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

MARCH 16, 2016

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The Hydrographic Services Review Panel met in the Sam Houston Ballroom, Tremont House Hotel, 2300 Ships Mechanic Row, Galveston, Texas, at 8:00 a.m., Scott Perkins, Chair, presiding.

MEMBERS PRESENT

SCOTT R. PERKINS, HSRP Chair

WILLIAM HANSON, HSRP Vice Chair

DR. LARRY ATKINSON

DR. LAWSON W. BRIGHAM

LINDSAY GEE

KIM HALL

EDWARD J. KELLY

CAROL LOCKHART

DR. DAVID MAUNE

CAPTAIN ANNE MCINTYRE

JOYCE E. MILLER

CAPTAIN SALVATORE RASSELLO

EDWARD J. SAADE

SUSAN SHINGLEDECKER

GARY THOMPSON

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

STAFF PRESENT

REAR ADMIRAL GERD F. GLANG, HSRP Designated

Federal Official

MIKE ASLAKSEN, NOAA/NGS

GLENN BOLEDOVICH, NOAA/NOS

ALAN BUNN, NOAA Regional Navigation Manager

CAPTAIN RICK BRENNAN, NOAA

GINA DAVENPORT, NOAA/NOS

CHRISTA JOHNSTON, NOAA/NOS

GARY MAGNUSON, NOAA/OCS

LAURA REAR MCLAUGHLIN, NOAA/CO-OPS

RACHEL MEDLEY, NOAA Customer Affairs Branch

LYNNE MERSFELDER-LEWIS, HSRP Coordinator

JOHN NYBERG, NOAA/OCS

RUSS PROCTOR, Chief, Navigation Services

Division, NOAA/OCS

DR. NEIL WESTON, Acting Chief, Coast Survey

Development Lab

ALSO PRESENT

DR. GARY JEFFRESS, Panel Moderator;

Professor of Geographic Information

Science, Director of Conrad Blucher

Institute for Surveying and Science,

Texas A&M University - Corpus Christi

STEPHEN BLASKEY, Licensed Land Surveyor, High

Tide Land Surveying

CHRISTOPHER C. FRABOTTA, Deputy Chief,

Operations Division; Chief, Navigation

Branch, US Army Corps of Engineers

Galveston District

CHRISTOPHER MCHUGH, Survey Technician,

TerraSond Limited

RAY NEWBY, Coastal Geologist, Texas General

Lands Office

DR. PHILIPPE TISSOT, Associate Director,

Conrad Blucher Institute for Surveying

and Science, Texas A&M University -

Corpus Christi

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Rear Admiral Gerd F. Glang, HSRP

Designated Federal Official

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

(8:14 a.m.)

CHAIR PERKINS: Good morning. Welcome to Day 2 of the spring 2016 meeting of the Hydrographic Services Review Panel. I'd like to begin this morning with a short recap of yesterday's activities.

We received a warm welcome from the City of Galveston, and from Jed Webb, representing Congressman Weber. We were once again fortunate to have the senior leadership of the Coast Guard and the U.S. Army Corps of Engineers provide thought-provoking comments, and participate during our full day of activities.

We heard about the impressive accomplishments of the Remote Sensing Division, capturing baseline pre-El Nino oblique imagery of the entire western coast from Mexico to Canada in only three days, using a King Air aircraft equipped with a commercial off the shelf sensor package. Over 3,100 images, and over 13 terabytes of data that will be essential for baseline analysis of the post-storm impacts to the western coast of the U.S.

One of the takeaways from yesterday from Dr. Callender, with this being an election year the Panel needs to keep our thoughts focused on how the HSRP's priority admission messages, what we should be crafting in those messages for the incoming NOAA Administrator, and for the transition team that will soon be introduced after the election results.

We need to be thinking about what are the tools and the services, you know, that we're going to need for the future of navigation. You know, what's navigation going to look like in the next ten years, and the next 20 years. And trying to keep that longer range of vision in our comments and in our thoughts as we make our recommendations.

Once again we heard compelling firsthand comments on the importance of the PORTS system, you know, to the pilots and to the mariners, and to the recreational boaters. And again, we heard compelling testimony about the challenges of funding those systems. So, in the entire time I've served on this panel, now over six years, that is a reoccurring, you know, comment that we have heard all across the country, from Alaska now to the Gulf, from Hawaii to Long Beach, everywhere we go. So that is something that it feels like we have not made sufficient progress on, in my opinion.

We concluded yesterday with a nice tour of the Galveston Harbor. Extend our thanks to the Houston Pilots, you know, for that. And special thanks to HSRP member emeritus, Captain Sherri Hickman for the hospitality, and for making that happen.

One thing that I missed in my comments yesterday. We did have three outgoing HSRP Panel members. So Admiral Evelyn Fields, Admiral Ken Barbor, and Dr. Frank Kudrna all rolled off of the Panel, without a chance for us to formally thank them. So, Admiral Glang has put pen in hand, and has prepared a -- you know, an official and appropriate, you know, exiting thank you letter for them. And would just like it to reflect, you know, in the record of today's minutes that we're acknowledging their dedicated service, and commitments and contributions to the HSRP, and thank them for their time that they served and wish them the best, you know, going forward.

So, with that, next on our agenda -- I don't think we need to do another safety logistics briefing. The bathrooms and the exit doors are in the same place as yesterday. So we have an opportunity now for comment and discussion.

There was a comment yesterday that we -- some of the panel members felt we were a little short on time for question and answer for the Tri-Service Directors. So we have an opportunity in the agenda now where we can use a little bit of time to continue that Q&A on the three programs, CO-OPS, NGS, and OCS. And then we'll have reports, you know, from our working groups.

MEMBER LOCKHART: Carol Lockhart. So yes, I just had some comments from yesterday after the NOAA folks' talks. Joyce asked a question about the -- why the data matters for nautical charting.

And I basically wanted to let her know that a lot of what we do now, we collect everything on the ellipsoid. All of the LIDAR systems that are out there nowadays collect on the ellipsoid. And a lot of our multi-beam and acoustic collects -- I'm sure you know this anyway -- are collected on the ellipsoid.

So the datum change will affect how we do things in the, you know, VDatum and everything else needs to be updated, which Rich mentioned yesterday, but because we do everything on the ellipsoid, and obviously the X and Y is changing as well, then those things will affect how we do things.

And then I had a question for Juliana. The -- all the LIDAR data you're collecting as part of your coastal mapping program, is that going to Office of Coast Survey to be put on charts?

I know there are some technical issues with how that can happen. And I'm wondering if the data's going to them, and how you're dealing with those issues?

MS. BLACKWELL: This is Juliana Blackwell. All the data that we have is available to everyone, including Coast Survey. I know that there are some experimental, well not experimental. These are in process right now to determine how to best utilize the LIDAR data for the charting purposes.

And I believe that was -- it falls under perhaps the auspices of IOCM. And I don't know if -- I think Ashley was supposed to -- is she here today? Is she going to be here today?

And so, there are opportunities that I think that are in progress right now and how they're actually utilizing it, I'm not sure I'm the best person to answer that. Mike Aslaksen, who is here, is there anything else I should add to that? Or ask for IOCM input?

(Off microphone comment.)

MS. MERSFELDER-LEWIS: Can you repeat that?

MR. ASLAKSEN: Sorry. Sorry about that. So, much of the issue is getting the data, which has been basically built around terrestrial technology and formats, getting it into hydrographic and charting formats. And that's been the real challenge.

The softwares that, in which the Coast Survey and other charting agencies take data in, do not readily adjust bathymetric LIDAR data. And it's really a technology transition issue in a good way, in that we're really getting a lot of data we never saw before that we can apply to the chart.

But as my comrades here sit -- we go back and forth back here behind the scenes here talking about that very same issue yesterday and today of how do we get this very high resolution data to the chart, which is really some of the places where our data needs to be updated.

So yes, it's a constant thing we're working. And really a recommendation out of the Panel could be helpful in the case of, you know, how do we get this data to the chart faster? Pushing on a lot of commercial interests is, I think is where the recommendation needs to go. Thank you.

MEMBER LOCKHART: So, one more question which isn't a follow-up. So you can release the mic. A question about the oblique imagery that's being captured. Is that -- you mentioned it's georeferenced. Is it -- can you also measure things off of it? Or is it just a georeferenced image?

MR. ASLAKSEN: Yes. The imagery is georeferenced and it is GIS-ready. So you do a bulk down on that data, bring it into a GIS software, whatever software you're using. And you can measure from it.

Some of the recommendations that we're getting back from the on need to collect are higher frame rates, in order to get more overlap between the images, to do structure from motion analysis. This is coming from the USGS and a lot of coastal managers, as far as using that to create elevation looks at pre and post.

And the other recommendation we're getting is more oblique. Right now we're at about a 45 degree. They want more, which means cutting holes in airplanes. And that's a different discussion. But anyway, yes, it is georeferenced.

MEMBER GEE: Just to follow on from the LIDAR a bit, and then just generally on other data. It's maybe more for Gerd I think.

And so, it's, you should say it's the technology to try and get the formats into the suitable hydrographic format. But it's also partly assessing the data, right, of the suitability. And that applies to a lot of other non-data that's being -- you know, not surveyed to the hydrographic standards.

I mean, we know there's a lot of data. I think that was on previous meetings about how we're, you know, not getting as quickly as it possibly could be onto the charts. So isn't that partly technology, partly then the suitable assessment to say that it's, it can be used in some way? Sorry. Yes. Okay. Lindsay Gee.

(Off microphone comment.)

MEMBER GEE: Okay. Sorry.

(Off microphone comment.)

CAPT. BRENNAN: This is Rick Brennan. So, I think that we can. I guess Mike and I disagree a little bit on this. We were having a debate, to be polite about it, last night.

I mean, the hydrographic branches right now do take LIDAR. We've been doing LIDAR for many years. And we have the ability to bring that data form in, and process that through.

It's just, I think right now when you start looking at the sheer bulk of what's coming in. When we talk about, you know, the entire U.S. coastline once a year. And that's in addition to what we've already got.

I mean, we -- just in the commissioned surveys that we're processing right now, you know, between our contractors and our in house, you know, we already are running a backlog. So if you suddenly then add that in, you know, thousands of square miles, I think it's just the challenge is going to be -- is that we're going to probably quadruple our -- you know, what that backlog of survey data is.

And then it, you know -- so, but that said, I think that the issue should be is that we give all of those surveys an H number, and put them into the queue. And have those in a system, and just start marching through them in as expeditious a fashion as we can and I think that way that they get in, and they ultimately have some way to make it into the charts. So, that's my personal opinion.

CHAIR PERKINS: Captain, can you say a few words on what that means, to give it an H number?

CAPT. BRENNAN: Sorry, yes. So, an H number is basically the -- is a registration number that we give all hydrographic surveys. So, any survey that's on its way to the chart gets assigned a -- we call them an H number but there may be other designations, depending on the quality of the survey.

But ultimately it's a registry number, so that we can track that through the process. And that's what it -- it maintains that all the way through to NCEI, when it gets databased there.

MEMBER GEE: Lindsay Gee, follow on question. So there's a move, I guess, to see that the traditional hydrographic surveying has been for, you know, deepwater ship main navigation. But there's now a move into the coastal resilience with the shallow water.

Having available, even knowing that that bathymetry is available, and it's suitable, and possibly for use for modeling, I'm not -- now we're talking about runoff and storm surge, and those sort of things.

How much effect does the quality of that shallow bathymetry have on the models that might be used for the surge modeling? And does that make a difference? And is it worthwhile trying to get that into at least -- maybe it's not going onto the charts right away, but into some form of database that's more usable, as opposed to different surveys in different places.

RADM GLANG: Gerd Glang, Coast Survey. So, Lindsay, your question about the quality, or the resolution of data to support coastal modeling? Which one do you want?

MEMBER GEE: I think it's saying if it's not -- it's in a queue for the hydrographic survey, that's fine. But to make it available more. And having then better bathymetry that's in that shallow water, does that make the modeling of the storm surge better?

RADM GLANG: Okay. So all hydrographic survey data that comes into our hydro branches is archived immediately after it clears through the sort of initial quality review. That sort of checks, do we have all the pieces? Does the data makes sense?

It all immediately goes to NCEI for archiving. And that's a public archive. So, all the data that we collect is made publicly available.

It's from NCEI that NOAA, that in particular I'm thinking of their digital elevation models they built to support tsunami mapping, for instance. So they're reaching into the archive, using our data, other data that's archived, to build those bathymetric DEMs, to support inundation modeling.

My understanding about what their requirement is for resolution, or accuracy for modeling, is it's much coarser than what we make available. In fact, for a lot of modeling they'll take whatever they can get.

So, it would be interesting to know, you know, it would be a bit of an academic exercise to do a sensitivity analysis, and to see exactly where it makes a difference.

I think as nested grid models are -- become more and more sort of the tool of choice to get down to the level of detail you need for understanding how a particular small basin, or a port or harbor might be inundated, then accuracy probably will start to play a part.

But right now it's, you know, the resolutions they're building these models at doesn't -- the requirement doesn't come close to what we need for nautical charting. Let me put it --- are you going to straighten me out?

MR. ASLAKSEN: No sir, just to support you, of course. Just to add into that though. The -- some of the clarifications. So, in, under the supplemental, which we collected topo-bathy LIDAR for Sandy.

One of the big uses of those data was to support coastal inundation modeling. So the data -- one of the data formats we delivered, which is available on Digital Coasts.

So the good thing to understand is all the topo-bathy LIDAR, both from us and the Army Corps, and well, as many people we can get to is available on Digital Coasts. One of the deliverables are DEM, D-E-M. And the one meter DEM, depending on the sensor, or the specification, is available there.

What we are seeing is that the modeling community's incredulous about the data and how high resolution it is. So, but we deliver one meter DEM format, they're actually, you know, reformatting that, or to a two meter DEM, because they can't handle the volume, is what we're seeing.

But there's a lot of increased interest in that. And, you know, like Jesse Feyen from Office of Coast Survey would be a good contact on this. But they definitely want the data. And it is being used.

But one of the things it does feed, as the Admiral said, is NCEI, and going to the tsunami group. And as this data goes in. In almost near real-time though, OCM, Office of Coastal Management, is taking that data from their sea level rise viewer.

So if you go to the OCM site, Digital Coasts sea level rise viewer, they're using the data from Sandy, JALBTCX, and other folks to actually increase the accuracy of that inundation viewer, if you want to see that real time.

CHAIR PERKINS: Yes. I have a question, Mr. Aslaksen. So the topographic bathy LIDAR data collected under Hurricane Sandy Supplemental, does any of that get assigned an H number, and go into the chart process? Or is it only going into the Digital Coasts?

MR. ASLAKSEN: No. That's what Rick has been speaking about, about us getting that data to, and in fact, is at the hydro branches now. So actually, I think one of the first datasets was Barnegat Bay, I think, which was mentioned yesterday.

But yes, everything that's gone to Digital Coasts is in queue to be applied to the nautical chart.

MR. ARMSTRONG: So, Scott, were you referring to topo or topo-bathy?

CHAIR PERKINS: Topo-bathy.

MR. ARMSTRONG: Okay. Sorry.

MEMBER LOCKHART: We actually did a hydro survey under Sandy funding, using topo-bathy as well for Barnegat Bay and it was specifically assigned an H number. It was a hydrographic survey.

CHAIR PERKINS: Thank you for clarifying.

MEMBER SHINGLEDECKER: Susan Shingledecker. My question's much more general. So if others had -- want to continue on that thread, I don't want to interrupt.

A question I asked in Long Beach, and I don't know if you want some time to think about it. But I found helpful of the three office directors is, what right now are your greatest challenges? What are the things that keep you up at night?

And if you're able to share those with us, how can we help you, you know, brainstorm ways to move the needle or, you know, start to overcome some of those challenges?

CHAIR PERKINS: Very good question. We'll give you a minute to think about that. Rich, I have maybe a simpler question. And then we'll go to Susan's.

You mentioned yesterday doing current surveys, you know, here in the Gulf Coast area. I emailed some colleagues last evening about that. And the question that came back to me, are those acoustic Doppler profiling? Or are those tethered or buoyed devices? If you can just a little bit more about how those are --

MR. EDWING: Sure.

CHAIR PERKINS: -- conducted.

MR. EDWING: Sure. So, Rich Edwing with CO-OPS. Yes, they are acoustic, you know, Doppler profilers, getting entire water column. The deployment methodology depends on the region.

I mean, we use bottom mounts. Sometimes we use, you know, sub buoys. It really just depends on what deploy method best suits the region we're taking those measurements in.

CHAIR PERKINS: Are those collected then using the NRTs, or NOAA assets? Or do you reach back to the -- to your contractors, you know, to collect that data through the hydrographic survey contracts?

MR. EDWING: We have used contracts in the past. But as budgets have shrunk we've fallen back, and we're doing fewer surveys today than we were a few years ago. And now we're pretty much doing them with in house assets.

But we often partner with -- sometimes we do use vessels of opportunity. Sometimes it's Sanctuaries. Sometimes the NRTs have helped. Sometimes the local university that's interested in, you know, partnering with us. So, there's a variety of ways we kind of get the platform support in the areas.

CHAIR PERKINS: Thank you, sir.

MEMBER LOCKHART: A question for the Admiral. You mentioned yesterday you're having workforce issues with the NRTs. And I'm wondering if you can expand on that a little bit, maybe let us know how many of the NRTs are affected by those workforce issues, for example.

RADM GLANG: So, we did -- Gerd Glang, Coast Survey. So, the Navigation Response Teams, we have six teams. And a couple of years ago now we -- I think last year -- I can't remember the exact timing.

We received approval to change the staffing profile for those teams, where we went from two to three. And we elevated, or changed the classification of one of the positions, the team lead position. So it's a professional series, not a technical series.

So that process took much longer than we'd expected. In the meanwhile we've held off on retiring -- on filling -- hiring some of the vacancies that happened over time.

So that, and the sort of general difficulty in getting workforce packages through the hiring system, we're keeping about four teams operational now.

If we needed to, we could certainly augment some of the other teams. But all the vacancy packages are ready to go here for the coming year. We're just -- you know, it's just process now.

MEMBER LOCKHART: Thank you.

CHAIR PERKINS: Mr. Edwing, what's keeping you up at night?

MR. EDWING: Well, actually slept pretty good last night. But what worries me during the day is our ability to keep expanding the PORTS program. You know, there's no such thing as a perpetual motion machine.

And you can see from my presentation yesterday, the system keeps on expanding. And there's lots of work that goes on with the existing system. And the workforce is being very stressed right now by the ability to keep up with that.

And so, we've been working hard over the last couple of years to, you know, find efficiencies. You know, things are now starting -- one methodology is to keep pushing things to the right.

In other words, somebody comes and asks for new PORTS, we say, well okay, you might have to wait a year or two now before we can even -- we can get to it. We've redirected some internal funds, you know, but I can only do so much of that. So, obviously people really value the program. I need to keep supporting it. And what's keeping me up at night, or during the day is, how can I keep doing that, providing that service?

DR. CALLENDER: So, I know you asked the office director what keeps them up at night. But I'll dive in anyway, because I'm playing on the same team.

So for me one of the fundamental issues around the Nav Services portfolio writ large is the inability right now to recapitalize the fleet that we've got. We've got fleets -- ships that are very, very old. Rainier, Fairweather are roughly, what, 48 years old.

There's challenges of being able to keep those ships running. You know, it seems like there's issues with some of the engineering support for those ships. And so, we end up losing a lot of days at sea, frankly because we've got old ships, and they're really difficult to keep running.

And it's a huge ticket item. And it's very, very political, as you might guess, in terms of making a case for those big ticket items. So, for me that's something pretty fundamental to what we do. And I'm not sure we have a solid pathway forward for recapitalization of the hydro ships.

MEMBER SAADE: So, this is Ed Saade. This probably is directed at Mike. But it seems like as Mike's office is getting more prolific with hydrographic LIDAR, bathymetric LIDAR, whatever we want to call it, from a logical point of view it seems like now there's a tremendous amount of overlap with the system in the Army Corps of Engineers side of the house.

And as we're talking about synergies, and trying to find the ways to stretch the dollars out, is there a way to focus all that energy and expertise in an office like Mike's, as opposed to spreading the dollars across all these different agencies? Or is that something that's against the rules to talk about?

CHAIR PERKINS: No, I don't think there's anything against the rules there, Mr. Saade. And it does -- I think your comment is correct, that there does appear to be some parallel capabilities between perhaps what's going on with the JALBTCX program, and what's going on in the Remote Sensing Division program, and other agencies as well. So I think that is a topic that is valid and worthy of deliberation. Juliana.

MS. BLACKWELL: This is Juliana Blackwell. Ed, we do a lot of coordination with the groups that you're referencing, Army Corps, USGS, from the executive level, all the way down to the technical working group level, of coordinating, you know, what our assets are, how we're utilizing them, where we're doing our projects.

We have online tools that enable folks to graphically display when they're working in certain areas, and what their collections are for. And the Sandy Supplemental work was a fantastic opportunity to showcase how well we can do that if we all work together to do so.

And I think that, you know, through IOCM and through those technical working groups that are cross agency -- across department, I think we do have the ability to do it right, and to have the capability exist in different agencies because we all have slightly different missions.

And when things come together in certain geographical locations, we can continue to work in the same field, but do things so that they're efficiently done. And I think a lot of that helps us with just cross-fertilization of how we do things, and why we do things certain ways, and to apply best practices.

So I don't think it -- you know, with the Remote Sensing Division being a part of the National Geodetic Survey, I would not advocate for trying to pull all of this information into one office and one agency. I think that having those different groups involved in the topo-bathy is an important thing.

And I think that, you know, recommendations on how we can do that better are certainly welcome. Maybe we can have some more in depth presentations on how we do things, and how we coordinate with other offices. But, you know, I think that we are showing that we can do a great job of doing that coordination.

And maybe one of the things is, who else should we coordinate with? And are there tools and other opportunities to showcase that in particular geographic areas? So that's my thoughts on that. Thank you.

MEMBER SAADE: Again, this is Ed again. I can answer that a little bit, just from experiences off of California, where it was the fact that our company collected data for all these different agencies.

And we went proactive with a FEMA contractor to let her know that the data existed. And they had no idea that the data existed. So there's agencies outside of the folks in this room that -- and maybe that problem's fixed. This goes back about three or four years.

But I would say that from a practical standpoint, with dollars getting thinner, and people trying to find ways to be more cost effective, that maybe it should be looked at in terms of inefficiency, to do it out of one, maybe two agencies, rather than three or four, which it seems like is going on right now.

RADM GLANG: Gerd Glang, Coast Survey. So Ashley Chappell is our program coordinator for Integrated Ocean and Coastal Mapping. She'll be here tonight.

I would invite her to give an update on what IOCM has been doing, including they've spent quite a bit of time developing a National Coastal Mapping Strategy, which gets directly at, I think what you're concerned about, interagency coordination. She'll be here tomorrow. So I would invite her to give us an update. Juliana.

