole observations, which is sticking a pole over the side of a boat with a device on it, so a lot of these areas are very much out of date.

So Casco Bay, we updated a little over 20 locations, we did that survey early enough in the year, we were able to actually to get the predictions updated in the 2016 tables that are coming out this fall. Puget Sound, were just in the first phase, were doing 48 locations this year, kind of in waves of 15 each time.

Network, I think were pulling up the last set as we speak. And I think for the three-year timeframe is going to be 138 locations altogether.

So next slide. So segueing over to the resilience aspect, and of course, really the Marine Transportation System is just part of that larger coastal community. But the point I want to make is -- and weve talked a lot about big data, but really the Navigation Services, and this really applies to all three offices. We have a national treasure of geophysical data. We have long-term high quality datasets, well documented, collected to standards that just provide a wealth of information and support many other types of tools and analyses and things that could be used for many purposes.

Certainly, the sea level trends is one of our longest standing products that we put out. Its certainly become of much more interest, if you will, over the last few decades with climate change. But this year, we added -- and you need at least 30 years of data from an NWLON station or from a tide gauge to be able to put out a meaningful trend, to really have the uncertainty get reduced down to where the output is meaningful. And we added 13 more stations to that list of stations, I have over 200 NWLON stations, but about 50 are in the Great Lakes, so really we have 140 out of our 160 existing coastal NWLON stations that have sea level trends nowadays.

So thats kind of a longstanding product that we continue to update and enhance. We also put out these sea level trends for all the international stations for our website as part of the GLOSS program. But I think a really good example is theres still kind of nuggets of information, good products that could be derived from this data is a nuisance flooding report that we put out the initial report in 2014. In Russells slide deck, there was the exponential rise, so I wont go into what that was. But that got huge media attention, it allowed us to have kind of a different kind of dialogue on sea level rise given that nuisance flooding can be a harbinger of sea level rise. And its also maybe another piece of information that people can use for planning, and now were starting to look at how can we kind of operationalize that and start to forecast it a little better.

Just last week, we released an update to that report that showed pretty much, and particularly along the East Coast that the nuisance flooding was kind of tracking what we had projected. In 2015, there was a -- its likely that those rates will increase even more due to a strong El Nino.

Next slide. Okay. So heres really bringing down to a very local level, where we partnered with the Weather Service to put a water level gauge in Lake Pontchartrain to fill an NWLON gap. But the Weather Service really had a gap in terms of data they need for storm surge and forecasting, so put in a water level station, and a meteorological station for them, were kind of collaboratively maintaining it. But Lake Pontchartrains a large body of water right adjacent to New Orleans, very influenced by winds and certainly, if a hurricane comes along, thisll be a very valuable data point. It also helps supplement some local observing networks that have been established for storm surge. St. Johns Parish, in particular. And really, were just dedicating this station next week in a small ceremony, but were already getting expressions of interest from some other local agencies in terms of building onto this in terms of additional water level stations.

So my last top five accomplishment for 15 gets into ecological forecasting, this is another area under the coastal intelligence priority and NOS Roadmap. But NOS is the operator for Harmful Algal Bloom Bulletins that are developed by the National Center for Coastal Ocean Science, weve been doing bulletins down in Florida for many years now, but there was a pretty large improvement made this year where using some new algorithms and then satellite imagery, were now able to distinguish between what kind of blooms are happening. In the past, we could just tell them well, it looks like theres blooms happening, but some type of cells are harmful, some are not, and people are trying to make decisions whether to close beaches or shellfisheries, or those sorts of things, and this gives them much better information to work with.

And kind of along with that, last year, we worked with the Weather Service in Tampa Bay, the weather forecast office there to get some of this information out to the general public for something called a Beach Hazard Statement, which is put out by the Weather Service. And once we did that, we had huge spikes in our websites because we were reaching a whole new audience through a different vehicle, if you will. And this year weve implemented that the other two weather forecast offices and now, the whole Florida coast is covered.

All right, next slide. Okay. Moving onto 16. More PORTS coming. The PORTS program has really been expanding pretty steadily here. These are two relatively small ones, Savannah, Port of Savannah is looking for an air gap to be installed there. Savannah has been doing a lot of work, theyve been really looking ahead and kind of anticipating a post-Panamax world, and making a lot of investment, a huge dredging channel deepening project planned. Has that started, Bill? Or is that -- yes. So I think thats actually started. Making lots of other improvements and PORTS is a part of their plan. And again, I think theyre going to -- this is the first sensor of a larger port to eventually be established.

Down in Matagorda, theyve been trying to address a longstanding issue there. Theres a long, winding channel that comes into Matagorda, strong currents down there, pushes the ships around, and theyve got a higher than average accident rate down there. For a while, the Coast Guard was trying to get something going down there because I think they were going, they saw an upside in not having not to respond to so many accidents, but that never really worked out because the Coast Guards just not really set up for these sort of long-term partnerships. But more recently, the Texas Water Development Board stepped in and provided funding, and after working through some site and technical issues, were going to put a current meter down there, which should hopefully knock that accident rate down.

One that we just approved yesterday, actually a third one is up in Massachusetts for Cape Cod Canal. Interestingly enough, the Massachusetts State Legislature says, and Im not sure of the exact wording, but it says if youre going to fund real-time observations for marine transportation, you have to invest those funds in the PORTS system.

So were getting a wave buoy put in off of Cape Cod, were actually partnering with NERACOOS, the IOOS Regional Association because they are set up to work with wave buoys and the Army Corps of Engineers, and were really just almost going to be passing the money over to them to kind of make this happen. But yet, another kind of model on the ground for getting a PORTS established, so thats new PORTS coming up for next year.

Next slide. So one thing that people -- we always tend to focus on the new PORTS that coming on line, but theres a tremendous amount of work that goes on with the existing ones. People always want more sensors, or sensors have to be relocated, or upgraded. And this is kind of a growing amount of work. I couldve shown a slide like this for FY15 that work that was done. This is work that were actually executing right now. Theres a longer list behind this of a port thats waiting to come in from the airport, so to speak. So Im not going to go through the list, its just to make that point.

Next slide, please. So this is another, I think youve all heard about this at various points in the past, weve had a lot of stakeholders stand up at various meetings to say we need PORTS data integrated with AIS because theres lots of benefits to that in terms of integrating data on their bridge of a vessel.

We did kind of all the development work a couple years ago, and did testing in Tampa Bay and Columbia River, weve kind of been ready for quite a while, but the Coast Guard had software development to do in there, kind of IT security things to get through. I was hoping to report this as an FY15 accomplishment, but it slid a little more, but pretty confident its going to happen now, Im going to cross my fingers behind my back, but Im pretty sure its going to happen here in the next few months. Were first going to test it out in Chesapeake Bay, but once that test goes through -- this will happen on a national basis, anywhere where theres a PORTS set data, well start getting it put out through AIS, and then after that, we'll follow up with NWLON data, and our operational forecast model data as well.

And the hardware manufacturers who make the black boxes on the bridges of the ship, theyre already putting the firmware in and starting to develop those value-added applications that starts to interweave this data with the other data available in the bridges of the ship.

Next slide. Okay. So the models. Not too much to -- I didnt really have anything to report in 15, but theres a lot of stuff coming up in 16. One interesting thing is, again, partnering with the Weather Service, they were developing kind of a weather model -- specialized weather model for navigators down in Tampa Bay. And we got together with them and said well, lets integrate our models, so that people only have to go one place for that information. So they were developing specialized weather forecasts that right along the channel of a bay, you collect and get their observed data, or forecast data.

And theyre also doing new things, like forecasting visibility data, building and wave forecasts, those sorts of things. So were integrating that with our Tampa Bay model, and as the Weather Service starts to replicate this capability in other places around the country, well be able to pick it up with our models as well.

Im going to mention the West Coast model, which is another interesting partnership that involves coast survey, CO-OPS, NESDIS, and IOOS. But its a regional offshore model thats being developed for the West Coast, and thats not so unusual, but theres a lot of R&D going on with this as well, particularly in the area of data assimilation. And thats the ability to bring in real-time observations of all different kinds, and be able to kind of have the model adjust on the fly, if you will, and put out better forecasts. So, were kind of testing that again, first on this West Coast model, and again, whatever we decide to use out of that could be replicated throughout the rest of the system.

And then last, but not least, were getting ready to upgrade our suite of Great Lakes models. The Great Lakes models were the very first models that NOS put into operation over ten years ago in 2005. They were developed by the Great Lakes environmental research lab out of LAR up in the Great Lakes. And they work with Ohio State University, and those models got transitioned over. But of course, they've kept on doing development work, so Lake Erie is going to be the first one thats going to get upgraded, you know, higher resolution model, can forecast out further, theres also going to be an ice module thats going to be added on there that theyve been working on, give ice information, so a lot of benefit in it, and of course, well move onto the other lakes after that.

But the other important thing about this is this is whats needed to enable a HAB forecasting capability up in Lake Erie. Youve probably heard about all the water quality issues up in Lake Erie this year, and last year around Toledo. This model is really going to help with that.

Next slide. Current surveys. Again theres phase 2 of the Puget Sound, just a graphic kind of showing that were working on the red dots below with the southern portion of Puget Sound this year, attacking the middle portion next year, and then completing the project the year after that. Again, I think 138 locations are being done. And then Cape Fear will be another survey done, a smaller survey, maybe I think at a dozen locations down there, got a lot of reports from the navigation community down there about predictions being out of date, or just gaps in their predictions.

Next slide. Okay, again, moving over to the resilience area. The communication of storm surge information has been a big challenge, lots of places to go get it, confusion about reference to data, so weve been working on kind of really two tools. One kind of at a regional level, and one thats really at the local level to help provide more information in a much more useful way to folks. One of these is a coastal inundation dashboard, which is at the regional level, just one -- its going to pull data from both our gauges and partner gauges, certainly one aspect of its providing the kind of traditional observations and forecasted, and predicted information kind of is going to replace our Storm QuickLook product, if youre familiar with that. But then its also going to provide a lot of historic information, what was the historic record, high water record there. Other types of information provide alerts when certain thresholds are passed, working with the local weather forecast offices to determine whats minor, moderate, or major flooding, and do some other things as well.

And one of those other things is kind of reach down to these local inundation benchmark networks. And thats where were establishing around tide stations, benchmarks that are also referenced to very well-known visible landmarks, like a park or a statue, or town hall steps that, again, instead of trying to give a person the elevation to NGVD 88 or to mean level low water, give it to them in these terms, and they can make some decisions based on that because they know what thats going to mean.

So were doing this in three areas, you know, Battery Park because of the iconic nature of that station, and Super Storm Sandy down in the Hampton Roads pilot project with Larry Atkinsons group, and then in Coastal Carolina as well. And of course, this brings together NGS and CO-OPS to a large degree, and to a smaller degree, coast survey.

Next slide. So theres lots of people that do gauging out there, you know, I have the national mission, lots of people do water level gauging for all sorts of other local or project missions. We work with them as best we can to leverage those gauges, leverage that data, weve had a longstanding kind of agreement with the Corps to bring in data, and kind of make shorts, NOAA standards, and those sorts of things.

And the fastest growing segment of gauging Ive seen around the country is for storm surge networks. Were seeing storm surge networks spring up all around the country, and they do a fine job of informing that local entity thats created them, but were trying to find a way to make that data more available, and serve larger purposes.

A partnership Im excited about is with the USGS, weve been talking with them, and this is really happening first on the East Coast, and enabled by Super Storm Sandy Supplemental Funding, but theyve got funded to do some work tide stations, some water level gauges along the East Coast for USGS missions, but those are now going to be installed and operated to NOAA standards.

And we focused on eight or nine NWLON gaps I have along the East Coast, and Im going to fill eight to nine NWLON gaps that USGS is kind of paying to install the infrastructure, the gauges, theyre going to operate them, I just come in and get the data, and its to my standards, so its pretty easy for me to work with that data. At some point down the road, well look at other gauges theyre doing that could be used for other purposes. USGS wants the take -- or USGS and I want to take this model and then replicate it around the country, were really talking to all the USGS marine sciences centers up and down the whole East Coast from New England down to Florida and engaging them and USGS is everywhere. I can start to leverage their technicians, and some of the capabilities that they offer. So thats a big exciting piece. So thats just a graphic of just one place where -- the pink areas or purple areas are kind of NWLON gaps and showing where they either have gauges or are putting gauges in. So can you click one more time there, Ashley? So Lawson will be happy to hear this. This is the one NWLON gauge that were establishing up in the Arctic next year. Its being funded by the Weather Service; this is the one mentioned by President Obama. I know its just one NWLON gauge, theres a lot of gaps up there, but one step at a time here. Its in Unalakleet, Alaska, but you can see theres only three gauges north of that, theres Nome, theres Red Dog Mine, theres Prudhoe Bay with a lot of area in between, and then kind of between Unalakleet and the Aleutian chain here, theres just one other NWLON station out on St. Pauls Island.

And then also Park Service. Park Service came to us, and weve just entered into an agreement with them, and theyre interested in establishing long-term stations for sea level purposes in the parks that they manage and are responsible for, how do they deal with sea level rise? Weve got a gauge in already at Assateague, and theres one to be planned to be put in Cook Inlet, Snug Harbor, the western side of Cook Inlet this next year.

Next slide. Im sorry, so yes, heres the graphic for the -- where the Cook Inlet gauges go in, Lawson. You probably go there all the time, right? A pretty hard place to get to, I think. All right. So next slide.

And actually my last slide, something kind of fun. Next year is going to be the 150th anniversary of our publication of the tide tables; this is actually a photo that Russell Callender sent from a recent trip up to Alaska. Where was this, Russell? Was it Homer or Kachemak Bay, or maybe it was Homer, right? Yes. And so he saw that, he sent us back a picture, so of course, we like that. So well make a little bit of a big deal out of this next year, but I thought it was a good note to end up on, so thank you.

CHAIR PERKINS: All right. Very good. Thank you, Rich. Next, well have our report from National Geodetic Survey. Ms. Blackwell.

MS. BLACKWELL: Thank you, Scott. Im going to try a different approach, Im going to be lazy and sit here, and then we can vote on how you want Admiral Gerd to do his. All joking aside. Im Juliana Blackwell, the director of NOAAs National Geodetic Survey. And likewise, as Rich did for CO-OPS, Im going to go over the top five accomplishments for this fiscal year, and obviously, we accomplished a lot of things, but these are the top five were going to focus on.

Many of these things the panel has heard updates on before. So this is probably not new information, but Im just going to highlight what weve done, and then talk a little bit about what the plans are for FY16.

So with that, next slide. So here are the top five as they will be presented to NOS leadership and as youll hear about here today, the Geospatial Summit that we held this year, the damage assessment imagery and some of the advancements, and utilization of our technology that was accomplished in 15. Our GPS on Bench Mark Campaign where we had a lot of assistance from stakeholders in helping us improve things for our vertical reference frame. The topo-bathy project in St. Croix, and last but not least, our educational video series, some of our training, and outreach materials that were developed this year.

Next slide. So first off, the 2015 Geospatial Summit was held in April in conjunction with the National Society of Professional Surveyors, and MAPPS conference on surveying and mapping. It was held in the Washington D.C. area, had a number of participants from the federal agencies that are involved in geospatial data. I know that I reported to the panel on this previously, but here is just a snapshot of some of the highlights of that event. Obviously, it took a lot of effort to get this put together, we had a number of stakeholders or a number of panel sessions -- speakers that presented on their perspective on how they use our products, and things about the new datums they would like to see focused on.

But at the Geospatial Summit, it was a two-day event; NGS discussed the tools that we were planning to make available to our customers, and also the strategies that we have scheduled to help with the transition to the new datums in the 2022 timeframe.

This is the replacement of NAD 83 and NAVD 88. Again, the panel has heard updates about this that the GRAV-D project thats underway that I talk about all the time, is in support of the update to the vertical or the geo potential reference frame thats under development. What this means is that it will reset where things are mapped from, from a datum perspective in 2022 and beyond. So all federal civilian mapping is to be related to the current national datums, which will be undergoing a change.

At the Geospatial Summit, we had in person as well as online participants, practically 400 individuals participated. The image on the left shows kind of a breakdown of the types of sectors that were engaged, federal sector being the greatest number, 41 percent. But also about 29 percent were industry private sector, and 13 percent other state and local government individuals participated. And then a smaller percentage of academia, actually local government is in the purple. And then just private citizens, nonprofit, and other non-U.S. involved.

Weve had a previous summit in 2010 that was actually held here at the Science Center, and in the auditorium, NGS plans on having future summits to bring more people together to learn about the new datums and whats involved. And what were doing to prepare people so that they can transition their datasets into the new datums. But theres not one planned for 2016, well be doing other outreach efforts, and then be planning for a 2017 summit, most likely.

The image on the right is the geographic distribution; I believe thats for our call-ins. One thing that youve heard me say before, and I'll continue to say is that NGS is not just about the coast, that we serve from coast to coast. So as you can see by the colors of the states that are depicted here on the right, the lighter colors having one participant, and its hard to differentiate, but up to six participants per state with the darker purple colors, we have a number of stakeholders that are in non-coastal states as well. We provide the geodetic framework, the positioning framework for all states, and for the U.S. territories. So we had representation from Alaska, we also know that weve got a number of other countries, especially our bordering neighbors who are very interested in what were doing with the new datums, and so we had participation from Canada at the Geospatial Summit, and we continue to work with all of our neighbors in trying to share our information and what were doing, and get their buy-in and support for the new reference frames that are under development. Were happy that Dr. Callender was able to be at the summit, and present at that occasion, and did a great job talking about geodesy and datums. So that was a great accomplishment for us.

Next slide. So as youll see, theres a theme through most of these that its coastal intelligence or coast-to-coast intelligence as well as using that intelligence for resiliency efforts. And again, it doesnt just have to be resiliency along the coast, there are some -- there are flooding issues everywhere, not just along the coastline.

This accomplishment here that I want to highlight is the newer technology and the improved use of technology that we have with our imagery and in particular imagery in this situation.

This is the first year that NGS has collected aerial oblique imagery. Many times, youve seen images that weve provided looking straight down on structures. And its a little difficult to tell what something is if youre just looking at the roof unless you know whats there already, and then you can identify things better. The oblique imagery and this is a picture of that is more of an angle; we clicked it at about a 40-degree angle so that you have some more definition of what those structures are.

Obviously, you get the shoreline, and all the natural features, and you get more information about what is there physically infrastructure-wise.

The key thing about this is having this information prior to an event. So you want to see the before and after. So being able to fly the oblique imagery, collect as much data as possible that our mission would allow this year will give us that before look, which hopefully we wont have to use for disaster response support, but if needed, well have a fresh picture of the infrastructure that is along the coastal sites for the nation.

Next slide. The second part of the damage assessment imagery accomplishment is more of what weve seen in the past. The before and after nadir or looking straight down imagery that has been collected.

Again, it speaks for itself; you can see what was there, and then what isnt there after an event. We have the capability. We use this primarily, or have in the past used this for shoreline mapping, coastal mapping efforts, but as you can see, in any situation where theres a natural or manmade event, its important information to be able to share -- to collect quickly, to be able to share, and to have georeferenced so that those images can be connected to geographic locations, addresses, so that people can get where they need to go in order to help rebuild in the future.

So this imagery that is on the screen here, it was collected this year in FY15 in the aftermath of the tornado in the northern Illinois area. Again, its just showing that we have the capability; we dont like to have to use it for this effort, but certainly can get out there and get the data and make that available to emergency responders as soon as the clouds clear.

Next slide. Third accomplishment to highlight is the GPS on Benchmark Campaign; this is something that weve done for the past few years. I think each year we do it, we do a better job of it, and we get more and more folks engaged. We do this in conjunction with National Surveyors Week, so we get to be a part of and help highlight the importance of surveying, as well as get folks excited about helping us by providing data on areas that we dont have as much data as wed like to have. So their collection of information, GPS data on points that we dont have helps us to build a better model, better geospatial and national-spatial reference system for them in the future.

So this event took place in March, again, in conjunction with National Surveyors Week, improving the awareness of professional surveying, and the data that was collected helps us fill in gaps.

The image on the left is what we provided to our customers or our stakeholders that were interested in helping. The green areas are those areas that were good. We have information; we have geodetic data. Were pretty confident in that, weve used that in models, and things to match up. The areas that go towards yellow and red are the areas that are really the gaps, where wed like to have user-contributed data sent to us so that we can pull that information out and help with our modeling, our geoid modeling in order to make a better vertical or geo-potential datum in the future.

So this is just a sample of an area; we made this available for the entire country so people could zoom in, in their local areas, and see what was needed, see if they could get out there with some equipment, collect some data. The beauty of it was is while this was part of this weeklong event, it didnt really matter if the data came in that week, or if it comes in tomorrow; the idea is to continue to build what we know about the earth. And we collect this information through our online positioning user service, the data comes to NGS, a lot of it can be used to help improve models.

The one thing that we did especially well, I think, this year is that we had a webinar in advance of this so that we could get more people aware of the event, explain to them what we were looking for, what they could do to help us. We had over 400 people attend the webinar event, which I think did a fantastic job of getting the awareness out there. So were going to continue to build on these things in the future.

I dont know exactly how many points came in during that week because again, that week wasnt really magical from a geoid building perspective. But I do know that our OPUS tool had an increase of 20,000 submissions during the month of March.

So I think its been a success, were going to continue to build on that, and letting people know where things are needed I think helps them understand and want to get out there, and help us help them.