MS. BLACKWELL: Juliana Blackwell. One other, just follow-up, since you mentioned FEMA. I'm currently serving on the Technical Mapping Advisory Council, which is advising the Administrator of FEMA on ways to improve their mapping program.

And so, from an operational, to an insurance industry focus, to just the entire scope of the national flood mapping program, it's an opportunity to highlight things about the coordination, even at the data collection level.

So, I will keep that in mind as we continue to meet on a monthly basis under TMAC, to have -- to see if there are opportunities to continue to include that coordination effort, so that FEMA hears that as well.

The points about what we do with the national -- the coastal mapping strategy, things like that, were part of the discussion last year in 2015, during TMAC.

But continuing to highlight the data deliverables, the data availability, everything that goes into making, you know, floodplain -- flood mapping products, I think is certainly another opportunity to highlight the need for that coordination, not just amongst the Army Corps or USGS and NOAA, but certainly FEMA and other agencies. So I will keep that in mind, your comments that you made here at HSRP. Thanks, Ed.

VICE CHAIR HANSON: Thanks, Ed, for bringing that topic up. It's something we probably need to talk about at every meeting, something we've talked about in the past as well. And one of the things that is -- a couple of observations from the conversation is, you'll hear a lot about lack of funding.

And so, we've kind of addressed that in the infrastructure side of things by trying to encourage our folks, our clients, folks we do work for, to be shovel-ready, not sitting on their hands waiting for the money to come, and then decide which projects you're going to do.

We've also approached that on the research side with the academics as well. So, be research ready. Have these projects in your back pocket, ready to go, so when the money comes. You never know if it's going to come from a federal source, state source, or even a private source.

So rather than sitting and waiting for the bag of cash to come out, and then figure out which one of them that you might want to do, you know, be a little more proactive on that.

And so the challenge to NOAA is going to be survey-ready. In other words, have that long list of needs and projects in your back pocket, ready to go, so when the money comes.

Sandy provided an excellent opportunity for a lot of coastal interest to show what they could do. And a lot of agencies had shovel-ready projects that started work the week after Sandy. A lot of researchers had projects.

I'm thinking about BOEM had a lot of issue related to offshore sand sources at our business, that they hadn't had funded for years. But these, when the money came they were ready to rock and roll. And they were out there within a few weeks looking for sand sources.

So the same thing with NOAA and NOS is just having that long list needs in your back pocket ready to roll. Not waiting for somebody to ask you what your needs are, but being a little more proactive on that.

And certainly having a collaborative message that you've already made it as efficient as possible. You've eliminated all the, as many inefficiencies as you can, except the funding, certainly helps sell the overall picture to everyone. And it helps -- it prioritizes projects internally as well, as to what we think is important.

So whether you get a couple of bucks, or you get everything you've ever asked for, being prepared for that is a big, big part of the conversation. So thanks for bringing it up.

MEMBER LOCKHART: Yes. Carol Lockhart. I just want to expand on what the Admiral mentioned about the work Ashley Chappell's doing.

I think there has been a complete sea change in how these agencies coordinate. I think ten years ago, I think Ed's concerns were very valid. And there's certainly room for improvement with including other agencies.

But, for example, last year at the JALBTCX workshop a whole afternoon -- actually ran a session there for a whole afternoon where NOAA were present. It was at an Army Corps workshop. The USGS were calling in on the phone. And other members of the public calling in on the phone.

And they had a live session with SeaSketch for the whole afternoon, focusing on different regions. And everyone was putting up where they had projects they wanted to work on, and seeing where those overlaps were between different stakeholders.

And it's something that we would -- we would never have seen that ten years ago. So I think everything's actually moving in the right direction. And I think some recognition has to be given to that.

CHAIR PERKINS: Great. Thank you for sharing that. The JALBTCX workshop is something that maybe not everybody on the Panel is familiar with. So perhaps maybe Ashley can brief us on that event as well. Joyce, you had a comment?

MEMBER MILLER: Yes, just briefly. Joyce Miller. My impression -- and Ashley has talked several times at these meetings -- is that that really has been successful, what Mike does, and out of Juliana's shop, and on the shoreline mapping, and the topo-bathy LIDAR.

My experience tells me it hasn't moved as quickly on the in-water survey side of it. That the, you know, there is better coordination. But not to the level of what you're talking about with the JALBTCX stuff. So that's just my experience.

CHAIR PERKINS: All right. I don't want -- this is good question and answer, and very fruitful. But I don't want to use all the time without having the reports from our working groups, because that is a scheduled agenda item here. So, Joyce and Dave, are you prepared to do your working group report outs?

MEMBER MAUNE: Yes. Joyce is first.

MEMBER MILLER: Yes. At the last meeting we decided to focus our energies on these one page papers; these technical papers. And at that point -- let me back up for the new Panel members and the public.

The legislative and policy working group, in the past there has been some confusion. And I think the new members saw this in some of the newest instructions about -- because we have a legislative group, about, you know, whether -- what exactly our role was, you know, talking to Congress or not.

And over time, through legal briefings, and so forth, it's been made very clear that the legislative group should monitor what's happening in the legislation. But its role is not to actively go to Congress, or anything.

And so, Glenn has really served that purpose -- before him, Paul Bradley, and now Glenn. And I guess there's a new Paul. And I just lost her card -- Christa. Yes, she's back there. And they keep us very well updated on what's going in Congress.

I mean, the other thing that happened is, there were three members on the -- there were actually four members on the legislative committee, myself, Admiral Fields, Admiral Barbor, and Gary Jeffress.

(Laughter.)

MEMBER MILLER: So the group is now me. And Dave and I had pretty much decided, especially since his group, which is labeled the -- let's see, Planning and Engagement Committee, we both had to some extent, in the intent of the group was engagement.

And we decided that in this time period the legislative group would work with Dave. And the other thing was, Frank was co-chair of that group. And Frank is no longer on the panel. So, our panel memberships have shifted a lot.

Just for information purposes, in the past the legislative and policy group, we worked on the charter, which is updated every three years. And Glenn, when are we due for another update? Is it a year and a half from now?

MR. BOLEDOVICH: Joyce, I'd have to check, but I think that's about right because we just reapproved it. It was for three years. And it was a little bit late. But we had to take a peek at that.

MEMBER MILLER: So that's still on our to do list when it comes due again. And the other thing we did was the standard operating procedures and we all viewed that. This was at Scott's request. We all viewed that as a work in progress, and that we would update it as things happened.

And one thing I wondered, from the discussions yesterday, is whether we should update some of the discussions we were having about the chair position, and how long it should last, and how the, you know, how the sequencing should go, the succession. And that might be something we want to add to the standard operating procedures, just to give the -- and I highly suggest you look through that because we didn't have a clear understanding of who did what to who, and who was responsible for what.

For instance, the program notes that the court reporter takes. It wasn't clear whether we were responsible for the summary or not, or what. So we developed these working procedures.

And also, to give people who are in charge of these various documents timeframes. This is what's expected of the panel members. If you're going to respond, do it in this timeframe, or tell us you're not going to respond.

So that's kind of what the legislative and policy working group has been working on. Plus, I, with -- sort of with the help of Admiral Glang, worked on this, the NOAA Hydrographic Survey Fleet: A Critical National Asset.

And I think Dave, he's been more in charge of it. I think we should probably, before we go into any of the papers, we should talk about the structure and, you know, where we stand on things before we actually work on the papers.

MEMBER MAUNE: I'll be doing that.

MEMBER MILLER: Yes. So, that's pretty much all I've got to say right now. I mean, the legislative and policy working group is not -- it's dormant right now. We thought that it was much more important to get a series of these one page papers ready for publication.

And some of these I think are possibly -- particularly this one given Dr. Callender's comments, this one is extremely time critical.

So, I'd like to see -- my goal is to have this agreed upon, finalized, and then go to NOAA for final making it prettier and, you know, final consideration. Dave.

CHAIR PERKINS: Dave, before you begin, let me ask Dr. Callender, or Glenn, or the Admiral a question about the timing of that position paper on fleet recap.

I just, you know, looking for advice, are we best served by wrapping that up and putting it front of Dr. Sullivan in the current administration? Or should we hold it back, and be prepared, you know, to deliver it promptly after the change in administration?

I just -- you know, we don't want to be premature on it. So, looking for any comments or advice.

DR. CALLENDER: I'd suggest both. I'd try to get something in front of Dr. Sullivan fairly quickly, if there's any possible way to do that. Because the conversations are happening on the Hill right now with the FY17 budget discussions. And so, this is very much in her mind.

It's also, you know, because it is going to be a long-term challenge to be able to come up with an appropriation that would support some of the fleet recapitalization. I think it also needs to be tailored to a transition document.

So you can't just do one or the other. I think you got to -- we have to continue to push and bang on this. I don't know, Gerd, if you have other thoughts on this.

RADM GLANG: Gerd Glang. No, I think you're absolutely right, Dr. Callender. I think this is a story that right now needs to be heard, because of what's going on with the budget. And I think it would be very useful for the transition as well.

MEMBER BRIGHAM: Yes, I agree. We should note in our letter -- have a paragraph about this topic, and then refer to the appendix, as we did with the Arctic report. Write it up a little bit as an urgent issue, and then refer to our paper that we append to the letter.

VICE CHAIR HANSON: Is it common in NOAA for the Administrator to leave immediately upon a new election? Or is it sometimes they carry over? Or is that just a -- it depends?

DR. CALLENDER: So historically, you know, the 19 January for sure they are gone. It wouldn't surprise me if it's a little bit before that. But again, there's no, we don't have any notice of that.

So what's typical is probably realistically the end of the calendar year. Now all that said, she hasn't said specifically when she is going to leave. But usually are pretty closed on that kind of comment. So, the transition team probably won't come onboard until sometime mid-January.

They could be, as I said yesterday, working with the outed Administrator for another three or four months. So it's hard to say exactly. I'm just looking at sort of the past transitions, and what the timing has been.

VICE CHAIR HANSON: Okay. And then that includes Admiral Brown as well?

DR. CALLENDER: Yes. My understanding is he wants to stay as long as he can. But again, that clock does time out with the new administration.

MEMBER ATKINSON: Larry Atkinson. If this is so time critical, why do we have to wait to append it to a letter? Can't we do something faster?

CHAIR PERKINS: Well, the letter will begin before we leave here. Our standard operating procedures say that we'll wrap that letter up in a five week timeframe. So the draft will be prepared in two weeks. It gets two weeks for review. And then it goes into NOAA.

So, in some terms that is probably as rapidly as we could finish this paper, and get it forward. So I think the timing is -- your point's well made. We don't have to wait for it, but we're not finished with it yet either.

DR. CALLENDER: It would be really great if there could be something earlier than that. A conversation with Dr. Sullivan, or Admiral -- Vice Admiral Brown would be helpful if it's very, very soon, if it's going to have any influence on the FY17 discussion.

It doesn't have to -- you may not have to wait. What I'm saying is to have a formal, full on letter. But some kind of briefer communication, expressing the opinions of the Panel, I think would be helpful. I know that might be hard to do.

CHAIR PERKINS: Well, it looks like we've got a pretty darn good start that was put in front of us here with the draft, you know. So, I'll accept that charge to try and get it done in -- ahead of our recommendation letters.

DR. CALLENDER: And I'm certainly happy to help facilitate a conversation if that's what we need to do.

CHAIR PERKINS: Thanks, Glenn. Lawson.

MEMBER BRIGHAM: That might be a opportunity for you and Bill to talk to Vice Admiral Brown on this one directly, as he opened the door to do that a bit.

It's a sense perhaps of the HSRP that this is a huge critical issue for the nation. And we get it. And the paper's coming up the chain maybe in the next couple of weeks.

CHAIR PERKINS: Yes. I'll reach out to his scheduler, and see what our earliest opportunity for Bill and I get back in front of him and deliver it. I know what my homework assignment is. Dave, are you ready?

MEMBER MAUNE: Yes. Dave Maune here. Frank Kudrna and I were co-chairs of the planning and engagement working group last year when we talked about the need to have issue papers.

This is the part of this HSRP meeting in which we roll up our sleeves, and figure out ways how we can give advice to the NOAA Administrator.

And we decided we would try to approach various issues that we thought the NOAA Administrator should be interested in, and give recommendations in a certain format.

So we've struggled a little bit with what format the issue papers should be. But we are looking for one page documents, printed front and rear.

So it's really two pages, but in a single sheet of paper, that would address various topics that we thought would be important to the NOAA Administrator, which is particularly true with an incoming administration next year.

I gave each of you on the panel the top part of this slide that's on the screen here, in which it laid out the issue paper titles. Those were originally in prioritized manner, in which the various members voted on what they thought was most important.

And so, from top to bottom it started off with a bunch of mapping topics. And then it went down to technology, and then the fleet, and Hampton Road and levels and tides sort of thing.

Over the months we were working on what format these issue papers should have. And we decided that it should include an explanation of the issues and the status, what challenges we face with these issues, what are the current ongoing activities involving that issue, and most importantly, what's the federal action that is recommended for the NOAA Administrator.

We also decided that we should add in what partners are part of this exercise, where the partners could work together to help hopefully solve the problems.

We have received some of the issue papers. Some of them are just about ready to go. And some of them have not been put on paper yet. So what I did was I -- on the chart I gave each of you I put X marks where there is a section with that heading. And you'll see a number of -- a lot of blank spaces. And then in at least three cases there's been no draft turned in to me yet to review. But in all cases the identified leader -- lead author is going to be called upon this afternoon for a 20 minute session.

We have most of the afternoon to work out these issue papers as best we can. And I've assigned 20 minute time slots to everybody in the sequence. But if you can see it on the board, and if you can't I'll read it to you.

I'm going to start off with Joyce Miller being first, from 1:15 p.m. to 1:35 p.m. Then Lawson Brigham from 1:35 p.m. to 1:55 p.m. Then Larry Atkinson from 1:55 p.m. to 2:15 p.m. Then Ed Kelly from 2:15 p.m. to 2:35 p.m. And Sal Rassello between 2:35 p.m. to 2:55 p.m.

Then I planned a break. I hope the break's okay with you guys back there in the planning group. I didn't coordinate this with anybody. It seemed to me like we'd need a biological break, if nothing else.

3:10 p.m. to 3:30 p.m., Susan Shingledecker here is going to be up. After that Bill Hanson, after that Scott Perkins. And then we have Anne McIntyre and Gary Thompson, who are brand new members to the team.

And they sort of chimed in and contributed something when they saw what the team theme topics were. And they're sort of -- there was some similarity between theirs.

And so I put a time slot there for the two of them, made it slightly longer. But to see if there's a way we can consolidate those papers into addressing these issues.

Does anybody have any -- any of the speakers have any problem with the 20 minute time slots that I've allocated to you? During that 20 minutes I'm hoping you to explain your paper.

And we had discussed whether we should break up into small working groups or not. But we decided at our last -- at our meeting last month that we wanted the entire panel to comment on every one of these.

And so, this was the best way we could see for having everybody get the opportunity to comment on each paper to see, can we make them compelling, concise? Will they have good recommendations for the NOAA Administrator?

Because without that, what's the use of having the paper if there's no recommended changes? And so, we've got to have recommended federal actions on all of these things.

And then, do they need to be consistent, and have the identical format? Or is there room for flexibility, that they might have a different look and feel? We were hoping that they had the same look and feel. But we shall see.

Now, whereas it's intended for the NOAA Administrator, I suppose the NOAA Administrator can decide how he or she would plan to use these papers, just for her own use, or his use, or how to share with other people.

I don't know that that's our decision to make. Because we are providing advice to the NOAA Administrator. So I assume that it is the Administrator's decision what to do with these fact sheets. Does anybody have any questions of me on, or comments?

MEMBER ATKINSON: Yes. Atkinson. If we've got 20 minutes, do you want us to do ten presentation and ten comments?

MEMBER MAUNE: That would be about right.

MEMBER ATKINSON: Yes, okay.

MEMBER MAUNE: Yes. If each person took about half the time explaining their paper, and then the other half for us to comment on the paper. Yes, Lawson.

MEMBER BRIGHAM: On the Arctic paper, this is Lawson Brigham. On the Arctic paper we just need consensus on some technical points. I mean, it's pretty mature. But there's still, we need consensus on, for all of the members on some particular points. And what do we want to say?

Like, one question is related to Admiral Glang, and how much of the United States maritime Arctic is actually charted to modern standards? Can we get an estimate for that? So, we're not technically incorrect for -- Anyway there are some points.

The other things is, my sense is still that these topics are slightly fluid. In one respect Captain Rassello and I, and Captain McIntyre have this precision navigation that relates not only to cruise ships, but to mega container ships.

MEMBER MAUNE: Yes.

MEMBER BRIGHAM: And so, we may want to meld the topics somehow. I don't know how that's going to go.

MEMBER MAUNE: That's possible. So if we can fit it on one page.

MEMBER BRIGHAM: Well, it will, front and back, yes.

MEMBER MAUNE: That was one of the --

MEMBER BRIGHAM: Well, that might be a little tricky.

MEMBER MAUNE: Yes.

CHAIR PERKINS: Kim.

MEMBER HALL: I just want to note that I saw on our agenda that there's time tomorrow morning too. So I don't if these 20 minute, the amount that we all like to speak and talk to these issues is maybe, Dave's schedule is a little too quick.

And it looks like there's time tomorrow morning to establish some of these, including Captain Rassello's paper, the Arctic paper, and then the resilience Hampton Roads project. So it looks like maybe we don't have to squeeze it all in this afternoon. There's some room. I just wanted to mention that.

MEMBER MAUNE: Dave Maune again. I pointed out that the checkbox does not have Joyce's paper with a checkbox and partners. Well, when she looked at the shift today she revised her paper. And I had, the one we have before us this morning now has partners on it. Yes.

MEMBER BRIGHAM: Lawson Brigham again. The papers go up to the Administrator, attached to our letter in some format. And then they go on the website to be transparent with this information. True?

So, these issue papers for the NOAA Administrator are going to be used by staffers and others on the Hill if we just direct them to the website.

MEMBER MAUNE: I would assume so, yes.

MEMBER BRIGHAM: So it's not an internal document. It's actually, well, it's internal in part. But then it becomes external when we put them on the website.

So I just wonder how the format -- I guess it's all clear and smooth. But I didn't know if there were any challenges in this process. I don't know of any, Admiral. But --

CHAIR PERKINS: I like the, I like what Dave has done here. So first of all, thank you, Dr. Maune, for the effort, and your leadership that you've put to get us to this point.

Having them have a consistent look and feel seems both beneficial and logical, you know. The length may be the thing that changes. Some of the issues are perhaps more complex than others.

Taking Dr. Callender's comments into account, about the importance and the timeliness of fleet recapitalization in that issue paper, and the fact that I have not put forward a draft on technology, in political fashion I would like to yield my 20 minutes of time that's scheduled for the technology issue paper, and suggest that we use that additional time, and put that effort to the fleet recap paper. It's me dodging a bullet for a good purpose. So I hope you'll consent to that.

MEMBER MAUNE: I'm fine with that.

MEMBER MILLER: One comment. Dave and I worked on the template. And Admiral Glang came in with a sample paper that was in this format, that we thought was quite good.

One thing I noticed, I did review most of the papers that are in existence. And something the authors should think about is, we are advising the NOAA Administrator about things that NOAA could, should, might do.

And especially in the areas of ports, and large ships, and so forth, there is so much overlap between what Army Corps is supposed to do, and NOAA's supposed to do.

And that I think we need to be clear about what NOAA can do. Because there's a lot of things that Army Corps is involved in that NOAA can't tell them what they should do. And so we just need to think a little bit about, in our recommendations to the Administrator, what is appropriate to suggest that NOAA do.

I noticed that some of the recommendations were extremely broad, and not really NOAA focused. They were more the Federal Government should do this.

I don't know if anybody would agree with that. But that was my comment, in terms of a general sort of look and feel, and message. That we need to be very cognizant of what our role is.

MEMBER MAUNE: I agree.

CHAIR PERKINS: Anyone else?

MEMBER SAADE: Yes. This is Ed Saade. I'd ask that we at least spend five minutes on technology, so those of us coming to the table can understand what the theme is. Is it technology recommendations for NOAA for the future? Is it technology transfer, that sort of thing?

CHAIR PERKINS: Ms. Saade, I wish I had a clear and succinct answer for you. And I don't. So, it was a topic that came out of the meeting on Long Beach. Lindsay Gee and I had done an email exchange on it.

I've got a list of about eight bullet points. So it is not clearly formulated. It's needs a lot of tender loving and care. And I think it might be a topic that I would be glad to hand off to someone with expertise --

MEMBER SAADE: I'll volunteer.

CHAIR PERKINS: -- and passion. Thank you, sir.

MEMBER SAADE: Okay. Which means I get five minutes then?

CHAIR PERKINS: Absolutely.

MEMBER SAADE: Okay.

CHAIR PERKINS: Yes. Any objections?

MEMBER MAUNE: I have no objections. And we were talking about the fact that NOAA has such a huge backlog of hydrographic surveys. Is there some way that technology can be used to come up with alternate ways of getting a lot of these large areas mapped, that we can't do with the current mode of operation. So, anything that can help us map more areas, better, faster, quicker, cheaper, whatever, is fair game.

CHAIR PERKINS: Yes, Anne.

MEMBER MCINTYRE: Anne McIntyre. I'm glad to hear that there's still maybe some flexibility in the topics of the issue papers. Again, having really no previous exposure to the work product and what the issues are.

What I'm seeing with, the practical issues I see with the tide and level really is related to the PORTS system, which is related to the, let's say the extreme navigation, the ENCs for the ships.

And really those products are used commercially in concert. And would maybe be better addressed like that, as opposed to tides and levels, as far as how they impact coastal areas during storms, and that type of thing.

So I think that there's some opportunity to combine the work that Lawson and Sal have been doing, with the issues that I saw with the tides and levels. And then maybe the tides and levels can be broken out into -- That's not my area of expertise. But just something along Gary's line of work.

CHAIR PERKINS: Lawson.

MEMBER BRIGHAM: Lawson Brigham. Yes, it's, we're, from what I heard from Anne and others, I mean, it's almost a working group and a task force to come up with -- And maybe we should have one on technology.

I'm a little, well, I'm not confused. But I understand we want to get an issue paper, two pages. But to get to that requires a fairly extensive effort among a bunch of us, over a series of meetings on the phone, teleconferences like we did with the Arctic.

So, in a way it's almost a working group effort to produce some sort of a report that we can synthesize to get to a, I mean, I know we want to synthesize. But I don't know if it's too many topics. But to me, some of the topics require a lot more work. And maybe we wouldn't send up in this letter all of the issue papers.

MEMBER ATKINSON: Well, we're only going to have a few issue papers finished by the end of this meeting. And a lot of them will be waiting until the September meeting. We hope to have as many as possible done in time for the new administration.

CHAIR PERKINS: Yes. Identifying them in the recommendation letter I think might --

MEMBER ATKINSON: If we can.

CHAIR PERKINS: -- you know, introduce them, that these are the issues that HSRP is going to be addressing in making, you know, preparing issue papers on. And then putting forward with this letter the ones that we actually have ready, I think is perhaps a good strategy. Mr. Kelly.