Next slide. The fourth is the topobathy project that was conducted in St. Croix. This happened at the end of October of last year, but still this fiscal year. It was a three-week long project in St. Croix Virgin Islands where we used our topobathy LiDAR and collected imagery along the shoreline to help support requirements, not only for the Office of Coast Survey, but also for the National Centers for Coastal Ocean Science, NCCOS, and other program offices within NOS.

This helped to update the charted depths for a lot of the island places where survey launches and ships cannot go, was able to be collected with a topobathy LiDAR that we have. And be able to update the charts. I think the last time that that chart had been -- the last survey had been done was using single beam sonar in about 1980. So time for a refresh. Im glad we were able to assist with that. And again, in addition, the data was also used for NCCOSs habitat mapping that was being done in that area. So a joint effort, a lot of program offices involved, but something that we were able to support as well.

Next. So this is the fifth accomplishment that I want to highlight. Just echoing what Russell mentioned regarding our involvement with the COMET program; NGS has worked with COMET to produce a number of videos that are pretty engaging in trying to explain at a relatively easy level what datums are about; why were creating new datums, things about surveying. As well as a full-fledged training lesson on understanding heights and vertical datum. So this is something that individuals can go onto the system and get a better understanding of what this is by going through the lesson plan. So this is the type of thing that were trying to do to better educate, have folks understand better the importance of the data that we provide, and continue to grow our online presence for outreach and education.

So this one thing is the actual lesson. There are, again, a number of videos that are available. Im pretty sure Ive blasted those out to the panel members in the past. And if you havent had a chance to look at those, I do encourage you, theyre really short videos other than the training module here. And I think that you would gain a lot from it, and share that with your friends and family as well. And then you can sit around and talk about geoids and datums with them.

What else do we have going on with this one? All these things are available from our website; Im not sure that theyre all as easy to get to as wed like, but were going to continue to improve our web pages, the content on them, and make things easier for people to find. But we can also share that with you separately as panel members.

Next. Just one slide here just to touch on the types of big level things that we are looking forward to accomplishing in FY16. Again, focusing on the customer. How can we get the customer engaged sooner, and as part of the development of our data products and services. I know that weve done a lot over the past few years of making sure that things are beta tested and reviewed, and things before theyre finalized. But in the development and the planning phases, we want to be able to get our stakeholders and customers engaged earlier on in the process. So that is one of my annual commitments to NGS and to our stakeholders is to get better customer engagement earlier on in the processes of the development that we have in our strategic plan. All of these things that are up here are also things that are being done in support of the NGS 10-year strategic plan; its not due for a refresh yet. We still have plenty of things to do based on what we set forth in 2013. But these all fall underneath that.

The second one is the regional advisor transition. Weve had a number of changes over the years with our advisor program, moving from state based to a regional approach. The state being some states, not every state, and we want to be able to reach all of our stakeholders, and so we have been working towards a regional advisor program. One other accomplishment maybe for 15 I should throw in there is we were successful in bringing onboard a geodetic advisor who resides in California and oversees California and Nevada at this time period. Dana Caccamise, and he was introduced when we were out at Long Beach.

The other good news, and I dont know if shes here at the moment. Last week, NGS brought onboard a geodetic advisor in Alaska. And So Nicole Kinsman started officially last week. Shes known to a number of the stakeholders in the community in Alaska. And Lawson, if you havent met her, well make sure that you do before you leave here. But happy that we had the support of the administration, and we had great applicants, and we were able to select two individuals for those really important positions to get the outreach education, the collaboration going in those two parts of the country. So that was an aside.

But anyway, the data modernization, again, ongoing plans for projects to support the datum change in 2022. Weve got a number of surveys that are being done in certain areas to help improve our end product. Weve done a lot of work this past year on special projects, and I wont go into a lot of details on that, but again, there are a number of project related activities that Ill be able to brief out at the HSRP and tell you more about specifically where things are and what were going to get done in FY16.

International collaboration, thats something that we do every year, but there is definitely a higher level of focus as we not only look at the datums and make this truly an American datum change. With our partners in Canada, and Mexico, and Central America, were looking at coming up with a better way to do a geoid model that would encompass all of North America. So continued collaboration with other countries, not only for the datum, but also for scientific research, technology exchange, anything that we can do with our partners in other parts of the world, too. Because geodesy certainly is a global science and we can certainly share and learn from others in that capacity.

And last but not least, Coastal Intelligence, obviously, everything that were doing is supporting Coastal Intelligence, and also resiliency, but there are a number of smaller projects and outreach opportunities where we can get the message out and do more, and well go into that in more detail the next time we meet. But those are the five areas that were focusing on for FY16 activities, and with that, I will stop and turn it over to Admiral Glang. Thank you.

CHAIR PERKINS: Thanks, Juliana. And you are right on the mark; were at 11:40 just like clockwork. And the webinars have been very good. My complements on those.

MEMBER JEFFRESS: Scott, can I ask a question? To Juliana? I'm Gary Jeffress. Juliana, the last government shutdown, I noticed that OPUS was shut down. If theres going to be a shutdown coming up soon, is that going to happen again?

MS. BLACKWELL: First of all, Im going to assume that there isnt going to be a shutdown, but we do have plans in place that will build on what weve done in the past as far as what will be available to our users. And all of these things, while they may be on our systems, they may seem like they are effortless, it requires people. It requires management, oversight, quality control, so I would say that its likely that the level of service, if there were another government shutdown would be similar to what was in the past. But we have not gotten any specific guidance different than that.

MEMBER JEFFRESS: But can I just add that in the last shutdown, when your service did go down, theres a service in Australia that was open and free to the public and works with data from anywhere around the world. And a lot of American users started using that service back in 2013, was it? And maybe you should let the public know that thats an alternative if there is a shutdown.

CHAIR PERKINS: Admiral Glang?

RADM GLANG: Thank you, Mr. Chair. I have exactly 20 minutes, is that right, Scott?

CHAIR PERKINS: Well give you 21, sir.

RADM GLANG: All right. So Im sitting here far away from you, but the better to see you with, rather than you looking at my backside. Consistent with the other programs, Ill provide you with a ramble through what I regard is among our top five accomplishments for fiscal year 15, and then youll see also our top five accomplishments, or planned achievements for fiscal year 16. Hopefully the things we do in 15 will lead to those things weve got planned for 16 being successful.

Next slide. Most of the panel, I believe, is familiar with our work in the Port of L.A., Los Angeles, and Long Beach. Among the products that we released this year were the first prototypes of high-resolution bathymetric overlays for electronic navigational charts for the Ports of L.A. and Long Beach.

And so these high-resolution bathymetric overlays can be viewed through a ships ECDIS system, or some of the electronic chart systems. So these are prototypes meant to help start driving conversations about precision navigation, and how we can better serve those users.

In addition, Coast Survey created a precision navigation demonstration tool through our website portal, we showed you that in Long Beach, and we continue to show that to leadership as we tell the story about where we believe precision navigation, to where the maritime sector needs to go.

The project in Long Beach continues, if youll recall the project to implement by the Port of Long Beach, and for the pilots, to implement a decision support tool for them to understand and make decisions about their dynamic under keel clearance for the ultra large crude carriers, that project continues specifically its the new Nearshore Wave Prediction model produced by the Weather Service, our Weather Service, that continues to undergo testing.

If youll recall, there were several additional -- there was one additional observation buoy, which SCCOOS was, in fact, able to put in place through some special funding provided by NOS.

And so these observation buoys, which are observing the waves are being used to determine and check the validity of the wave model. And that effort, I would expect, is going to take quite a while longer, another year or so.

We have a new version of nowCOAST, nowCOAST.noaa.gov, which is scheduled to become operational on September 21st. NowCOAST is the data portal for all sorts of national weather service, and NOAA, and National Ocean Service data. I highly recommend you take a look at it because I cant describe it in words. In this new version, weve upgraded the frontend, if you will, the web interface. Theyve added a variety of new data layers. Theres key technology now implemented so that users can actually grab the data streams that theyre seeing and connect their applications to those data streams. So nowCOAST is a terrific way to not only see all the different environmental intelligence that NOAA offers, but also to capture it, and bring it into your decision support tools.

A couple of new data layers, near real-time, lightning strike density data for both land and overwater areas. There is a mariners tab, which is basically a customized tab so that mariners can click on that, and view those things that are of interest to them, like marine forecasts.

We have our second industry day planned for the end of this month, September 29th and October 1st. So the NOAA Navigation Industry Day is something that Coast Survey instituted last year in conjunction with the Annapolis Boat Show, its a way to highlight directly with the industry folks, the guys who actually write -- and women -- who actually write applications and programs for the recreational boater, in particular, but also the non-SOLAS class navigation industry out there. Its a way for them to see what data we have and how were serving it up for them to grab, and build into their applications.

So this years session will be part of the National Marine Electronics Association International Expo and Conference in Baltimore, those sessions are September 29th and October 1st, weve invited -- we have the Weather Service, from within NOS, the IOOS program, CO-OPS will be there, certainly Coast Survey will be there; I think theres eight or so NOAA programs that will be demonstrating how their data can be used by the industry, and then repackaged, if you will, as we push our data through the value chain and get it to users.

And then last thing Ill mention here is our geotagged Coast Pilot. Our Coast Pilot now is geotagged with reference points so that it can link through the HTML version to our nautical charts, and theres a great potential there for now that its geotagged, you can take that Coast Pilot in an electronic form, and theres the opportunity to do all kinds of creative things. Weve demonstrated that internal to Coast Survey in the past.

Next slide. Big effort in 2015 on prioritizing the Arctic at Coast Survey, and certainly other parts of NOAA, and that included outreach activities with our stakeholders. For instance, we briefed the Alaska Arctic Council Ad Hoc Working Group, which is comprised of more than 160 Alaska officials and stakeholders, and thats organized by the Alaska Governors Office of International Trade. Their interest in particular to us is the updating of charts through new hydrographic surveys to ensure safe navigation and promote the development of Alaska, as well as the protection of that environment.

In June, a group of us traveled to Kodiak to celebrate the deployment of the NOAAs ships in Rainier and Fairweather together with the U.S. Coast Guard to the Arctic. We talked this morning with Vice Admiral Brown about the recent glacier conference, I think its two weeks ago now, global leadership in the Arctic, which was organized by the U.S. State Department, and I had the opportunity to talk about our mapping and charting needs, and what we need to do in the Arctic. The White House released a fact sheet, in fact, outlining what our priorities are for the Arctic, and that included a mention of the work that were doing with the Coast Guard in mapping the marine shipping route that would take you from Unimak Pass up through the Bering Strait and into the Arctic.

As far as actual surveying work, mixed news, generally good, our two NOAA ships surveyed about 550 square nautical miles on their Arctic project, most of that work was in Kotzebue Sound, an area that although there are some soundings , they're of dubious origin, so well be able to fix that. And also one of our contract partners, TerraSond, they completed 307 square nautical miles, and Ill talk a little bit in my new technology piece about what they did. So thats exciting.

In those track line bathymetric surveys that were working on with the Coast Guard, weve taken this corridor from Unimak Pass and up through the Bering Strait, and weve just assigned each of the ships a lane. As you go north to do your work, travel this route, and then as you go south, travel this way south. And then this way we can acquire the bathymetry across those lanes. This year we acquired about 4,900 lineal nautical miles of track line bathymetry between NOAA and the Coast Guard, so thats pretty exciting, thats one way to -- while not hydrographic survey quality, it certainly has great value in informing us about the chart, and well probably be able to use that data on the chart.

We also released our 2015, the third edition of our U.S. Arctic Nautical Charting Plan. This is really, if you will, a catalogue of our products that weve planned or that weve identified as needing to build. It doesnt set forward what we need to do for hydrographic surveying, rather it tells maritime users and others interested, where do we need to build new charts. We think in these places. And specific to mariners, it dives into detail on both Raster products and electronic products about scale, and coverage in some of the new coastal areas of interest.

And then in our transforming our charting production line, a huge priority for me in my now third year at Coast Survey is to transform our chart production line thats one of the two factories that we have, to a single line system, and to that end, were populating the database, our nautical information system, and were about one-third of the way through that. More or less in line with our three-year plan, and that will lead to more improvements in harmonizing our suite of electronic navigational charts.

Slide 5. So partnerships, both interagency, and among states, and with our international partners. Weve made a variety of progress and had some great opportunities under our integrated ocean and coastal mapping effort, youll recall map once, use many times. A key activity is to communicate to other partners and for them to communicate with us, where were going to be working, where are we surveying so that hopefully we can join them upfront and take advantage of their work, and likewise, they can take advantage of ours. To that end, the SeaSketch tool was expanded. This is a web-based tool where people can share in a very simple way where theyre going to be working. That was expanded into a nationwide mapping tool, and it includes information not just on hydrographic surveying or ocean mapping activities, but also on topographic data acquisition plans.

So thats the U.S. Federal Mapping Coordination site. Thats quite an achievement, and one of the key activities that I use to sort of measure how well IOCM is going because I believe its all about evangelizing this map once, use many times concept. Was the level of participation of our National Coastal Mapping summit, and we had over 60 participants online, I think a total of 100 or so, which took place in Oregon earlier this summer. So thats pretty exciting.

Coast Survey leads the U.S. IOCM effort. Were one of the three co-chairs of the Interagency Working Group on Ocean and Coastal Mapping, and theyve produced -- one of the things they have to do is produce reports to Congress, and were all up-to-date on those things. Theyre somewhere in the approval process.

More locally and more -- the relationships that give us more tangible results, if you will, are those that we establish on the working level. We have a new collaboration starter with the State of New Jersey; they have a hydrographic survey capability. They do work in their state waters. Apparently, we used to know this 40 years ago, but knowledge evaporates. So now weve reestablished that. Thats pretty exciting.

We also have a collaboration with Coastal Carolina University. And within NOAA, if youll recall we helped develop a tool, which is now commercially available to allow our fisheries vessels, their ME70 fishery sonar to display and log bathymetric data, which is quite a technical achievement made through our relationship with the University of New Hampshire. And actually, just recently, last week, the NOAA Ship Bigelow was able to use that tool to help them discover a downed aircraft, so there you go actually using our tools. And that was only possible through the work done by the Joint Hydrographic Center.

Cuba in February, the Coast Survey Delegation was one of the first to directly engage with Cuba in a long, long time, and we were able to focus on hydrography, and meet with their hydrographers and cartographers. In particular the area of interest is improving charts in the Florida Straits. And then in July, I sent an invitation to Cuba inviting their national hydrographer to the United States. Were expecting that visit to happen soon.

Building on our growing expertise in developing satellite-derived bathymetry, we hosted a workshop which included participants from 11 different foreign countries, and they came here to Silver Spring, and they learned how to use freely available imagery to generate derived bathymetry, and to use that to assess their nautical charts' adequacy.

Slide 6. NOAA Ship Thomas Jefferson is testing two new autonomous surface vehicles. So these are fairly small, but theyll allow us to survey with these autonomous vehicles in very shallow and near-coastal areas where its impractical or not safe for our survey launches to go.

We have operationalized our use of ship automatic identification systems, so we have a database now. We buy AIS data from satellite providers, and we get some from other sources. We can use that AIS in our chart adequacy assessment process. We also used the AIS to fix the Magenta Line issue on the Intracoastal Waterway, which you may recall. Weve recapitalized our two NRTs, our two boats from the Navigation Response Teams, boats 1 and 2, and weve put in the order for boats 3 and 4, and then next year, hopefully, well be ordering boats 5 and 6.

These two boats are actually being delivered, one to Gulf of Mexico area, and the other to San Francisco area. So the team will be transitioning from their old platforms to their new platforms in the coming months.

Other international news, working through our partner countries in the International Hydrographic Organization, were pleased that the IHO Interregional Coordinating Committee approved at our request a crowdsourced bathymetric working group. So in the world of international charting, this is kind of a big deal. We have a long way to go. But having an international body to discuss and engage on how do we collect, how do we assign metadata, and what formats do we use for crowdsourced bathymetry, so these are freely volunteered observations that could come from anyone, in particular, recreational boaters. Its kind of a big deal to get other countries around the world engaged on that.

My aim is to use this Crowdsourced Bathy Working Group to engage with the industry.

I think Im falling behind. Slide 7. So I mentioned satellite derived bathymetry. So one thing in satellite derived bathymetry, we had our researcher use derived bathymetry to assess the chart adequacy off of Barrow, Alaska. And if you recall where that red area is, it looked like we had some shoaling happening there. And so we had a NOAA ship up there, the Fairweather, and we said we want you to validate what we think we see in the bathymetry from the satellite imagery. And they did, you can see the line pattern that they ran over it. And in fact, what we found was it doesnt look like theres a shoal area there.

So what were discovering here by going back and doing on-the-ground validation of what we see in the derived bathymetry is that there are some real limitations, technical limitations. So there are a few theories kicking around why that is, but it has been a very robust year for how we put this stuff into place, and were learning a lot.

So why dont we go to slide 8. So one of the things as we get smarter about the limitations of satellite-derived bathymetry will be developing a policy on how were going to use that to inform ourselves about the adequacy of our charts. I mentioned Crowdsourcing Bathymetry, theres a datacenter thats being -- or a database thats being built with our partners within NOAA over at the National Centers for Environmental Information thats formerly known as NGDC.

Well be increasing the use of our autonomous surface vehicles, theres a workshop planned this fall with CO-OPS and with the IOOS program using one of their validator contractors. And this workshop will invite industry, vendors, researchers, government representatives, and its a bit of an ASV-palooza is what I like to think of it as. So a variety of ASVs will be brought and demonstrated, and theyll pose some big questions, how well do these things work? What are the operating costs? What do you need for staff to operate them? What are the scale levels? Things like that.

Then also through the University of New Hampshire, Joint Hydrographic Center and the industrial partners at the Ocean Mapping Center, theyll be looking more at the autonomous behaviors of these platforms.

Slide 9. Were also working on our policy on how we consider other types of data. In particular, weve worked very hard on establishing relationships and discovering the data holdings at USGS and the Army Corps, their topographic and bathymetric LiDAR data. Its really now developing the processes of how you cook the soup, if you will. How do you get that LiDAR data efficiently through our processes and onto the chart?

The panel will be pleased to know that we continue to flog ourselves on these interagency agreements. So in particular, you may recall we had an umbrella agreement with NGA last year that took probably a solid year to get in place. And then this year, to take advantage of that agreement, NGA said all right, were going to give you your money that we promised to give you last year that requires another agreement, which weve been working on now for seven or eight months. But that agreement is just about finalized, unfortunately, too late for money in 15.

But what is driving our conversations and NGAs interest in particular, and were actually going to be helping them out; they have some new hires, about a dozen or so theyll be bringing to our office while their new hires are awaiting their clearance process. So its kind of an exciting collaboration on different levels that we havent seen, at least in a while.

Then we have an agreement between -- at the NOS level, and the U.S. Army Corps of Engineers, and thats going through a final draft, and hopefully will be signed here by October. Well get that Army Corps umbrella agreement signed, so were pretty excited about that. That was also another long and trying process.

Within our organization at Coast Survey, we went through -- this goes back at least four years. A sort of an organizational assessment, do we have the organizational structure that supports the functions that we see we have to do now and in the future? And one of those things that came about was we identified the need to establish a new branch within the navigation services division, requirements and product management branch. And its really to get at what Juliana talked about earlier. Institutionalizing that customer requirements process, understanding your value chain, and understanding how your customers use your products, and how they want them changed. So were trying to institutionalize that and were jump-starting our acting branch chief, were sending her off to the United Kingdom Hydrographic Office for three months provided the Government doesnt shut down, but shell be going shortly.

At the moment, were actually hosting a counterpart, if you will, from the UKHO, and I think Guy Funnell is here in the way back. Were also emphasizing, last slide, on how we staff into the future. And one of the things weve identified is the need for a chief geospatial officer within Coast Survey. Probably just -- well probably have to call him a GIS manager in the workforce parlance. So were pretty exciting about adding that capacity, that role of a geospatial officer.

Were rolling out very shortly here our new Raster Chart Tile Service, this is pretty exciting. Id love to spend a full hour on this with you, but the Raster Chart Tile Service took us much longer than we had planned. Basically, weve taken all of our raster charts, so think of the paper charts existing in electronic space, chop them up into millions of cells, that required a lot of cleanup work down at the pixel level, so that they can be reassembled very quickly by users through their apps or their smart phones or in their software packages.

So we have worked in kind of an open source way, an open consortium way with a long list of vendors who have participated and provided feedback. The Raster Chart Tile Service uses standard open source Web Tile Service functionality. If youd like, I can demonstrate it; itll also be demonstrated at the Industry Day at the end of the month. I do have one more slide, but I think Ill skip this one in the interest of time. Just know that were working on reprioritizing our survey requirements in the coming year. And I know at the working group level with the panel, weve started to explain some of this to you, and we can come back to that maybe later, maybe Friday or so.

That concludes my remarks.

CHAIR PERKINS: Great. Thank you, Admiral, and congrats -- or near congrats on getting the MOAs accomplished. Were a little behind schedule. Imagine that for an HSRP meeting. But our next item is lunch for the panel, and then we reconvene at 1300 hours.

(Whereupon, the above-entitled matter went off the record at 12:07 p.m. and resumed at 12:59 p.m.)

CHAIR PERKINS: Okay, before we start the next session on the agenda, I do want to take just a minute to recognize two of our panel members that arent here with us this morning. Susan Shingledecker with BoatUSA, and Carol Lockhart with Geomatics. So, just when we did the introductions earlier this morning, I skipped over them. So just wanted to touch on that so we do have a little more gender diversity and skill set diversity in the panel than whats represented right here at the table this morning. So with that, Ill pass it over to Dr. Callender.

DR. CALLENDER: Thanks, Scott. So Im very honored to introduce our next speaker. Dr. Kathy Sullivans official title is Undersecretary of Commerce for Oceans and Atmosphere and the NOAA Administrator. Shes previously served as the Assistant Secretary of Commerce for Environmental Observations and Prediction and was serving in this role when she last addressed this panel at the Anchorage meeting in 2012.

As you know, that position is now held by Vice Admiral Manson Brown who we had the pleasure of talking with this morning. Dr. Sullivan has held many titles over her impressive career, including oceanographer, chief scientist, chief executive officer, and astronaut. But as many stories that are out there, titles dont actually tell you what the real story is. And I would say simply put, Dr. Sullivan is passionate about earth observing, and is deeply committed to the role that NOAA plays at providing environmental intelligence to inform decision making.

At NOS, we think about coastal intelligence because thats where we work. With that very short introduction, its my pleasure to introduce Dr. Katherine Sullivan.

ADMINISTRATOR SULLIVAN: Thanks, Russell, thanks especially for keeping it really mercifully short. Im delighted to be back with the panel again, I see a number of familiar faces from the Anchorage session and some new ones, so welcome to all of you I have not met and had a chance to visit with before, welcome. And let me give you a first word of thanks for your service on this panel.

And to the familiar faces, I will carefully not say old faces, glad -- Evelyn. I got a really nasty look from Evelyn Fields there. But pleasure to see you all again.

I really dont have highly prepared remarks at all. I wanted to comment and maybe ruminate even a bit on a few points for ten or fifteen minutes, and then throw the floor open to all of you because I think a Q&A and a discussion is probably of greater mutual benefit.

So Russell and I have mind melded over the past couple of weeks about the work that youve been doing, both to take a fresh look at the process that the HSRP is using and to take a look at the direction, the scope, the topics that youre taking on. I consider those sort of institutional hygiene moments when a board or a company does those things. Theyre very, very important. Theyre too rarely done, and so I want to express my appreciation to all of you to working with Russell and Gerd and taking that on.

Weve been having that kind of how do we work together well for the future discussion with a number of our federal advisory committees. The one that I am most consistently most directly engaged with is our Science Advisory Board. And over a number of years, that advisory board had gotten into a pattern of a certain set of standing working groups, and a certain rotation of some topics, some of which will remain ongoing topics, we really do want and need their help on, such as being an independent review group to look at the work programs, and budgets, and successes, and metrics of our cooperative institutes.

But as I watched that group work over the year and a half or so that I was back working as Jane Lubchencos Deputy, it seemed to me that they were underplaying their hand and underplaying the hand that they could play for us. I put this to them when I became acting administrator deliberately in a pretty blunt way. And said your main mode of operating makes you, with all due respect, yet another one of the groups that critiques and audits and measures us. We do have many, many, many of those. As I look at the expertise around the table, theres a dimension you could bring to us that just working in that mode doesnt bring because that group, I think like this group, has the intellectual capacity, the experience base, the perspectives on a swath of our world that is really of the highest possible caliber. And something that is always among the rarest commodities for a leader of any organization, but even rarer for government executives, is a group of thought partners who in a spirit of constructive approach to the best interests and future of an organization will really help us think wider or deeper, or more insightfully than we normally have time to think in the hubbub of the day-to-day.

And so weve been really very substantially revamping what the Science Advisory Board does and the kinds of questions we discuss together. Thats one first change: were actually discussing questions together, not just playing ping-pong with reports. Widening our field of view, including widening our field of view to why dont we bring people in to talk to all of us who are not on the board, and shake all of our thoughts up a little bit, and see what new insights that gives us.

And trying to lift the conversation up to some more strategic questions that, again, they with their expertise, with their wider range of experience, with other outside parties, they can go consult with or engage on their own recognizance; they can bring us perspectives that we dont have the access and dont have the time to get.

For example, were talking with them now about look, we can audit and critique the things NOAAs doing today until the cows come home. There are an awful lot of forces of change afoot in the world. And especially a group advising us on our scientific portfolio, what is the world, the trends, some issues that we should be checking now to make sure that our five, and ten, and fifteen-year science investments are positioning us for. And not only our investments, but we should maybe learn from that. Theres something happening at DARPA you should pay closer attention to; it could bear fruit you will need in a decade. It could bear fruit you want to onboard very rapidly in a decade, not just discover and take another decade to deal with.

So weve been doing a lot of that sort of gear shifting with the Science Advisory Board. And Russell and I talked about that kind of change at some length, and I think there probably are some opportunities for a similar degree of shifting and rethinking in this world as well. I mean, I look at the way technology is changing. It continues to shrink; data rates continue to accelerate. Available platforms to do any of our maritime missions, at least hypothetically available platforms are proliferating and changing just as hypothetically available satellite platforms are changing. CubeSats are a wonderful thing; theyre about the size of this microphone base. And there are those that will tell you today that all of NOAAs missions should be done on CubeSats tomorrow. Thats a wonderful thought. The precision instruments we need currently dont exist in sizes much smaller than this table. So until those two things line up, CubeSats are a hypothetical for us.

But the notion of a distributive architecture as opposed to everything on one satellite bus, thats something we should be assessing, and making sure we do the all-in costs, does it really turn out less if you have to launch 30 of them. Its probably less for one; is it really less for 30 if it takes 30 to get the coverage?

I just spent an hour or two yesterday with outgoing Rear Admiral Jon White of the Navy Oceanographer. And incoming Tim Gallaudet who will be double-hatted as the operational oceanography commander, and the oceanographer of the Navy. And the Navy Oceanography Command and in particular, NAVO down in Bay St. Louis, Mississippi, I would argue is out in front of almost all of the rest of the Navy in how theyre using unmanned aerial and undersea vehicles. They have refined concepts of operations, theyre driving sensor developments. Theyre using them in routine mission segments. They too are not yet at a point where its completely supplanting, but its a force multiplier for any flyaway unit or boat unit that they deploy.

We talked yesterday about, what can we learn from a closer conversation with our Navy counterparts about the road they have followed to reach that point. And how many onramps and off ramps, and fuel stops can we skip because theyve learned some things that we ought to not insist we have to go relearn ourselves, we just pick up and say that actually works, start now.

So I just wanted to share with you that kind of musing thats in my mind because as you all think about working on your process and on your strategic approach, I thought maybe a little bit of an example from a different arena where were working in the same direction with another committee, it might be very helpful. You really do bring a tremendous array of talents and insights into the fold for us. Its irreplaceable. And I would just close by encouraging you to keep engaging in the six big questions Russell has put, and on the even broader question of is there even any different dimension of conversation or issue that you might take on, and which you could be really significant thought partners with us, helping us see more clearly. What do we need to anticipate? What might be possible futures, what capabilities, or capacities, or opportunities should we be watching for and thinking about as we go about our everyday work?

The day-to-day folks out on the steel plates towing the fish, and plotting the pings, they will carry on with that work as they should on a day-to-day basis, but for the person in my seat and Manson Browns seat, and Russell Callenders seat, were the ones that really need to get our heads wrapped around where should we be aiming this agency to be five and ten years down the road. We get precious little help thinking about that, and as you know, the budget cycles and the congressional cycles tend to drive all of us back to very small increments based one notch off of what youre already doing. I believe as leaders of an organization that does such important things for the country, its incumbent on me, and Russell, and Manson to not fall 100 percent victim to that trap. But be sure that we do find ways to look ahead and anticipate, and talk with our congressional colleagues, and talk with our executive branch leadership about where we need to bend the arrow towards, and where we need to be moving towards.

If we dont, momentum is momentum. It will carry on in the direction it has always been until an organization winds down or its mission becomes obsolete, or just becomes supplanted by things that didnt have its head in the game enough to anticipate. And I think it would be a real shame if that happened to NOAA at all, but certainly in particular to this function.

So let me just stop there. That was quite philosophical, and I sort of apologize for that, I guess, sort of. But I thought it might be useful to do a little bit of a Monty Python moment, and just do, and now for something entirely different. So that was your something entirely different. And let me throw the floor open to all of you.

CHAIR PERKINS: Well, thank you. Thank you for being here; thank you for the continued support for the panel. The challenge of how this group can be better thought partners, I think thats encouraging to hear. In the time that Ive been on the panel and since being voted as the chair, I think weve struggled with defining the identity of the panel, and what is our real mission, and what can we be doing to contribute, taking taxpayers' dollars that fund this activity, and putting forth a meaningful work product thats useful to the administration. I think youve helped articulate what we should be trying to do, so thank you for that.

Panelists? Frank?

MEMBER KUDRNA: Good seeing you again, and thank you for coming. We had a really positive session this morning with Admiral Brown and his commitment to work with and assist federal advisory panels and ours in particular, and it was really positive and refreshing. And we had a long conversation about engaging constituents and the issues that are always on the table of budget and available resources and demand that exceeds resources. And Admiral Brown and Russell both talked about being able to communicate in plain language what the benefits and value of NOAA are.

And one of the things weve put on our table is developing some sort of engagement document associated with HSRP that would clearly articulate the kinds of things that need and could be done with resources. And weve put that on our agenda for one of the things were going to start working on. And your thoughts on that, and the value to NOAA?

ADMINISTRATOR SULLIVAN: Thanks, Frank. I completely endorse that notion. I guess, let me ask a question of clarification about the way you phrased it. You said a communications and engagement piece associated with HSRP, do you mean that to be about the HSRP? Or about the fields of interest of HSRP or the NOAA mission areas of interest to the HSRP?

MEMBER KUDRNA: I think both. I think NOAA, as you well know, is a misunderstood organization that isnt clearly understood by people outside. And I think the value of an independent body talking about the kinds of things that need and could be done by NOAA could be very positive. When developed, its something that other individuals could take forward, and advocate for if they chose to.

ADMINISTRATOR SULLIVAN: Thanks for clarification. I would certainly endorse that. I think the art form in those things tends to be several-fold. But one is, how big a topic scope do you take on? You could take on all of NOAA, you could take on particular units or domains where theres a vital role to be played. I have a bias from my own experience, as we all do, that says if we want to engage broader publics, the important thing -- the most important thing to talk about is talk about them. Talk about them, talk about their world, talk about things that could be better in their world, talk about needs theyre feeling, and then talk about the way a NOAA or an organization is moving to respond to that.

I want to talk about me usually sends people scampering for the corners. But if you can connect to people in their world in ways that resonate with them, and things that theyre seeing or theyre experiencing, that can be the text, that could be the way you approach the topic, it can be pictures, there are lots of ways to do that. But when people see themselves in something, they lean in. They either see a need theyve been looking for a way to meet, and oh, you said youre going to do that. Or they see something theyve really appreciated, and oh, youre showing me how thats done. So there can be an art form to the design of those things.

This may be just a quibble or it may be a line of thinking that would produce some insight thats useful to designing this kind of thing. You used the phrase -- and Im not meaning to pick on your language, but sometimes picking at the language we use shows us things that were missing. NOAAs a little understood organization. The part of NOAA someone counts on, each person knows very well and really values. The fact that theres a bigger NOAA, many people dont know, or what it is. And I ponder that frequently because I can think of companies, like, Proctor & Gamble and Yum! Brands. Some of you probably have at least of heard of Proctor & Gamble, how many have heard of Yum! Brands? I guarantee you youve all eaten at a restaurant or have taken a food item off the shelf that Yum! Brands produces in the last couple of months. And so Yum! Brands has taken the strategy of I dont care if you know about the holding company, I want your loyalty to the product. And then they go to their investors and show the value of the basket of things that they are, they dont bother the consumer with trying to fall in love with Yum! Brands.

Proctor & Gamble does a little more of a hybrid thing, the P&G name tends to be a little more forward. I thought about this a lot and I still dont honestly know quite what the right approach for NOAA is to move in the direction of Proctor & Gamble, much less a McDonalds or Disney takes a tremendous investment financially in making impressions in peoples minds. Its usually beyond the reach of even a mid-sized company much less a nonprofit or government agency that doesnt have authority to use taxpayer money for those kind of purposes.

So it may be that our strategy -- and it may be that our better strategy is to work on the functional pieces that matter most to distinct segments. And be sure they appreciate that, and then count on it being the candid engagement, the informed engagement folks like Jeremy and his colleagues on the Hill to be able to look at that basket of things and say this comes to me as an entity. Because they, too, make both top-level investment allocation decisions and differentiated decisions. And I think at the end of the day, we, the leadership of NOAA, have to be able to make both cases, we have to show that there is an integrative logic to the organization, we are making the organization operate in a way that not only preserves that integrative logic but capitalizes on it so the taxpayers getting some one plus one is three, or at least 2.2 out of their dollars.

And then were ensuring sound execution, good planning, smart strategy in each of the different units. But just some thoughts.

MEMBER KUDRNA: Very good. I may just add just one other comment. I guess our turf being HSRP, I would see this more as a case example for HSRP that might have some applications broader to NOAA in some of your other FACAs or some of your other groups to go forward from a practical standpoint.

ADMINISTRATOR SULLIVAN: The mission areas that you all look at and think with us about and our weather mission areas have the greatest, most direct touch on human lives in the national economy. They go right to the heart, its a very direct touch. And so, again, I would look at those mission areas that fall under the HSRP purview and how those touch the flow of commerce, the jobs that that creates, the vitality of our ports, the ability in Kansas City, Missouri to have strawberries from Chile in the middle of the winter, I mean, you can go on and on. And this all happens, you have these things because cargo can move safely and swiftly in and out of our ports. And thats a viable sector and an important economic activity because of the safety of it. And how do we ensure that stays safe, and how do we ensure those ports stay viable and highly efficient as the environment around them changes?

As sea levels change, as cargo vessels get much bigger, as one degree of pitch means a channel that moved X tons of cargo last year now cant move that much because the hazard level went up, how do we not make that happen? We ensure that doesnt happen by getting NOAA out there in the field and making sure weve got the Coastal Intelligence, the Environmental Intelligence, the planning tools that the port captain and the city planner, and the pilot up on the bridge can use to -- its probably stories, to me, it would be stories like that from which Ive come back and say you could steal a page from the Gee, How Do They Do That book, or The Way Things Work book. Yes, wow, how do you do that?

Its really very clever, you put this here, and this here, and this here and an app here, and thats all fed -- I keep going back to the corporate world, I think of the old BASF commercials. Were not the app on your iPhone, were the Intel that makes your app worth looking at. So I would find for a communications strategy, I would look for plain language, kitchen table storytelling, everyday folk starting points that touch them, and then decide how to reflect that back into how do they do that or who are these guys, or who is that masked man that makes this work?

MEMBER MILLER: In our most recent two letters to you, we have expressed concern first about Admiral Glang is staying awake at night because he didnt know how to get more ships or new ships. And then in the last time, the lack of hydrographic survey efficiency in the last couple of years in addition, in the HSIA reauthorization of 2008, there was a new ship that was -- I dont know, requested, authorized, whatever, that it hasnt happened. So our concern is that the backlog grows, the surveys arent getting done at the rate they need to be, and I think Coast Survey is doing an excellent job of looking at new technologies, such as small vehicles and so forth.

But in Alaska, you cant do it without ships. So in the five to ten-year timeframe, what do you see NOAA needing in terms of hydrographic capability, I guess Id call it. Looking at new technologies, certainly, but how do we leverage, how do we get the resources needed, whatever those resources are, for -- HSRP is here to look at what Coast Surveys doing, I think theyre doing the best they can with what theyve got. But the fact is like everybody else, they need more.

ADMINISTRATOR SULLIVAN: Sure. A couple thoughts come to mind. One is painting context, when you look at what is Coast Survey doing, I think -- and this is a similar comment Ive made to our Science Advisory Board -- if you look at what is Coast Survey doing or what is NOAA doing in the lab and you assess and critique that, probably a perfectly fair assessment and critique, but for many audiences outside the NOAA agency who will read that report if all they see is this needs to be on NOAAs not doing that. What they see is the agencys not doing the right thing.

And so painting the broader context, taking a little more time even in sort of review reports, to be sure it comes through clearly, that there is a need, and it is of this scope, and the agencies with the resource provided, the agencys rate of advance is limited to no more than about X. Now with those X dollars are they executing well? Are they employing sound strategies? Are they prioritizing or triaging wisely? Thats a fair question.

But absent that broader context, Ive seen over and over again what comes true, and the way many of these reports get used back on us is youve been criticized again for not doing X. Well, fair, but Ive got a $10,000 problem when I was given a $100 bill. And then the $10,000 problem $100 bill part wasnt in the report, just the NOAAs not getting it done part.

So Id be alert to that potential misunderstanding or misinterpretation of what your intent really was. We are absolutely going to need to recapitalize some federal ships, some of them will have to be NOAA ships. Were working with the executive branch and were working with Jeremy and his teams right now to be sure that case is clearly laid out. I started Admiral Devany working on that three-plus years ago now.

Were striving to get the assessment weve produced cleared through the administration so we can share it with Capitol Hill. Im confident it makes a very compelling case that the total set of needs -- of ship needs in the federal government from basic research to nautical charting, and so forth they are genuine, they are substantial, that it is just not the case, that you can buy any 15 Boston whalers and let each of them do anything on a day-to-day basis. There is both the practical logistics of placement and transit, and so forth, as well as specificity of equipment and seakeeping drive you to realize there have to be some differentiation -- that we can do a better job at operating our ships and equipping them in a multi-mission way, and our assessment weve done shows that, and we will do that.

But at the end of the day, the fact that NSF has a new ship based in Alaska does not mean suddenly every NOAA fleet need is met if well just time-share their ship more efficiently. The fact that the president has called for an Icebreaker for the Coast Guard, which is absolutely an important need, does not mean that therefore everything NOAA needs to do in the Arctic can be satisfied, and nothing else is needed.

You know, its tight budget times, and both the executive branch and congressional budgeting processes detest budget wedges. Well, let me be clear. They detest positive slope budget wedges, they love negative slope budget wedges. So in this kind of tight climate, that has intensified. So we have to make our case to people who dont know anything about these fields and dont care to, to some who may or may not know something, but they dont wish to hear it because it delivers an intractable problem to them in the form of a number they cant find a place for.

And thats on us, thats just a lot of persistent explaining, and analyzing and shoe leather. But again, your voices, you are independent folks, you know the realities of operating fleets and vessels. You can look at us and take a look at whether were really being as intelligent as we ought to be about multimode operations. Are we being as intelligent as we ought to be about onramps for technology and improving our own internal processes for doing that. Are we pushing on our own culture where we need to so that well actually use something and supplant something we had been hoping for, instead of just holding on and waiting until the cows come home.

Please do work with us and help make sure were being as agile and wise as possible there, but we could certainly also use your voices on the broader picture that you are authoritative voices that say is it a legitimate truth that this is a distinct mission. Furthermore, the scope of which is so huge that the notion of accomplishing it in a timeframe thats reasonable for the United States economy by timesharing with X other missions is an implausible notion.

We say that lots of times, but our voices are discounted in many quarters.

VICE-CHAIR HANSON: Dr. Sullivan, again, thanks for coming here today. Weve noticed -- Lawson and I were talking, your 2012 appearance in Anchorage. I dont know if you recall, but next door to us in the big conference room was a huge gathering of over 500 people getting trained for Shell and their exploratory efforts that summer. So obviously, there was a lot of Arctic tension then, it continues today, and I think it continues to show the big role that NOAA/NOS needs to play there.

So along those lines, and as Joyce mentioned, the fleet, and one of the things weve tried to focus on with the group here last year is helping to articulate the NOS message. Instead of focusing on this deal and the people, lets focus on the mission and what were trying to accomplish, and sell that, articulate that message.

From that, drive your investment decisions, building new vessels, were in the dredging business, thats how we decide on how to build our fleet and maintain our fleet. Its based on the workload facing us. And so to articulate that message not only to your own fleet, but also to your contracting community who is also looking to provide those services. And if theyre short-term, maybe thats a good way to go sometimes. If theyre long-term, which I happen to think they are, its going to be a combination of both.

But articulating that message is key. So where we get to, so we articulate the message, and we see this a lot in the infrastructure business these days, thank you for mentioning sea ports, and I know Kurt Nagle is going to be here, and youll be pleased to know that weve also appeared in front of supply chain FACA that Im on a couple of years ago, and helped articulate the NOAA message there as well.

But the real question is, is what the infrastructure deficit we have. At some point infrastructure or research advocates are getting sideways talking about budgets. And weve got the wrong people talking about money. Youve got some very innovative, very thought provoking people working in this room right now with NOS that really shouldnt be talking about budgets. They need to be talking about their next product, and where theyre going to take NOS in the future.

So as we begin the financing discussion, a question comes, if the feds arent going to provide the money, or cant provide the money for whatever long list of reasons, wheres that money going to come from? Its got to get done. So for us to focus our message, it really needs to be on getting the work done. On the infrastructure side, we say weve got to articulate the need for infrastructure, we dont care if its federal, we dont care if its state, we dont care if its private. Weve got to articulate the message, its got to get done.

And I think we need to argue that this charting, these surveys, the environmental mission that NOAA and NOS have, if we can focus on that and figure out where the moneys going to come from at a different level because thats -- its very distracting and its inhibiting our competitiveness.

ADMINISTRATOR SULLIVAN: I couldnt agree more. And one of the topics we talk about with some fair frequency among my team because were trying to put our head out on that broader space, is on lines just like you raised. So what are the implications in terms of potentially different public-private models? Can we find any instances in other agencies, other fields where there is some kind of public-private model that maybe we should look at that we dont have authority for now, perhaps. But maybe we should think that through and analyze through a little bit. And consider whether the next thing we go through the White House to the Congress for maybe is not the next check but permission to work in this way, and change the equation in some other ways.