MEMBER KELLY: Yes. Ed Kelly. Dave did a great job in getting us started with all of this. And some of these are relatively rough drafts of what will have to actually come out. And distillation is really what I see as the biggest factor.

Anne just mentioned, you know, tides and currents. And that's part of the ports and harbors piece. It obviously affects large vessels, cruise ships. So we have to, you know, really get together on some of these.

And I think by giving us 20 minutes or so, we'll be able to throw things into, maybe into the right piles. And maybe reassign some of these topics so that they fit better under these umbrellas.

And I don't think, like we say, they'll probably not all be ready. But we should reference that these are key topics that were identified and are being worked on, and will follow as recommendations. We'll get whatever we can with this one.

But do we have to wait for a formal recommendation letter? Or can our recommendation letter from this meeting set the stage that these are being worked on, and will be provided in short order, so that we don't have to wait until September, and then start working again?

We might be able to identify and target quite a few of these, and put them in in succession, you know, over the next several months.

CHAIR PERKINS: Yes, correct. We do not have to wait until our next meeting to communicate to the Administrator. So we can communicate upward at any frequency, and at any temporal occurrence that --

MEMBER ATKINSON: Yes. That we've identified these as key issues, and are in the process of summarizing and providing recommendation, you know, subsets, in essence, that would follow our recommendation letter from this meeting.

CHAIR PERKINS: Yes, Joyce.

MEMBER MILLER: And I would encourage new members in particular. There's single names on all of these. I don't think there should be single names on all of these. So, if you're interested in a topic, jump in feet first is my --

CHAIR PERKINS: Yes.

MEMBER GEE: Lindsay Gee. I'm not jumping in directly, Joyce. But I would, just regarding the technology paper. As Scott said we just had a couple of emails on that.

But it seems like technology is across a number of these papers anyway. So it's probably going to get more than five minutes. But the ones that are in the existing issue papers are quite specific I think, and not too future.

But then maybe a general technology paper is more about that, you know, five, ten years, solving the issues down the road a little bit further. And I guess that's what we could discuss is the --

When we discuss the technology papers, like, well, that's kind of broad. So, where do we really want to take it is probably the first step of how far down the road in the future that might be.

CHAIR PERKINS: I'm really excited to see what Mr. Saade --

MEMBER GEE: Yes.

CHAIR PERKINS: -- has in mind. Dr. Atkinson.

MEMBER ATKINSON: Yes. Larry Atkinson. Just the mechanics of doing this. What about if we, this afternoon we give our presentations, we have a discussion, and then, I'm looking at my own. I go back and make some changes.

And then we've got time, we could make time tomorrow morning or afternoon to go back. I could get up, and others can say, okay, I've made these changes. And get some kind of, some of them maybe we can get a consensus, that yes, that's okay. It's accepted if you do those changes, you know, type thing.

So we can leave here with -- I don't want to have to face this again in six months, or whatever. Let's find a way to finish some of these. We should be able to.

MEMBER KELLY: Ed Kelly. I agree. I think we have to get a product as a result of this. And one of the things as we go through this a little later on, is to more sharply define exactly what these will look like.

One of my biggest challenges was getting ten pages of ideas onto one and three quarters of a piece of paper. So, you know, it's going to be tough to do that. And that's why maybe segregation of some of the topics and cross referencing might help to abbreviate the length of these things.

Because I think any one of these things could be a thesis, as opposed to, you know, just a couple of bullet points saying here's the situation, here's the problem, here's the solution. It's kind of tough to boil it down to that.

MEMBER LOCKHART: I guess I have more of a procedural question. And that is, you know, we are recommending, we're going to send this attached to a recommendation letter to the NOAA Administrator. And that is our function, to make recommendations to the NOAA Administrator.

But within that letter, are we able to also suggest that the Administrator share this with other individuals within the Government, different agencies, things like that?

Since we are listing partners as one of the items on these issue papers, it seems that would be a prudent thing to do if we have the ability to do that.

DR. CALLENDER: So, Dr. Sullivan has told her leadership team that what she wants to do is basically send or leave a letter, if you will, for the next NOAA Administrator of where Dr. Sullivan sees NOAA, where we are now, where are the challenges, where we're going. So I think she would find this information welcome for that.

That said, it's always a little awkward to send a letter to the current Administrator saying, this is, we're all excited for the next one. And so, here is, that's for them.

So be real careful how you phrase it. You know, phrase it for her of, this may be useful to you in that letter to the new Administrator. And for to not remind her that she's leaving and we'll have a new one come onboard.

CHAIR PERKINS: Yes, Kim.

MEMBER HALL: Hi. Kim Hall. I just had a couple of questions as the new folks on the, read both of the papers. And we've had a couple of chats.

There's a chicken or the egg situation we've got, where we'll give everybody 20 minutes to discuss the papers. But from my perspective, having read them, there's some places, like Ed just said, where, for example, I'll use an example, the cruise industry paper.

The issues that are actually brought in that are not specific to the cruise industry or mega-ships. Precise navigation is a demand that we see from every corner. We heard it all day yesterday, more ports, more funding, those kind of things.

And so, how do we want to establish, like give the folks ten minutes to give a quick briefing of what they're doing, and then discuss maybe how we recategorize these papers.

Because again, the cruise industry one is a little bit too specific. And sorry, Sal, I know I work for the cruise industry. But it really is a larger issue. And we can anecdotally point to cruise industry and mega-ships.

But it should, I don't think that it should be a paper that is just about the cruise industry, or just about mega-ships, or both. So I just wanted to ask, kind of as a new person, kind of point of procedure there, chicken or the egg situation. Thanks.

CHAIR PERKINS: Yes. You make a good point. The issue definitely isn't isolated to the cruise industry or the mega-ships. But that gives us a context.

That gives us a, you know, the arrival of the Ben Franklin over the Christmas holidays, the largest ship ever to pass underneath the Golden Gate Bridge, right.

So I think what we're trying to do there was capture that in a currency, you know, put it in the right temporal context, so that can resonate perhaps differently than the same message about the importance of precise navigation.

You know, if we title it precise navigation it sounds like something that we've talked about a lot. If we put it in the context of something happened that has never happened before, the arrival of a mega-ship with less than five feet of clearance underneath the Golden Gate Bridge, we might be able to attract a little more attention in a very noisy environment.

So that was the reasoning to put it in that context. But your point is valid. I can't believe I'm going to say this. We're a little ahead of schedule. Lawson.

MEMBER BRIGHAM: I'd like to get us back on schedule. Why not just talk for a few, we have a few minutes. Why don't we just go do the working group on the Arctic?

And then, I mean, there's not much to say. And finish that one. I mean, we were scheduled tomorrow. But, on the Arctic working group there's not a lot to say really.

CHAIR PERKINS: I'm agreeable.

MEMBER BRIGHAM: Yes. It's Lawson Brigham. For the new members, and to remind the long term members, we had a working group the last four years on the Arctic. And we would periodically, at ever meeting, brief out some issues in the Arctic, and have presentations.

But I think the important thing that happened in L.A. was Dr. Callender and the Admiral provided us some questions to answer. And that was very helpful to focus what is NOAA actually interested in, and the specific navigation services questions.

And so we took that. The working group, it's, look around the table here. It's Larry and Andy Armstrong, and Sal, and Gary in the back, and now Anne. So we have five or six people. And we met in teleconferences, I think seven or eight times, Lynn, during the summertime, with Ashley Chappell also helping us.

So Andy and Ashley are, of course, NOAA representatives to help us with technical issues. But they're not, I mean, they wouldn't steer the discussion, but help us in handling the discussion.

So we spent the summer, and then we, to answer. And your packet is, in fact, the report we put together. And it was, we reached consensus on that report in the September meeting. And then appended it to our letter to the Administrator.

We didn't expect, and it didn't happen that the Administrator would answer our recommendations to the questions that you gave us. It was just to highlight, I think, to her the range of issues.

But in the letter to the Administrator we did say, strongly suggest that the NOAA Administrator take action on the President's words about charting and hydrography.

In other words, either a press release or some external acknowledgment of the President's words about, putting the emphasis on, you know, ice breakers, but navigation services, and charting and hydrography he actually said.

So we sent that up. We're not quite sure that that actually happened. But nonetheless, we answered these questions. There are some technical points to be further discussed to improve the issue paper, or gain consensus on it.

But the question I think at hand is, is that process helpful and useful to the NOAA senior staff? We answered your questions. We sent it up. We had a rich discussion, I think, presentation and discussion at the last HSRP meeting. And so, is that process helpful to tease out some of the issues? I think that's the question at hand.

It was a fair amount of work. We had pretty good chemistry, and good consistency in answering the questions back up. I personally think it's a reasonable model for the working groups to handle a particular issue.

So I just kind of throw it back out, Scott, to you and maybe Bill, whether you think this process, and to the senior NOAA leadership, whether this process is helpful, just to start the dialogue.

DR. CALLENDER: Well, I'll go first. And I'd like to, absolutely like to hear Rich, and Gary, and Juliana's thoughts on this. I thought it was actually extremely useful from my perspective.

Because, you know, by us putting out some questions that I know in some cases were probably pretty hard questions, it really was able to help engage and focus the panel into some larger strategic issues that we'd love to have, you know, your opinions and thoughts on.

So I thought, quite frankly, it was incredibly useful. I know it was hard. It's also going to be hard for us then to take those thoughts coming from the panel, and sort out, okay, how do we take those recommendations and try to put them into practice.

But certainly, I thought it was a pretty good way to target the conversation. Let me ask Rich or Jarrod if they have some thoughts too.

MEMBER BRIGHAM: Yes. It's Lawson Brigham again. Again, this goes on the website. So the staffers from Senator Murkowski's staff asked me about Arctic, or whatever, I referred them to the website. And I referred them to the report.

And I further referred him to the line item budget item for the Arctic. I said, that's an issue the Senator can deal with. It's been vetted through, you know, our committee, up to the Administrator. It's highlighted. We believe that it's, if we're ever going to make any headway on hydrography we need to have some attention on Arctic.

So, that was just one example. But I said, read all of the issues. It is a report by us to the Administrator. But it was fueled by the questions of NOAA. So it's a joint effort.

You know, I made it clear to them that I thought it was a joint collaborative effort of the NOAA experts, plus citizen input, to come up with some ideas. And again, I did focus it, because that's what our group was, that we should take a look at a line item budget if we're never going to get any enhancement for Arctic hydrography.

MR. EDWING: I think it's been very useful, in really two levels. One is, I think it's been a great way to help coalesce the collective wisdom of the panel around certain key strategics. Well, some of these are tactical. I think they range from tactical to strategic issues.

But it's a great way to have, just help highlight these issues, and kind of coalesce down to a few. A large amount of things the panel can look at. And we to kind of narrow it down.

But then it also provides a toolkit for the panel. And probably this gets down to more the individual panels. That if you use them, take out there and help, you know, educate and promote the activities of the NOAA navigation services to the public, and Congress, and others.

MEMBER MILLER: Lawson mentioned the questions that Dr. Callender posed, which have been answered in pieces by the various working groups. And it had been of discussion several times.

And I, because I had been taking notes in a lot of the meetings, including the coastal intelligence meeting, I put together a draft, which is in the package I believe, Lynne.

And I just noticed there's no specific timeframe to discuss that. And I wondered if we wanted to carve out some time to just see. Because I put together sort of bits and pieces from various things. And in some cases I included things that were my own opinion for discussion.

It certainly is not a finalized report. It needs the consensus of the panel. So, do we want to carve out some time to go over that?

CHAIR PERKINS: I don't have any objection. But, you know, I do want to make we use as much time as possible on the fleet recap piece, you know, to try and bring that further along in the process.

That broad question that Lawson put forward, you know, were the results of the Arctic working group beneficial? And did this help?

You know, I just, my observation, right, is that this body, the HSRP, has gone from taking 120 days or more to draft a one page recommendation letter, you know, to where now we are producing meaningful, you know, tactical and strategic detailed information, you know.

So I think we've made a tremendous step forward in the time that I've been on the panel, of how we operate, and what we're delivering in terms of outcomes.

So from my perspective, I think it's outstanding. And I think that that's the benchmark that each of these topics should try to match.

MEMBER BRIGHAM: Lawson Brigham again. Maybe just to sum up on the Arctic. We still have the working group. I'm sure we'll meet in teleconferences in the months ahead.

I think we should remain a working group on Arctic. People see that Shell has departed, and ConocoPhillips, and Statoil. So nothing's happening in the American Arctic. But a lot is happening in the whole of the Arctic, and in the U.S. Maritime Arctic.

And I think we need to have this working group to keep the pressure on internally in NOAA. The hydrography and charting is number one for Arctic issues, beyond oil spills, ecosystems, base map, whatever the other issue is.

For the Arctic the baseline for interests, national interests, are what the HSRP is about. So we should keep the Arctic working group active. Maybe tease out some other questions in the months ahead.

But I'm interested in keeping Arctic hydrography. And I think the team for the internal dynamics of how NOAA responds to the Arctic, as well as the external. So I think we'll just continue to work.

CHAIR PERKINS: I think that's fine. And until we're directed from the Administrator, or from the DFO, or some other, you know, avenue, that there's no longer a need for that working group, I think you're absolutely right, Lawson. Keep it in place, an keep the focus, don't let the focus, keep the optics on it.

MEMBER BRIGHAM: And keep the linkages going for, between this and the new survey ships in the acquisition process. Keep that.

CHAIR PERKINS: Right. The benefit of what you've done, and how legislators can use that as a reference document, you know, is timeless, you know. And so, keeping it current, and not letting it expire seems very logical and prudent.

VICE CHAIR HANSON: I've got to challenge Lawson a little bit here as well. Because certainly the urgency without the exploration, it changes the dynamic of the discussion. And so, we're going to have to figure out who, besides Dr. Brigham and NOAA, is pushing for this, the Arctic.

There's, we've got to be much clearer. You may want to go back and take another look at what we've written up, and see who the other stakeholders are that really care about this.

MEMBER SAADE: So, that's, the quick answer is, now there's cable route surveys going through there. There's lots of other activity that continues to go on. The Navy's running around. Everybody needs it. It's not just about oil exploration. There's a tremendous amount of other activity going on.

And it's, I'm with Lawson. It's crazy that we had all this momentum from the President going up there, and then wind up with not any additional funding, not any additional support.

VICE CHAIR HANSON: So, there are answers. We just need to articulate them, and get those partners involved in what we're trying to do there.

MR. ARMSTRONG: I would just note that out of the recent President/Prime Minister meeting, when Prime Minister Trudeau came to the White House, was issued a statement which includes a statement on low impact shipping corridors that says, we'll work together to establish consistent policies for ships operating in the region, et cetera.

Vessel traffic patterns, countries will work together, share assessments of navigation data quality, and capacities for supporting safe and low impact shipping.

And so the, clearly the White House still has Arctic shipping on mind. And specifically some issues with navigation data quality.

I think that will give us an opportunity to focus our efforts with a slightly different emphasis than before perhaps. But nonetheless, with some specificity.

CHAIR PERKINS: All right. Admiral.

RADM GLANG: Gerd Glang, Coast Survey. So, can I respond to Lawson's initial question about whether this was useful or not?

CHAIR PERKINS: Please. Please so.

RADM GLANG: So, I think that the document was very useful. I think the working group provided some practical and actionable recommendations that we can follow-up on, and see if they bear fruit for us.

On some of the more analytical questions, I appreciate the working group's thinking. It certainly validates our thinking. And I would look to the working group to continue to help facilitate our thinking. Are we thinking about this in the right way?

The prioritization, and the amount of work we can do in the Arctic in a given year is very much driven by resources and capacities. We asked the question about how NOAA might think differently about this region. So we're looking for out of the box ideas.

One thing that I believe we made the panel aware of, I know, Lawson, you're aware of, is we have planned an Arctic nautical charting workshop to take place in Anchorage. Actually, it's next Tuesday.

It's sort of the first time we've tried this. I'm not sure how well, how much representation we'll get from stakeholders up in the Arctic.

We would certainly appreciate any last minute facilitation of additional participants in that. But we think that conversation with stakeholders may be a way to start getting at understanding some of these other sectors.

I know there was a recommendation from the tug and barge, the near-coastal operators. They have a completely different view of what our priorities should be up there, versus say the Coast Guard. So I think in general it was very useful. And I appreciate the hard work. And I do look forward to the working group continuing.

CHAIR PERKINS: We are two minutes ahead of schedule. I know, that's amazing. Let's go ahead and break. And then we'll meet back in place. And let's get out panel discussions started right on time at 10 o'clock, please.

(Whereupon, the above‑entitled matter went off the record at 9:43 a.m. and resumed at 10:03 a.m.)

CHAIR PERKINS: All right, thank you. We'll officially reconvene. And I would like to pass it over to Gary Magnuson so he can introduce our Panel and take it from here.

MR. MAGNUSON: Thank you, Scott. We're going to go ahead with the process, like we did yesterday, on the first panel session.

The moderator will introduce each speaker, they will give their presentations. You will have the option, during the presentations, to fill out cards, written questions, for the panelists. Scott has a few of those.

Just indicate, write down your question and which panelist the question is directed to.

Then at the end of the last presentation, those written questions will be read by the moderator and directed to the appropriate panelists. And then following that, we will have questions from the floor.

So we hope it works well, gives you the flexibility of a good give and take. And also, as been suggested, that the panelists could also ask each other questions. So hopefully we'll have plenty of time for all this to happen.

Again, it's meant to share information and we'll all learn from what is presented.

Panel 2, Regional Vulnerability, Resilience and Recovery. What an appropriate topic for this area of the country.

As we heard from Councilmen Brown and Jed Webb yesterday and others, how important this region is. Particularly to the petrochemical industry and the nation's energy.

But is also particularly vulnerable to extreme weather events. And there's many places downtown to remind us of the Great Storm, as they talk about it.

So again, the Panel topic, Regional Vulnerability, Resilience and Recovery. Particularly NOAAs role in helping areas recover from these events.

The Moderator for this wonderful Panel is Dr. Gary Jeffress. He's not a stranger to many of you since he served two terms on this panel. But for introductory purposes, he is officially Professor of Geographic Information Science at Texas A&M University and Director of the Conrad Blucher Institute of Surveying and Science.

So please, without further ado, Gary, please.

DR. JEFFRESS: Thank you, Gary. Good morning. First of all, I'd like to thank Admiral Glang for inviting me back to the Panel to chair this session. Or moderate this session.

And personally want to wish you a good, a happy and healthy and long retirement. And I very much enjoyed all the meetings that you organized over the eight years that I was on the panel. It was a lot of fun.

Anyway, onto the topic today of Regional Vulnerability, Resilience and Recovery. And the importance of coastal planning and physical oceanographic data.

And we've gathered here today five experts who on a day-to-day basis, use a lot of NOAAs physical oceanographic data and nautical charts and realtime data and information provided by NOAA. And use it in a scientific environment.

And we have five speakers. A land surveyor, a coastal geologist, a coastal modeler, with a PhD in physics, and one of the Corps of Engineers navigation branch managers at the Galveston District. And also a hydrographic surveyor on the panel.

And so I'll get straight into that. But I just want to give you a little bit of the background of why we're here.

And this is what it looked like after the storm in Galveston of 1990. It completely wiped out the entire city. And also 6,000 lives, roughly. Still the largest death toll from any natural disaster in United States history.

And you've might have noticed, since coming to Houston, when you landed in Houston and motored to Galveston, the typography of the coast of Texas is a little vertically challenged. And that's actually getting a little worse as time goes by.

But this is what the Galveston storm, and there's been many since 1990, storms that have hit the Texas Coast. And it's pretty much been, the landscape of the Coast of Texas has been pretty much carved up by hurricanes. And the typography reflects, the coastal plain reflects the series of hurricanes, which have shaped the coast and the plain at the Coast of Texas.

One of the issues that we're going to talk about today, especially Steve Blaskey as a land surveyor, is the importance of knowing where the ocean stops and the land starts. And in surveying, in the surveying world, we call that the littoral boundary. The legal littoral boundary.

And this slide here depicts a court case which started the Texas Coastal Ocean Observation Network. It is a ranch called the Kennedy Ranch, which is down in Kennedy County.

A huge property. Slightly smaller than the King Ranch, which is the biggest ranch in the United States. The King Ranch is just to the West of the Kennedy Ranch.

And back in 1988, the owners of the southern portion of the Kennedy Ranch, which is what's depicted in here, belonged to what's called the Kennedy Memorial Foundation.

The two children, from the Kennedy family, inherited the ranch. The northern part was inherited by the son. And the daughter, whose name was Sarita, inherited the southern part.

Sarita never married, but actually was known to have married into the Catholic Church. And she left her estate to the Catholic Church. And they setup this Kennedy Memorial Foundation to manage the property.

And back in 1988 they decided the boundary of their property was not as depicted on nautical charts. Which is this area here.

But up to the channel of the intracoastal canal. As their deed described it, the eastern boundary of the ranch to be the shore of the Laguna Madre.

And so they went to battle with the Texas General Land Office over the title to this 30,000 acres of mudflats. And of course the mudflats, in and of themselves, is not worth a lot. But there is oil and gas underneath it.

And now fighting over a $40 million value of that oil and gas royalties. And that's how we became involved in the tide gage network.

So that's a pretty important part of the history of Texas and also how we define, legally, the coast.

And this is the other thing that, from NOAA's tide gage record here in Galveston, is the sea level trend that we're faced with along the Texas Coast, at various levels of subsidence.

This record shows a 6.34 millimeters per year increase in sea level at the tide gage. Now that's not all sea level rise. We believe, and we haven't actually measured this yet, that half of this is due to subsidence, not sea level rise. So this is a combination of both sea level rise and subsidence.

We've since installed GPS receivers on a lot of the tide gages here in Texas, and around the Gulf, to directly measure the subsidence rate. So these are the two principles, to give you a background, into what our speakers is going to talk to you today.

And our first speaker is Steve Blaskey. He's a land surveyor in Texas. And he operates a practice here in Galveston. He's also one of the graduates from our undergraduate program in geographic information science.

He graduated in 2004 and came to work at the practice that he now owns. That practice records go back to 1934.

And one of the things that Steve did, when he first came to this practice, was talk to his boss, whom he since bought the practice from, to digitize all his surveyor records. All the maps and plans.

Digitize them and organized all that data into a GIS. And it was actually an open source GIS.

And he hired high school kids, over the summer, to scan all these documents and put them in a GIS and organize all the valuable research data that they use and put in the records, since 1947.

And he finished that project in early 2008. Correct?

MR. BLASKEY: Yes.

DR. JEFFRESS: Just before Hurricane Ike came through here and they ended up with four feet of water in their office and it destroyed all the paper records. But it was all in the computer, which didn't get affected by the storm, and their office was back up and running within a week.

So Steve is one of our star graduates who we brag about. It's all yours, Steve.

MR. BLASKEY: Thank you. And actually we finished scanning the last document two and a half weeks before Ike made landfall. Shoved it in, got it all uploaded and shipped the hard drives away and it was lucky. Really lucky.

But anyways, you'll have to -- okay, I need an assist from the back there. Thank you. Nope.

DR. JEFFRESS: The next slide presentation.

MR. BLASKEY: The next presentation. Well anyways, while they're doing that, my name is Steven Blaskey. Like he said, I'm a registered professional land surveyor here in Texas.

I'm also a licensed state land surveyor, which is an additional certification that allows a surveyor to locate the littoral boundary. The legal extent of private property in Texas. And actually file those records with the Texas General Land Office.

And today I'm going to talk to you about how we use the tidal datum data on an everyday basis in Galveston. And there's four major ways.

The first we've talked about is determining the extent of private ownership in Texas. Secondly, we assist developers and land owners in determine dredging and channel depth for private developments or boat channels or any kind of access for private recreational vehicles.

We don't really get into the big stuff like Mr. McHugh does, but smaller scale. Wetland mitigation and determining accurate elevations for structures within a flood zone.

To set the forefront on the extent of private ownership, there was a court case style, Luttes v. State, in which the Texas Supreme Court determined that the extent of private ownership, in the State of Texas, goes to either the mean high water line or the mean higher-high water line, as determined by the date of the original survey.

So if the survey was performed, you know, the original survey from the sovereign, whether it's the King of Spain, the President of Mexico, the Republic of Texas, if that date of survey was prior to January 20th, 1840, we use the mean higher-high water for the determination of between public and private land.

If it's after that date, which is the date that Texas, the Republic of Texas decided to subscribed to British common law, we use the mean high water line. Which in this area is a very, very small difference.

In fact, in Galveston, on the beach, we just did one where we went across that interface from mean higher-high to mean high water, and the difference was only three-tenths of a foot in elevation.

So on the ground, we're talking less than a foot of space. But to be right, you have to be right.

There's some practical applications as to where that boundary falls. The first of which is the main purpose of Luttes v. State was to set forth the structure on conducting coastal boundary surveys.

A coastal boundary survey marks the location of the littoral boundary, prior to any erosion response activity. And an erosion response activity is defined as shoreline armoring, sediment management, re-vegetation, creating dunes. And there's one more, and it's escaping me, but that's okay. Well, it's not there. Oh, and wetland restriction. Thank you.

The second reason to determine the extent of private ownership is for any kind of dune creation or mitigation. And especially in the City of Galveston.

The City of Galveston has what they call an erosion response plan that says, any kind of dune creation or mitigation or any kind of creation of any structures has to happen a certain number of feet away from mean high water, in some cases, or mean low-water in certain cases.

And the third reason to determine this extend is to assist in projects that are stabilizing shorelines. To stop erosion or slow erosion or combat erosion.

The next major reason we use tidal datums, as a surveyor, is to assist in determining dredge and channel depth for, like I talked about earlier, private boat channels for recreational fishing vehicles or for people that have boat houses and want to pull their boat up to their backyard and helping them established how deep the channel needs to be dredged to get their boat in at most times.

There was a development that we worked on in Texas City where the developer wanted to guaranteed perspective buyers that accepting cases of extreme, extreme low tide, they would be able to bring a sailboat with a six-foot keel up to their house. So there was some economic value on being able to determine where the water was going to be in most cases and actually help them project that forward, in time. You know, with the subsidence and the sea level rise.

Doing these and tying these projects to a tidal datum, gives us the ability to project how often these projects will be to be revisited or re-dredged. At many points in the future.

So it helps them guestimate cost. It helps these individual homeowners' associations budget for how much money they're going to need to spend on dredging in the next decade.

We also use tidal datums when we're helping in wetland mitigation. Because the tide, the value, the elevation of the tide, at mean high water or mean low water, has a very, very tight correlation with what types of vegetation will go where.

So in these kind of projects, we work hand and hand, with the biologist, to determine where to plant vegetation, what vegetation to plant and how to protect the vegetation going forward.

And finally, the major reason we use this is to help plan where to put structures and how high to place the structures within a flood zone. It doesn't make much sense to put a low structure in an area that's going to be overtaken by tide, in the case of a storm or in the case of just normal weather events.

So planning where to place structures and how far from the littoral boundary or from the edge of where the damage would be greatest, helps future planning. That's me.

DR. JEFFRESS: Well that was quick.

MR. BLASKEY: I know.

DR. JEFFRESS: Can I just, you only took about seven minutes of that presentation. Can I just ask a question?

And maybe you can discuss what we call in Texas, the Texas Open Beaches Act and the easement that goes with that, and the problems with the severance case.

MR. BLASKEY: Sure. Sure. Originally the State of Texas had a statute, it was the Open Beaches Act, and it provided for a rolling easement that went from mean low water to the line of vegetation along the beach.

And it was reserved for all public use. Later that was codified into the state constitution, which gave it more strength.

And then, what was it, 2012 a lady named Carol Severance sued the Land Office on the validity of the Open Beaches Act. Which she ended up winning, but it was a very constrained ruling stating that the state only had right to have an easement where an easement could be perfected. By either prescription or through time and use and memorial.

So with the shoreline eroding, the prescriptive easement can never be established because it was never in the same place as the beach was moving. So it's thrown this whole little island into a bit of fuss as the status of the open beach has been brought into serious question.

And that's, you were more involved in that than I was, weren't you?

MR. NEWBY: Somewhat, yes.

MR. BLASKEY: Yes.

MR. NEWBY: But it was specific to Galveston Island.

MR. BLASKEY: And it was just specifically the West end of Galveston Island. Everything from about 57th Street in Galveston West to the San Luis Toll Bridge is where this ruling kind of took place.

But the logic they used to get there was very open-ended. Meaning an attorney could apply that same logic anywhere in Texas. It just hasn't been done yet.

DR. JEFFRESS: The actual court case was tried in the federal court in New Orleans. The Severance case. Which is really unusual.

And how the Texas Supreme Court got involved was the judge of the federal court case in New Orleans asked the supreme court, does the easement move if there's an avulsive change, due to a hurricane in this case? And the court said, no, it doesn't.

So how do you have a beach easement that's not on the beach? Is the question.

Anyway. With that, we'll move on to our next speaker, who is Mr. Ray Newby, who's a coastal geologist. And he works for the Texas General Land Office.

And is heavily involved in communications between the General Land Office and the U.S. Army Corps of Engineers in coastal matters here in Texas. Particularly related to coastal studies and beneficial use of dredged material.

He's been before the -- he's positioned at the General Land Office. He worked as a hydrogeologist with the Texas Natural Resources Commission.

And before that he was in private practice consulting on assessment and remediation of contaminated soil and groundwater. So, Ray, please.

MR. NEWBY: All right, I think I've got a hot mic now. Thank you, Gary, I appreciate the introduction there. And I'd like to appreciate Gary Magnuson for the invitations --

Okay, is this better? Okay. Well, thank you very much. I appreciate the opportunity to present here.

First off, before I get into the discussion, I'd like to give you a little background on the Land Office, which you've already heard a little bit of.

The Texas General Office, which is chaired by statewide elected official, the land commissioner, who is currently Mr. George P. Bush.

The Land Office is the oldest state agency. A matter of fact, it predates the State of Texas. It was actually setup after the war for independence from Mexico.

How we're involved with coastal issues is that we are the, essentially the state land manager, for both uplands as well as state-owned submerged lands.

Which include all tidally-influenced lands as well as Gulf of Mexico lands offshore to three marine leagues. Which is about ten miles offshore.

We're also the lead agency. We're the administrative agency for the federally recognized coastal management program. We're also involved with beach and dune protection, as what was previously alluded to, as far as oversight of the Texas Open Beaches Act and the Texas Dune Protection Act.

We also administer the state funded Coastal Erosion Program. We're also responsible for Coastal Oil Spill Response.

And then since about, I believe 2011, we've been the lead agency for Disaster Recovery administering federal HUD funds for Hurricane Ike and Dolly recovery. As well as some of the other disasters that the state has experienced.

And as Gary and Steven alluded too also, we get sued frequently. But Texas has almost 400 miles of Gulf shoreline. More than 3,300 miles of bay shoreline.

And of the 18 coastal counties, out of 254 counties, those 18 counties represent about 26 percent of the state's population. Okay.

And some of these next slides I'll go through fairly quickly, because they were covered yesterday.

As you're well aware of by now, the Texas coast is a working coast. We've got several of the top ten ports in the nation. I believe yesterday we had the most vessel movements in the country.

Also, this slide right here represents the oil and gas pipeline network of the nation. In which the Texas and Louisiana Coast are basically the cardio center of the oil and gas industry, of Texas.

Also mentioned yesterday, I believe Galveston is the fourth largest cruise port in the U.S. We also have quite a bit of visitation up and down the coast, from South Padre up to this area. And also ecotourism is beginning to be quite a big industry on the Texas Coast.

Also, commercial and recreational fisheries are a significant part of our state economy. For those of you that are staying down at the Harbor House, if you get a chance to go to Pier 21, talk a walk over to Katy's Seafood at Pier 21 and look at some of the bounties being hauled in from the Gulf.

And these fisheries are very important. But they depend mainly on the coastal ecosystem we've had. Predominately the wetlands.

Ninety-five percent of the commercial and recreational fishery species originate from these wetlands. Those are the nurseries for those fishery species.

And those wetlands, and this is somewhat of a data value, but roughly $6 billion was the rough estimate on the fisheries value of Galveston Bay wetlands. It doesn't include the additional value, ecosystem functional values, that you get from water quality purification as well as flood water retention.

But these ecosystems are in stress. And through some of our planning efforts, we've identified what some of the top issues of concern on the coast are. And here's a sampling of some of the more significant ones.

You see wetland and habitat loss is one of the more significant issues. And let me just say that these are not mutually exclusive issues.

But you have, as was mentioned, gulf beach erosion is fairly widespread. How that affects our tourism and local economy is pretty significant.

Flooding and storm surge. And I'll get into that a little more in the next few slides, is pretty significant.

But getting into some of the coastal engineering concerns that we deal with on a daily basis, working the Texas Coastal zone, is that fundamentally we have a limited knowledge of coastal processes.

Coastal engineering and the supporting science behind it is still a relatively new burgeoning science. It wasn't until after World War II we actually started doing more investigation into the coastal zone to try to understand the processes that affect the coast.

Sediment transport and sediment budgets is one of the big aspects on that. Is trying to identify where your sediment is eroding from. Where is it accreting and how is it getting there between the two.

Inlet and beach dynamics is another big issue that we deal with in trying to understand coastal processes. As well as those processes that affect the estuarine environment. Particularly salinity and hydrodynamics.

There's been a significant growth in the use of numerical models to look at these processes. From circulation to morphological change. But there needs to be more as far as groundtruthing to validate these models.

You've probably heard the adage that all models are wrong, but some models are useful. And that definitely applies here in the coastal zone.

Let me just give you an example of some of the issues we're concerned with here. This is San Luis Pass.

Okay, here's San Luis Pass, this is Galveston Island. And approximately 20 miles from our current location, this is the Southern boundary of Galveston Island, this is San Luis Pass.

Most tidal inlets, in natural functioning, are an equilibrium in that the sediment in this case, which mainly transports from the northeast to the southwest, will come in. You'll have some retention in the pass, with the tidal flow, sediment will continue down the coast.

However, this pass, from our investigations that we've done for about the past two decades or so, has shown indications that it's out of equilibrium. In that a lot of the sediment that's booking down the coast goes into what we call the flood tidal delta, which is this deposit inlet, but is not getting transported back out. For whatever reasons, we're seeing this flood tidal delta grow at a pretty significant rate.

We think it a lot of it has to do with hydrodynamic changes that have been conducted with the creation of some of the channels, such as the Intracoastal Waterway that extends here. And then also the fact that West Bay is connected to the Houston Ship Channel. Which has been widely modified over the modern period.

And so we're looking at this as a potential sand source to nourish Follets Island down here. But we're trying to have a better understanding of the processes, so that if we do go after sand in this flood tidal delta, we just want to make sure that we do no harm to affect the ecosystems around it.

So this is an example of some of the challenges we deal with in our, to try to address coastal erosion and the processes that affect it.

Some other concerns that we have is, if you're doing coastal restoration, we need to have sediment. Either sand for beach nourishment and dune restoration or other types of sediment that are more conducive for wetland restoration.

Texas, in general, is a sand starved coast. We're not blessed with the sheets of sand off the shore of Florida. We mainly have a mud dominated sea floor, out in the Gulf of Mexico.

And so we do quite a bit of sand source investigations with some of our local professional service providers, engineering firms as well as academic institutions like A&M Corpus and A&M Galveston and UT.

We're also trying to develop sediment inventories so that we have a pretty good clearing house of where these conducive sediments, where the most conducive sediments for restoration lie.

Another issue we're diving into is regional settlement management. Which is a term that the Corps of Engineers has been utilizing for about the past decade. And Chris will probably touch in on this a little bit in that beneficiary use of dredge material is a big part of this.

With regional settlement management, you want to have a better ideal in what your natural processes are and how our sediment management activities are affecting those.

Here's an example of a recent development that we have. About three or four years ago we put together what we call the TxSed Coastal Sediments Geodatabase.

We found that there was a lot of geotechnical and geophysical information that was out there, but it was spread in separate locations. And using file cabinets and not really useful.

The Corps of Engineers we found had a bunch of what we call analog files, which are paper reports. And we basically pulled a bunch of those in-house, scanned them, digitized the sediment information.

We also reached out to the academic institutions to get their sediment information. And had put this into the central clearinghouse that's available on the web.

Moving on, I guess some of the additional engineering concerns that we have really come down to the growing concern about climate change and relative sea level rise.

I don't have to explain to the folks here in the room that there's a lot of variability as far as the predicted future sea level rise. And that has significant implications on coastal restoration and coastal protection.

Mainly if you're talking impact on storm surges. If you have a one-foot rise in sea level, that does not equate into a one-foot rise in storm surge.

Your storm surge is actually going to be exponentially higher for every incremental increase in sea level rise. And trying to figure out what your future target sea level is going to be has significant implications.

For instance, if you're going to raise a hurricane protection levee, you know, raising it three feet versus one-foot has got significant economic cost. You also have other real estate considerations as well as environment impacts that you have to consider, when you're talking about these large structures.

And I mentioned previously, about the growth and numerical modeling, there's been a lot of effort to try to look at the future landscape.

What's going to happen if you have a one-foot rise in sea level versus a three foot rise in sea level?

Unfortunately, most of the models that are out there, or most of the tools out there, are inundation models, what we call bathtub models, where you're just taking existing topography and flooding that.

But with that, that's kind of a simplistic view of it. Which is a good tool to begin with, just to give a public an ideal of what to anticipate.

But with the coastal processes, storm surges and so forth, you're going to have significant changes with the shape of the coast, that's not just going to be related to inundation.

And so there have been a few models, such as SLAMM, which is Sea Level Affecting Marshes Model, which tries to emulate how marsh habitats are going to migrate with future sea level rise.

You know, some areas of marshes are basically going to get squeezed out where you have existing development where those marshes do not have room to migrate. That's a fairly simplistic model, but it gives us a better idea of where we're going.

NOAA has developed a better tool called EESLR, which is, I think, Ecological Effects on Sea Level Rise. Which helps us get a better picture of those morphological changes.

But also, as we're looking at coastal restoration and coastal protection, we're trying to get a better idea on what the effects are going to be on critical infrastructure. Your transportation network as well your hospitals and schools and other types of infrastructure.

We're also trying to get a better handle on what it's going to do to our natural systems. I'd like to mention wetlands, but also we're concerned about some of our bay-head deltas as well as the fate of our Barrier Islands.

Gary already showed you this slide here. This is Pier 21, which is a few blocks from us here, where we had over two feet of relative sea level rise.

Gary correctly pointed out that we think about half of this is the footprint of increase of subsidence that we saw in the Houston, Galveston region, from about the 1940's throughout the 1970's.

Subsidence has decreased significantly, but at the predictions, as far as the sea level rise hold true, this could very well be a predictor of our future. Because that accelerated sea level rise would probably overtake the footprint of subsidence.

And because the sea level rise, as well as other factors, such as lack of sufficient sediment, we have some of the highest erosion rates in the nation. Roughly four feet on average is a coast wide value. But we do have some portions of the coast that are eroding in excess of 30. And in some cases, 40 feet per year.

But as far as some of the challenges we face, in addition to the engineering concerns I just mentioned, of course I think you hear it from everybody that the funding is kind of fundamental. There never seems to be enough.

And then when funding does come through, there doesn't seem, at least from our perspective, to be enough planning to be able to accurately prioritize where to best spend those funding sources.

Other challenges we face. Increased coastal development. I think one of the speakers yesterday mentioned the three mega-trends we're seeing as far as the population explosion.

The significant growth of the oil and gas industry we've seen in recent years. As well as the navigation demands that are increasing with the Panama Canal expansion.

But one of the things we're facing on the coast is that we're seeing many new residents still flocking to coastal areas. A lot of these folks are unfamiliar with coastal issues.

They've never experienced a hurricane. They don't know why you really need to evacuate if you are going to be in low lying areas.

For instance, on the west side of Galveston Bay, we've got some very dense residential communities. It's your classic suburbia, but a lot of these folks don't realize that the extreme risks they're in, if and when the next hurricane approaches.

And this population explosion is putting an increased pressure on natural resources, as well as on our critical infrastructure. And we're seeing this manifested in impacts on water quality and water quantity. As well as effects on our local natural ecosystems.

And in general, we kind of have a lack of public, as well as political, awareness of coastal issues. Texas could very well be a microcosm with the U.S. in the fact that the coastal areas compete with the landlocked areas for resources and funding.

We've been asking ourselves the past several years, is Texas a coastal state, are we just a state with a coast?

The 18 coastal counties that I alluded to, mapped earlier, that's 18 versus 236 inland counties. And so it's hard to get resources to address coastal issues. And additionally, it's hard to get adequate resources to do adequate coastal planning.

With that being said, we have attempted to dive into comprehensive coastal planning. This was a little brochure report we put out about four years ago called "Shoring Up our Future."

And we reached out. We held stakeholder meetings up and down the coast with elected officials and other stakeholders.

We had regional technical advisory committees to help identify the issues of concern, that was on a previous slide that I showed you, and was used as a tool to help better educate the legislature, and the public, on the needs of the coastal areas.

Now looking forward, things are starting to look much more promising. Back in November, Texas General Land Office signed a feasibility cost sharing agreement with the Army Corps of Engineers for a $20 million study to look at comprehensive planning for the Texas Coast, within the context of coastal storm risk management and ecosystem restoration.

Some of you may have heard about the concept called the Ike Dike. Which is a Dutch-style coastal spine that has been proposed to protect the Galveston Bay region. That's what we call the coastal barrier alternative.

There are also some inland alternatives as a counter to the Ike Dike. And so the coastal Texas study is diving headlong into this.

I'm sure we'll be making quite a bit press over the next couple years as we proceed with this study. But hopefully it will end up with comprehensive coastal storm risks management for the Galveston Bay region and other vulnerable parts of the Texas Coast.

As was mentioned yesterday, Hurricane Ike was a significant storm. It could have been a whole lot worse had that storm hit further down coast and inundated the industrial areas of the Houston, Galveston area.

I like to tell folks that the Texas City Dikes and the Port Arthur Dikes came within about two, one to two feet from getting overtopped during Hurricane Ike.

And to put that into perspective, we basically came within about a foot of a national depression. Because Hurricane Ike hit three days before Lehmann Brothers went bankrupt.

And so in the economic free fall we were in, we came really close to losing a significant fuel production capability, that would have put us further down into that financial free fall.

Trying, a more optimistic aspect. We do see significant funding coming in from the Deepwater Horizon oil spill settlement and RESTORE Act funding.

It was unfortunate that it took a tragedy to get us to this point, but it is a generational opportunity that we have to try to better assess and better approach the issues of concern on the Texas Coast.

Additional funding looks to be coming in through what we call GOMESA, which is the Gulf of Mexico Energy Security Act.

Where royalties coming in from federal Outer Continental Shelf, oil and gas production, will be shared with the producing states to help mitigate some of the impacts that we see from New Orleans gas industry.

Additionally, I showed you our TxSed Geodatabase that we have. We are also developing other geospatial based decision supports tools to better help planning so we minimize conflicts between resources. And better plan the future for the Texas Coast.

With that, I guess we'll do questions later, but I appreciate your time. Thank you.

DR. JEFFRESS: Thank you, Ray. Moving right along, our next speaker is a representative from the Galveston District Corps of Engineers. He's Mr. Christopher Frabotta.

He is the Deputy Chief of the Operations Division and he's Chief of the Navigation Branch at the Galveston District.

Chris is a graduate from the University of Florida with a bachelor's of science degree in environmental engineering. And he graduated there in 1998.

And he went into the Army and served as a cavalry scout. And was on active duty from 1988 until 1990.

He then joined the Army Reserves for five years. And went to work at the Corps of Engineers in 2001 to 2011, in the Wilmington District, up on the east coast.

He was involved in a lot of construction management in that position. Working in New York as maintenance dredging contracts. Developed disposal island levee improvements. Has done some rehabilitation of navigation and water control structures.

And in 2011 he moved to Galveston and took up his current position. And I know he's a friend of TCOON because he's done a lot of work in helping us to get TCOON to the shape it is.

So, Chris, tell us about what you do with the navigation structure, et cetera.

MR. FRABOTTA: Thank you. Well first I'd like to say it's an honor to speak in front of the Panel today.

I have been either contracted to or full-time with the Corps for about 17 years now. Five years with the Galveston District as the Deputy Chief Operations. And kind of dual-hatted as the Chief of Navigation here.

So I didn't think my commute could get too much shorter. I'm about 2.3 miles from our office down the street, until you all had to schedule the review panel and I live basically across the street. So I got to walk to work today. So that was great.

Today I'm going to go over a few things. I'm going to give you a quick overview of the Corps of Engineers, kind of from a national standpoint, and drill down into the district. Go over our missions.

We talk about some of the port stats, but I'll go through that real quickly. Some funding and what we do with the funding. What do we actually do with the Corps of Engineers, with our navigation funding.

And then following kind of the theme from Colonel Pannell, the Galveston District Commander yesterday, following his theme on how we execute through partnerships. I'm going to give about six examples of some partnerships and folks around the room that have really helped the Corps and the Galveston District undertake our mission.

So real quick on this. This is a map of the U.S. and it shows the different divisions. So kind of similar to the Coast Guards Districts, our division boundaries have several districts under them.

So we have nine divisions. North Atlantic, South Atlantic, Great Lakes region, Mississippi Valley, Southwestern, Northwestern, South Pacific and the Pacific Ocean Division.

And we are located in Southwestern Division. And you can see the Galveston District there. Basically along the Texas Coast.

There are 16 coastal districts that have coastal navigation projects. What I would tell you is the Corps of Engineers is a big organization. We have many business lines, we have navigations. Probably our biggest, definitely with respect to funding, it is.

We have flood risk management, hydro power. Kind of a subsidiary of hydro power as recreation as we build these dams and create these lakes.