So what are the external drivers that are likely to change our equation over the next 10-15 years that we should be thinking about now and how do they affect workforce or skills, or technology, or mission capability. And what are other terms in the equation that potentially could be changed so that the outcome, the equals term is equals mission effectiveness, equals mission accomplishment.

We want that up, so how many terms are there in the equation and which ones should we be looking at trying to think innovatively about.

MEMBER BRIGHAM: Im wondering what your take was since you were up at the Glacier Conference and with the president on our ability, NOAA and HSRP to articulate better what the president himself said about charting, and Icebreakers, and navigation services. And it may be the first time in history other than FDR that actually spoke about navigation services. So how, particularly related to Arctic, how do you think we might be able to take advantage of this instant of time on this particular narrow topic to enhance the charting and hydrography, and geoid observations from Alaska?

ADMINISTRATOR SULLIVAN: Well, I think, Lawson, I mean, the fact that that was mentioned is, I think, very good testament to both some of the work that weve been doing, and the way that NOAA, Coast Guard, and Navy have been working together to make sure that the presidents advisors really understand that clearly. I mean, we work up through the OSTP and Council on Environmental Quality, some things the Coast Guard and the Navy, of course, mainly work up through the National Security Council, and weve maintained a close working partnership with them on what Ive labeled broadly as Arctic Environmental Domain Awareness to include charting, but also tides, and currents, and water levels, and many other parameters that you know are really critical to Alaskan communities, especially coastal communities.

So weve worked a lot since the very first pen stroke was put on paper to create the National Arctic Strategy all the way through this conference. I couldnt have been more pleased that those points came through as clearly as they did in the presidents remarks, and in the deliverables he announced, including the increased emphasis on general environmental observations in the Arctic.

I dont have a really smiley, glib answer for how to turn that into practical realities because of both the budget ground rules were operating under these days, and everyone would say very difficult political climate that we have both between the executive and legislative branch and between the parties on the Hill. That is what it takes in this country. As the adage goes, the president proposes and Congress disposes. So we are ready and on deck, and backing up and amplifying what the president proposed. Weve got the solid materials and the mission cases, all of the things we can to demonstrate the substance behind his remarks that there is real need there that matters to real people. And there is real need in terms of capacity in particular, in Coast Guard and NOAA to come anything close -- to even slightly accelerate the meeting of that need.

And I have no doubt that -- Jeremys got three key counterparts that drive the appropriations process on behalf of the Senate and the members of the Senate and the House, I couldnt speak more highly of the kind of rapport relationship we have, its open, its transparent, its candid. So I have no doubt that they understand and appreciate, and to a very high degree credit the cases that were making. Because theyll tell us when they think were spouting BS, theyll just call us on it.

So I think we are working every lever and avenue we can on an everyday basis from our side, but it goes in the end into the hands of the Congress, and I dont envy them the difficult decisions that they face. If Congress were the model of comity and constructive behavior today, I would still not envy them the task because the financial conditions just are very strained across all the fronts they have to deal with, and it all sort of -- the tip of the pyramids kind of right here.

MEMBER BRIGHAM: But it does lead to some new public-private partnerships. Its hard to fathom that we have leasing offshore, and none of those funds go to infrastructure. So maybe it requires on the Hill some new legislations for when the government does lease offshore that part of that is devoted to the charting, hydrography, safety issues, environmental protection, and environmental awareness, et cetera. So that --

ADMINISTRATOR SULLIVAN: Oh, well, on that score you also need to talk to your congressional delegation --

MEMBER BRIGHAM: Of course.

ADMINISTRATOR SULLIVAN: Which has made the first part of that speech frequently, but tends to have a second set of needs they would apply the funds to. The proportion of lease royalties that would return to the states is something both your senators raise frequently. But their shopping list of where they would apply it does not match your shopping list.

MEMBER BRIGHAM: But of course, in this case, Interior leases out, but it isnt a whole government approach because Interior doesnt take into account back 30 years ago, the case that we do need infrastructure, and we begin with -- and in fact, this is ocean, so we begin with environmental observations, and seabed hydrography.

So it isnt a whole government approach, its very narrowly focused from my perspective.

ADMINISTRATOR SULLIVAN: Yes, but thats established by the law and not by the presidential direction.

MEMBER BRIGHAM: Oh, of course.

ADMINISTRATOR SULLIVAN: And we do struggle with that seam a number of times on both budgeting and other matters, the major land holder in Alaska, of course, is the Department of Interior, there are tremendous environmental remote sensing needs on the Interior lands of Alaska, certainly.

But the changing Arctic, one of the most significant dimensions of the change underway in the Arctic is that it is, again, making it an ocean realm, and that is the biggest game changer. Areas that are accessible for transit, for resource extraction, for tourism, for whatever. I would argue the biggest game changer is going to be the way the ocean is changing.

And so you get the royalties collected here, but the service and mission needs to deal with that changing ocean reality in a different agency. And youre right, theres not a handshake mechanism that allows funds to flow. And just the one final budget and civics lesson, which Jeremy can give you better chapter and verse on or correct me on if I get it wrong.

But at any given stage of play, how the budget is seen to balance or to not balance takes into account where those royalties went. So the current financial circumstance, actually makes it harder in some cases to tap royalties like that because someone has book kept that on some or other side of the ledger either in their favor or in their deficit, and the proposal to move it somewhere else and expend it disrupts that whole balance.

MEMBER BRIGHAM: The new Arctic steering committee from the White House may help to at least sort out and discuss some of these interagency issues.

ADMINISTRATOR SULLIVAN: The steering committee has already helped make a number of things happen, and coordination points work better within the limits of existing law. No executive order -- whichever partys in power, the guys that are not always yelling and screaming about executive orders. No executive order changes existing law; no executive order gives me as an executive branch leader any prerogative or permission to move beyond existing law. And existing law includes where did the congress allocate my money?

But it can demand that the players around the federal table, the executive leaders, heighten their situational awareness, look to line things up better, modify their next budget request to reflect some better, more efficient alignment. So it has made some good things happen on that front, but it of itself cannot change these boundary conditions.

CHAIR PERKINS: Well, Jeremy, that was quite a segue leading into hopefully the how youre going to enlighten us on whats going on, on the Hill, on the appropriation side.

MR. WEIRICH: Well, first of all, thanks for letting me be here today. I really appreciate the opportunity to speak with you all. The work that you guys do and the service that you provide to NOAA and to this panel is extremely important. And certainly serving on this panel is well recognized, certainly on the Hill, given all the folks who want to get recommendations to come to the panel, and apply to it so the -- the work that you do is very important, so we appreciate everything that you do, thanks.

I guess Im here today both for professional interest and personal obligation. I had started my career in NOAA within Coast Survey has a hydrographer working on the NOAA Ship Whiting under the command of then-Lieutenant Commander Glang, who had the misfortune of having me as one of his ensigns on there. But as bad as he had it, he didnt have it as bad as Rick Brennan who we shared a stateroom, so for those of you who know Rick, whos a great guy, I learned a lot on that ship. And both with Coast Survey and the folks working onboard and on land, I learned pretty much what you all know, which is the data and the science that goes into the charts, the navigation, the geodesy is extremely important, not only for safe navigation, but for commerce, and for keeping the economy going.

So if anything, I want to be here today as an opportunity to share some of my perspectives, to hear your perspectives, but also just as a start to serve as a resource for you down the road, you know, for the panel as you guys and gals need to have further feedback and perspective. We can serve as an independent resource for you and sort of fact-check any items that you may be hearing.

For todays purposes, like Kathy, I dont have any planned remarks, I can only commit to this as early as Monday, unfortunately. Ive been working with the CR down there on the Hill, so Ive had to shift gears a little bit. But I did want to have an opportunity to provide at least some perspective on some opportunities that I see, and some challenges. Kind of throw just our perspective, and then see what you all have. I do want to provide plenty of opportunities for questions and comments that you may have.

I think in terms of opportunities, I think one of the things that this group has the benefit of having is -- or certainly at least from the Coast Survey perspective, NOS navigation perspective is that this is one of three programs within NOAA that has wide bipartisan and bicameral support. Thats very fortunate, thats something that you should certainly take advantage of. That doesnt mean that from an appropriations perspective, we just shower money on the program. But it does mean that theres few disagreements, and theres a genuine need and desire from all four corners from the appropriations perspective; folks that really want to help out and see you whenever they can.

I think from a challenge perspective, though, it does lead into the funding, and where we have had difficulties in trying to provide sustainability. I think level funding is the new normal, level funding is the new happy, I think you may have heard that, thats not necessarily a satisfactory statement, but in some cases, that is the world we live in. Trying to characterize the funding that weve seen for Navigation Services, I was kind of rattling my brain last night to try to see what the perspective may be, and so I -- as I learned from Gerd, let the data speak for itself. So I crafted a couple of charts and graphs, I dont know if we have those.

And I apologize, these were done last night, so if you cant necessarily see them. Basically what I have up here, its just some data that we have in our fiscal charts on funding that weve providing for Navigation Services. This follows NOAAs current budget line, kind of puts all the items in the pot.

What youre looking at there is requested funding, what the Senate provided, what the House provided, and what was enacted. It looks like a busy chart, but was able to go back to about 2008, and if you go to the next slide. What Ive done is just split the two up, so what youre looking at here is -- or what was requested and what was enacted.

What would be nice is to have a nice big trend line coming up, and it used to be where really up until about 2011, 2012 the Congress really came in above and beyond what the president was requesting for Navigation Services. And this includes IOOS, the current program, the observation systems out there. And Ill get into some other charts real quick that kind of split things up, but what youre seeing is -- there was a big dependency between the administration and Congress in terms of how the budget request could come in, and what Congress was willing to provide down the road, some of that had to do with earmarks. Some of that had to do with congressional interest in Navigation Services.

Whats happened pretty much since 2013 since sequestration down the road is theres been a change in terms of how the request came in, and what Congress was able to provide, part of thats a disconnect in terms of what spending level the president wanted to go for, and what Congress was working with. At the end of the day, were working with real money, the requests coming in is based on a proposal. So we can only spend what our allocation is, and that sort of reflects that.

Its starting to normalize, though, in the sense that the president and Congress are realizing what those real values are and so were trying to find some more common ground. So I think one takeaway on that is there is a -- its tough to manage this from a budget perspective, you know, seeing fluctuations and not being able to predict what happens from beginning to end. Because the cycle here represents over a year, longer if were dealing with CRs.

And so its a tough anticipation if you are someone in the Marine Center whos having to try to decide what youre going to be able to fund for next year for fuel, for personnel if youre seeing all these costs fluctuate. And then you toss in some technology refresh in there, and then thats another added hassle.

If youll go to the next slide. This represents pretty much how the House and the Senate has funded Navigation Services. I kind of threw this one up here because it shows the Senate likes you guys a little bit better than the House does.

But thats changed, though, in the sense that the House has traditionally underfunded NOAA to some extent. Im using general terms here. And what were also seeing is that this is starting to normalize quite a bit, which is very good. That just shows a recognition on the Houses part that theyre willing to invest upfront on what Navigation Services do, Hydro Services, rather than just waiting until conference to acquiesce to a Senate number. So thats very positive.

Two more slides. What this one -- not to spend too much time on graphs and budget stuff, but what this is, it parses out the funding that really strictly affects NOAAs hydrographic work. What I mean is that it takes out hydrographic survey backlog, which Im going to get to in another slide real quick. And what weve seen is, again, this trend of -- its a busy slide because its fluctuating. And again, this emphasizes that if you are a NOAA office, Coast Survey, who is trying to provide efficiencies in survey processing, do technology refresh, this is a tough budget graph to deal with. Especially tackling with personnel and contract as well.

So this is difficult. As difficult as this is, an overall trend on this is that it has been going up.

What this is, is the address survey backlog, this is outside contracts, basically, that go out for data acquisition, thats how we view it. This has been going down. For the folks who are on the hydrographic board who represent outside groups, this should be a genuine concern. Again, I let the data speak for itself, just throwing it all up there. Whats nice about it is the House and Senate have come to more of an agreement upfront in terms of how do they feel, how important this work is, and how important the private sector. So thats normalizing from a Senate-House perspective.

But overall, the trends come down a little bit, its decreased, and we need to bring that back up. But of course, if were bringing that back up, we need to make sure that the folks within NOAA have the ability to process that data, produce charts, continue to do the geodesy that they need to do. So thats it for slides.

I think a couple of other topics that I want to hit before we open it up to questions is I think one of the other opportunities or advantages that Coast Survey has, and its worth me pointing out, is you havent gotten caught up in the debate on the National Ocean Policy. Im not here to bring that debate up, Im not here to do the pros and cons, Im just saying that in the world I live in, we have to deal with that on a regular basis. Theres attacks that come in, and from our Senate perspective, we try to stay neutral. But I have seen programs really get hit and tackled by that over -- in some cases, misconceptions. And Coast Survey has done a great job, and NOAA has done a great job, at least from the navigation side on not getting that wrapped up around there. That youre going to let the charts speak for themselves, youre not going to provide the policy on that, which is extremely important.

A caveat on that, which I think is to drive the point home, Marine Spatial Planning is a hot button. You may have heard that certainly from the states and the regional side. Integrated Ocean and Coastal Mapping is not a hot button. Were able to push forward new initiatives, its not the same thing, but its within the same realm, but thats an important mark in terms of when we work with our colleagues to describe the work that it is that you guys do, thats how we keep things separate.

I think for challenges, just to wrap up a couple -- the ships our challenge. Dr. Sullivan described things very well in the sense that the fleet plan that is out there articulates very well the need for NOAA. The problem is I havent officially seen that plan, OMB hasnt released it. NOAA, for its part, is doing a great job of describing that, but it doesnt necessarily fit within the context of what the Coast Guards doing, what NSF is doing, which are other discussions out there of which in some cases are a little bit articulated.

We have members who are very interested in building new ships. My boss, Senator Cochran is interested in that. Because he sees the value of the shipping industry, and shipbuilding. But that being said, we need to describe that a little bit better so that we get more momentum. Thats not to say that if we had that out there, and I dont want to put a misnomer out there that if OMB had that out there that today wed be funding that, we do have the budget challenges that go in there, its just another obstacle in that discussion.

The topic was brought up about public-private partnerships. I think the PORTS system is a good example of that. I know the recent Hydrographic Act had allowed for NOAA to pick up the entire tab of PORTS, O&M. From an appropriations perspective, we havent necessarily endorsed that in recent years. Part of that is because we do see value in the public-private partnership, and if you guys have comments on that, Id be happy to hear it, but just from our perspective, just know that thats $4 million that wed have to find someplace else, which is difficult in this time, but like I said, Im happy to discuss that further.

I think Im going to pause right there and open it up to anybody who might have any questions at this point.

MEMBER MAUNE: A couple of years ago, I briefed the House committee that controls the budget for the Department of Interior, and this staffer said that in their budget process, they found that what the Defense Department asked for, they got, what Homeland Security asked for, they got, and everybody else was kind of also rans, and as though they werent important at all. Do you have the same experience on the commerce side? And would there be any benefits if we were better able to couch what we do in terms of national security?

MR. WEIRICH: I think -- I can answer that in two ways. One, the national security component is extremely important in describing what NOAA does. Its certainly been a great tool that NOAA uses and should certainly use more, and I encourage you all as you work as independent voices on this, and as you talk to various folks to use that as a tool, its very important.

In terms of Homeland Security and DoD getting everything it needs, or even in the Commerce, Justice, Science Bill of where NOAA sits, does FBI get everything it needs, things like that. To some degree, part of that is a discussion on how the budget is separated between discretionary and mandatory funds, but also defense discretionary, non-defense discretionary.

So theres a big chunk of the budget is defense discretionary.

We have 12 subcommittees, the defense subcommittee is certainly by far has the largest budget to work with. The Commerce, Justice, Science Bill we do have a portion of defense discretionary funds, a lot of that does go to FBI, but theres a whole bunch of other subcommittees that are trying to vie for non-defense discretionary funding. And thats part of the overall debate thats going on right now in terms of that balance, you know, whats right. Im not going to weigh in on what that balance should be, Im given an allocation, I work with it, but lets just say that sometimes when the allocations are spread out by defense and non-defense, sometimes theres a little bit more leverage or more of a perception that defense-related agencies get more money. Some of that is just the perception on how thats split out.

VICE-CHAIR HANSON: If you, and maybe this is for Dr. Sullivan as well, I don't know, but as you do your charts there, itd be interesting to look at the -- you broke out the NOS, the hydro part of the budget process request versus actual. How would that compare to the overall NOAA budget? Is that a similar random type of chart there? Or is there some correlation between the two?

MR. WEIRICH: Thats a great question. Because NOAA is a diverse agency, and theres certain aspects that have gone up and down. We do -- when it comes from an operational perspective, we try to provide consistent funding as best we can. I think one artifact thats important to note on the comparison between the NOAA in-house hydro work compared to the external contracts is an artifact thats in there has to deal with sequestration, and the recent cuts that have come in, not even before sequestration, but certainly with 2012 is that when these budgets came in, or the appropriations came in late in the year, they came in certainly after December. And so what that drives NOAA to do is theyre given a budget thats much less than what they were anticipating, in some cases, much less than the year before, 2011 was a CR.

And so NOAA has to pay the bills already halfway through the year, theres certain obligations that they have to meet. And so what ends up happening is that the sacrificial lamb in all this is external funding. And weve seen that with the survey backlog grants, weve seen it with research grants. Both fisheries and OAR, and that is a problem. And thats not necessarily NOAAs fault, Ive even tried to explain that to outside groups because at the end of the year, they have these obligations that they have to meet. But it is a problem, especially when were dealing with sequestration, or dealing with these fluctuating budgets, is it makes it difficult for a federal agency to plan like that.

ADMINISTRATOR SULLIVAN: I might just add two quick things. One is one of those years that Jeremy cited, I did not have final spend plan numbers, I mean, the actual byline item approval from the Congress until 47 days before the end of the fiscal year. And it is federal felony with individual penalties to overspend what your final number becomes, so that puts a double whammy on managing the outside money.

The comment about the charts I would make, I cant off the top of my head tell you how closely the top line NOAA number -- the volatility was similar, I can tell you that. But if you look at the satellites and weather missions, Jeremy showed you a number of places where he pointed out the Senate likes these functions better than the House. On satellites and Weather Service functions, it tends to the be the reverse. And weve seen in a number of these years House marks that very closely matched the presidential request or went somewhat high on the weather and satellite functions and physical science functions.

And in many, if not almost across the board, coastal functions very, very low House marks. So we have an A and B pattern and then we have a B and A pattern that affect different parts of the agency differently.

MEMBER KELLY: Youve opened the doors so I will gladly go in on PORTS. PORTS is a very, frankly, one of the most wonderful products that comes out of NOAA. When we talk about aiding navigation, safety, everything else, it all comes back to PORTS. NOAA itself and others refer to PORTS as the federal backbone, yet, it relies on outside private funding to handle the maintenance. Which in of itself might not be a bad thing, its somewhat unprecedented in certain federal circles, you dont have to have local airports pay for FAA and other services.

But what I would like to say is I think we just have to be blunt about this, this is not a well working public-private collaboration; what this is, is a reaction to a budgetary default on the part of the federal government who should be paying for this.

The cost of PORTS in various port locations falls upon usually deep-sea shipping interests. If we could have the PORTS system and set it up as a 900 number, wed make a fortune because the majority use of this stuff is academics, recreational users, the actual government itself, Coast Guard, Navy, everybody else, weather services, beach managers, OEMs, first responders, you name it, everybody uses it. Its a wonderful success story. The reality, however, is that I am aware, and since a lot of the organizations like myself are involved with the port authorities and whatnot that pay this, and theres also a paucity of money there. And I just have to say that I know in New York, were out of money for the next cycle. Weve been paying for this out of the 50-foot dredging project that weve been doing at the port of New York and New Jersey as a contingency expense, and port authoritys told us, we dont have any more money. The next time we have to do this, were going to say no. And I think weve run into the same thing in the Delaware River where its actually gone dark briefly.

Houston has told me, because I know the people down there that are paying for it that they have no money for the next cycle. So I think we might be looking at a very dangerous situation, potentially one or more of these systems going dark. And they are essential to commerce, theyre essential to the safety, security of the public, you know, this is what government is designed for, for the security and safety of the general population when there is a general benefit to the general public. The constituency thats paying for this are foreign flagship operators, 90-some-odd percent of all the ships coming into this port, major deep-sea ships that pay for it. Not the tugs and barges, or the coastal business, or anybody else, its international shipping thats being assessed this cost.

And its just not right, it really needs to be addressed, it needs to be fixed, everybody understands blunt realities as far as budgets, but I think we need to start saying that this is something that NOAA is looking to pay for, but at this point, cant because its going to start going dark in various locations probably in the next billing cycles.

MR. WEIRICH: I think the only response Id have on that is -- and I completely agree with you in terms of the amount of usage that has come out of this. I originally started working with the pilots on this, and the Ports Authority but has blossomed up since then. Its my understanding that those did start up as partnerships, though. That as part of the agreement, that PORTS would pick up the O&M and that was long ago, and thats since changed, but that was the initial agreement. And so we do hear from other folks about how the value of public-private partnerships, though, and if the federal funds cant come in, where can we leverage other public-private partnerships, and that is one area -- Im not saying that thats going to stand or stay because obviously, theres folks who -- especially on the authorizing side that have granted that.

But it comes -- that whole cycle of changing this to make it a full NOAA 100 percent responsibility, it doesnt necessarily -- it may end with us but doesnt necessarily start with us, I mean, the presidents request has to have that incorporated in there as well, that helps. So its a discussion that has at all different levels, and I think the president certainly sees the value on that, and certainly understands the fiscal pressures that are coming down on that.