We have recreation programs, environmental stewardship and regulatory. Where we regulate structures put into waters of the U.S. or filling of coastal wetlands. Or Section 404 wetlands.

So here in the Galveston District though, we have essentially three of those missions. We have navigation, flood risk management and regulatory.

So we have about 300 employees here in the Galveston District. You can see our boundaries run from the Louisiana Border down to Mexican Border and about 100 to 150 miles inland. It encompasses the entire Texas Coast.

Those 300 employees, we have offices staggered along the Texas Coast. And hydrographic assets staggered along the Texas Coast.

Our main office headquarters is here in Galveston, right on the end, east end of Galveston Island. And we have offices in our Port Arthur in Bay City, and Corpus Christi and then Port Isabel.

Ray Newby talked about the 18 coastal counties. We cover all of those.

And then our ports and our waterways make up about 600 million tons of cargo a year. So to put that in national perspective, 2.5 billion tons of cargo are shipped per year. Which puts us at about 21.5 percent of all the nations tonnage comes in and out of the Texas ports.

And of course Brian Hill discussed yesterday, with MARAD, that we load and unload troops and equipment. And there's three ports deemed congressionally authorized as strategic ports within the Galveston District, being Port Arthur, Beaumont and Corpus Christi.

And then finally, the maintenance dredging. We dredge about 20 million cubic yards a year. So our navigation mission is essentially short and sweet and to the point. It provides safe, reliable, efficient, environment sustainable waterborne transportation systems for the movement of commerce, security and recreation.

I will tell you that over the past ten years there's been a focus by congress and the president's office of management and budget to do some performance based budgeting and put more funding towards the channels with high commerce or high tonnage. And I'll show you a slide on that in a second.

I'm not going to go over it in detail, but I will show you that our other mission statement, for flood risk management, Ray covered it well with Coastal Texas Study.

But we look for, at improving resiliency through construction of structures. Whether they're levees, sea walls, flood walls, to reduce the risk of loss of life, long-term economic damages in public and private sector.

And you can see one out here. The Corps of Engineers built the Galveston sea wall after the 1900 storm.

And I'm going to show you a couple slides on some existing hurricane flood protection systems, that have saved billions of dollars' worth of infrastructure during Rita and Hurricane Ike.

So Texas Coast, our navigation program. You heard it before, there's six deep drafted jetty inlets that the Corps of Engineers is responsible for monitoring and maintaining.

Those navigation complexes are in the yellow font, from north to south. Sabine-Neches Waterway, Houston Galveston Texas City, Freeport, Matagorda, Corpus Christi and then Brownsville, or Brazos Island Harper is its federally authorized name.

All of those deep draft ports are interconnected by the Gulf Intracoastal Waterway. The Gulf Intracoastal Waterway actually starts at Apalachicola Bay, Florida and goes for 1,109 miles to Port Isabelle, Texas.

In Galveston District we're responsible for 379 of those 1,109 miles. And then several tributary channels that you can see in the blue.

So with that, here's the depths of those deep draft navigation networks. You can see Sabine is authorized to 40 feet. And we're maintaining it to 40.

And you can see the others with those numbers. Forty-five for Houston Texas City Galveston, 45 for Freeport, 36 for Matagorda, et cetera.

The number below, in the circle, is what we're either authorized to dredge it to, but haven't received the funding for or in a study to deepen it. So there's a lot of new work and capital work that we have either planned or scheduled and are just waiting on federal appropriations.

So the next slide I won't go into this in depth, but I'll show you these are the top ten, excuse me, the ten deep draft, and one shallow draft port, in the State of Texas. They're relative rankings with respect to national commercial tonnage. Houston's at two, Beaumont's at four.

And what I will tell is that 21.5 percent of all the tonnage, domestic and foreign, is going through Texas ports. And really even more shocking, I guess, is right out here, through the Houston Galveston Inlet, 12.5 percent of the nation's tonnage goes in and out of this inlet right here.

Also, we have the Gulf Intracoastal Waterway, which is ranked separately. It's ranked as an inland waterway.

And this slide kind of shows its relative tonnage based on the other major inland waterways in the country. With the Mississippi River ranking first, the Ohio River second and the Gulf Intracoastal Waterway third. With about 126 million tons in 2014.

And then Captain Penoyer mentioned during his presentation yesterday that, yes, a lot of oil comes in here. And we have a lot of refining capability here.

But those by-products of the refining process are feed stocks to our manufacturing facilities. Whether it's Dow Chemical or BASF.

And if you look here you can see, almost 75 percent of the products that are traveling along the Gulf Intracoastal Waterway are petroleum, petroleum products, chemicals related projects or other crude materials used for feed stocks. Just up and down the Gulf Intracoastal Waterway we're seeing, in our higher areas, 75 plus trips per day.

So Corps of Engineers, Galveston District funding. We get funding to do a lot of different thing, studies, deepening's, widening's.

I'm focusing on O&M here. The operations and maintenance of the channels I showed you a few minutes ago.

And the ten-year funding history. A lot of folks are kind of complaining about funding for good reason.

But the Galveston District, we're seeing an uptick in our funding. From back in '07, our O&M budget for navigation projects was around $83 million. And then 2016 we got our final allocation a couple weeks ago and we're at a $155 million.

So I'll tell you in a few minutes what we're doing with that funding.

So a $155 million in 2016. What activities are we undertaking? We're doing maintenance dredging and associated activities.

Associated activities are sampling of sediments, coordination with agencies, et cetera. We're building placement areas, we're building beneficial use sites.

Of course we're performing our hydrographic surveys. Tells us where we need to dredge. And then finally, when we do dredge, how much to pay our contractors.

We're repairing coastal structures. We have six deep draft jetty complex that we maintain. So on occasion we need to place additional stones on those structures.

We're reporting the channel conditions. I'll show you that as well.

We're removing hazards to navigation and then we're coordinating with other state and federal agencies including GLO and NOAA, U.S. Coast Guard, MARAD, et cetera.

So the different partnerships that we have, this is, in some cases, regular business and/or initiatives that we're undertaking. But we're undertaking them with, in partnership, with other state and federal agencies.

First, our new work and our maintenance dredging. I mentioned a few minutes ago we dredged 20 million plus cubic yards a year in the Galveston District.

Some of our partners, every navigation project that we have has a non-federal sponsor. So the Galveston Entrance Channel, the non-federal sponsor is represented by the Port of Galveston. They need to do things financially on their end. Like provide lands and easements and rights of way for disposal, et cetera.

Some other partners that we have are dredging contractors. We spend $90 million a year, last year, on maintenance dredging. And our contractors, large and small businesses, have responded and done a great job on that.

So Texas Coastal Ocean Observation Network, '88 through present. Here are our sponsors. Whether they're cost sharing, technical or managers of the network.

And really, I put U.S. Army Corps of Engineers up top. And that may be the case, with respect to dollars invested into the network.

But you can easily flip this list over and the Texas A&M University, Corpus Christi and Conrad Blucher, on the ends, represented on the ends of this table today, have really provided the continuity of the network over the past 25 or so years. Through turnover and federal government offices, they've really, really kept the system running and kept the data flowing. So big thanks to CBI for that.

So what is TCOON? You've heard some folks talk about it. The map I have up here, the green flags are active stations. And the red ones are historic stations. So there have been stations there before. Either on a temporary basis or permanent and been destroyed and we've relocated them.

The Galveston District has used CBI and the TCOON network to get to our conversion to mean lower-low water, to get us lined up with NOAA and the Coast Guard.

We're in the middle of that conversation right now. And within the next few months to a year from now, we'll have the entire district converted from our legacy dredging datum of mean low tide to the internationally recognized datum of mean lower-low water.

So this is what the structures look like. You heard about Sentinels of the Coast. That's on the left of your screen.

It's a 48 inch diameter model pile. Next down to about 36 inches and comes, in diameter, it comes about 30, I think two or 34 feet out of the water.

There's two of them installed and operating right now. And another four that my office has financed to be instrumented from NOAA. And we're going to get those online by the end of this fiscal year, so by September 30th.

The other common data collection platform is on the right. It's a four post system. We're using those as well.

I can tell you, after Hurricane Ike these were missing. So we're really, you want to talk about some examples of resiliency, we're installing six of these Sentinels of the Coast and we're really hoping that that's going to help us out during some storm surge events.

The third and final type of data collection platform, we use structures of opportunity. So existing piers or other structures.

Gulf Coast Joint Hurricane Response Protocol. Of course everybody knows when Ike hit we were down and our navigation systems were closed.

And it's the responsibility of the Coast Guard and the Corps to restore operations. And we tapped into our partners and our resources to do that.

Here's some photos here of Boliver Island. You can see one house standing. And then the road that you came in on, the Causeway, what that looked like after Hurricane Ike.

So back in the early 2000's, the Gulf Coast Joint Hurricane Response Protocol was drafted by the executive director of GICA. The Gulf Intracoastal Canal Association.

And he pulled, he, Raymond Butler, pulled all the federal state agencies that had a stake in restoring navigation together. And we actually signed up to this protocol.

So NOAA is a signatory of it, the Corps of Engineers is. Of course the Coast Guard is. The pilots, different pilot's organizations are, et cetera.

And it's broken into two working groups. A port coordination team, that you heard some folks talking about yesterday, and a navigation restoration team.

So the port coordination teams are chaired by the Coast Guard, in the case of Port Arthur and Houston the VTS directors, and the other navigation complex is by the waterways chiefs and different Coast Guard entities.

And the navigation restoration teams are chaired by Corps of Engineers representatives. So there's one person that leads that team in the Mobile District, one person that leads that team in the New Orleans District and I lead the team here in along the Texas Coast for the Galveston District. And here's all our partners.

NOAA plays a huge part in the navigation restoration as the National Weather Service goes first on our conference calls to tell us where the storm is at, where it's going to hit. And then once it does hit, how the winds and the surges so we can get in there and recover from the storm afterwards.

So if we know the storm is going to hit in Houston Galveston area, those staggered resources along the Texas Coast will trailer them and relocate them here in advance of the storm. We'll layout assignments for these service vessels, station to station or buoy to buoy, and we'll get everybody lined up to do the quickest recovery as we can.

Next partnership is USACE eHydro webpage. And then how that is poised to feed the NOAA's online charts into the future.

So about two years ago the Galveston District kind of leaned forward a little bit ---let me back up. Five years ago the Corps of Engineers developed hydrographic survey software called eHydro. And they put it out to the districts and said, we are going to make this mandatory in the future, please start utilizing it.

So about two years ago, Galveston District leaned forward and we came up with a public website. And we're presenting all of our channel data onto this district website, Galveston District website.

Now NOAA, they've got a big footprint. Six million square miles of waters they need to chart. Ours is very refined and small. We're doing hydrographic surveys within the federal channels that I outlined a moment ago.

So I'll walk you real quickly through the eHydro website at the Galveston District. If you look at here, if you click on hydrographic, channel hydrographic surveys, it will give you a list from North to South. This matches the navigation systems Sabine down to Brazos Island Harbor and then the Gulf Intracoastal Waterway.

And let's, for example, if I click on Houston Galveston Texas City link, it brings you to the entrance channel that comes in to the Port of Galveston.

And for example, if I click on Number 14, which is the Boliver Roads to Exxon dock, I have the choice of either clicking on the survey maps or the X, Y, Z data. So for today's example I'll click on the survey maps and it will pull up this PDF file.

So the PDF file has got a lot of information on it. It's got a vicinity map on the top right showing where you are in the coast, where you're at on the project.

It gives the channel boundaries or the toes of the channel. It gives the A-to-Ns or the Aids to Navigation, the latest aerial imagery, a scale, a north arrow, a legend, a contour of colors, what those contours stand for.

And if you zoom in, these lines are the actual survey vessel lines that you can zoom in and see what the depth of that channel is.

We update these surveys at a minimum of once per year. And we do that annual survey between March and June, ahead of hurricane season.

But at -- these channels have different shoaling rates. So there's several channels that have a high shoaling rate; we'll survey as often as every four months.

So as this data is updated, it's put on this website and you can see here, Galveston Entrance Channel or right in front of our office, we surveyed back in January. So the data is 60 days old.

The next example of the Corps working on a coastal resiliency with our partners is our beneficial use of dredge material. Land Commissioner George P. Bush visited the Galveston District last week and we really put this graphic together for him, but I used it today.

You can see every triangle there we've done beneficial use. Yesterday there was the question, how many acres of marshes were created when doing the Houston deepening project about ten years ago. And the answer to that question is, about 3,400 acres of marsh were created. So that's one dot on this, that's one dot right there.

All the rest of them is beneficial use of dredging material. That 20 million cubic yards of material that we dredge every year, we place onto shorelines, we place onto beaches, we create marshes, bird habitat, aquatic habitat, et cetera.

One really great example I'll give you is the first time that we dredged out of the Galveston Entrance Channel and placed sand onto the beach was last year. And Great Lakes dredged and docked it with the Terrapin Island and a booster pump.

So here you can see the Galveston Entrance Channel coming up into Galveston. Of course this is Texas City and then the Houston ship channel up here.

We dredged this entrance channel up to about right here, about every 16 to 18 months. And I'll zoom into that box.

This area highlighted in red is an area, just due to hydrodynamics, is where the sand falls out. The other areas we usually get siltier, muddy material.

And we dredged this area and we have been historically placing it into our EPA-regulated ODMDS or offshore dredge material disposal site.

So we pay to get the dredge here, the Corps of Engineers. We pay to get, to dredge the material up and we pay to sail it over to here.

And in this case, the Texas General Land Office and the Galveston Island Park Board cost shared into the incremental cost on moving the material from the ODMDS to the beach.

And just, here's a photo here of the operation. And every grain of sand that you see in that picture, left and to the right on the bottom, was placed during this dredging event. About 600,000 cubic yards per mile, plus or minus a beach about 300 feet wide.

If you're driving out of Galveston and you go out to 61st Street, everything west of 61st Street, all that material has been placed there. Before we got there, there was rocks out there. All the way up to the sea wall.

And then the final partnership is our hurricane flood protection systems. Ray Newby did a good job going over our study that we have going on, but an example, or some examples of our built projects are, and I'll go back to this navigation map just as a graphic to show you the location of these areas.

Port Arthur, Texas City, and Freeport all have constructed hurricane flood protection levee systems. And these pictures here are the inside and the outside of these flood protection systems after Ike.

So you can see the debris line. This is about ten days after Ike hit. You can see the debris line in some areas came within a foot of the top of the levee.

So after you leave the Galveston Island and you're driving over the Causeway and you see all those refineries to your right, at Teas City, this hurricane flood protection system essentially saved billions of dollars' worth of infrastructure after Hurricane Ike. And the same could be said for the facilities at Port Arthur and Freeport.

So with that, you know, there's 16 coastal districts in the Corps of Engineers and I feel privileged to be able to be the chief navigation here.

Both myself and my staff, and really the folks around the building, the 300 employees, when they go home at night, they feel like they're contributing to something. You know, clearly the economic drivers are there.

And when we do our maintenance dredging, it actually has an impact. It allows commerce to flow freely. Thank you.

DR. JEFFRESS: Thank you, Chris. Our next speaker is my colleague, Dr. Philippe Tissot. He is the associate director of the Conrad Blucher Institute for Surveying and Science at Texas A&M at Corpus Christi.

And for us he manages a hydrodynamics lab. And he also has a title of Associate Research Professor. Having the word research in your title like that means he's not teaching anymore.

And Philippe comes to us from Switzerland where he got a degree in Engineering Physics from the Swiss Federal Institute of Technology in Lausanne.

And following that he, and his wife, moved to Texas to College Station, where he pursued a PhD in nuclear physics. But we don't use that school much around the Blucher Institute.

But one of the things he did learn was modeling. And he's now, calls himself a coastal modeler. And he's done a lot of work looking at tide gage records and physical coastal processes. And he's going to talk about that.

And he does a lot of work in research. He involves a lot of our students in research. One of the things that they've done, just recently, is developed an app for an iPhone and for Android phones, which is called Weather on Wheels.

Which goes and gets weather forecasting from the National Weather Service, overlays it on a navigation route and it predicts the weather as you're going from Point A to Point B in the United States. So if you want to plan a trip from like here to Dallas, it will tell you what the weather is going to be like as you go along the trip. And updates it if you refresh it as you go.

And I believe he's got over 10,000 users of that app right now. And it's steadily growing.

And that was a project, particularly supervised by Philippe, but actually carried out by the students. And undergrad students at that.

He's well published with 29 peer reviewed articles and over 170 proceedings at conferences. He was a professor of physics on our campus for 12 years, but he just recently gave it up to be a research scientist.

So we're lucky to have Philippe on our stuff who is our in-house coastal processes modeler. Philippe, tell us about it.

DR. TISSOT: So thank you for the introduction. Also, thank you for -- the Panel, for inviting me for the opportunity to give this talk.

And thanks also for the great partnership with NOAA over many, many years. And the Corps of Engineer with Chris here, with TCOON, and the Texas General Land Office. And also local surveyors. It really makes work a lot more fun when you do it together.

So I'm going to talk from the research side. And the two messages that kind of hopefully are going to come out of this talk are the spatial variability.

When we think about relative sea level rise, you know, nation frequency, storm surge, which will be the title of my, the focus of my talk, I'd like to communicate how much spatial variability there is.

And the corollary of that is that you will need to measure. Measurements are very, very important. So that's going to be the focus. And so -- thanks, I'm talking.

Measurements, let's talk right here. A few minutes walking distance, the La Pier 21 Station. Which is really the gold standard. The NOAA NWLON station. The gold standard for water levels in the Gulf of Mexico.

I'm going to show a couple of charts there. The one at the bottom, you've seen it several times already. The 6.3 millimeters per year relative sea level rise. That's fantastic information. Very long-term.

And I've also plotted a comparison, on the top right, of the water levels measures over the past ten days, up until this morning, and compared with the tidal predictions.

And for a couple of messages there. One is that along the coastal, the Texas Coastal, the Texas Coast, the wind, the atmospheric forcing's are very important.

The tidal range is microtidal, so we have a small tidal range. We have a large influence from wind and atmospheric forcing.

And if you want a prediction of the water levels, the tidal prediction is not a good one. It doesn't meet National Ocean Service standard anywhere along the coast. There's still a lot of useful information there, but it's something to keep in mind.

And I've put that chart also to introduce -- there should be -- there's something that doesn't work.

So the difference between the black line and the blue line, well I'm going to call that the surge. The definition would be the surge. And so a small surge over the past week.

And that surge will, so it's basically depending on that atmospheric forcing. As opposed to the tides that are strictly based on the gravitational forcing. And I'll talk about surge a little more in a while.

So focus of my talk. The importance of measurements. And also the mean relative sea level rise, storm surge.

And I'm going to look at inundation from two points of view. The small surges, or so called nuisance flooding, and also the larger surges.

And I'm going to share the methods that we've been using to quantify how much is inundation going to increase with relative sea level rise along the Texas Coast and the Gulf of Mexico.

And I'll finish by talking about the need for probably better information for coastal managers and for beach managers. Talk about the difference between tidal datum and inundation frequency for those tidal datums and how to possibly do a better job communicating it. CO-OPs is having some excellent research in that field as well.

So when I talk about sea level rise, I like to put the big picture first. And over the past --

So we've had a large sea level after the last glaciation. And really during the, for our civilization, we've had remarkable stable sea level rise. We benefitted from that. Much easier to maintain the coast when you're in a stable environment like this.

If we look at the past 130 years or so, then we have a sea level rise that is, if you look at global sea level rise, static sea level rise, we have 1.7 millimeters per year, over the past century, based on tide gage record.

If we look at the more recent record, based on the satellite altimetry, we have 3.3 millimeters per year. And if we go back to the Pier 21 long-term trend, we have 6.3 millimeters per year.

So that emphasis which one is important. It's obviously the 6.3 millimeters per year, if you're managing coastal resilience around Galveston.

So that difference between 6.3 and 1.7, vertical and motion, possibly also changes in ocean current, so it's quite -- and that will be variable. Show the spatial variability of that subsidence.

So we if look at -- so relative sea level rise, the local portion, relative sea level rise is what is important.

If we look at the Gulf of Mexico, then we have some of the largest vertical and motion. We have some of the largest relative sea level rise. Up to one centimeter per year in Louisiana and higher at some locations. And when you go to Florida or when you go to the Coast of Texas, then you go as low as 2.2 millimeters per year.

And why is it important? As several of the speakers before said, there's a tremendous concentration for navigation in our economy.

I counted. I recently went to the website and we have, actually ten of the last 13 or ten of the top 15 U.S. ports are right here. From the U.S. Transportation Department of Statistics of 2016. So it is important.

I have split the surges and inundation into two categories. One is the big ones, Hurricane Ike here. You've seen some pictures.

On the far right you have a picture of the former installations of Pier 21, which also suffered during Ike.

And at the bottom, those are smaller flooding. Or so called nuisance flooding. There's a picture of Washington, D.C., Charleston, and on the bottom right, Corpus Christi.

They are not deadly, but they lead to insurance claims and they need to be managed here. They're quite important for that.

So a question we've asked is, how much more inundation are we going to sustain for the big ones, the small ones, and how can we quantify the differences between the two?

I wanted -- this is an older presentation and there's a few things that I wanted to share. For Hurricane Ike, if you look at the Pier 21 data set, you would see that the surge was captured. The peak of the surge was captured. Which is great.

But you would also see that the instrument broke. The top right picture shows the problem, the acoustic instrument broke.

Fortunately, we have, NOAA has backup measurements at each one of those stations. And the backup measurements, the pressure sensor, held on through.

So a recommendation is, yes, keep all those backup water levels. And probably keep two different technologies when you're measuring water levels.

Such that, because if you have the same technology, there's a good chance that if one breaks, the other one may as well. So that is a user's thought on that issue.

So we're interested in flooding related to different size of surges. And one of the motivation was in Corpus Christi in 2008.

We had two flooding events that would be part of the nuisance flooding. They were related to Hurricane Ike and Hurricane Dolly. Both hurricane that landed quite far away from Corpus Christi.

And on the picture on the right, we see the flooding, but you don't see any storms, you don't see dark skies, you don't see waves. Very sort of a quiet flooding event. And those type of events are going to increase with relative sea level rise.

So we developed a methodology a few years back to try to quantify that. And the questions we're after are, what is going to be the influence of relative sea level rise on flooding, surge range, coastal geology and the hurricane climatology? How do you put all that together to try to predict model, how inundation frequency will change?

To capture that, I'm going to show the example of Pier 21. We start with the water levels since 1908. So that's fantastic obviously.

We remove the sea level trend, we remove the tides and we end up with a surge time series. And we can make the assumption that the surge times series itself is not going to change that much with relative sea level rise. The atmospheric portion of the water levels.

That surge time series can be modeled as a probability density function. On the bottom left, different ways to do it. We use a GEV function. And so we get statistical distribution for surge.

If we integrate that statistical distribution, we can estimate, compute, the chances of getting flooded. And that's the next slide on the top left.

The dark line gives you the chances of exceeding a certain level on every, for different water levels.

We can make the switch from surge to water level because the water levels have the tides on top of it, but the tide is sometimes positive, sometimes negatives. So on average we can switch from surge to water levels.

And then we can add the relative sea water rise. And we can get another probability function. Another community distribution function that tells us what is going to be the chance of getting dated for certain vertical level at the end of the century. So that's the dotted line on the top left over there.

Once we have those two we can create a ratio. And that's the big graph in the middle of the slide.

The dark line tells you what, how much your inundation frequency will increase as you move to the end of the century. The dark line is for linear rise. So continuing the 6.3 millimeters for Pleasure Pier, all the way to the century.

And the dashed line as with an acceleration. I'll talk to that a little more.

And one of the take-home messages there is that when you look at that ratio, it's estimated to be about six times for water levels around one meter and a lot less around two times for Hurricane Ike type.

So when you think about nuisance flooding, they're not devastating, but in proportional, they're going to increase a lot more. That's because of the probability distribution function. They're going to increase a lot more than the large flooding.

So we are talking about spatial variability. We looked around the Gulf of Mexico and there is large differences in relative sea level rise. When you go from about 2.2 millimeters in Key West to one centimeters in Grande Isle Louisiana. How is that going to affect those rations?

So we plug in the different relative sea level rise for the location. And also a big difference is going to be the surge range. I'll go back there.

And if you look at the distance from the Continental shelf. In Galveston we have a long distance that allows the surge to build and gives us those very large surges.

So if we compare locations, we have, it's the graph on the bottom left. In the middle portion we have the two locations in Galveston that have large surge ranges, as opposed to Key West that has a very narrow surge range. So that will play a role in the result.

So we plug in the surge range, the vertical and motion to the statistics, and we get to this graph. That shows the, so on the top left we have Galveston, Pier 21.

We have the six-time increase in inundation frequency for about 1.1 meter. And you have also dash line below and above, that's the confidence interval.

With that method, we can recreate alternate history of surges. We can assume that all surges are created with equal chances and we can resample and give alternate search history. And that allows us to check out variability. And yes, so we have multipliers between five and ten.

If we pick an accelerating sea level rise, then the results will obviously change. And the results are in this slide. And the multipliers are as expected, quite larger.

And in the previous slide, in the linear sea level rise case, Grande Isle in Louisiana was the place where there's going to be the larger increase.

When you step to an accelerated sea level rise, it was a bit of a surprise when we first computed it. Key West becomes the place where we have the largest increase in inundation frequency.

And the reason for that is that there is, the surge range is very small at Key West. So if you put two feet of sea level rise to an area that has about the max of the surge range is less than three feet, then you step into a type of water level that the area has never seen. And so that's why that inundation frequency is so high.

Now it's not nothing to be too dramatic because you don't need a very tall sea wall because the surge range is not very large. Yet Key West is going to get into, places like Key West will be in a situation that they've never seen before. And that will take some planning.

So that's the spatial variability of the impact of relative sea level rise on inundation. And you've got, so those are the two final paragraph for this part of my talk.

On the left, the red curve is for the Grande Isle, which will be the most affected on a continuous, on a linear sea level rise. And on the right side it will be Key West. Because of that surge range.

So some methods to compare what may happen.

The second part of my talk, though shorter, is if you go to the local level, I'd like to share.

We're trying to help the management, beach management and coastal management. And we're using data from Bob Hall Pier. It's the only instrumented Pier on the Texas open coast.

And we're hoping to add more instrumentation and open for suggestions on that. We've given suggestions.

And then we have, so we're fortunate we have an NWLON station there. And we have also installed current profilers and wave gauges.

And the part I'm going to emphasize is that if you have a wave gauge located right next to an NWLON water level, the NWLON station does not just measure water level, it also measures water level variability. You have the standard deviation.

And you can make, you can put the model together that compares that standard deviations with the significant wave height. You can create a lower model, which you see here.

And once you have a model between the significant wave height and the standard water level deviation, then you can go back in time and create a wave history. And that's what we did.

And so we suddenly have a 13 years wave history. Now the quality of it is not tip-top yet. There's more QA/QC and statistics to do. But we were able to identify the past hurricane with reasonable wave height.

And so now we have a water level history and a wave height history. What we can do with that is put them together. And that's a good estimate of wave run-up.

So we can go back and have an estimate of how high the water went on the beach for 13 years. And with that we can then compare with the tidal datums and figure out how often are the tidal datums inundated. And that's going to be the topic of the next three slides.

The tidal datums that are most used and have been talked about. The highest astronomical tide, mean higher-high water, mean sea level.

And as you imagine, with the atmospheric, the wave run-up, those are going to be inundated quite a bit of time.

There's some type of discussion that high astronomical tide, for a beach manager, as well. If I'm above the highest astronomical tide, it's going to be dry most of the time. And that's a misconception that I think we should communicate.

So the result is that, for the highest astronomical tide, and these are estimates, but I think they'll be pretty close once we clean up the wave history. About half of the time, the highest astronomical tide is in the water. And that's on the ocean side. On the bay sides, the results would be different. Because you have different atmospheric forcing.

And so we think that we need a better type of statistics to help the beach manager. And we think that a flooding frequency datum, something that tells you, well, if you want to be 99 percent of the time dry, this is that vertical height.

And in cases like Bob Hall Pier, you can compute that and you can communicate it. Well, communicating it, so that's great. But to communicate it you also want to do it in a fairly visual fashion. Something that's easier for the beach manager to look at.

So in Ball Hall Pier we have a benchmark. And so from the benchmark, we can look at where, on a pier pile, those datum corresponds to. And a later presentation is a lot more clear there.

But the blue lines are the highest astronomical tide and the mean high high water. And the red lines are the five percent and ten percent inundation frequency line. And so that should give a very visual way for the beach manager to see where.

And the picture was taken in January, where you have the lowest water level, low tide. So we didn't get too wet when we took that picture. We still got pretty wet actually. Poor students were the most wet.

(Laughter.)

DR. TISSOT: Last slide before I conclude. It's also about spatial variability. And if you take the TCOON data, we have about 23 years for several stations and you compute the sea level rise, the relative sea level rise on a relatively small area. That's the Texas Coastal Bend. And we followed the National Ocean Service methods to do that, of course.

And you can see a lot of variabilities. South of College Station you have 2.5 millimeters. And we go Rockport, 7.2 millimeters. You'll notice that it's a little higher than on the NOAA page and that's because we take only the last 23 years instead of starting in 1948 like you have in your official page.

So it's quite a bit of variability and I think it needs to be measured. I think it calls for high density observations. There's going to be, as Chris and Ray talked about, there's going to be billions of dollars invested to protect our coast. And we need the right data and we need it to be consistent.

So I hope I've convinced you of the -- it's like preaching to the choir here -- but the importance of those local measurements, that the variability is, every time we look, the spatial variability is larger than we thought. And we scratch our heads a little bit to try to explain it. Perhaps it's sea level, you have subsidence, you have river bed fluid extraction.

Also other conclusions, the tidal land dunes are not good indicator of an inundation frequency. And we need better ways, I think, and maybe there will be feedback from the room, there's better ways to help the beach manager and planner for coastal areas.

The questions are going to be for later, right?

(Applause.)

DR. JEFFRESS: Our final speaker today is Chris McHugh, who is a hydrographic surveyor. He works with TerraSond Limited in their office in Corpus Christi.

And he's recently taken on the challenge of being our adjunct professor in hydrographic science on our campuses and actually teaching this semester about 20 students the art and science behind hydrographic surveying.

Chris is a graduate in the master's program from Southern Mississippi State University at Stennis. And prior to that he has a bachelor's of science degree in marine science. And so he's been a coastal guy ever since he's come out of high school.

And I know he's also a sailor. He just bought a new sailboat to play with down in Corpus Christi. And he's very knowledgeable on all things hydrographic. So, Chris, tell us what you do.

MR. MCHUGH: Well, thanks, Gary. I just want to say what an honor and how humbling it is to be in a room with all of you. Not just to be invited for the talk but just to be here.

There's been a lot of talk about what data products are coming out with, technologies that are new and each agency is coming out with. But not really much of who the people that are out there collecting this data. Because the technology doesn't mean anything unless you have people that know what they're doing with it, and knowing how to QC it and making sure that it's right.

So that's basically what I'm going to talk about here. So forgive me for reading from my slide for a second, but the IHO defines hydrography as the branch of applied sciences which deals with the measurement and description of the physical features of oceans, seas and coastal areas, lakes, rivers, and their prediction of their change over time, for the purpose of safety of navigation and support of all other marine activities, including economic development, security and defense, research and environmental protection.

But this is a meaningless statement. It's meaningless without the hydrographers that do the work. They really bring these words off the page into a practice science.

In the beginning, hydrography consisted of brave men setting out for years and years at a time for their governments to map and explore the new world, using astronomical observations for positioning, a lead weight tied to a rope for soundings. Captain Cook is one of the most famous. Captain Bligh as well.

My company, TerraSond, we're very big in Alaska. We've done surveys up there for NOAA, one of their contractors. And we have surveys that match Captain Cook's original surveys to within half a foot. That's half a foot, you know, in X, Y, Z position. That's unbelievable. Hopefully, we weren't wrong, but --

(Laughter.)

MR. MCHUGH: And to think that they had such a great understanding of how their measurements were taken, they had to compute these things by hand. And they understood and had -- just meticulous with all their measurements.

And it really gave them the want and the need to make sure everything was right. Because they were doing this for a purpose and they're proud about it and they were making sure their measurements were correct. And it shows that, you know, within half a foot. And it's amazing.

And now we have radio waves bouncing around space and on the earth that are giving us the realtime positions almost anywhere in the world. Then we take sound waves and propagate them through the water column and have them reflect back to us.

And we're measuring not just bathymetry, but properties of the water column. We can measure gas seeps, we can get information, intensity data about bottom characteristics. We can penetrate through subsurface and get different layers of the earth.

It's amazing what we can do. And then we can take all those things and make 3D models that are georeferenced. And every little point in that georeferenced model, like this picture of the downed submarine in the bottom right. I mean, it's amazing. It's like an artist couldn't paint a better picture. And we did that using sound. Remote sensing.

And I feel like we lose sight of that, and we lose sight of the technology, in how cool and what we're actually doing with it. And we take it for granted. And I think the underlying problem with that is people don't appreciate it as much and they don't want to understand the whole science behind it.

And then they lose some of the QA and QC things because they just see numbers on a page. Oh, we just collected data. And it's like, yeah, but your data is a foot off because you have a draft in the wrong spot or you didn't enter your draft. So you have to really understand what's going on.

And I believe, how do we start with this? I believe it comes down to the governing body. Back in the 1500s, the governments of England had a problem. They couldn't position themselves on a line of longitude to the accuracy that they could the line the latitude. So they put out to the geniuses of the world at that time, some of the people that invented a lot of math that we use today, to come up with solutions.

And two solutions came out of that. You had the H4 to keep time at Greenwich Mean Time and then keep ship time. And then you had lunar tide tables. They still required a lot of calculations and a lot of measurements. Sometimes a few hours in a day and sometimes a couple days to get accurate measurements.

We've come a long way since then. And NOAA has some of the most stringent hydrographic specifications in the world. And it's great. And I think we're doing very good from the government level down. But now we have to focus on the people that are doing the work. Our students and our hydrographers, you know, they're our future. And where are they getting their education? Are they understanding what they're doing exactly and making sure that their quality is good? And what effects did that have for our data sets and our coastal regions?

And so these are the challenges, I think, that we need to face. And I feel like if we can overcome all these challenges we'll be sitting pretty good.

We live in a dynamic world. Obviously, we've talked about this before. Our coastline is huge. And I heard once that it would take about 200 years to map the whole coast and get it up-to-date. But that doesn't make any sense. It would actually be a lot longer than that. Because our coastline is constantly changing. It's dynamic. Plates are moving, land is subsiding. You have isostasy, you've sediment flow, hurricanes and storms come through.

Which we know -- I know Mr. Newby can attest to this -- the more we try and control it, which is great, and hurricane sea walls and groins and levees, it changes the environment. And then we have changes farther downstream that are affected. So the more that we do, the more the environment changed somewhere else. And it's a battle that is going to be constant fight. It's never going to change. We're not going to stop it. We can only try and control it, to a point. And also measure it and understand what are changes are doing, and the best way to implement changes, for what we want.

And I think people don't realize this, I've noticed this especially in class in working with students, they don't know the limitations of our charts. And so I did an experiment.

I basically have 17 students in the class. And I told them to go to NOAA, go to the online chart viewer and open and download a PDF of any chart in the U.S. and then tell me how old the hydrographic data is from. They all told me 2013 to 2015, of the publication date of the chart.

And then so I pointed out in class, and I directed them to the source, and said, okay, this diagram here shows where the original data sets are from that are on the chart. A lot of these are checked and stuff. And then we're looking at the dates. And I had them basically write down all the dates from their charts.

And you can see a lot of them were during wartime efforts when sonar was invented and we started using single-beam sonars. Only a few were since the last six years. There were a lot in the 1800s that are still on there.

These are in areas that obviously are not commercialized, they're not used very much. But I think we have a responsibility, as scientists and hydrographers, to the public, as well as just commercial shipping lanes, to update charts for regular boaters that are going out.

And as a sailor, I know the hazards. I never trust my charts. They're just there for guidelines. And I know all too well that, between tides, charts are great, I love them. But my point is that recreational boaters are not going in places where it matters. They're going in places right around shorelines and little marsh inlets and stuff like that. Where it's such dynamic change and there's such sediment flux and influx that it's almost impossible to keep the charts up-to-date. We don't have the manpower to do it. And we have different technologies that we're trying to work with, like LIDAR and satellite based imaging.

But I think we need to get the funding in place and try and get these charts up-to-date as much as possible. And maybe internet-based things. But that's a different talk.

Recently, a good friend of mine, Dr. Ian Church, who is one of John Hughes Clark's grad students, he said to me that hydrographic scientists of the future need to have a holistic view of hydrography, beyond numbers on the chart. We need to understand the science of our environment to understand the limitations of the work we are doing within it.

And it's true. And there's not too many hydrographic formally trained degree programs in the U.S. There's only three that are recognized by IHO, as of 2011.

There was the one that I graduated from, the University of Southern Mississippi. It's a Joint Naval Program. It's a one-year or a two-year program. The one-year program is an accelerated program, mainly for the Navy. NOAA sends their guys there, the Navy does, fleet survey team, NAVOCEANO, foreign navies as well. As well as three IHO candidates every year. So we have a big international collection there. We get hands on training, very in-depth theory.

Viewing the IHO's webpage, they just updated their Category A. Basically their certification for the degree program, what the degree program needs to meet. Differential equations, linear algebra, in-depth tide theory, underwater acoustics, geodesy, in-depth GNSS, how it works.

I mean, Dr. David Wells is there. If anybody knows him, I feel like he's invented GPS, he's been around so long. And worked on it actually when it was first coming into existence. And great resources there. And we also have the Navy that supplies all the sonars and the technologies that's there that they're using.

And the University of New Hampshire is the same way. They partner with NOAA. They also have UNB up there to kind of partnership with. That's an ocean engineering degree so it's not as focused in hydrography and charting. But it is still a great program. I have a friend in grad school up there right now.

And then there's the Florida Institute of Technology, which isn't recognized as a Category A or a Category B. It's just recognized by the IHO as a school that has a lot of teachers and classes that are hydrographer-based and it's a good learning environment for that.

There's other colleges, like Cape Fear Community College in Wilmington. That's like a marine technology degree so they'll do a very applied, hands-on, okay, here's your sonar, this is how they work. But there's really little to no theory in there.

But we need more university programs like this around the world that are IHO recognized to get our workforce out there. I mean, we've talked about the NRT team problems, having staffing issues. And just staffing issues in general around private companies.

And there's just not enough people out there that are formally trained and want to be in that formally trained industry. The problem is you have people that get hired on as private industry or government and they went to school for marine science.

Or they really want to be a dolphin trainer, but obviously that job everybody wants. So they got a job, just to get a job nowadays. And they're doing hydrography and they realize, oh, this really isn't for me. And then we have retention issues.

But when you're more formally trained in something you want to stick with it because you already know what you're there for. You already know what you've signed up for.

And so I've called around a lot of private industry companies, because now I'm in the private industry, and I was wondering where their employees are from. So I called up some of the people I know at the bigger corporations, and less than 25 percent of their employees have any formal training. They have scientific background engineering. But there's a lot of on-job, in-job training and investment. And then they leave. Because they realize it's not what they want to do.

Like I said, we need more degree programs that meet IHO specs. More hands-on technology. Leaning environment. Theory is very much needed, but we also need the hands-on equipment and the technology to use sonars. Working with TCOON, at Texas A&M, has been great and the students love it as well.

Getting hydrographic softwares available to students and focused internships and opportunities through relationships between private companies, as well government entities.

There is also -- there's no professional licensure for hydrographers right now. There's just certifications. ACSM, obviously IHO.

And then so you kind of wonder, where is the incentive to be diligent and have an integrity in your company, and with your surveys, if you're not held to any kind of standard? Your certifications basically just say that, okay, you're qualified, you know what you're doing. But if you do it wrong, you can't get that certification taken away.

Land surveys, our POS's obviously have this. And I think hydrographers, no offense, might be a little biased, have more moving parts with them than some land surveying stuff.

DR. JEFFRESS: Excuse me, Chris, we better wrap up this session. We're running out of time. So if you don't mind, we'll stop you there. And we've got a few minutes left for questions.

So, Gary, do you have some written questions that you might want to pass to us? Steve?

MR. BLASKEY: The first question is, the source of Open Source GIS that I'm using for my records project, I'm using the quantum GIS platform. It was just readily available and it's free. We've also used, we've experimented with Manifold GIS, and obviously the ESRI suite.

The next question says, how will the replacement of NAD 83 and NAVD 88 impact the work that you do?

As long as there's a straight conversion to it, it really won't. We're just giving answers in the datum that's being provided to us. So I don't know that that would be any detriment to what we've done. We would just come up with what the conversion is and convert our legacy data over to the new datum.

What tools do we you need to make a -- I can't read this one.

DR. JEFFRESS: Oh, for the reference frame in 2022, what tools do you need to do conversions with this new datum?

MR. BLASKEY: To be honest with you, I don't know what tools I would need to make a transformation in the reference frame of 2022. We're a little ways out, I'm sure I'll figure it out by then.

DR. JEFFRESS: Ray?

MR. NEWBY: Okay. This question is: is the Texas Coast resiliency plan incorporating natural infrastructure, like new restoration marsh, et cetera, to protect the coast versus relying on sea walls and other hardened structures?

The answer is yes on that. We have a preference for soft solutions versus hard structures. And I would add into this, in addition to using the natural environment for protection, wider beaches, wetland buffers and so forth, we're also looking at nonstructural solutions, such as code changes and potentially relocations and buy-outs.

The other question is: what is needed to produce a more precise inundation visualization prediction model? Is it more hydro data, more LIDAR data, more 3D building, impervious surface information?

I think all those. I think one of the things that's really limiting some of our inundation models, as well as morphological models, is lack of reliable vertical data.

You know, LIDAR will only get you so close. And especially in like the Texas Coast, where you have a very low tidal range and a very low relief environment, you need as precise of vertical elevation data as you can have. And I don't think LIDAR is really getting us there yet, compared to some of the stuff that our on-the-ground surveyors are getting.

Last question is: the Texas Coast resiliency, is there any interests or thoughts about developing cooperative studies with NOAA or other agencies?

And that's a resounding yes. The more that we can leverage other resources ,and not only funding, but expertise, is going to be needed as we move forward.

Are you -- and if so, how -- incorporating sea level trends into wetland restoration projects, and other projects susceptible to sea level rise?

Most of our wetland restoration projects are really on about a 20-year planning horizon. However, we are incorporating designs, such as when you're building marsh terraces or mounds or so forth, to give enough elevation to allow for future sea level rise so that your vegetation will still survive.

For the Corps studies, where we're looking at Corps of Engineer studies, we have a 50 year planning horizon, where under executive order now the Corps has to consider several different sea level rise scenarios.

And it's even going to further into looking past 50 years to looking at, if you're going to build a hard structure as a levee or a flood wall, to basically incorporate adaptation measures so that you can actually go in and build adaptations to 100-year planning horizons.

DR. JEFFRESS: Chris?

MR. FRABOTTA: Yes, sir. All right, so the first question says, what sensor do you use for your hydrographic post-dredge surveys, single-beam, multi-beam or sonar?

And the answer to that is, I guess, a little bit complicated. It's, what are we using the survey for? So if it's strictly an after-dredging survey, we typically use single-beam and we run cross-sections on our channel for that. And the reason is, here in Galveston, it's a lot different than the East Coast. We don't have hardpack sand shoals. We mostly have soft bottom channels that the channel lays out really flat. We don't see a lot of pinnacles.

Other districts can, and do, use multi-beam surveys for both before and after dredging surveys. For payment, contractor payment.

But for before and after dredge, 99 percent of the time we use single-beam. If we're looking for something, if we're looking for a hazard to navigation, you know, Mr. Nerheim and I were talking earlier, we had a barge spill a load of sheet piles in the water. We dusted off our side-scan sonar and our multi-beam and went up there and did a survey for that. So if we're looking for a hazard to navigation, we'll use something other than the single-beam.

The reason we use single-beam, though, is the data is easy to contend with. It's low volume and quick processing time.

The second was: what's the average time or goal to get the survey results in eHydro?

Right now, we, as I said before during my presentation, that the Galveston District kind of leaned forward to implement eHydro. And we started implementing this navigation complex here, Houston-Galveston-Texas City, two years ago. And in November of last year, '15, we finally got the Gulf Intracoastal Waterway online.

We have been directed by our headquarters, in a memorandum dated about two weeks ago, to implement eHydro across the country. So, some districts are behind. Or just recently got the direction to do it and they're starting to implement now.

In that memo, there's a five-day turnaround requirement. So after we get the survey done, we have to have it uploaded within five days.

Okay, next question. Changing the datum has a big impact on port and coastal communities. How have you worked with them to implement these changes and how have they responded?

So this process on converting from mean low tide, our legacy datum, to mean lower-low water, we've been working on the Corps for about six years, really in partnership with Conrad Blucher.

We have an annual dredging conference where we have our sponsors and stakeholders, harbor pilots, et cetera, attend that. And we've been briefing them and updating them as it's been coming.

And we have about half of the Houston-Galveston-Texas City complex converted right now. Or a little bit better than half. And by the July/August timeframe, we'll have the whole complex converted.

How have we communicated with them? We've been to public meetings, we've gone to an annual conference or biannual conference called, Dredging Your Docks. We've communicated with local hydrographic surveyors.

And this also has regulatory implications as our regulatory division issues permits, dredging permits, relative to mean low tide. We are no longer maintaining those MLT tide boards, or tide stats. We now reset them to mean lower-low water.

So we have, in draft form, public notice that is going to go out here shortly for the whole Texas Coast that provide some examples on how to do the conversion from your permit for mean low tide into our new vertical datum of mean lower-low water.