The discussion is certainly open, and were not -- my comments on where we are on the PORTS system is less about having a strong fist saying this is where congress stands on this, its more of this is what the current state is, and this how all sides look at it. Its certainly an open discussion, and no ones hard either way on it. Im just trying to provide some light in terms of why hasnt that changed in the years, and its still an open discussion.

CHAIR PERKINS: Yes, Frank?

MEMBER KUDRNA: Jeremy, the senate has been positive toward NOAA in the past, and there have been a number of senators indicating theyre going to retire. Is that going to have a negative impact on the level of support for NOAA? And are there some folks sitting on the bench that are likely future champions?

MR. WEIRICH: Thats a good question. I think its one aspect of an overall issue, though, and that is communications to the Hill overall. Because I mean, theres been plenty of ocean champion folks, certainly in the senate over the years, Senator Inouye, Senator Hollings, Senator Stevens, Senator Gregg, these are just to name a few.

But as much as these members have been real champions for the ocean, theres still plenty of members still coming on in that need to get brought up to speed and to see the value, and to answer your question, yes, there are members out there that are very open to this. Open to hydrographic issues and navigation issues. But this is where you all come in to provide an extra voice on what NOAA does and what that value is.

From my position, we get -- in order to help craft our bill, this isnt something that Senator Shelby or Senator Cochran, Senator Mikulski even on the house side, they dont sit in a back room and just craft this bill. Theyre very collaborative in what they hear from people on the subcommittee, the full committee, and overall in congress, and all the members have an opportunity to write to us on what their priorities are. In addition to that, we hear from outside groups that provide their feedback, as well as members will do what we call Dear Colleague letters of where we have groups of members signing onto one particular topic.

To provide some perspective of where this topic stands, yes, the costal centers will weigh in, but they dont necessarily weigh in en masse like they used to. And we dont hear from very many folks within the maritime community about this, at least not as much as I think we should. I think this year we did receive a letter from the Ports Authority, which is great. Theres been prior years where we havent had that. I think from a hydrographic survey industry community, to be able to band together and weigh in on that is good.

So I guess my point being is that the work thats being done by NOAA and the subject matter reaches a very diverse group of folks. And the amount of jobs that it supports in the long-term, in order to keep some of these ports running by extension is very important. So I think the more that that voice can get out there, what you all can do to help with that would be very important.

CHAIR PERKINS: Yes, Joyce and then Ill have a follow-up.

MEMBER MILLER: Just a follow-up to Eds comment. Its just not private people that use the PORTS system and other systems that NOAA provides. For instance, after a disaster, the NRTs and stuff. Theyre heavily used by other agencies, I mean, PORTS -- when we went to New York, it was probably half of the usage was reported out of federal agencies, FEMA, Coast Guard, et cetera. I mean, Im sure that they do things that NOAA uses as well. But how do you get some support from other agencies for things like PORTS to help with budget issues?

MR. WEIRICH: Its a challenge NOAA has overall. I think that PORTS is a microcosm compared to the challenges we have with satellites trying to get the other agencies in that and joint from a national securities perspective how important these weather satellites are, and were talking about billions of dollars at that point. And its difficult to get the other agencies to weigh in because they see that thats not something that they have to deal with because theres other things that theyre funding of which NOAA is leveraging to some extent.

So its good to hear their voice, though, coming in, especially if -- on a case-by-case basis and thats where the stories come in with New York-New Jersey, and Delaware Bay going down and going dark, thats going to have a larger impact, and its hearing those voices coming in, rather than the bill payers, but hearing it from the folks that have to actually use that data and not have that data anymore is going to be very important hearing that voice and adding to the discussion.

ADMINISTRATOR SULLIVAN: I want Jeremy to put a provision in my budget bill that says I can do what the state department does. They charge other agencies basically a service fee for embassy security because every agency with any overseas presence relies on the United States Embassy. I want that provision for weather satellites, for nautical charts.

CHAIR PERKINS: Jeremy, how long have you been on the subcommittee?

MR. WEIRICH: Since December 2008.

CHAIR PERKINS: Okay. So youve been there long enough to have that look back at when NOAA used to -- in the Blue Book, there were dozens of PPAs. And so now theyve been bundled together under NOP, Navigation Observations and Positioning and there are only three PPAs in the FY16 Blue Book. I would be curious to see whether you think that has been an effective strategy that was executed of bundling those PPAs. Looking at your charts, it doesnt look like that was an effective strategy. Now maybe its the circumstances, and the continuing resolutions, and the will of the congress to appropriate funds, but maybe there was a strategic -- you know, are we doing the right things with only having three PPAs and theyre under navigation observations and positions.

MR. WEIRICH: Thats actually more of a NOAA budget office question. And Im going to answer it and Im not dismissing it. The reason being is because the one advantage that we have on that is it allows NOAA to be able to move funds in a way that gives them some discretion. So when we -- it took a lot to roll those charts up, and we dont do that all the time, and theres still plenty of charts that we keep rolled down.

The NOAA -- out of the CJS Bill, the NOAA table is the biggest headache to deal with because of having to manage all those and making sure everything adds up well, and they were very long when I first started, especially when we dealt with earmarks. Those head up their own little lines.

What happened with NOS, though, is there was a certain amount of trust that came in, in terms of how NOS and it started with Holly Bamford in terms of how they were going to be able to look at the budget, and a certain amount of trust of how congress felt that, you know, giving NOAA some discretion to be able to move out and by rolling up that helps with that.

The disadvantage, obviously, is that some lines seem to disappear and so how were able to advocate for those can be different. What you see or what you see in the Blue Book, that wasnt what NOAA proposed, there was some back and forth with congress and saying well, you actually need to have this line out, you need to have that line out, we cant do it that way. Because they wanted it shrunk down more. But in my opinion, has it been beneficial? I think it would be because as -- if Im an agency thats getting a budget late in the year, not getting my budget on September 30th, my appropriations on September 30th, and I know its going to be several months after that, and I have it to execute and meet contracts both for personnel and for grants, and to meet those pressing issues, having that leverage and that flexibility is actually pretty important. That being said, Im open to hear any negative aspects that may have come out or anything from the outside that honestly we may not be seeing or be aware of. And we can have those discussions offline, too, I mean, that doesnt have to be brought up now.

MEMBER KUDRNA: My understanding is part of the problems associated with the really low transfer ability of NOAA compared to other agencies. Their ability to move money is miniscule without a submitted plan.

MR. WEIRICH: Yes. So what happens is we provide the appropriation, and NOAA provides us with a spend plan as all agencies do under bill. And NOAA has the same transfer authority as any other agency in our bill. In fact, DOJ has more restrictive transfer authority. So its a 10 percent -- 5 percent --

ADMINISTRATOR SULLIVAN: -- or 10 percent, whichevers less.

MR. WEIRICH: So it does provide some -- by rolling it up, that provides NOAA a little more flexibility and not have to have it reprogramming because theres that amount of trust. Thats not to say that we give NOAA, you know, say go ahead, do whatever you want, they communicate with us on what they do, and thats from my perspective because part of our job is accountability and oversight, we havent had a problem with that.

ADMINISTRATOR SULLIVAN: There are other agencies government-wide that have more reprogramming latitude, but the CJS Bill is very tight.

MEMBER MILLER: Just a question, why is it so difficult to transfer funds among agencies? DoD to NOAA, I mean, it just seems like -- and its also difficult to transfer to, say, small private companies or something that want to do a survey. I mean, Admiral Glang just told us after how many months of work, we may have an MOA with two other agencies. So why?

RADM GLANG: Just to be clear, thats not Jers headache.

MR. WEIRICH: Yes. Thats more on the administrative side to some extent. To some extent. From an agency-to-agency perspective thats set up, we dont have any restrictions on that. There are some -- to be fair, there are some general provisions that we have in our bill of which weve tried to help with, that allows NOAA a little bit more flexibility to provide funds to outside groups, outside non-federal groups whether its researchers, or states, and things like that. And weve tested the water recently, we were able to get the house to move out a little bit on some recent language. Its not as far as NOAA wants to go, but it is a step in the right direction. And again, thats testing trust is what were looking at from an accountability perspective. Because it could open the door up, if we had this carte blanche authority to allow NOAA to just transfer funds anywhere and everywhere, that theres some concerns with that.

But to answer your question, were helping from that perspective. But from the agency-to-agency perspective, not my headache.

ADMINISTRATOR SULLIVAN: So federal acquisition law of longstanding, of course, gets translated into procedure. And the federal acquisition regulations, they are extremely complex, and theyve evolved over time as these rule books tend to do, any misstep adds 16 more pages to the rules to try to prevent that misstep from happening again as opposed to firing the guy that did the misstep.

And the clear intent of the rule is not to expedite the efficient use of government funds. The clear intent of the rule is to nail shut any little pathway that might lead to any misstep or misuse, or fraud, or waste, or abuse. So its a very laborious multilayer process because its oriented towards to prevent any misuse. Its not oriented towards enable efficient accomplishment of the federal mission.

CHAIR PERKINS: Jeremy, if we were able to get the will of congress to embrace doing a reauthorization of the Hydrographic Services Improvement Act, from your seat, what would be the one or two things that we should fix or change in that reauthorization that would make this process work better?

MR. WEIRICH: Thats a good question and its a fair question. Since thats in the authorizers realm, we dont -- we work with them only to know kind of whats in their bill, and making sure that theyre not appropriating an authorizing bill. But what is helpful is the authorizing levels of appropriations that they put in the bill, which is helpful. You kind of want to make sure that those levels are going to be healthy and high, and that they do reflect the needs of -- to reflect the current needs, but also where the needs are going to be five, ten years out based on these authorizations. And that should reflect kind of what we can do from an appropriations perspective.

And I dont mean that they have to put in their -- some budgetary aligned trend of where were going to be. But its more about making sure that what their planning for jives with what the administration wants to go for, and kind of what the appropriators have been endorsing in the past. So if they want to move out on a complete right angle on where hydrographic survey should go, those things are more -- its less about making sure that somethings in there that we want, its more about making sure that theres a checks and balances going on in there that its in line with what we can find and where we see our priorities going.

So if they decide, for example to completely privatize all of hydrographic surveys 100 percent, okay, well talk to them about where do you see the data quality assurance coming into play here, and those type of discussions. Im not saying that thats happening or seeing that, but you get my point that we want to make sure overall that theyre planning well for the future.

MEMBER KUDRNA: Some of the federal advisory committees in their authorization provide annual reports to the congress. We dont have such language in ours, however, were up for a reauthorization. Would that be something that could be useful to the senate side?

MR. WEIRICH: It could be useful to the authorizers. It wouldnt not be useful to the appropriators, only because we have many requirements for the agencies overall. Dr. Sullivan would be the first to realize the burden that we put on NOAA for reports. At the end of the day, we can -- as appropriators, we -- I dont want to say that we have more of a daily contact with our agencies more than the authorizers do, thats not a fair assessment by any means, but if we need information, we can just grab it. And its more a formal report is less useful to me than a meeting like this, or a conversation on where those litmus test needs are right now. Because we have to put a bill out every year. It may not come out on time, but we have to put it out every year. And it's those instant messages that are good, rather than an annual report that may come out six months late.

VICE-CHAIR HANSON: Are you going to ask him about a three-month or a year-long CR?

MR. WEIRICH: I can't answer that.

VICE-CHAIR HANSON: So, Jeremy, you mentioned the allocation. I think that's a key piece that we often overlook. Is there a way for us to impact that or how do we pay attention to that? Maybe that's a better way to phrase it.

MR. WEIRICH: So, to better describe what I mean by allocation, so my subcommittee receives an allocation from our full committee based on an overall allocation that we get, basically, from the Budget Committee that says, here is what you can spend; and our job is to spend without going over. So, we have to meet a number at the end of the day. We don't leave anything on the table. We spend every dollar. But as we had for this year, the Senate's allocation is essentially less than last year. It does go up, but there were some funding items that we were able to do last year that we can't repeat this year. So, at level funding that can be difficult.

There is a larger discussion being had right now in Congress in terms of raising the budget caps for both discretionary, defense discretionary and non-defense discretionary. I'm not prepared to talk about that on the record here. But having that higher level of allocation obviously, means we can spend more money. But I don't want to miss the point though that NOAA is competing with the Science Agencies, Justice, as with every other subcommittee has their own agencies competing. That's not to say that NOAA is always second fiddle to Justice. That's not the case at all. But what's nice about how those communities are set up is that there is this balance that we try to look at. Okay, here is our overall level. What are the overall needs? And NOAA is just one piece of that discussion.

So, I don't want to plant a seed that if we fix the allocation problem, NOAA overall is going to go up or this piece of NOAA is going to go up. It really just comes in to be able to resonate that this is a priority for NOAA for the nation and that message is really what needs to consistently be made to members regardless of what our allocation is.

CHAIR PERKINS: We're almost perfectly on time. Dr. Sullivan, Jeremy, if you're agreeable, I would turn to the back of the room. We have quite an audience here, something that we normally don't see at an HSRP meeting. I'm sure it's not because of the Chair. I'm sure it's because of you two. So, I would like to take this opportunity just to see if we could entertain any question from the audience? I'm guilt-free. At least I asked. And we're on time. So, thank you both very much for spending such a big block of time with the HSRP today.

MR. WEIRICH: Thank you. I guess, and one last thing just in closing, my discussion here is candid. But I'm happy to have further discussions down the road as a resource for you all. So, don't think of this as an endpoint, but make sure you lean on me, but other appropriators out there to be able to help you out in whatever you need. Thank you.

CHAIR PERKINS: We have a short break and then we reconvene at 3:00 p.m.

(Whereupon, the above-entitled matter went off the record at 2:28 p.m. and resumed at 3:00 p.m.)

CHAIR PERKINS: Great. Thank you for returning to your seats in a timely fashion. Next on our agenda is a speaker panel of non-federal associations. This panel of non-federal associations is the first of two sessions on the program to identify and assess the value of certain NOAA products and services that are critical to advancing and achieving their association's missions. This panel was put together by Dr. Maune, and I will turn it over to him to introduce the panelists.

MEMBER MAUNE: Good afternoon. I'm Dave Maune, and Frank and I sort of worked this program up together with an idea on saying how we might approach this HSRP from a perspective of determining what is NOAA doing right, what's NOAA doing wrong, how can we improve and does NOAA need to change course? And it seemed to me as though this direction -- I mean, this PowerPoint slide was prepared in advance. But just today, the different speakers today used the following terms, Russell Callender mentioned engaging stakeholders. That's what we're trying to do today. Juliana Blackwell mentioned customer engagement. That's what we're doing today. Admiral said, how do our customers use our products and how do they want them changed? That's what we're trying to do today. Dr. Sullivan said, what do your customers need from NOAA? That's what we're trying to do today. Jeremy Weirich just said, what is the value of what NOAA does? All of this is very consistent with what we had planned on doing in this session today.

Next slide, please? I was involved in a previous cost benefit analysis for NOAA back a long time ago, 1998. It started off with user forums, talking to our customers and case studies determining what NOAA might do to modernize the national height system in the United States. Back then heights were determined by differential leveling. And the results of this study was that we needed to switch to continuously operating reference stations, core stations and differential GPS. And we documented the need for high accuracy DEMs based on NAVD 88, things like that. But it all started off by talking to our customers with forums to see how we might be able to improve.

Next slide, please? More recently, I was involved in the National Enhanced Elevation Assessment, in which we analyzed the mission-critical requirements for 602 functional activities for elevation data. It resulted in U.S. Justice 3D elevation program called the 3DEP based on quality level 2 LIDAR for 49 states and quality level 5 for Alaska. We looked at future technologies, such as single photon and Geiger mode LIDAR. Started off by talking to a lot of people, answering their questions and having them answer our questionnaires.

Next slide, please? Relevance to today. Both studies were based on customers' stating their problems. What's wrong with the status quo? Both studies cited improved accuracy as a major benefit. And accuracy is a hard thing to translate into dollar benefits. But both of them had that in common. Both studies succeeded partly because dollar benefits were quantified. Both studies resulted in major program changes at NOAA and in USGS. Today, NOAA still wants to provide improved products and services to you if realistic and affordable, and we hope you can help with this process.

We don't know if we're going to succeed or not, but we thought it was worth a try, because what we've done in prior studies in using this kind of approach is consistent with what all of the speakers today said NOAA has in common in trying to determine what do our customers need from NOAA and how can we serve them better? That's the common thing here.

Next slide, please? Assumptions can often be made to translate intangible benefits, like accuracy and safety in dollar terms. That's going to be the most difficult thing we have to do as people tell us what they need. It's often very difficult to translate that into dollar benefits. But the success of any analysis ultimately boils down to being able to compute the return on investment in some way that people in Congress might appreciate the value to the taxpayers. We don't know if it will work, but we thought it was worth a try.

So, I think that's my last slide. We're going to have -- I'm sorry, we do have two more slides. This introduces the four speakers for this afternoon. I'll go through their bios briefly. You can hit the next slide. And these are the five speakers we're going to have tomorrow from the federal government.

Our first speaker for this afternoon is Kurt Nagle. He is the president of the American Association of Port Authorities. He has over 30 years of experience in Washington, D.C. related to seaports and international trade. Since 1995, he has served as president and chief executive officer of the American Association of Port Authorities, and Kurt began working at AAPA in 1985. And this is the alliance of the leading public port authorities throughout the western hemisphere. I am told he is a very nice person and that he is going to give us some good insights on how NOAA serves the port authorities. And it turns out he is almost a neighbor of mine. We're both from Alexandria, Virginia. I've never met him before, but welcome.

MR. NAGLE: Thank you, Dave, and thank you to the Advisory Council for the invitation to be with you here today. As Dave mentioned, the AAPA is the collective voice of the public seaport industry throughout the western hemisphere. We have the public port agencies throughout Canada, the United States, the Caribbean, and Central and South America. Today, my views are those obviously, of our U.S. members.

I think just as an initial comment, based on some of Dave's introductory remarks. It's, without question, the most, I think, critical time for our nation in terms of our infrastructure in and around our seaports, most definitely, including our navigation services; and I'll talk a little bit about some of those specifics as we go forward.

But as all of you in this room are aware, ports are gateways to our regional, as well as our national economies; and on a yearly basis, more than $2 billion metric tons of foreign and domestic trade worth about $2.5 trillion moved through America's seaports. With our nation's manufacturers, policymakers and innovators striving to continue to look for ways to boost the U.S. economy, create and sustain more jobs and with global competition increasing by the day, the role played by America's ports and that navigation system is more critical than ever.

We just had an updated national economic impact study that I think again kind of overlays the importance of everything that this Advisory Council is representing, that the cargo activity moving through America's ports accounts now for over 26 percent of our U.S. economy. So, over a quarter of our economy is accounted for by the trade that moves through our nation's ports and our navigation channels. That trade and cargo activity accounts for over 23 million jobs, and in this economy, obviously, those size numbers of jobs is very significant. And also importantly, in terms of, again, making the case for why the investment in these types of navigation services is so vital and has a very significant return is that that activity generates over $320 billion a year in local, state and federal tax revenue. So, it literally is a golden goose for our nation's -- not only our nation's economy, but the revenues that it provides.

Again, as all of you are aware, we're seeing dynamic and dramatic shifts in both trade patterns, but as well as how that trade is moving. That creates a lot of challenges, but also offers new opportunity. Among some of the things that are just happening as we speak, the new mega-alliances among carriers that are seeing more and more larger vessels bringing in more and more diverse cargo into America's ports. Between now and 2017, global ocean carriers are supposed to take delivery of over 150 vessels, of a capacity between 10,000 and 18,600 or even larger TEUs.

Certainly, you all are aware of the Panama Canal expansion that's underway, due to be completed next year. We're seeing increasing trade through the Suez Canal, and our nation's ports and navigation system on all coasts in the Great Lakes need to be able to accommodate the larger vessels and increasing trade. Our nation is continuing to negotiate both a Trans-Pacific, as well as a Trans-Atlantic trace partnership agreements. That would bring more trade opportunities, but again, we need to be competitive if we're going to be able to complete in that global environment.

With ships getting increasingly larger, ports are faced with assessing whether they have adequate channel capacity and adequate marine terminal capacity to accommodate those vessels. This gives you just a little bit about a big picture, but it kind of gives a little bit of focus then to when we talked specifically about why it's important that we effectively and efficiently utilize all of the technologies, services and infrastructure improvements at our disposal to prepare for what's ahead.

In terms of AAPA and NOAA, AAPA has been a longstanding supporter of NOAA and its hydrographic services mission. Dave talked about some of the studies a number of years ago. AAPA led the Marine Navigation Safety Coalition back in the late 1990s that resulted in increased federal funding support for many of the services we're discussing here today. As the nation's chart maker, having NOAA's charts updated with the precision and accuracy provided by modern hydrographic surveys give those entering and exiting ports the confidence they need to transit the U.S. coastline safely, even in extreme weather and sea conditions.

As I mentioned earlier, the average size of container vessels calling U.S. ports has grown considerably over the past five years and the trend toward even large vessels will continue in the years to come. Ships that are getting larger, drawing more water, are pushing channel depth limits to derive benefits from every last inch of draft. As a result, the margin for error for ships transiting port channels has for many ports reached the critical stage.

Larger vessels provide many advantages to liners, shippers and beneficial cargo owners, including economies of scale, reducing the cost of shipping and making U.S. exports more competitive internationally. In addition, these new ship designs allow for more fuel efficient operations and therefore, reducing emissions and improving air quality in the local communities, as well as globally.

Ports across the country that need to service these large ships need to obtain and maintain adequate water depth, made possible in many ways by NOAA's surveying services to monitor needed dredging and channel and birthing depths. Many of our nation's marine shipping lanes, harbors and port areas haven't been mapped for many years, when measurements weren't as extensive as is possible today. We believe it's vital to improve this situation. Therefore, AAPA continues to support NOAA's national charting plan to strategically dedicate NOAA Hydrographic services and related resources to provide the necessary support for port channels across the nation. Port channels should also be safe for navigation and support commerce and U.S. international competitiveness.

As you know, NOAA delivers tools and information to help those entering and exiting a port select the safest routes through shallow and often challenging waterways. AAPA supports the maintenance and growth of NOAA's physical oceanographic real-time system or ports, which currently operate in 23 ports around the country providing up-to-the-minute information on tides, currents, salinity, water and air temperature, atmospheric pressure, wind, in terms of speed, gust and direction, water levels, current, waves, weather, visibility and bridge clearance, obviously, all of which are vital for safe operation.

Independent economic analyses have found that the port systems to be effective in accident avoidance, enhanced cargo handling efficiency and reduced delays. This information helps mariners time the movement of their vessels through U.S. seaports and waterways. In terms of improvement, AAPA supports making ports fully funded as is authorized under the HSIA. With a growing base of users of PORTS information, the time has for this to be a national navigational service and having port systems wherever necessary.

AAPA values the use of NOAA positioning information to avoid collisions and ensure safe passage. NOAA's national spatial reference and the national water level observation network provide the geographic reference framework necessary to determine land and water elevations to help those entering and exiting a port safely move around obstructions in our nation's busy waterways. AAPA also values NOAA's air gap technology, which measure the distance between the bottom of the bridge and the surface of the water flowing underneath to provide for precise bridge clearance information in real time. This has served to reduce risk and make ports more operational.

Again, as ships become larger and taller, air gap technology and improved information on bridge clearances will become even more critical to port operations. In addition, AAPA values NOAA's navigation response teams to provide emergency hydrographic services for affected port areas, speeding the resumption of maritime commerce. Navigation response teams search for submerged obstructions and shoaling that pose hazards to vessels and provide essential information to quickly reopen shipping lanes. In terms of improvement, APA supports the availability and the advancement of NRTs to be available when ports need them, particularly in recovering port operations in a timely manner.

In conclusion, AAPA and the port industry has a long history of working and partnering with NOAA on critical aids to navigation. This partnership continues to be critical as we look for creative ways for accommodating the growing demands of our economy, global trade and the ever larger vessels plying that trade. NOAA plays a critical role in helping the U.S. build a 21st century seaport and navigation infrastructure. I appreciate again the opportunity to participate in your Advisory Council meeting today and I'd be happy to discuss any of these issues further when appropriate. Thank you.

MEMBER MAUNE: We're going to have questions and answers at the end of all of the floor presentations. So, I will then proceed with the second presentation. I hope we can get a copy of your presentation. Can you email that to me?

MR. NAGLE: Absolutely.

MEMBER MAUNE: Our next speaker or Tony Cavell. He is president-elect of the National Society of Professional Surveyors and SPS and hails from Lafayette, Louisiana. He is an active member of the Louisiana Society of Professional Surveyors and served as the president. He works at the LSU Center for GeoInformatics in Louisiana Spatial Reference Center and was a member of the original class of certified federal surveyors. Tony, the floor is yours.

MR. CAVELL: Thank you. Good afternoon. I may present a slightly different perspective on much of what we've heard today. I would dare say that 90 percent of the people in the room have something to do with coastal hydrographics. I'm a land surveyor. We do hydrographics as well indeed, everything from dredging to the positioning of ships offshore, my hydrographic experiences with John Chance back before the days of GPS. But I wanted to let you know that since even before I called myself a surveyor, I've been in awe of the things that NGS or the Coastal Geodetic Survey and NGS and National Weather Service and NOAA have been providing. If we go back and think about it throughout history, we've got some of the first nodes on the ARPANET, atomic clocks from NIST, National Bureau of Standards, accurate geodetic databases and weather forecasts. Sop and put yourself out of the 2000 teens for a few minutes and think how wonderful, how Wizard of Ozly-like those things are. As I look in the room I think I can share this from our childhood. These things are amazing.

I should tell you a little bit about myself. I think he said I hailed from Lafayette. Louisiana is a dynamic place. So, a lot of my comments might be colored by my origins in Louisiana. I speak from the National Society of Professional Surveyors and have got some input for you from them. But bear in mind my perspective. We were hearing a lot just a minute ago how important ports are to a country and its economy. Louisiana wouldn't be a part of the United States if Jefferson hadn't made a statement something to the effect that whoever controls the isle of Orleans is not our friend. So, we sent Livingston to go try to buy it. And if it hadn't been for some terrible, from his point of view, mishaps that Napoleon's armies were having, it wouldn't happen, because effectively they said, no, you've got to take the whole thing or nothing. Well, you got the whole thing.

We do a lot of hydrographic work. Weve got lots of ports, some of them now nascent. But the River Teche had ports, the Mississippi River, obviously, and then there is New Orleans, there is Baton Rouge on up. Lake Charles has their ports. We have a lot of inland hydrography. We've got a lot of lakes and small rivers. We've got ash ponds from coal burning power plants. As simple and as quiet as an ash pond looks like, trying to figure out where the bottom is on something that goes gradually from water to something solid is not a simple process. But it's crucial, because if you wait too long to clean out your ash pit, you don't have room to put next week's ash. So, this is the sort of thing we deal with every day.

As far back as 1803, Louisiana has played that part of a stepchild a little bit. Even in this morning's newspaper, somebody has got a proposition for a cure to the coastal erosion problem of let's just move the delta for the Mississippi River up to South of New Orleans. My career path started in physics. I ended up in surveying. I joined the Louisiana Center for GeoInformatics, Roy Dokka was the director, I was associate director, and we established a network of core stations. He was a geologist, and he essentially, wanted to study subsidence and plate tectonics and explain that sort of thing going on in our state, a place that most geologists avoided because it was too complex. I was the surveyor and was trying to tell him how valuable the real-time data would be, as well.

So, we ended up building what's now called C4Gnet. It's the largest real-time network, university-owned real-time network. It covers Louisiana and some parts of the gulf coast, in conjunction with a consortium of states from Florida to Texas, where we're trying to set up core stations and make studies of primarily, the control for surveying along the Gulf Coast. But you invited me here as a representative of the NSPS. We have 17,000 surveyors as members, many of them in hydrography, a great a majority of them I'm sure not, but all served by NOAA.

In order to speak to you, since it's been a few years since I called myself a hydrographer, I did a little research and queried some of the members of NSPS. I wanted to re-familiarize myself with the site. The ones I'm most familiar with are the ones at NGS. But I also wanted to know what the members had to say. I think the most valuable resources that NGS has is much like a library. There are volume that sit on a library shelf that may not get used. But when it's needed, it's the most valuable thing you can find. And it's good to know and have confidence that there is a repository for that data. NOAA, since before NOAA's inception has been doing that.

So, we proceed to the questions you asked. What NOAA products, data, services are valued by our association and how beneficial are they? Well, my answer, in brief, is the breadth of hydrography, like most surveying, is very large. All NOAA products, data and services are valued by my associates at one time or another. So, it makes quantifying the answer -- to disappoint some of the moderators -- it makes quantifying them difficult. Frequency does not directly correlate to perceived value. As someone said earlier, how many times are the data, I think its port system is accessed by the fact that somebody pushes a button on their navigation device. It's valuable if they don't have other navigation. It may just be an artifact so that the other guys -- is real impressed by the system he's got. On the other hand, very few people probably dig out the coordinates with a critical eye off of a data sheet for a core station. Yet without the underlying foundation, especially in today's NSRS, of the course, all of the other products become less worthwhile.

Some of the comments I received, I amalgamated and tried to make them more brief, and here they are on the slide. The webpage for the marine weather forecasts generally viewed by regular users of -- performers of hydrography, twice the data plan the survey activities and warning of bad weather. The National Hurricane Center, I'm in Louisiana, I'm in the Gulf Coast, East Coast probably too. The National Hurricane Center is used to track storms. And again, is it going to impact my survey? CO-OPS, tides and predicted tides, it's used again as a control session for the survey. And the hydro hotlist is you daily during survey operations to make sure the control stations are operational.

The Office of Coast Survey, some download the latest Raster and ENC charts for use during surveys and for comparison to their final products. Search and download previous survey data. It helps validate your current results. Hydrographic specs, deliverables and field procedures are invaluable for testing your own in-house procedures to make sure that you're either doing a good enough job for your client or in the case of some contracts, that you're meeting these specifications so that you meet contract reqs.

OPUS and CORS, I think one of the most valuable products to me, and I think will prove in history is the development and the accessibility of the CORS network. I don't know the percentage, but there is not a high percentage of the CORS that are actually known by NOAA or NGS. A great majority of the stations, like the ones we established, are owned by others who are proud to contribute to the program, that is the National CORS Program. OPUS was the door, the keyhole through which anyone could access -- I'm sorry, which anyone could access this data in an answerable way. I collect data with my GPS in the normal way and I simply go to a website, and wow, my emails got an answer that as long as I did everything I'm supposed to is a very defensible answer.

The marine forecast is always used for offshore work. NOAA tides is typically used for check. It would be nice to establish tide gauges in the Gulf Coast, I was told more than once, as there seems to be gaps. We participated on setting up some core stations on CO-OPS and some National Weather Service. It's amazing to me to learn how valuable the noise in our GPS data was the data for the National Weather Service, being able to measure water content between the antennae and each of the satellites. I don't know how much it helped them, but they assure me it's quite a bit. Imagine how many core stations there are in the nation and how many satellites each one of them is looking at every second. If that's good data for them, it must be a lot of very good data.

Tide gauges are the most valuable when they have the different datum conversions. I had several comments that they were lacking a NAVD conversation and how valuable that would be. To explain its value is it prevents error in reports and our performance if someone were to make a mistake in the manual datum conversions.

This brings us to question two. This is the one that I answer more poorly. The charts, of course, are used in navigation software. They're used in the Mississippi a lot to ensure travel in the channels. And of course, the NGS datasheets were my first introduction to geodetic data from the days when they came in little folded up packets. They're like little magic packets from the Wizard of Oz.

Here is the question number two. What other products, data or services would you like NOAA to approve under offer? How would your association benefit? Well, this is much more difficult to answer, because it's hard to imagine what you haven't seen yet. Someone who works with the data and works with the programs oftentimes has an idea or hint or I'd love to do that, and that's the source in a lot of cases for answering this question. Many colleagues did comment about the ease of data conversions and tide stations. I believe continued improvement of the Internet interface is important. I've been impressed in the last months how the interface from the public through the Internet to some of the data has begun to get a little bit more intuitive and easy to get where you're going. The interface is becoming more uniformed. That's to be expected with some maturity, I guess.

I would like to suggest that since so much of the data that NOAA collects is database driven, that if we could have an interface that presented possibilities of what I'm interested in and I'd like in my report, basically, it becomes a query and a report comes out. I don't know if that's clear to everyone, but if not, questions later.

More marine forecasts, a more detailed forecast would always be helpful, of course, and it would always be nice to get status updates on OPUS and CORS that are down for maintenance and the like. That's a difficult one in many cases, I'm sure, for NOAA to administer, because so many of those CORS don't belong to NOAA. So, that would depend on the suppliers.

CORS are accessed through many other programs. It would be helpful to have a utility in which you can enter the location time and data of the survey that would recommend which CORS would likely give the best results. That's just one of the suggestions I received. It would also be really nice if all of the tide gauges had conversions for all vertical datum. So, I'm repeating that because it was an oft made comment to me.

Those are the results and the answers from my association. I have a few elaborations of my own. Some of the most valuable things that NOR or its ancestors has ever produced are benchmarks. Sometimes they're on a seawall, sometimes they're under the Washington Monument, and sometimes they're out in the middle of a pasture. Some of them are centuries old or almost centuries old, some of them are decades. But they serve as reference marks for where things are. The most important thing everyone has talked about or needs to bear in mind is we're very interested in the what. Those of us speaking, our end users are very interested only sometimes in the "what" did you give me. But we can't give you that without the "where."

Now, the CORS are the 21st century version of a benchmark. It's that simple. The old benchmarks didn't know they were moving, the new ones do. So, when they move, we know where they are. It's that simple. They are that valuable.

The photography by government agencies, whether it be the farm bureaus, whether it be the U.S. Coast and -- I mean, Corps of Engineers, NOAA or whatever, have fantastic historical value and analytical value sometimes, maybe most especially, in legal situations. I've been able to access this data and answer people's questions and keep them out of court or get them out of court quicker as a consultant. Some of the services that NOAA provides, well, one service in Louisiana is Tim Osbourne. I wanted to single him out. Tim is an energetic fellow, who does seem to know how to get things done, even when you're uncomfortable with how it got there. But it seems to work out for the best, and he knows all of the right people.

Our geodetic advisors, right now, Dennis Reardon covers my area. But all of the geodetic advisors have been open to my phone calls no matter where I'm located when I have a question to be answered. They're a very valuable resource.

The advances in technologies are all around us, but it's increasingly know where, not what, the ability to apply geodesy. Most of the time, users can work out details, both geometric and physical, gravimetry, tide keeping, all of these are what are needed as a foundation, without which almost all the rest of NOAA products are just guesses. It needs a foundation.

Once close enough for hand grenades and horseshoes was okay. It doesn't cut the mustard anymore. In my lifetime, it was once -- actually, a little bit longer than my lifetime, it was once good enough just to make position on the seat of a mile. In World War II, if you had a sexton and you were standing on the brig and you were taking your position, that was about what you did if you were good.

A five-day weather forecast today has similar probabilities than two-day forecasts used to have. Once upon a time, a knotted rope allowed navigators of the Mississippi to Mark Twain. Today, some fathometers claim centimeter precision. Today's weather navigation positioning are dependent for value on geodesy, excellent geodesy. I'll let you read some of my slides outside of my speaking and try to get to some closing comment.

Most important, in all pertinent fields we are considering better, finer resolutions of initial conditions are limiting our results. The hardest information to convey to the public has to do with precision and probability. Most of the public, heck, all of the public, except for a few, prefer to think in binary terms. Is it or isn't it? That's all they really care about. It's exactly for that reason that accurate or true data must be emphasized over possibly false, high precision data, especially when the public is involved. And I'm going to give you my definition of accurate. I didn't say, accuracy.

The lawyers and the philosophers understood accuracy or accurate to mean truthful. If there was a little bit of a flaw in your testimony on the witness stand, then you were no longer a truthful witness. In measurements you have precision. You have estimates. "Closeness to truth," is an engineering and a mathematic terms. But when it comes to the public, if it's accurate, they can go to the bank on it, bear that in mind.

And lastly, one of the founders of what became NOAA, Ferdinand Hassler's motto was, it's the duty of every man to be honest and to do good. He set the tone and the course of U.S. science in its earliest decades and I think it makes a good rule for us to follow today. There are a couple of more slides after that, but you can read them on your own. Thank you very much.

MEMBER MAUNE: Thank you. Our next speaker is Bud Darr, Senior Vice President of Technical and Regulatory Affairs, Cruise Line Industry Association, CLIA. He is responsible for the cruise industry's interest in shipboard operations, safety, security, environmental stewardship, emergency response planning and exercises, medical facilities, public health matters both in the U.S. and internationally. CLIA is the world's largest cruise industry trade association, with representation in North and South America, Europe, Asia and Australasia. CLIA represents the interest of cruise lines, travel agents, port authorities and destinations and various industry business partners before regulatory and legislative policy matters.

He spent some time in the Coast Guard, for 17 years, I think that's right. He was in the Navy as an enlisted marine submarine nuclear propulsion navigator. Didn't I read here somewhere that you're also a lawyer? Yes. You graduated with honors of George Washington University Law School. So, he is a Jack-of-all-trades here. Bud, the floor is yours.

MR. DARR: Good afternoon, I really appreciate the opportunity on behalf of the cruise industry to be here today and speak to you a little bit about what CLIA does and that the cruise industries interests are not only as a user, but to actively promote not only here in the U.S., but around the world where we operate hydrographic services of all type, with the goal of improving safety; because at the end of the day that's what we're all trying to do is operate vessels in a safer and more efficient manner, with the emphasis being safer, because that's truly what matters.

Next slide, please? Our marketing department makes me put that slide up. What we do as an association. We speak with one voice for the entire cruise industry. We represent about 95 percent of the capacity in the cruise industry worldwide, with very few exceptions. Every major cruise line that would come to for you are active members of our association. We represent the interest of the cruise lines across a spectrum of venues and to a spectrum of stakeholders in all the kinds of subject manner that Dr. Maune just described.

I'm responsible for a lot of things, but I can assure you I don't do any of them particularly well. But I do have enough knowledge to really be able to work with a variety of groups. And to help in that, we have a variety of advisory committees that are established under CLIA, composed of our members, as well as a professional staff, which is located in a variety of places. Kim Hall, who some of you may have met today, is responsible for our advisory committees on navigation and hydrography, as well as our Operations Advisory Committee, and she also actively participates with our safety committee in facilitating that. We are truly a global organization. We've undergone a major transformation over the last few years between a North American centric organization, to one that truly represents a global industry in a global way. So, our headquarters is in Washington, where I work and Kim works, as well. But we have offices in, I think the latest count is 15 around the world, in various places and it's necessary for the way that our members operate.

And this is why. You can't fit all of the dots on here, but we're in about 1,000 ports and destinations around the world. I was speaking with one particular nautical ops vice president the other day and he said he has 600 ports in his portfolio. So, much in the days of maybe tramp steamers, where you didn't know where you were going next, we know. It doesn't do any good to keep it a secret for us, because we can't sell it if we don't tell people about it. But it's going to be all over the place. And our industry is truly a global industry, and we have differing challenges when it comes to hydrography and reliability of navigation systems where we operate. But the common thread is there always is room for improvement, ways to operate more safely, and it truly is a partnership to make that happen. There is a shipboard component to safety, which our members are principally responsible for. Kurt did an excellent job and work closely with APA as well, of laying out some specific items. I had a list in my notebook there of specific items that we were also very supportive of and Kurt hit all of those, plus a few more.

I boiled down that I think that this panel was very wise in its recommendations towards maximizing use of oceanographic research and hydrography survey assets, as well as trying to extend precision navigation to as broad a scope as possible. But the shipboard component, the shore-based component that Kurt speaks for within the ports and harbors, and then the inherently governmental component, really for us to maximize the potential to operate as safely as we possibly can has to be a partnership. And I really welcome the chance to be here in a group like this, because do see all of that represented here, and I think we all do share that common goal.

Quite honestly, when I heard Kurt describe the numbers of throughput and economic contribution, I'm quite humbled. Our industry is $40 billion in annual U.S. economic impact, 370,000 U.S. jobs. But it fails in comparison to the types of volumes overall Kurt was describing for the maritime community. But it's not about quantity, it's not about volume. Whether you're talking about a precious cargo or potentially an environmentally hazardous cargo or you're talking about our cargo, the most precious of cargos of people, no accident. It's something that we should tolerate if it's preventable. And in our case, the volumes are not large. We're about 300 oceangoing ships out of, it depends how you add them up, but maybe 70,000 worldwide trading oceangoing ships. But the consequence of an accident for us, particularly one that's avoidable as a navigation incident, is just so high. It just is not something I can monetize.

I have some idea of the monetary consequences, besides the 32 lives that were lost in a high profile incident our industry had in 2012, but it just isn't worth it. For us, it's really about safely operating to preserve the lives of the passengers and crew that trust themselves in our hands every day. But we can't do it alone. We have to work with our partners and work together in groups such as this.

I'd like to talk specifically about a few items. And safety of navigation, I want to stop on that one for a moment, because these slides are general on purpose. I really wanted to have a discussion, if we could. On this item, one of the things I'm responsible for is the cruise industry's representation at the IMO, and we do so working together with governments and other non-governmental organizations. But in the navigation area, both the advancement of technology and also the enthusiasm of the regulators, and quite honestly, at times, the vendors who are coming up with new great ideas has pushed further and further the envelope on the sophistication of the hardware that we're using onboard and in some cases, the software that goes with it and it's been a challenge to keep up with the human software component, which sometimes gets forgotten. But it just can't be overstated how important that is to make sure you don't forget the training user-friendliness of the interfaces and things that go with the actual human operation.

But all of these great advances in operation and technology-driven improvements in what we see physically when we step on board a bridge and decide it's our turn to operate, which once upon a time I used to be able to do, it doesn't work if the underlying data, the underlying information, the underlying electronic chart, all of those products, if they aren't compatible. And even if they look great and are compatible, if they aren't reliable, the system will break down. It will fail. So, we can dream up all of the best ideas in the world of theoretically how we can operate a ship, but if the reliability and accuracy and availability of the hydrographic products and other information products that feed them is not there, we're kidding ourselves. It won't really work the way we want and we won't be able to protect the lives, the environment and the communities which the maritime industry operates in.

Another thing that I wanted to mention about progression in navigation is at times the development in the equipment are driven not as much by user demand, but maybe more by the good ideas that the engineers can dream up. And I think it's really important to make sure, particularly if we memorialize these things in regulations going forward, that they are something actually useable on a day-to-day basis by the seafarers that so safely and properly operate our ships every day.