And how have they responded? Essentially we -- it's a little bit confusing without a picture in front of you -- but we set mean low tide conservatively, both subjectively and empirically, back in the '60s. We did not set mean lower-low water. We empirically derived it with water level data.

So the differences between mean low tide and mean lower-low water vary as you go up and down the coast, and as you go up and down the navigation projects.

We did coordinate with our headquarters to say, if mean lower-low water comes out a foot or two feet difference than mean low tide, can we have the latitude of reporting in mean lower-low water but increasing the reported depth? So, we're not dredging any deeper, we're not dredging any shallower, but we're dredging to the same depth we had, but reporting mean lower-low water. And headquarters said we could.

So the impact to the permitees and to the berth owners and that kind of stuff is, we're not dredging the channel any deeper or shallower, we're just now reporting in mean lower-low water. So it's a foot difference in reporting here in Galveston. It's two feet down in Corpus Christi.

So, that communication, to the harbor pilots and to the ports, is what we're going through right now, port by port.

Next question. At the past panel meeting, in Charleston, we explored some of the challenges and promise of eHydro to allow better sharing of Corps of Engineers survey data with NOAA. From your perspective, how is eHydro working for your district and is NOAA able to apply your survey data to the charts in a timely manner?

It's a good question. For our district, so far, we are serving it up at the district website. That memo that came out a couple weeks ago is looking at it more as a national initiative. And we are, and our cartographers in my district, are looking at how to implement serving that data at the national level.

And then there's folks in our headquarters offices that are coordinating with NOAA at the highest level to make sure that NOAA can import that data. Both that it's named right, the format of the data is correct, it alerts you when the data is out there, et cetera.

So it's not something that we're taking the lead on at the district level. It's a national initiative. But I did talk to Rear Admiral Glang about it at break, and we do have monthly calls with all of the 16 coastal navigation districts in the country. And I'll be sure to bring up, in that call, that NOAA is very interested in implementing into their online charts.

The second question was: your presentation showed how your survey data is displayed on your district website, but is it being picked up and used and updated for NOAA charts and others -- has it been picked up on NOAA charts, or other sites beyond, in the individual USACE district website?

So, the folks I know that are using it are the harbor pilots. Captain Morris recently retired. He was the captain or the presiding officer for the Houston Pilots. And Captain Wally with Texas City and Galveston Pilots. They're both using it and they've hired companies to import the data and to get it put on their online -- to put on their chart plotters.

Next question. Your region has a lot of ambitious channel deepening projects. Could you briefly discuss the approval process and permitting timeline from conception to completion?

So, it's been a huge problem within the Corps of Engineers that some of these deepening projects take 12 to 20 years to get approval. And some of the ports have leveraged an authority out there called a Section 204 that allows the port to do the deepening report, the port to pay for the deepening, and to hand the maintenance over to the Corps of Engineers. And that's been done in several cases within the past couple of years.

It's been done at Freeport. Report Freeport and Freeport LNG partnered to widen the Freeport Channel from 400 feet to 600 feet. In May of last year, the Corps of Engineers, my district, accepted the operations and maintenance of that. In July it will be the second time we're digging that and maintaining that to 600 feet wide.

The Port of Houston did that Section 204 on deepening the Bay Port and Barbours Terminal Channels from 40 feet to 45 feet. They're currently under contract. We've accepted Barbours. And when they're complete with Bay Port we'll be accepting that.

And the Port of Corpus Christi has done it on the La Quinta Channel deepening where we had 39 feet and they deepened it to 45 feet. And we've assumed the maintenance.

What I'll tell you is that the Corps' planning process has undergone some improvements over the past four or five years called SMART Planning, to where it's a maximum of $3 million on a study, three years to complete the study, and three inches thick on the report. Because we've had some reports that would reach the ceiling, as you can imagine, with some environmental issues.

But those are being implemented. I think they've improved. I don't think that they're where the Corps or our non-federal sponsors want them to be, but they've gotten a lot better.

Last question I had was: hurricane response protocol shows USACE in a role for hydrographic surveys. How is that coordinated with NOAA's NRTs, who does USACE fund further development of eHydro?

So we, the Corps of Engineers, are in charge of restoring navigation within the federal navigation channels. Of course the captain of the port, in the case of Houston -- Sector Houston Galveston, Captain Penoyer and his staff is on the hook for closing the port and taking our recommendations on doing one of three things. Either keeping the port closed, opening it under restriction or opening it free and clear.

And our team that I listed out, makes those. We're in charge of coordinating the surveys and really performing the majority of them, but our team that I've listed out there, which includes the Coast Guard and NOAA and the Brown Water Industry and the harbor pilots, all provide input to making recommendations to Captain Penoyer, in this case, to open up Houston-Galveston-Texas City. And how do we tap into NOAAs NRT resources?

They're another hydrographic assets to us. So we have nine larger boats within the Galveston District and many, many, a couple dozen small skiffs that we can survey with.

NOAAs got a vessel that they share our boat house currently. So they're right on site. But we also have fireboats on the Houston Ship Channel that have data collection, fathometers with data collection capabilities. We have Brown Water Industry that can give us verbals.

We use all of that survey data to maybe open up under restriction until the Corps can get back in there and validate the surveys before we open up full navigation. That's all I have.

DR. JEFFRESS: Okay.

MR. MCHUGH: The question was, as a practicing professional and adjunct faculty at CBI, what do you feel is the biggest challenge to getting today's students interested in your chosen profession?

I have to say, it's they don't hear about this profession until it's too late. They're already in college, they've already had their chosen degree track and they don't know it exists.

Too many people have -- like what do you do? Well, I'm a hydrographic surveyor. What's hydrographic, what is that? And people just don't know. And they also don't know what it entails.

So just basically knowledge of what hydrographic science is. And it is a science. And just applied geophysics in general. And they just don't have the knowledge of what it is and it's just not presented to them early on in their education. And that's probably the biggest interests.

Because once they hear about it, most of them are very -- either intrigued, interested and want to be part of it or at least appreciate it. That's it.

DR. JEFFRESS: I have a question for all of the panel members from Ed Saade. Does any of the Texas Natural Resources Information System funding support your needs and is there overlap with the TNRIS data?

MR. NEWBY: I guess I'll take a stab at it. The TNRIS is the Texas Natural Resource Information System. It's maintained by the Texas Water Development Board.

And TNRIS has basically been designated as the central clearing house for geospatial data, aerial photography in mapping products and so forth.

And we do have some interplay with their StratMap initiative, but as far as funding, I think we probably see more funding through our coastal management program too than what we get back from TNRIS.

DR. JEFFRESS: And TNRIS is a really good resource with geospatial data and information. You know, aerial photography, maps. They work closely with USGS in producing mapping series for Texas. And they make that all available over the web, from their website.

Sorry we went over -- oh, you got another question? Sorry, go ahead.

MR. MCHUGH: The question is what -- who do you think should regulate hydrographic surveys?

Well, NOAA regulates ours now. The only charting agency in the U.S. Other hydrographic surveys that are done, you know, for private clients or state governments or whatever it is, are just regulated by the company itself.

I think what we need is some kind of licensure, somebody in charge that -- you know, like a land surveyor. You can't submit a land survey that a company did without a professional registered land surveyor attached to that company, that they'd have to check it. So I feel like it should be the same for hydrographic surveys.

So if we want to do a survey for a park commission for water volume computations in one of their lakes; we'd have to have a registered surveyor or hire a contractor or a registered hydrographic surveyor for that. So he can look over the data and put his stamp on it and say, yes, this is good data or no, you're off or this doesn't match some data or you should redo it, re-look at it and then resubmit it.

DR. JEFFRESS: Thanks, Chris. Well, with that I think we should ask for anymore last minute questions or reserve them for lunch.

I want to thank the panelists for coming and spending their time with us. There's a lot of information there. If you have any more questions, by all means, collar them after and then they can probably answer those questions.

So in the meantime, I ask you to show your appreciation one more time.

(Applause.)

DR. JEFFRESS: Back to you, Scott.

CHAIR PERKINS: Great. Thank you, Gary. Thank you, panelists. Excellent presentations.

We are at the public comment period now, so at this time if anyone from the public in attendance would like to make public comment, please take the microphone, state your name for the record and we look forward to hearing your comments.

MR. DASLER: Jon Dasler. I just wanted to comment a little bit on professional licensure, right. So there is a national certification program, but it's just a recognition by the peers, it's not a license to practice.

So many states require that the work be done under a professional surveyor. In fact, the State of Texas has a -- I think it's called the Occupational Code 1071.002 which requires surveys on the beds of the bodies of water be conducted under direction of a professional surveyor.

So therefore you're bound by the ethical laws and the professional standard of work practices, as defined by the state, on that front.

So I think moving forward, I think for the academic programs, it's probably prudent to prepare students to take the National Council of Examiners for Engineers and Surveyors has got a Fundamentals of Survey exam. Which starts that track, eventually, for professional registration.

And I would encourage those academic programs to kind of look into that and prep students for that, going forward. Because there is a real gap, I think, in the field moving forward on that front. And I think that would benefit the nation.

The other thing, I guess in terms of clearance of the ports. So when a captain of a port does close a harbor, so sometimes those are cases where we've had several on the Oregon coast where crabbing vessels have blocked entrances.

So typically the underwriters are notified. And so funding comes through the underwriters. We've done several surveys for opening ports. So that's an avenue to open a port that doesn't require government funding to do it. It's funded by the vessel underwriter that created the problem, but that's another source as well.

One last comment. I think on sort of the near-shore bathymetry of the Gulf, you know, there's a lot of discussion on the deep draft. One would hope at this point we would have critical navigation deep draft areas covered in behind us. But there's -- you know, that's an ongoing effort that's still years out to completion.

But there's a lot of needs in the near-shore bathymetry within the Gulf. There's a lot of infrastructure in the Gulf that's in pretty shallow water and you've got supply boats and crew boats navigating pretty shallow water to get to this infrastructure.

And then we've heard in past HSRP meetings that near-shore bathymetry is crucial to oil trajectory modeling. So having accurate data in the near-shore really helps in where spills are going to progress and move that forward.

And so I would not forget about that. And I think the DOC lawyers might agree that once you have data on a chart, and if it's old an inaccurate, that is a greater risk than not having a chart.

So I just want to state that, that that's something to keep in mind. There's a lot of data on charts, especially in the near-shore, that's out of date and inaccurate. As evidenced by Barnegat Bay. Thank you.

MS. MERSFELDER-LEWIS: Are there other comments?

CHAIR PERKINS: Okay, we will break for lunch. The Panel will be in the Cynthia Mitchell Room. And thank you all for your participation this morning.

(Whereupon, the above-entitled matter went off the record at 12:21 and resumed at 1:48 p.m.)

CHAIR PERKINS: I did have a request that we allow just a little bit more of public comment. And knowing that the next public comment period isn't until the conclusion later today, I would like to be accommodating and allow Mr. Dasler that opportunity.

MR. DASLER: I guess just a follow-on onto my comment is that I think the Office of Coast Survey does a great job with the budget and within the constraints that they have.

I think the issue, especially as it gets back to Barnegat, is it shouldn't take a disaster and a hurricane supplemental to find a problem and fix the chart, right?

So I think the bigger problem is how the program is funded and what can be done where it doesn't take supplemental funding to resolve some of those issues. So just a follow-on comment to that. Thanks.

CHAIR PERKINS: Great, thank you. And we do appreciate the input, Jon.

Mr. Maune?

MEMBER MAUNE: Thank you. I was hoping to have Joyce's paper up on the screen. But we're having some difficulties here. So Joyce, are you about ready to load it?

(Off microphone comment.)

MEMBER MAUNE: Okay, Joyce, you're on.

MEMBER MILLER: We talked about this earlier this morning -- I guess I should stay by my mic. We talked about this a little bit this morning and the panel members all have a copy of this that was put on the desk this morning.

I wrote an original couple of drafts and shared them only with Admiral Glang to get a sense of whether I was going in the right direction. And in a conversation, oh, about -- I don't know, a month or more ago, he basically said he was fairly happy with it. But I modified the second paragraph a lot based upon his comments.

So this comes from -- for the new panel members, this comes from three successive panel discussions and subsequent letters to Dr. Sullivan basically saying that NOAA should get its ships together, I guess I'd say.

(Laughter.)

MEMBER MILLER: NOAA should get its ships together. The first one was Admiral Glang shared with us that in 2013 and '14, neither the Rainier nor the Fairweather surveyed in Arctic waters and that the production rates had been extremely low for many years, but also that both ships are very old, 49 years old now.

And actually, one question I have, Gerd; what was their original design life? Do you have any idea?

(Off microphone comment.)

RADM GLANG: So I think -- he's talking to me. Gerd Glang, Coast Survey. So I think, Joyce, the design life for those ships, built in the 1960s, was probably not more than 30 years.

MEMBER MILLER: So we could safely put 30 years in.

RADM GLANG: I think -- yes, approximately 30 years, I think, would be fair.

MEMBER MILLER: And they were -- now one thing I hadn't realized was the Fairweather, I believe it was, was laid up for a number of years and then brought back out, correct?

RADM GLANG: Correct.

MEMBER MILLER: Yes, but she's still 49 years old. So that was an issue. And in the 2015 budget -- no, it was the 2016 request, NOAA requested $170 million for ship replacement which then didn't show up in the budget, because NOAA had produced a fleet recapitalization plan that went to OMB.

And OMB would not release it for whatever reason. And that was from Jeremy Weirich who works on Senate Appropriations. So the Senate Appropriations Committee would not consider it initially.

And then when the joint budget -- when the President's -- well, when we finally got a budget last year which, as everybody knows, seemed to give a little bit of something to everybody, it included $80 million for a new ship.

And then we've had some subsequent discussions here about recent problems with what that -- there's now $80,500,000 in the budget for a ship replacement which is not nearly enough for the whole ship.

And when that budget came out, what I was told was that the 2017 budget would have another similar amount in it for outfitting of the ship.

And so since that time, as we talked about yesterday, there has been great uncertainty in the inside of NOAA as to whether that money will go for a general oceanographic ship, for a hydro ship, which are the oldest ships in the fleet, or for potentially two fishery ships. So those are the issues.

And the reason it's really important for us to get a paper out is that those discussions are ongoing and very critical. And as Dr. Callender said, you know, the sooner we can get this paper together the better.

So shall I just walk through it, paragraph by paragraph, and see -- couple of things I've come up with, I have not said anything in this about the survey backlog. So consider as we go through it, do we want to put something about the hydro survey backlog in it.

I also didn't have the information that we've kind of gleaned since we got here about more recent discussions about what type of ship that money might provide to NOAA.

Okay: "So NOAA's Office of Coast Survey provides hydrographic information that is essential for safe navigation and keeping our ports open and commerce flowing. This information not only is the foundation for up-to-date nautical charts but also plays a key role in storm readiness, disaster recovery, coastal resilience, and on time delivery of goods and services to the nation.

"Whether by conducting routine bathymetric surveys" -- I put in the topography of the seafloor. Obviously the Administrator is going to know what bathymetry is, but if this went out to the public, some people might not know. I don't know. What do people think? Should we explain bathymetry or not?

MEMBER MAUNE: I like it. I think some people don't know what bathymetry is.

MEMBER MILLER: Okay. Yes, okay.

MEMBER HALL: Can I just point out to you that even if it goes -- I think in our letter to the Administrator explaining that, hey, we also think that this has got a wider audience than just you, so that was not us -- hey, you don't know what this might be.

MEMBER MILLER: Yes. "Bathymetric surveys or providing emergency services after storms or tsunamis. The ships and launches that are needed to perform this work are a vital part of the nation's infrastructure. And, like much of America's" -- not Americans, America's -- "aging infrastructure, critical components of NOAAs hydrographic fleet need replacement and/or upgrades."

I put a picture of the Rainier in front of -- I think that's in Puget Sound, but I'm not sure that I -- but any suggestions for a different or better figure? Yes?

MEMBER HALL: Not for the figure but for -- does there need to be a qualifier in front of, you know, need replacement and/or upgrades to stress? I don't know if it's urgent, or rapid, or kind of stress the timing here of when we expect or would hope that the upgrades and replacements would happen?

MEMBER MILLER: We could put --

(Off microphone comment.)

MEMBER MILLER: Okay, are in urgent need of replacement, all right, and/or upgrades.

So in terms of the picture, this might be something that the NOAA publications people can help us with in terms of -- our intention is that we get this to the NOS publications person and that they help to make it, you know, a glossier whatever.

"The NOAA ships Rainer, shown here, and Fairweather were built in 1968 with an original design life of 34 years. These ships carry" -- I was talking to Rick and Gerd, they carry five survey launches each. And that makes them -- so instead of two, "five survey launches each and are two of the most productive survey and training vessels in the NOAA fleet. As of 2016, both still conduct annual surveys in the challenging Alaskan and Arctic waters."

And, yes, Andy?

MR. ARMSTRONG: Andy Armstrong. You know, I recognize that one of the important roles of these ships is maintaining expertise, but I'm not comfortable with the idea of calling it a training ship. So I wonder what the Admiral's view on that is.

MEMBER MILLER: Those were the Admiral's words, let's put it that way.

RADM GLANG: Those were my words. If I were writing it, I think Andy's point is good.

I think it's important to emphasize the ships are where we build our expertise for not just our new NOAA Corps officers who learn both hydrography and to become professional mariners, which is a context that's very important to the program, and we expect officers to come back through the program as they progress through their careers, but we also use to build the expertise of our physical scientists and practicing hydrographers in our civilian workforce which includes both the wage mariners and the regular FTEs.

So it's really building that expertise across different dimensions that are important to the overall success of the program. It's a mouthful, I know.

MEMBER MILLER: Yes. What I'd suggest is, instead of saying survey and training vessels, we could just say survey. Because the next paragraph too talks specifically about training. So I would say let's take out training in the caption there.

So the next paragraph says, "The ships and launches of NOAA's hydrographic fleet also play irreplaceable roles in research and training." Is irreplaceable --

MEMBER KELLY: Vital?

MEMBER MILLER: I had used vital. Yes, Brigham?

MEMBER BRIGHAM: Yes. I'm not sure it's irreplaceable, I'm afraid. I think there are other training situations or whatever. So vital, I would recommend.

MEMBER MILLER: All right. I also expect that there will be some editing function when it goes to the NOS, in research and training.

"Private government partnerships are used to develop new and innovative survey equipment and techniques which are evaluated and tested on these vessels. Almost 50 percent of NOAA junior officers are trained in hydrography and sonar technologies aboard the ships, as well as qualified Officers of the Deck.

"Dedicated ships carrying multiple survey launches are one of the most efficient and cost effective ways to conduct hydrographic surveys."

I know that was -- the talk about developing technologies, do we want to expand that any more? It's kind of brief.

(Off microphone comment.)

MEMBER MAUNE: We have about eight minutes left.

MEMBER MILLER: Okay. "Currently the assets of the NOAA hydrographic fleet include three aging 200 to 300 foot ships, two newer medium-sized vessels, 17 small boats" -- I counted that from five on the Rainier, five on the Fairweather, two on the Jefferson, and the six, and I can't add, so that's 18 -- "and experimental autonomous sensors."

"NOAA also contracts with commercial vendors for approximately" -- Rick, Gerd, what percent of the surveys are contracted out, approximately?

RADM GLANG: I think about half is a good general average.

MEMBER MILLER: Okay. So about half, I'll just put in half -- "of it's hydrographic surveys."

"Although contracting for a portion of surveys is an important element of OCS' portfolio, NOAA must also maintain in-house survey capability and expertise to effectively manage hydrographic surveys and ensure navigation safety."

Comments? Yes?

RADM GLANG: Hi, Joyce, Gerd Glang. So the number of ships, you were counting Rainier, Fairweather, Thomas Jefferson, the Hassler, what's the other one?

MEMBER MILLER: The one in -- the Bay Hydro.

RADM GLANG: That's a 52, 54 foot --

MEMBER MILLER: Well, I was counting Jefferson, I mean, the Hassler isn't 200 to 300 feet is it?

RADM GLANG: It's 124 feet, I think.

MEMBER MILLER: That's the reason I put two medium-sized vessels.

RADM GLANG: So the Rainier, the Fairweather, the TJ, and the Hassler, and the survey launches that go with those ships are operated and funded by Office of Marine and Aviation Operations, the line office for NOAA that operates the fleet.

The six NRTs and the Bay Hydrographer come out of Coast Surveys base budget. We want to separate that out so it's clear. Where do you want to make the point in here?

MEMBER MILLER: The point I was -- you know, I don't know how they're funded in this discussion makes a big difference.

CHAIR PERKINS: Well, my comment, we've got goulash here. We've got everything under the sun here. And I think what we need is a more clear and succinct request to fund a ship.

MEMBER MILLER: It's on the back.

CHAIR PERKINS: I know that. But I'm just -- just my observation, right, of what, you know -- the Administrator, we're going to send this to the current Administrator. She knows the issue. She's been briefed on the issue, you know? Can we shorten it and make it clearer and more succinct?

MEMBER MAUNE: Does someone else know how to summarize the ship availability better than Joyce does? Somebody from NOAA?

MR. ARMSTRONG: I wonder if Joyce and I could work together to take a shot at what you're aiming at, Mr. Chairman.

CHAIR PERKINS: Yes. And, you know, I'd like to take Glenn up on his prior comment. We have a clear consensus -- and I guess I'm going to ask for a show of hands as the Chair. We have a clear consensus that this panel wants to recommend full funding for a replacement hydrographic survey vessel, correct? If you agree with that, please raise a hand.

MEMBER BRIGHAM: Lawson Brigham. Yes. I mean, I might have some issues with the point challenges and the actions needed. I'll just -- just the first one.

I don't think these are at the end of their operational life. I think they're past the end of their operational life, even though you're operating them. I mean, if they're 30-year life cycle, which is all Coast Guard standard, I think if we are to -- we might want to quibble not with the narrative but quibble or have a discussion on some of the points to see if we have consensus on the points, I don't know, or the recommendations or actions needed.

CHAIR PERKINS: Kim?

MEMBER HALL: Is this somewhere where we can take from our DoD brethren and do a bottom line up front at the very top and then go into the narrative, say, Administrator, this is what we're telling you? We want a ship, and this is why.

CHAIR PERKINS: Susan?

MEMBER SHINGLEDECKER: Susan Shingledecker. I would just wonder if there's a way -- the beauty of a one-pager is if you can present data graphically in a way that gets their attention. And I was wondering if there's a way to show, to Lawson's point, that we're past the useful life of the ship or whatever the term is.

Is there a graphic that can show the age of the ship, and maybe the productivity of the ship when it was first commissioned, and how the maintenance needs are taking out some of the time?

I know that might be hard to come up with, but if you could have a compelling graphic that shows the diminishing productivity, that might get someone's attention quickly.

VICE CHAIR HANSON: And I think one of the things that's missing is monetizing. So it's less productive, so what's the dollar impact?

MEMBER MILLER: The last paragraph -- well, and under challenges there's a bullet about management challenges. We could certainly put something in there about, you know, loss of -- you know, lost time and so forth, that's --

MEMBER MAUNE: Dave Maune here. I think we should also have -- one of the challenges is that we have a 200 year backlog of work. To me that's a vital statistic that should go in here.