I want to talk about some specifics, in particular where some focus might be a value for our industry for precision navigation, and that's in the Caribbean base and also in the Gulf of Mexico, ports such as Galveston. Where we have a large presence and it appears to be a growing presence over time is one that I think might greatly benefit from expanding the precision navigation program. There are others we could identify, as well, and particularly, in the Caribbean where we have a very heavy presence.

I should probably take a moment to just briefly describe to you how we're allocated. If you think of us in terms of capacity, it's about a third in Europe, it's about a third in the Caribbean, and it's about a third everywhere else; and that balance is shifting a little bit because some capacity is being shifted back out of Europe into the Caribbean. That number will go up a little bit. And of course, as you've probably seen in the news, China is an interesting frontier for everyone, which will present its own hydrographic challenges for those of us who are going to operate there. But I think you're fairly stable at about a third. This is not a declining market. It's a growing industry. And in these Caribbean ports, although we operate there frequently, a lot of times we find a lot of room for improvement so that we can get the information that the Bridge Watch Team is getting to match up with the full potential of utilizing the equipment and also, more importantly, when you're talking about local operations that are complex, whether it's the inside passage in Alaska or somewhere in Europe, it's really important in order to be able to maximize the safety potential of the interaction between the Bridge Watch Team and the pilot; because what will happen is if the reliability and confidence in the information the Bridge Watch team has available to them, keeping in mind that they're responsible for berth to berth passage planning by regulation, if that reliability and confidence isn't there, we're going to kind of step backwards in time and really rely upon the instinctive and qualitative and experiential benefit that the pilot brings to the Bridge Watch Team. That will always be a value. But I don't think we want to go towards more and more reliance of it, because ideally, the Bridge Watch Team is working in full support of the pilot who is bringing his local expertise. And we'll never really be able to gain that maximum potential out of these great advances in technology and improvements in operations, again, if that underlying data is not there to provide that confidence and repeatable reliability.

Arctic cruising, I want to say a couple of things about that. I really do believe that the presence of the passenger ship industry in the Arctic now and in the near term is probably overstated a bit. There is a presence. There probably will continue to be a presence in how you define the Arctic kind of matters, because in IMO terms it's more political than geographic or ice condition driven, but in other places maybe it's something more simple, like southeast Alaska or the Aleutians.

In any event, there is some presence. It's not going to be a rapidly growing presence. And the fundamental reason why is the fundamental hallmarks that make our business successful just don't exist in that region. The logistics chain is extraordinarily difficult. The costs involved in it are very high. So, the prices that you have to charge to take guests up there on what would be an extended voyage, which is only available to some people -- the average voyage is about seven days. Up there it would be substantially longer because of the transit times and there is a lot of travel time. So, there is not going to be, in my opinion, any rush for any huge demand up there. But when we do operate there, reliability of the data that we're using and of real-time to the best we can get, information on the conditions is very critical to constantly reassessing the risks during the voyage and making sure we're operating in a safe and responsible way as we can.

With electronic navigation charts, I did want to say one thing about EMCs. I think that it's not only the data, but availability, as I mentioned in the beginning, is also very important. And I think availability really needs to be for everyone. And although there may be costs involved and some of those costs are recoverable to some governments, I think it's very important that monopolies not be granted on the information that's really needed for everyone to operate safely and maximize the safety potential in the new developments that we've had. So, those costs needs to be reasonable if there are costs associated with that, because every passenger on every type of ship should have the same level of operational safety that can be provided if that potential is there from government services, as well as the cargo sector, as well. I think, again, it's this balancing between the shipboard component, the shore side component and the governmental functions.

And then lastly, with enhanced navigation, IMO struggled with e-navigation and an implementation plan for that for some time. Quite honestly, our industry can't wait. We've continued to push the envelope with the types of systems that work for us effectively, some more successfully than others and they get changed out. But a couple of key things, I mentioned earlier, for example, must be user driven. There has to be an actual operational benefit to the people running the ship day to day in order to be truly effective and truly be embraced. It can't outpace the sophistication of the operators. So, it constantly forces a challenge on a ship owner that if they put a new system onboard, they've got to responsibly train the operators so that when they're operating the ship day in and day out they're capable of it. But we need to be cautious that we don't introduce so much complexity that it actually outpaces the ability of your typical operators that are educated and smart and they do this every day to be able to properly draw this full potential out.

And then lastly, I would say, just as at IMO we look forward to working with everyone there on advancing these issues and doing so in a way that truly works for everyone and improves safety, again, thank you for the invitation to be here and work with you not only today, but in the future. So, thank you very much for your attention and for the chance to speak.

MEMBER MAUNE: Okay. Our fourth speaker this afternoon is Steve Bowen. He is the associate director and meteorologist of AON Benfield, Impact Forecasting Division in Chicago, Illinois. Since joining the firm in 2007, Steve has played a leading role in natural catastrophe analysis for AON global clients and colleagues. A key component to this analysis is conducted through AON Benfield's Cat reports, which he transformed into an industry leading product. The reports are now internationally recognized by clients, colleagues, insurance industry representatives, government officials, emergency management agencies, and media as a critical tool for real-time meteorological and natural disaster information. Steve, the floor is yours.

MR. BOWEN: First off, I would like to thank NOAA, the National Ocean Service Leadership Committee, and Jesse Feyen in particular, for the invitation to speak here today. There has been quite a bit of very interesting dialogue already, and I think a lot of what has been discussed can certainly be used as a springboard to hopefully further mitigate our specific our specific industry needs moving forward.

To provide some background, as you've just heard, I work for a company called AON Benfield, which is a reinsurance brokerage firm, where I work in the Impact Forecasting Division in Chicago. AON is unique in being the first brokerage firm to have its own in-house catastrophe modeling group in the industry. In fact, forecasting, we rely very heavily on data that is collected and made available by NOAA, the USGS and FEMA. As a background, catastrophe modeling is an increasingly important industry tool that helps a vast array of groups, that includes not just the insurance industry, but also state, local, federal government agencies, many other industries in the private sector to better recognize both quantitatively and qualitatively the levels of financial risk, given portfolio exposures.

Now, for those who are not familiar with how catastrophe models work. In the very broadest sense, they are basically, computer simulations that are used to calculate financial losses from different disaster perils. Each model takes into account a number of different parameters, such as information on property locations, information on the physical characteristics of exposures, which means things like type of construction, occupancy, the year the structure was built, number of stories, et cetera, and also the information on the financial terms of the insurance coverage.

The model output helps estimate the financial costs of a particular event or set of events. So, in impact forecasting we have a suite of more than 100 individual catastrophe models for perils all around the world, with particular emphasis on perils like tropical cyclone, floodings, severe convective storm, earthquake and terrorism. Here in the United States there is considerable interest in our hurricane model, which implements and takes into account historical data from the National Hurricane Center, including the IBTrACS and the HURDAT2 databases, plus a plethora of geospatial bathymetry, shoreline and post-event imagery data for our model.

We've also directly integrated NOAA's SLOSH Storm Surge model component into our hurricane model to help us combine both wind and coastal flood analysis to determine financial losses on what's known as a ground up or commonly known as total economic and an insured loss basis. Now, this analysis is critical for our clients not just in real-time during an event, but also during off season dates as clients seek to determine their pricing levels, giving upcoming contractual seasons. I'm a meteorologist, so I don't have much of a background on that. So, you guys can lower your guard if you have any concerns about anything from the insurance industry here today.

But in impact forecasting we have two separate event sets in our hurricane model, that include historical NOAA data tracks, in addition to a robust stochastic suite of 26,000 separate probabilistic event scenario tracks, which translates to 1.6 million unique tropical position points that can be modeled to determine the potential impacts from hypothetical landfalling or near landfall events.

Now, to provide even more detail about our hurricane model, which is also consistent with the methodologies used by the rest of the major catastrophe modelers, we use a complex series of mathematical equations that takes into account storm track, storm intensity and wind parameters. Specifically for the wind component, we analyze official date for the National Hurricane Center to generate a time series of minimal central pressure, radius of maximum winds, forward speed, and the direction in motion of the storm center.

We also develop a time series of these wind speeds using observed data from the NCDC. Now, in order to reduce any propagation error, given the long time line of these simulations, given these storms, we actually reduced the time increment to three hours from the NHC's longer six to twelve hour forecast points just to generate some more specificity for the model. We use a grid with a cell size of five degrees by five degrees to solve the mathematical equations over the Atlantic Ocean Basin, and within each cell the moments of the storm parameters are soon to be constant.

We also have a full set of damage curves that have different combinations of construction types, the age of the construction, the occupancy types and use of secondary construction modifiers.

Additionally, the model is able to simulate offshore events for more complex modeling, such as oil platforms in the Gulf of Mexico. This type of modeling was very helpful in instances such as the Deep Water Horizon oil spill back in 2010. I don't want to get too far off topic from discussing the hurricane model, but in offshore events such as this we rely very heavily on data from NOAA's AOMO Division. The agency does provide invaluable data feeds for us, like the evolution of geostrophic currents, the evolution of sea heights and the evolution of sea height anomalies is very helpful for us to integrate for validation purposes.

Now, during the Deep Water Horizon event, we were also very interested in the output from the finite element model called ADCIRC. ADCIRC, for those not familiar, is short for Advanced Circulation. It is a very well respected model, an even higher resolution model that has actually historically performed with the greater level of accuracy than SLOSH. ADCIRC has been used for such applications such as the prediction of storm surge and flooding, modeling tides and wind-driven circulation and other maritime analysis.

There is also an accompanying wave model called SWAN, which can be run in tandem with ADCIR that produces extremely granular and accurate results. Now, unfortunately, access to the ADCIR output is not necessarily freely available and requires tremendous computational power for the paying customers. Other options to obtain the information is to work directly with universities, such as the University of Notre Dame with Joannes Westerink, or the University of North Carolina, and actually have them run the models on their own platforms, which can be very, very beneficial. But for now, we've got forecasting like the rest of the catastrophe modelers are continuing to use SLOSH for our storm surge component. It's primarily due to the fact that it's free and who doesn't love free? And it can actually, be run much faster than ADCIRC.

Now, in our storm surge model, we consider the local bathymetry, the entire lifecycle of the tropical cyclone, and we identified client locations that are provided elevations based on local address, using 30 meter resolution data from the USGS. And our outputs for events such as Hurricane Sandy and Hurricane Ike did perform quite well and reasonably match the actual losses that were reported by our clients.

In proving our catastrophe modeling capabilities with the hurricane model specifically, it's crucial, as the tropical cyclone peril does remain the costliest in the world, particularly with the recent passing of the 10-year anniversary of Hurricane Katrina's landfall on the Gulf Coast. We were reminded of just how financially significant these events can be for communities in the United States and around the world. And to provide just some background as to why much of our focus is on coastal impacts and storms, especially for our industry, just given how much it can impact the insurance, here are some eye-opening statistics.

As the head of our Catastrophe Insight Team, I'm regularly collecting and analyzing natural disaster loss data around the world and I use this data to help our clients and other people within the industry to help determine some loss of specific trends in regions of the United States and elsewhere.

Now, specifically for the U.S., despite not having had a major category 3 above hurricane make landfall since Wilma in October 2005, it does actually remain on average the costliest natural peril in the nation. For example, since 2000, the U.S. has annually averaged $25 billion in economic losses and $13 billion in insurance losses from these cyclones. So, even though we're in the midst of a record streak with no major hurricane landfalls, the statistics certainly indicate that when they do occur they do prove to be tremendously costly. And just to provide some more detail to this, the costliest disaster in the U.S. and U.S. history was Hurricane Katrina, which caused an inflation adjusted economic cost of $151 billion. So, that's a heck of a lot of money. And when you consider this value in comparison to different other recent major U.S. disasters, you can see just how staggering the loss was for the country.

Katrina's value compares to $11 billion for the costliest severe thunderstorm outbreak, which occurred from April 22 to 28 in the Southeast in 2011; the 1993 Mississippi River floods caused $35 billion; and $9 million for the costliest winter storm event, which was the 1993 Storm of the Century. Even in terms of the costliest drought in modern times, 1998, the $82 billion economic cost is a little more than half of what Katrina cost.

To drive home the point further, since 1980, there have been 38 tropical storms or hurricanes that have cost at least a billion dollars in inflation adjusted economic losses in the U.S., and of this total, 26 of those storms caused insurance losses above that same threshold. This loss does include loss from both wind and flood components or impacts. So, for our coastal and inland flood models, we rely very heavily on statistical data using the actual losses and policyholder data from the National Flood Insurance Program for validation purposes.

Now, within the insurance industry, there actually is a current push for proprietary policyholder information, as there is an increasing desire for private insurers to possibly become more engaged in the space moving forward. Now, beyond any possible any future impacts resulting from a change in climates or weather variability, it's also critically important to highlight the continued migration of the U.S. population into urban areas and along more vulnerable coastlines. As we all know, the East Coat and the Gulf Coast are particularly vulnerable to hurricane landfalls. In some of the latest statistics from the U.S. Census Bureau, roughly 39% of the population or 123 million people now live in counties immediately along the coast and even higher, 52% live in counties that drain to coastal watersheds.

There has been a 45% increase in coastal population between 1970 and 2010, and it's expected that another 8% growth will occur or 10 million people by 2020. To provide an even greater context as to how many people are urbanized or concentrated, 52% of the U.S. population lives in an area that equals less than 20% of the entire continental U.S., which is pretty incredible. Now, this trend is also seen around the world and as exposed as the U.S. population may be it, actually, it remains much less than what is seen in Asia, which is likely the most vulnerable continent on earth for major coastal storms.

So, given these realities, the question becomes, what products or data from NOAA and the National Ocean Service could help us in the catastrophe modeling realm for the hurricane peril? So, first, even higher resolution data or LIDAR data from current levels would be very effective for us and others in the industry to better integrate topographic elevation data into our models. The same can be said with the coastal storm surge component and bathymetry data, which was actually mentioned earlier today. Currently, the data I believe has presented a 1 by 1 kilometer resolution and an even more refined level would greatly help calibrate our model, as it would allow for greater accuracy for our analysis. Also, my more robust series of data buoys would be quite helpful to obtain real-time historical surface conditions. I know oftentimes the buoys are sent offline due to storm damage or other technical issues and it can take several months or even longer for them to come back online, which does pose some challenges.

Additional items on the want list, which I know may or may not be feasible given some proprietary, financial or any other university partnership agreements, would include the availability of ADCIRC outputs, even more detailed NFIP policy data at a more granular level beyond the current city or county level and an increased reanalysis data set for hurricanes that goes beyond the current 30 years. We also deal with GIS and the ability of have near real-time shapefile availability would be tremendously helpful. An example would be in the immediate aftermath of a hurricane we would love to have a shapefile that outlines coastal surge inundates, just how far inland that water penetrated.

And finally, and I know I'm not alone in this room in saying this, we would love for FEMA to nationally update all of their flood zone maps. Some our outdated by decades, and this would significantly allow our industry to more accurately model coastal or inland flood events, help better protect residents and predict loss scenarios. And another one would be, which I know there are a lot of restrictions about this, but from the Army Corps of Engineers, we would love to know the actual locations of levee locations, but like I said, we do understand the restrictions that are posed by National Security for that.

Each of these new or more detailed sources of data would be very helpful not just for our group, but for the rest of the industry to be able to more accurately model residential and commercial exposures. While the level of data that is currently made available by NOAA and other federal branches of the government really is outstanding and far surpasses almost every other country in the world, we are greedy and we would always love to have more. As our technology improves and model sophistication does become more complex, it's expected more of us to be able to, for our future abilities, to help our clients recognize and understand the levels of risk. It's only going to become more refined and accurate over time.

Now, all of these points do highlight the importance of the work that the catastrophe modeling sector within the insurance agency is bringing to the table. To be able to quantify the risks associated with coastal inundation from tropical cyclones or any other synoptic event, say a Nor'easter, for example, it is more critical than ever for us to properly prepare to help our clients know how to best mitigate any future impacts.

A few others and myself from the insurance industry have been collectively working with the White House and NOAA in the past year on a presidential initiative to help better improve the relationship and integrate the public and private sectors on a number of fronts. A main part of this collaboration, which overall is meant to help mitigate some of the future impacts from climate change and extreme weather events, is the delivery and exchange of a huge amount of official data from various branches of NOAA, the USGS and FEMA. And opening up and making available this data will help sectors far beyond the insurance industry to better prepare for natural peril risks of the future.

The continued improvement and enhancement of data from NOAA and the National Ocean Service will be a truly vital part of this process for not just our industry, but for many, many industries beyond, and we certainly, very much look forward to helping collectively move the dialogue and the discussion forward.

So, with that, thank you again, for your time, and I look forward to answering any questions you may have.

MEMBER MAUNE: Thank you very much, everybody. I would now like to open the floor up to questions, first of all, from the HSRP Panel, and then from the public.

MEMBER BRIGHAM: Lawson Brigham, from the University of Alaska Fairbanks. Just a comment. We should use all of your points that you've made in some of our marketing information and quote you, if we can, the ports data, the reanalysis stuff. Every point there was very helpful integrated together. It was a very powerful message. So, thanks for all of your presentations.

MEMBER MAUNE: Thank you.

MEMBER BARBOR: Ken Barbor. Bud, you highlighted Galveston as a need for precision navigation over, probably, higher throughput, Miami's or other places that have a risk factor issues. What's driving your Galveston recommendation?

MR. DARR: A couple of things. One is the complexity of the navigation entering that port, whether it's Galveston or Houston/Galveston. Also, the weather conditions are much more challenging than we typically see in the higher volume ports on the East Coast of Florida, which rank one, two and three in the world in volume. They're just not as weather adverse and the conditions are more predictable and the navigation conditions and the volume of traffic you see in both directions is not the same. And the other reason why is I do think that Galveston has quite a bit of potential for continued growth, whether it's migration from Houston, as some lines have announced, or whether it's as an alternative to other places. Itinerary decisions are made by individual cruise lines, of course, not by the association. But all of those things add up to -- it is one area where I think there could be quite a high return on investment for what are very precious taxpayer resources.

MEMBER MAUNE: Sal?

MEMBER RASSELLO: Sal Rassello. How would like to add some comment on Galveston. I've been there many times. The port is challenged by the low visibility and I think also from the traffic coming down from Houston, heavy traffic, heavy, big ships, big tanker ships. So, I think a better precise navigation in that area will benefit to the safety of the navigation and to the commerce of the area.

Also, I would like to add some comment on the earlier presentation regarding the data you collected in the port with the course that after you collect from your survey in the river. All of these are valuable for our coasts, which is the safety of navigation. But I think if it is data not reported to the head user on electronic chart, because now we navigate electronically, there is not much value with that. To make it more clear is that if a ship departs from Hamburg, say Hamburg, a port in Europe across the ocean with using the electronic navigation ECDIS and arriving in the port of the United States, where the port itself is not connected to this port, then all the passage plan drops, collapses before enter the port of the United States, where the navigation becomes more critical than when it is in the ocean, in the open sea.

Therefore, I think we should stress that all of this data is valuable data we produce from various entities will be reproduced on electronic charts, and the electronic charts is the future of navigation, the safety of navigation. Thank you.

MEMBER MAUNE: Thank you. Frank?

MEMBER KUDRNA: Steve, I think we may have first met at the Illinois Climate Center down in Champaign when you were the first insurance representative ever to attend any of those. My question is this. We've been talking about charting backlog and updated charts in various parts of the country. Do you see this as becoming a factor for consideration by insurance companies, determining their rates or insurability of vessels and industry insurance?

MR. BOWEN: Well, currently, the private insurance industry primarily covers commercial interests. And as I mentioned, there is definitely an increasing interest from the private insurance side to become involved in the flood insurance game, because right now the NFIP is the predominant thing. And one of the big issues that the industry is having in trying to understand the risks involved are flood maps, and they are very outdate; and the fact that we aren't able to accurately model these events and truly get a scope as to where the greatest risks lie -- because with different construction types and just how the earth shifts and everything else, it's tough to get a true accurate representation of what the risks are, not just on coastal locations, but for inland flood events. So, yes, getting these maps updated is critically important for the industry as we look to take a bigger stake, not just on the commercial side, but the residential side. I wouldn't be able to quantify a specific number at this point, but yes, it would --

MEMBER KUDRNA: My question was also pointing to the waterside, where you've got very data nautical charts. Is that a factor that insurance companies will and might be looking at?

MR. BOWEN: It can be. I can't specifically, speak to that at this point. But yes, absolutely, in terms of how we're modeling with our storm surge model and what properties we're looking at, yes, it absolutely does make an impact.

MEMBER MAUNE: Admiral?

RADM GLANG: Can I follow up on Frank's question, but maybe we'll direct it to Bud, specific to the case of like the Crystal Serenity, which is planning an Arctic voyage through the Northwest passage next year in 2016. One of the things I had been trying to find out is does the insurance industry care or does the cruise line industry worry about the availability of charts. We've been trying to get a sense for that and we haven't had a lot of luck. So, maybe you can help fill in the blanks.

MR. DARR: The short answer, Admiral, is yes and yes to your two questions. The insurance industry does care and there are special insurance considerations of all type that go into an extraordinary voyage such as that Northwest Passage on a conventional looking ship. And then the cruise industry in general, absolutely. Although the volumes I think will remain relatively small in the Arctic for cruise ship traffic, it will be a viable itinerary for certain types of ships. But I think it will continue to be a niche. But that presence is not going away. And I think the consequence of a navigation accident of any type up there, of any ship type is much greater because of additional risk factors, which I'm sure everyone here is well aware of. Those can be planned for and those can be mitigated, but is a substantial advancement in the safety of polar operations to have greater reliability in chart data than we presently have.

So, I think continuous improvement in that, updating existing data, and obtaining new data where it doesn't exist in the high latitudes, both north and south would be of substantial value going forward, not just for our sector, but for the entire maritime community.

CHAIR PERKINS: Question for Mr. Nagle. With the grant money that MARAD an AAPA had to do the port investment toolkit, in knowing that there are hundreds of ports in the country and there are only a handful of NRTs, how did you address emergency response in your port investment toolkit? If there is not enough NRTs to go around and if the NRTs aren't funded at the level needed, how do you advise your port operators to address getting the port back open?

MR. NAGLE: Well, I would have to check with our folks that were most involved in the toolkit, but I don't believe the toolkit addressed that specific issue.

But I think that is a question of where the -- I think the line between what is a federal responsibility and what is a local and then how do you kind of deal with those sorts of things, given the fiscal realities, et cetera, is part of what the broad scope of that investment toolkit is intended to be for our membership, to try to identify what are ways to try to address the whole range of issues, whether it's infrastructure or things like response and how do you reopen your port, et cetera. But I have to check to see whether the NRTs was specifically addressed in that.

CHAIR PERKINS: I was just curious whether that got addressed. I was involved with the toolkit project in very early phases and haven't studied the finished product. So, shame on me for that.

MR. NAGLE: That's phase one. We're actually in the beginning stages of phase two, so it might be something that if it wasn't specifically addressed, we can ensure that as we go through that in the next phase that we can address those types of things. But I'll get back to you on that.

CHAIR PERKINS: And for Mr. Bowen, you mentioned needing LIDAR data and bathymetry data. So, I'm curious what other data sources are you using? I'm assuming you're using digital coast as a data source?

MR. BOWEN: Yes.

CHAIR PERKINS: Can you speak to what other sources and avenues you go to to acquire that data, and how does it compare to the NOAA data?

MR. BOWEN: Primarily, the NOAA data. Basically, we're just looking to refine and have higher resolution to be able to more accurately model the data. I can't speak directly to the data. My R&D team would be able to answer some of those questions and get back to you. But what we have, the grid sizes are at this point large enough where we can get a pretty granular idea and be able to model and come up with loss estimates. But if there is the actual data, we just want to be able to get more refined. I mean, that's kind of the reason why we're hoping to start doing more with ADCIRC, as opposed to SLOSH, for example. So, it's way more granular.

CHAIR PERKINS: It would be interesting to know if you could take the action item to report back whether your team has actually used any of the topobathy LIDAR, the higher resolution shallow water data that was collected post Hurricane Sandy?

MR. BOWEN: I know for that we did. I know we did. I'll get back to you though on more specifics.

CHAIR PERKINS: Looking for that data point, that data you're able to do better, more accurate modeling using that data than in other geographies where that data doesn't exist.

MR. BOWEN: Exactly.

RADM GLANG: Can I build onto your question? So, Steve, you mentioned specifically higher resolution LIDAR and bathymetry data. I guess my question is, what do you think the requirement might be for the -- how much higher resolution? And again, it's rhetorical for you maybe, but a question for your R&D team. And then what's the vertical uncertainty that you need for that bathymetry, and where do you get the bathymetry data from now? So, we're just piling on questions. You don't have to answer it now.

CHAIR PERKINS: Have you thought about applying for the panel position?

MR. BOWEN: Like I said, I can't speak entirely to some of those questions. I know that we are using the AOML, the data that's available from that industry. I guess I was going to ask a question, because you had mentioned there was going to be a launch on the 21st, you had mentioned this morning, some of the nowCOAST --

RADM GLANG: The nowCOAST.NOAA.gov site is going to a new platform and it will have some new features, right?

MR. BOWEN: Okay. I'm going to have to talk to our R&D team about some of these questions. So, I will get back to you on that.

CHAIR PERKINS: That's great. So, in my mind I'm always writing budget proposals, so when I hear that a user has a request, like what you had for higher resolution LIDAR and bathymetry, then in my mind I'm starting to make the story -- I'm trying to explain through our NOAA budget process what's the value of that to you. So, again, it's rhetorical. I wouldn't expect you to know this. But what's the value of that to the industry, to the reinsurance industry? What value does that bring you? Is there a way to capture that in dollars? So, if I give you five meter spatial resolution bathymetry, all the way up to the mean high water line, what does that mean in dollars to you?

RADM GLANG: Well, I mean, it ends up --

CHAIR PERKINS: Or the person who has the beach house on the beach for their insurance --

RADM GLANG: Well, it's important in terms of the pricing. The insurer then can go to the client and say, okay, you're in X zone. You have this X risk. And if we were able to look at a more refined, more granular level to be able to understand where the true risks lie, then in terms of pricing we're not jacking up somebody else's rate that doesn't need to have their rates raised that high, but it's going to be a more accurate representation of where their exposure currently exists. So, that's where for our industry and for our clients, that's where these pieces will come together.

CHAIR PERKINS: That's part of the challenge. The panel will have a conversation tomorrow with an economist about telling the story about the economic value, and he is going to approach it more from an educational point of view. But certainly in our budget process, for us to be able to say, well, here is the economic value, that person living on the Outer Banks only needs to pay this much or this much less in insurance, that kind of a story.

RADM GLANG: Well, it's different, because different parts of the country, obviously have different values. Talking about housing values in Miami are a lot different than say, Pensacola or Galveston. So, it really just depends on the specific industry locations.

CHAIR PERKINS: This is purely self-interest. I get one paragraph in the NOAA budget process. Joyce?

MEMBER MILLER: Joyce Miller. I had a follow-up on what Scott asked. This is for Mr. Nagle. Are you aware of any times when the NRTs have not been able to respond to needs in ports at this point?

MR. NAGLE: I'd have to talk with our folks that are involved with that to see if there has been specific instances. I think our general issue is, again, to provide that greater capability for a quick response. But to give you specific instances of either delays or something like that, I'd have to talk to our folks. But I can check on that for you.

MEMBER MILLER: In many cases, when we've gone to areas that have had to use the NRTs, they walk on water. They're rock stars. They came in and got the port opened in as short a time as possible.

MEMBER MAUNE: Anyone else on the panel, questions?

MEMBER RASSELLO: I want to answer regarding the value of having a more defined, more accurate data in the port, in waterways. That's what you were asking. What's the value for the end user? Let's talk, for example, Galveston in Houston Channel. After a couple of days of low visibility, you were about 100 ship or tanker outside Houston Channel waiting, a line to get in. This is a big loss of money for everybody there, all the country, I think. Having a more precise data on the charting, I think the traffic would be optimized and there would be less waiting outside before entering into your business.

Even without having a low visibility event, it will be good to have a good management of the traffic in and out according to the size of the ship, which ship would enter first, which would enter after that. Organizing the traffic would be, the better charting in the part will help to organize the managing of the traffic in and out of the port.

MEMBER NAUNE: Thank you.

VICE-CHAIR HANSON: Sal, you forgot to mention a deeper and wider channel would also help Galveston a little bit. I want to thank Dave and Frank for putting the panel together first off. Since I've been on this panel we've been asking the question, trying to help identify who our customers are and who uses the products and how. It's the first thing you need to know if you're going to sell something. And I think the panelists you've brought here has given us a really diverse set of ideas on how these products get used. I'd actually look forward to another iteration of the discussion. I hope you guys aren't bashful about staying in touch, as we won't be bashful about asking questions.

So, I just again, appreciate on behalf of the panel, Kurt, Tony, Bud and Steve, appreciate your input. Just the side conversations already, I know our brains are turning here, what little they do turn these days on what to do with all of this information. Thank you.

MEMBER MAUNE: Thank you. Anybody else on the panel with questions?

MEMBER BARBOR: Ken Barbor. I've asked this sidebars here today, but let me ask Kurt. We've been fully indoctrinated and Ed has done his job, and we all nod for federal funding for ports. Yet we were informed that Louisiana just bought into two more ports and they managed to fund all of theirs. Is there any way forward other than federal funding? Is it really that big an issue that we can't keep viable ports online or can't enhance them to the need necessary without full federal funding?

MR. NAGLE: It probably depends on maybe your definition of what area in terms of federal funding. Actually, a comment that I make in a lot of our presentations that I didn't talk about here in some of the overview is -- and kind of specifically, I was just literally out in LA and Long Beach yesterday looking at some of the major investments that are going on there. Without question, the vast majority of the investments in the infrastructure are being undertaken either at the local level in terms of the public port authorities themselves and/or their private terminal partners or other partners.

The industry as a whole and for most statistics standpoint is investing about $9 billion a year in their infrastructure, and that includes both the terminal facility infrastructure itself, their share of any improvements to navigation channels, deepening, widening, and there is a very significant cost share there, up to over 50%, depending on the depth. And even now on the landside connections in terms of what the public port authorities are doing really outside of their jurisdiction in terms of either their direct investments and/or trying to cobble the funding from both a local and any sort of a public prior partnerships and/or at the state or federal level in terms of that connecting infrastructure on the land side. So, I think from very broad terms, again, the majority -- if you turn around the other way, there is a relatively small percent that really is federal, but I think where the frustration from the industry comes from is even that relatively smaller share is not being maintained and not being adequately invested in.

I forget who mentioned it to somebody, maybe it was even before we started, offline, there is a lot of ports that have stepped up and said, we're even going to advance the total cost of the deepening and widening project so we can move those products forward. But there is, and part of what I think certainly, what your Advisory Council is doing is talking about what is really the federal and the national benefit and gains and importance from both a safety, economics, et cetera standpoint of what that federal role is? So, our point we're literally not -- I think part of our message to Congress in fact is we're not as an industry coming up asking for a handout. We're making very significant investments in the infrastructure that we have jurisdiction over. A port right now couldn't deepen and widen a channel on its own if they so choose because it's a federal navigation channel.

So, I guess that's a very long answer to say that there is a lot that's being done at the local level, even more than historically has been the local role because of the fiscal realities, but there is a huge federal and national interest in that infrastructure.

MEMBER MAUNE: Are ports doing some of their own multi-beam surveying?

MR. NAGLE: That's I'd have to get back to you on. That I'm not familiar with the specifics, but I'll check on that.

MEMBER MAUNE: I was just wondering, if everybody is sitting around waiting for NOAA to get there, might some people decide, well, I'm going to do the best I can with what I've got. I've heard people say, some data is better than no data.

CHAIR PERKINS: Dave, I had the opportunity to meet with the Portland, Oregon Port Authority last week and they are absolutely doing their own survey data. I have a question for Tony. I like seeing your slides and appreciated you recognizing the benefit of OPUS and CORS. And Juliana, I think earlier today you mentioned during National Surveyors Week, 20,000 points were processed in OPUS in a week?

MS. BLACKWELL: Just to clarify, there was an increase of about 20,000 additional from our normal -- we normally have about 25,000 OPUS users per month. And during the month of March, which again, whether it was National Surveyors Week or just an anomaly, I don't really know. But there were 45,000 OPUS solutions that were processed in the month of March. So, I was just clarifying. But over the course of a year, there are 300,000-400,000 OPUS solutions.

CHAIR PERKINS: Okay, that is where I was leading to. So, Tony, with 17,000 members, and you mentioned it would be nice to get status updates so you would know. What are the additional value-adds that NGS could provide in the OPUS toolset; and with those value-adds, there were 17,000 members, I'm assuming they're the primary users of the tool, would they be willing to pay for it or help fund it?

MR. DARR: Frankly, the OPUS project, if I can call it that, has added and been adding features in some ways as fast or a little bit faster than people know to ask for. So, part of the thrust I was making earlier is that the people who are developing these products oftentimes have a better intuition about what's possible than the end user who is very happy with what he has got right now. Would they be willing to pay? I would give you a qualified yes on the basis that it would almost certainly depend on how you ask them to pay, and I don't know what that way is.

If there was a subscription of some kind in which the value of what they receive additionally was perceived to be fair, I think it would be a good ROI for a lot of the users. On the other hand, I'm going to give you a slight divergent example, we operate a real-time network that covers Louisiana and some of the Gulf Coast. Most users of real-time networks who come to use ours for a little while, perhaps they are transient, will make a comment like, wow, you guys are sure expensive. We set our subscription rates several years ago, six or seven years ago at just below what was then considered the high rate from my research. And there were other real-time networks that sprung up around the country. Many of them based in a public agency, such as the Department of Transportation, for instance. And someone raised the notion that the production of this tool is similar to getting a Xerox copy of a public record and that the cost to the end user should be no more than what the paper costs.

So, many of the operations tried to run and are trying to run or have tried and failed to run on no income, other than whatever their institutional budget would provide. And some of them have actually shut down services because of that. They have not been able to keep up with technology or the repairs and whatnot. We have. I will take the risk and speak for most of our users and say that they're enthusiastic users, because it works, it's there and it allows them to do their business in a profitable way. So, that's a long-winded way to say, yes, if it is presented in a palatable way and you avoid the argument, which may be hard for a government agency like NOAA to do, that this is worth charging for -- but you can have everything except this little tidbit unless you subscribe. I don't know the administrative headaches, but it sounds to me like it would be one.

So, yes, if it gives an ROI that's beneficial, yes. I think which of those perks are valuable enough would take a special study, individual. But the general answer is, it's possible, yes.

CHAIR PERKINS: Thank you.

VICE-CHAIR HANSON: If I could just chime in on this discussion, because I think one of the points we need to reiterate, and Kurt made it, as did Tony, is that we should not forget this is a federal responsibility. The infrastructure is a federal investment. What we're doing is we're being realists. We're saying that these products aren't being provided. The ports are being dug, they're not being maintained, and we just can't wait. We're not going to wait on it. We're going to make some things happen. We've seen the governor step in, to their credit, but they don't want to take it out as a long-term issue. Again, it's a federal project, a federal responsibility to provide this type of service.

So, as we're looking at talking to you guys about perhaps paying for the services if they're that valuable, helping us identify those services might have value, but we expect, I think you're already doing this, that we can count on your help too when it comes to a lot of advocating for NOAA and its products, because they do provide real value to you and we'd like to reiterate that federal responsibility, as well as also underscore the potential that -- and asking your customers if they would pay for the real value.

MEMBER MAUNE: Any other questions from the panel?

MS. BLACKWELL: May I just as a follow-up, a few sentences about the discussion about OPUS, not that more funding wouldn't be welcome. But I just want to say to the panel and to the audience that again, thinking about, if you're not fully versed on CORS and OPUS, the CORS network, which is approximately, 2,000 stations, there are really only about less than 70, seven zero, that are owned by NOAA. So, this is a partnership effort. This is data that is freely available from these partners that contributed to be part of this CORS network.

We at NGS use appropriated funds to manage, to process that data and assure our customers that it's reliable and make it available. That data is what's used for the OPUS service. So, in other words, somebody submits data from a point that they've surveyed and they submit it through OPUS, that gets processed relative to local CORS stations and they get information back. Those local CORS stations may or may not be NOAA-owned, they may not even be federally owned. So, I think it's important to understand the system in which we are talking about, especially, if we're getting into this discussion about fees. And I know that that was a nice question to ask, the value of it, would people pay for it, but I just want to make sure that we understand that that's probably not realistic given the situation of what the network is and what the service is that's already been developed through appropriated funds.

Not that there aren't ways to improve things and to show the value that those services provide, but I just want to be realistic about this discussion on this topic and say that the OPUS and the solutions and the numbers that I quoted, there are different returns in the OPUS suite of products or options that are available. Sometimes people submit data and that individual gets that information back and that's as far as it goes. That's my 25 to 40,000 solutions a month. That's what I'm talking about there.

In other cases, the individual agrees to go a little bit more, provide a little more data and share that solution so that other people can benefit from that. So, that's a wonderful thing, as well. And then another option is let's do a project and process that project together as more of a geodetic surveying or a land surveying output, and then at some point sharing that into the NSRS and being accepted into the NSRS. So, there are different flavors of it. So, I just wanted to make those clarifications while we had this topic on the table. Thank you.

CHAIR PERKINS: Thank you, Juliana. We just have 10 minutes left and I wanted to see if we have some questions from the public out there? Anybody with questions? Yes, sir?

MR. MITCHELL: Actually, it's just a couple of questions I wanted to offer answers to. Todd Mitchell, with Fugro. Dave, to answer your question about ports that are doing hydrographic surveys, port of LA, port of Long Beach also do their own, there is probably more, as well, but definitely those three, including Portland. Admiral Glang, to answer your question about the densification of data required to do inundation mapping, and also Mr. Bowen, I was at the COPRI Coastline Engineering Conference last week, and just to cite a particular example, there was this Tsunami Roundup Study that was in Oregon. They did three different studies where they looked at densification of nodes for a 200 nautical mile fetch for a small port on the coast of Oregon. So, obviously, they're looking at a pretty large reach for just a small area.

They did a study with 200,000 nodes, 300,000 nodes and 1.1 million nodes. It was an unstructured grid, so at the deepest water areas it was 15 kilometer spacing between points. And in the optimal return on investment, which was the 300,000 point, it was 1.5 meter spacing at the shoreline. And then they also had topographical data from the National Coastal Mapping Program to look at the fetch online as well. So, basically, that sort of diversity of very scattered and not very dense state in the deep water, but once they near the shore they were looking at about 1.5 meter spacing. That's it.

MEMBER MAUNE: Thank you. Any other questions or comments from the audience?

MEMBER BRIGHAM: I'll go back to the question. Kurt mentioned that it is the federal waterway system; it's a federal channel. So, all of these other surveys, like you just mentioned LA, I guess, and Portland, how is that information integrated to the nation's chart system? I mean, you probably have an answer for that, I guess.

RADM GLANG: It's Gerd Glang from Coast Surveys. So, specific to the port of LA and Long Beach, it's my understanding that their hydrographic survey capability is used to survey along the peer faces to ensure that the ships have adequate depth to get their draft alongside; and we have had conversations about bringing their data over and using it to update the charts. But frankly, for the current scales of charts that are available, those numbers barely appear and there barely room, is my understanding. Most of that survey data is used locally.

Now, if you picture the future where you have port-scale ENCs available, then absolutely, what we would envision is taking the local data from along those peer faces, putting them into your bathymetric database, adding the Army Corps bathymetry that they're requiring for their channel surveys, and then in those non-Army Corps areas, like the anchorages where NOAA has the responsibility, add those in and you would be constantly superseding datasets and pouring it into that bathymetric database and you could create a new product at a push of a button. That would be the vision.

MEMBER BARBOR: Ken Barbor. Again, Bud made a comment on ENCs and Captain Rassello kind of followed it up. But I'd like to try to clarify and make sure it's firmly in my mind. Availability and access, availability I define as adequate and up-to-date; and access I would define as not too costly. I am expecting that NOAA's ENCs are not too costly in the realm of ENC. And I am hoping that available, that we are adequate and up-to-date, or where in particular is that not the case.

MR. DARR: A little bit of both. I just wanted to confirm. When I used those two words, you hit it right on the head. Essentially, access is realistically accessible to all users that might have a legitimate need. Keeping in mind the commercial maritime community, oceangoing subject to SOLAS, we don't have a choice. That's the regulatory framework we're operating under. Admiral?

RADM GLANG: So, we should not have a problem for anyone accessing U.S. ENCs. I think maybe from CLIA's perspective, they're a global association, and we know from our conversations with CLIA and the work we've done, for instance, in the Caribbean, doing some analyses on the availability of ENCs that there are challenges there. There are places outside of the U.S. where there is a challenge for getting these ENCs.

MEMBER BARBOR: Is there a role for the HSRP and influencing any of that, because that is not a NOAA budget item?

RADM GLANG: We could think about it and talk about it.

MEMBER MAUNE: Frank?

MEMBER KUDRNA: Question for Mr. Darr, and Sal you may want to jump in on this too. With Cuba opening up, are there issues regarding charting and mapping? And I remember before things changed, it kind of fell off the end of the Earth on our charts, didn't it, as we got out of U.S. waters. Are there issues that we should be discussing or NOAA should be discussing relating to opening up Cuba for commercial passenger vessels?

MR. DARR: I would point out that Cuba has been open to commercial traffic, including for certain cruise ships and passenger ships. It just hasn't been accessible to those operating out of the U.S. with bases of operation there. So, there is quite a bit of experience. I can't answer your question specifically on what the needs are, because our members haven't talked about that very openly at this point. But I would anticipate exactly the same sorts of issues that we have with enhancing the capability and updating the data that exists in the rest of the Caribbean basin, particularly where the presence has not been as pronounced as I think it appears that it could be for commercial traffic in the near future, not specifically cruise traffic.

MEMBER MAUNE: Anyone else?

CHAIR PERKINS: We were worried about when we should start the public comment period. So, excellent session. Thank you, gentlemen. We would ask that please send Dave your PowerPoint materials so that those can be part of the official packet that goes out in the meeting summary. They will get posted on the public-facing HSRP website, as well.

MEMBER MAUNE: I think we have all of the PowerPoints, don't we, Lynne? We have them already.

CHAIR PERKINS: Well, we're at the point on the agenda where we allow public comment at the microphone from anyone in the room. So, if there is anyone that would wish to address the panel or make a comment related to the Hydrographic Services Review Panel and navigation services, the microphone is open and this is your opportunity. There will be a public comment period tomorrow and Friday, as well. So, apologize, if you've been waiting all day for that, but this is the opportunity. This is extended to anyone that's on the call-in line, as well, so we can take input from the people that are participating virtually, as well. Just giving a minute here to see whether we have anybody respond virtually through the chat window on the GoToMeeting webinar.

If I were an auctioneer, this is where I would say, going once, going twice, okay, great. With that, we will adjourn the public portion of today's HSRP Panel Meeting. Thank you.

(Whereupon, the above-entitled matter went off the record at 5:01 p.m.)