MEMBER MILLER: That would be a good thing in the back. I guess, since we had done issues and, you know, we had -- maybe what Scott is saying is we need a brief introductory paragraph that makes -- well, I mean, there are several asks at the bottom. And maybe it's a function of the structure of this. I don't know.

In the issues and status, I was trying to line up what are the most compelling, you know, problems with the fleet. And certainly training is one we keep on coming back to because of the issue of, well, you could just contract out all your surveys.

But then Coast Survey has no expertise in how to do surveys. And that's -- you know, that's one of the issues. And so, you know, perhaps we should cut out some of this. But you tell me what -- you know, what's not important to say.

CHAIR PERKINS: Just one point. Captain Brennan just gave me a quick brief. And I'd like to take this opportunity to let him share that so I don't muddle it in the repeat of it.

CAPT. BRENNAN: Rick Brennan, Coast Surveys. So I can't say a whole lot about the content of it, but there's two documents that are out right now. And I'll have to ask Admiral Glang to help me on the acronym, but it's the IWGFI report, the Interagency Working Group on Facilities and Infrastructure which is chaired between NOAA, NSF, and I believe it's ONR.

And so basically they had a report that was out. That report has been revised and basically talks in very broad terms about the whole research, the national research fleet. We're expecting that to, hopefully within a week here, to clear the Office of Science and Technology Policy at the White House and be signed.

And that will have quite a bit of fodder for you, I would say, in that report. We hope that, within probably two weeks of the release of that, that the OMAO fleet recapitalization plan will also be released. We think that we've broken the logjam at OMB on that and that that's going to come out.

And so that will have even more detail on that. But I think a lot of the graphics that you're talking about should be in that report and will be helpful.

And then all of that should be shortly followed behind by the independent review team, the IRT, that's been stood up at OMAO. And they're currently looking at these. And so that's being -- you know, they're looking heavily at the fleet, the non-fisheries side of the fleet and what are the needs there.

And they're currently gathering all those requirements and have been doing interviews around all the line offices, and from industry as well, to understand where the needs are within the NOAA fleet to begin to, you know, to put in an independent paper that could go to -- you know, that can go elsewhere.

You know, whether it goes to the Senate or Congress, or wherever, it doesn't need to be encumbered by going through OMB. So I guess that's the intent of the IRT that's been established.

MEMBER MAUNE: This is Dave Maune. We're about an hour behind schedule just about already. Obviously we have some more catching up to do. I wonder if we could briefly go through the actions needed to see if there's any fundamental disagreement on what actions are needed. Would you mind switching to that?

MEMBER MILLER: Oh, that's fine. Rick, one question though. Yesterday we heard that that IRT, I think, or whatever, the fleet recapitalization plan -- or the last one you talked about, was probably 18 months in the offing.

CAPT. BRENNAN: I think that's their final report. I think the way the statement of work was written that they wanted an interim document that gave, you know, the first blush review of that so that there was something sooner. And then a longer term document, or a more in depth document, would come at the 18 month point.

MEMBER MILLER: Okay, all right.

CAPT. BRENNAN: So I think that was the intent.

MEMBER MAUNE: Then can you switch to the recommendations?

MEMBER MILLER: Yes. Can you go down on the screen? Do you want to look at the challenges at all or just the recommendations?

MEMBER MAUNE: We don't have time to go through all that. I'd like to switch to the recommendations to see if we can agree on that.

MEMBER MILLER: Okay. "Allocate 2016 appropriated funds for construction of a new hydrographic survey vessel."

And I put "with enhanced oceanographic capabilities" to kind of give a head nod to the original request that NOAA made -- "to replace one of the two Alaskan hydrographic ships."

"Request continued funding for hydrographic vessel outfitting and sensor development in 2017. Develop and disseminate long-term actionable NOAA fleet recapitalization plan for continued upgrades and replacement of NOAA's fleet with replacement of the aging hydrographic survey fleet as the highest priority.

"Consult with federal agencies, academic organizations, state and local interests and private and commercial entities to develop a whole- government approach to the problem of the aging oceanographic fleets."

MEMBER MAUNE: Thank you. I like the suggestions about the declining productivity of these ships as they pass their life. If there's some way we could get that in there, I think it would be helpful.

MEMBER MILLER: Well, that's up in challenges. "Due to the age and size of these ships, there are significant management challenges with respect to maintenance environment compliance, staffing habitability, and ability to operate."

And I can change the last sentence. "These problems have led to," what I said was, "reduced efficiency and in some cases loss of an entire year's survey time."

MEMBER MAUNE: Yes.

MEMBER MILLER: We could say something like -- instead of reduced efficiency we could say what you were suggesting.

MEMBER MAUNE: If the productivity is now 20 percent of what it was when they were new or something like that. I have no idea what the percentage is, but if there's some way we can use statistics to our benefit here to say how less productive they are now than they were before it would help, in my opinion.

I think I'm going to need to switch on to some other papers. We've got a whole bunch of topics to go. So thank you, Joyce, for your work on this. And I was hoping we'd be able to agree on this today, but it looks like not. And so I am proposing we -- Susan's holding her hand up.

MEMBER SHINGLEDECKER: I'm just thinking. I mean, I know there are certain papers that are further along than others. If I wasn't mistaken, it seemed like Dr. Callender really said that the timing on this paper is potentially the most critical.

MEMBER MAUNE: So you're saying you think we should go through on this until we finish this one up?

MEMBER SHINGLEDECKER: I mean, I know, for one, that my paper can wait until tomorrow. Or we can do some work remotely on the papers that are less time critical.

MEMBER MAUNE: Joyce, what do you think of a sub-group? Would it help if you had more time to work this over?

MEMBER MILLER: Yes. But, you know, I have to speak out of frustration. I handed this paper out -- the first draft, well over three months ago and never got a single comment from anybody.

MEMBER MAUNE: Yes.

MEMBER MILLER: And, you know, large scale comments, to totally restructure this is going to take time, especially with a group.

MEMBER MAUNE: Yes.

MEMBER MILLER: You know, we need to have some consensus on it, particularly if it's going to come out and, you know, have significant disagreement about how it should be structured.

CHAIR PERKINS: Yes. We do not have to have consensus on every word, right? We need to have a majority consensus to go forward with this issue paper, which we have already accomplished that through the show of hands.

So let the record show we did not have a unanimous consent, right. I think that's important because we all represent different -- you know, this panel has a diverse composition for a reason, right.

But we don't have to wordsmith every single word, right. What we have to do is agree on what is the key fundamental task going forward. And we can leave it in Joyce's and Andy's hands, or in a group's hands, to prepare and circulate. And we do not have to have unanimous consent on it before we can submit it.

MEMBER MAUNE: Dave Maune. Is this something that Andy and Joyce can work on tonight or the next few weeks, and we have a meeting in a month from now to go over it?

CHAIR PERKINS: We can't wait a month.

MEMBER MAUNE: We can't wait a month?

CHAIR PERKINS: No. We need --

MEMBER MAUNE: So we need to get this out this week?

CHAIR PERKINS: That is the advice that we were given by Dr. Callender who's the Deputy AA, and I only want to realize that advice --

MEMBER MAUNE: Well, then we'd have the choice of either sticking with this right now or working on it tonight and coming back tomorrow, seems like.

CHAIR PERKINS: Yes. You know, as the Chair, I think I have the proxy to say we can spend the time, we can spend more time on it right now. We've got a long list of other papers that --

MEMBER MAUNE: Okay, Joyce.

CHAIR PERKINS: -- but this has been identified as the more urgent of the matters that we're going to address. Mr. Brigham?

MEMBER MAUNE: Okay, Joyce. Then you can go back to the challenges and your other topics, if you like.

MEMBER BRIGHAM: Yes. I'll just express -- Lawson Brigham -- I'll just express that I think there's too much narrative in all of these. The whole -- I think the NOAA staff, the Administrator, know all this stuff. And even though it's going to go external on the website, that's the way it is.

And the way we wrote the article was to have very little narrative but lots of challenges and lots of recommendations or action items. So I thought that was the model. And I think the narrative needs to be squeezed down to a paragraph or two.

CHAIR PERKINS: I'm inclined to agree. And I think that the competition, right, for this $80 million is a fisheries vessel, right. So we've got -- this paper needs to make our case to the Administrator why it needs to be a hydrographic survey vessel.

And the more, I think the clearer and the more succinct we can make that; give us a hydro vessel not a fisheries vessel, and tell them why. I think that's the challenge that we're asking be embraced with the rewrite of this.

MEMBER MILLER: Okay, but I don't know that we want to say not a fisheries vessel.

CHAIR PERKINS: But that's why I asked the prior question, okay. And so maybe we need to go back a step. Do we have consensus that the request is for a hydrographic survey vessel?

MEMBER MILLER: Yes.

CHAIR PERKINS: And let's do the show of hands, and let's do a roll call, and let's make sure we get it right this time. We're going to ask for a hydrographic survey vessel in this issue paper. Is there anyone that abstains?

(Off microphone comment.)

CHAIR PERKINS: I know. I keep looking at you, like why aren't your hands in the air?

PARTICIPANT: I think you have unanimous support.

CHAIR PERKINS: All right. So we've cleared that, the request is going to be in this paper for a hydrographic survey vessel. And so that clears that pathway for why we make the case for a hydro survey as the priority over other vessels with the appropriated $80 million.

MEMBER MILLER: Okay.

MEMBER HALL: So I think the first paragraph needs to say exactly that, the very first line in this. Like I said, that concept of the bottom line up front. NOAA needs a new hydrographic survey vessel. And then you go into the discussion.

MEMBER LOCKHART: Carol Lockhart. I generally agree with that. I think -- and I will apologize to Joyce. I did not look at this three months ago. I think that first big ask has to be right up front so people know why they're even reading this to start with.

MEMBER MILLER: Okay. That's pretty simple.

MEMBER LOCKHART: I would like to see, we live in a visual world, and I would like to see maybe what Susan suggested, described as a graphic so you, for example -- and that may be hard to do right now, because this is something we need to finish this week.

And so we maybe can't pull those numbers at this late stage, but a graphic showing maintenance costs going up and productivity going down on the same graph, something visual like that to really nail home that this is why we need one of these. And then, as Lawson said, a little less narrative and then the remainder of the challenges and the asks after that.

In general, that would be my suggestion, that all of these, the main ask comes first. There could be additional asks further down in the paper. But the main ask saying why am I reading this to start with should be right up front.

MEMBER MILLER: Okay. Do we want an introductory paragraph then that is labeled as such?

MEMBER MAUNE: Well, it starts off with the issue. And you're proving the issue, that we need a new hydrographic survey vessel. I do like the idea of saying the message up front. So if there's a way to weave that into this format it makes sense to me.

MEMBER LOCKHART: I think we need to say it up front. I think it should just be like one or two sentences.

MEMBER KELLY: Ed Kelly. Yes, the ask should come first, because that's the first headline. You could probably sum that up in one sentence. At the meeting of the Hydrographic Services Review Panel it was unanimously agreed that NOAA is in urgent need of a new vessel, oceanographic vessel, you know. And then just continue from there.

CHAIR PERKINS: I'd like to recognize Dr. Brigham.

MEMBER BRIGHAM: Yes, Lawson Brigham again. We're asking for one ship except that we have two to replace, and the same issue as with the icebreaker. And the President said icebreakers. So I don't know if we want to go hard over on it's a single hydrographic ship. It's just a nuance. We all agree to have it, but maybe in the language we should say ships or, I don't know.

CHAIR PERKINS: You make a good point.

MEMBER BRIGHAM: It's just a nuance that we should --

CHAIR PERKINS: The singularity of it, I think, is important. You know, there will be political opposition to this request, right. We know that not everyone in the hydrographic survey community is in support of, you know, the vessel replacement.

So I think asking for the single ship is the compromise position, you know, on this as opposed to asking for replacing both of those vessels. It's just the perspective, and it's just my perspective on it.

MR. ARMSTRONG: So I might suggest some language like the most pressing need is for a new hydrographic vessel, the most pressing need in the NOAA fleet is a new hydrographic vessel.

It doesn't necessarily rule out other hydrographic vessels down the line or fisheries vessels. It just says the single most pressing need is a new hydrographic vessel. The second one might be the third most pressing need or something. But we wouldn't have to say that.

CHAIR PERKINS: Yes, agreed. It's about trying to capture the appropriated funds from FY '16.

MEMBER MILLER: Is this the single most pressing need in NOAA or is it in NOAA, in coast --

CHAIR PERKINS: I don't think it's our place to try to determine what the most pressing need for NOAA is, right. That's not what the HSRP is in place to do. It's to make a recommendation specific to the hydrographic surveying program.

MEMBER MILLER: So the most pressing need, the single most pressing need for the NOAA --

MR. ARMSTRONG: So I would say it's the most pressing need in NOAA fleet replacement. I mean, that's what I would suggest the panel might want to say. I'm not a voting member, so I'm not going to vote.

MEMBER HALL: And the fisheries people might vote differently, but I think we can say that we think that it's the hydrographic. And we don't have to say it over another one, but that's what we think the pressing need for recapitalization is.

CHAIR PERKINS: Does that give you sufficient guidance to try and do a rewrite, Joyce?

MEMBER MILLER: I would ask people to state what they don't want taken out, what they think is vital to the argument.

CHAIR PERKINS: I think your last two bullet points, excuse me, your first two bullet points out of the four that are on the screen, or that were on the screen, for the actions needed, I think those first two bullet points are fine the way they were written.

MEMBER MILLER: And you don't think we should discuss the longer term issues?

CHAIR PERKINS: I do not. I don't think this is the time or the place in this particular document for that. It's just my perspective.

MEMBER KELLY: Ed Kelly. I think, you know, in the future federal actions needed, the third bullet dot down, I think it's important that we also say that to move forward we should develop and disseminate. I like the language there. I think that's a future plan that should be part of this as well.

CHAIR PERKINS: I think the future plan can be in our recommendations letter, it can be in subsequent, you know, communications. But what I thought I heard was that we need to make a strong and compelling case as soon as possible about specifically asking about a hydro survey ship. The longer term plans, we have the luxury of time to address those in greater length and in different documents.

MEMBER MILLER: But I think the root cause of bullets one and two is that there's not really a NOAA-wide plan, that there's, you know, that there hasn't been a coherent NOAA plan for fleet replacement, or at least there hasn't been one that has been allowed to be disseminated.

CHAIR PERKINS: I don't think that's the problem we're trying to solve right now in this moment in time with FY '16 funds sitting there that are going to get, they're going to get taken for something, right. But they're not going to get spent on creating a longer term fleet recapitalization plan.

MEMBER KELLY: Ed Kelly. Perhaps we're really looking then at two separate documents. This one is designed to be more forward looking and more over encompassing. Whereas what we're really looking at is to craft a letter from this group saying that it's urgent that we create a new hyrdrographic ship.

Because I don't think we should abandon a lot of the very good stuff that's in this. I like this one, you know, for future plan and the incorporation.

But what Dr. Callender was saying is we need to get a letter specifically about that ship now. And maybe this issue's letters go back into the draft again, back in the mix with some of the others that are going to require some rewrites, maybe some consolidations, whatever.

CHAIR PERKINS: The longer --

MEMBER KELLY: Maybe we're looking at a separate letter on this and not necessarily this same format.

CHAIR PERKINS: The longer document may be of great value for the transition team and for the next administrator.

MEMBER KELLY: But that's why I think, instead of trying to adapt this issues and concerns letter, perhaps we just extract what we feel is necessary from this and create a stand-alone letter.

CHAIR PERKINS: Lindsay?

MEMBER GEE: Lindsay Gee. Yes, I kind of agree, I think. If the priority really is to, well, within this it's saying, yes, we don't have the ships. They're getting old. We're now getting a backlog, and it's inefficient the way we do it. So that's the issues page which is generically the replacing the hydrographic ships.

And so maybe this paper as a more general one is okay. But the letter that accompanies it is drawing attention to specifically this budget to say, well, the problem we've got right now is we need to get that money as the first priority in the fleet's replacement.

So it would seem a shame, the work that's been done here, I think, that we're kind of drifting off again and walking back. So that's my comment of not being involved in the previous two years. But it seems like you've done a lot of work. And now, okay, we're walking back from the work that's been done.

CHAIR PERKINS: Dr. Brigham?

MEMBER BRIGHAM: Lawson Brigham. I think we learned that it's very difficult to send multiple different letters out. So I think our letter from this meeting we can, the major point of the beginning of the letter can be this issue. And I still believe attached should be the issue paper. And we shouldn't send multiple other topical letters. A single letter from the meeting, consensus reached on this topic, it could be the number one topic of this meeting maybe, I don't know. And that's what goes up in our letter to the administrator.

CHAIR PERKINS: Andy?

(Off microphone comments.)

MR. ARMSTRONG: We should consider the possibility that the train has already left the station on the new ship and that it might not be a hydrographic ship. So we don't want to have our only salvo on the money that's in this budget. Because that might not happen, and then our whole argument is out the window, because that's passed.

So I think we need a more generalized statement expressing the Board's feeling. But we also need the input that takes a shot at the ongoing process.

So I'm kind of agreeing with Ed that we need, that somehow we need both pieces. I agree with you that the immediate issue is the money that's appropriated for a ship. And there seems to be some uncertainty about what kind of ship it would be. And we need to get our oar in the water on that.

But my sense is the Board's feeling is that it's not a one-time issue, that there's a continuing problem, or even if we lose the argument on this ship that the argument is still there for the future.

MEMBER MAUNE: Thank you. Is there work that can be done tonight between you and Joyce on this subject and try to pull this together by tomorrow?

MEMBER MILLER: I guess the question is do we want this to be -- and Dr. Callender said, you know, there could be two papers. But I hate to get into the spam of too many papers.

And, you know, I kind of agreed with what Ed said. Maybe this is the longer term paper. Maybe we don't need to put this as the attachment. But we do need to make a forceful argument and couch it well.

Maybe what Andy and I should do is work on a paragraph that goes into the letter rather than trying to attach this. Because if, you know, if we're trying to make progress on all these papers, then -- And I kind of agree with Dave. I think having small groups to work on these papers might be more effective than --

MEMBER MAUNE: Yes.

MEMBER MILLER: And I don't think it should be just Andy and me. I think, you know, if other people are interested they'd be welcome to --

MEMBER MAUNE: I would love to know if there's NOAA people that are able to participate in this that could provide you some statistics that might help you in some way.

MEMBER MILLER: I have seen, in not recent things, but I have seen graphs that, you know, in various presentations and so forth that look at ship productivity. I know that Coast Survey keeps those statistics. It's just a question of whether we can include some of those figures in this, productivity figures.

MEMBER MAUNE: Yes. Is there some reason why we cannot include productivity figures and graphs that you use in other documents?

MR. ARMSTRONG: Andy Armstrong. We pointed out in 1963 or 4, all the way up until the 1990s, these were single beam ships. So productivity is a, in terms of surveying, I mean, there's probably days at sea or something like that that could be a proxy for productivity.

MEMBER MAUNE: Yes.

MEMBER KELLY: What product we're trying evolve depends on what our actual timing is. And I'm still a little unclear. I thought what I heard from Dr. Callender was that we needed to act promptly. And if we try to just put this as a paragraph or a key point in our official letter from this meeting, I understand that's five to six weeks out from this point. And that doesn't strike me as being urgent.

And anything we do right now I don't think we'll have time to, if we're looking to do that, sometime where two or three people get together overnight, we're not going to have time to mine data, and statistics, et cetera. That's pushing it out a couple of weeks.

I believe that we have an urgent point, is that we, you know, and how we put that in a separate letter, I don't know if there's any restriction on us not being able to just send the administrator a separate letter on a specific topic as an urgent issue to follow with our meeting summary and to then subsequently attach these issue papers as our vision of recommendations that should be carried out over time.

The money for this ship, to me, seems to be, from what I've understood, very time sensitive. And we need to either treat it that way or not. So we're really trying to figure out what it is we're trying to do here based on timing.

MEMBER MAUNE: Well, I'm wondering if we can have our cake and eat it too by having a long term vision, but then saying that the most urgent requirement that needs to be acted upon in 2016 is this, and somehow bring the most urgent part to the forefront while still keeping the big picture in mind.

MEMBER KELLY: Well, we have so much of it right here in place --

MEMBER MAUNE: I know, I know. That's what I mean.

MEMBER KELLY: -- that re-crafting a cover note for this, perhaps, is the best way to do it and just, you know, flesh this out as we've discussed which is really tweaking it, not really re-designing it. It's tweaking what Joyce has already put together.

And then put a cover note on top of that stressing that this is such a specific and urgent issue, and ties into our issues and concerns, and just staple that to the back of the request letter or the recommendation letter.

MEMBER MAUNE: If we were to have a small working group on this tonight, who would be willing to help work on this? Did I see Andy? I see a number of people raising their hands.

MEMBER MILLER: Well, Rick was back there. I'd second that.

MEMBER MAUNE: Okay. All right. Is there a room we can work in? Just work in here? I guess we can have an early supper tonight and come back and work on that paper.

MEMBER MILLER: Yes.

MEMBER MAUNE: See if we can have something better by tomorrow. Is that okay with everybody?

MEMBER MILLER: It's fine.

MEMBER MAUNE: Okay, then. I propose that we move on to Lawson Brigham and his paper on the Arctic.

MEMBER BRIGHAM: Yes, Lawson Brigham. Let's see if we can do this in 20 minutes. I think we can. I'll be optimistic here, Mr. Chairman, and Dave.

MEMBER KELLY: Joyce thought you only needed ten.

MEMBER BRIGHAM: Of course, this issue paper is based upon, you know, a fairly extensive study. So I drafted it. I've had other people read it. It has to be and should be consistent with what our working group and what we had consensus of the HSRP. So that's what this document is.

I would not recommend retooling the paragraphs, the first two paragraphs. However, the title perhaps should be "Mapping the US Maritime Arctic," and I say rather than charting or whatever. Because we have geoid observations and all the rest of it. So I guess you could call that mapping. But the title, I guess, should be "Mapping the US Maritime Arctic."

And again, for the new members, the US maritime Arctic is out to the EEZ from the Aleutian Chain to the Canadian/US border. So it's a huge area. It goes out to the EEZ 200 nautical miles or less, depending upon what the space is.

The first two paragraphs are synthesized from the working group report that we had consensus on. In red are a couple of technical issues to reach consensus on. What number do we want to put? In yellow is what Ed Saade gave me. And I incorporated it, in red. No, no, in yellow, I guess. Yes, in yellow is Ed's comments.

So you can see, so let's just go down the ones that I have a comment on in red. And the question was an estimated, and I said one percent, and we had this discussion during the, in September at the HSRP meeting. And it's nuanced, this one percent is nuanced, to modern international navigation standards.

And I'm not quite sure that's a correct number, Admiral. But we could, if it is correct, we could also say, and qualify it, that 30 percent of the US maritime Arctic is actually surveyed.

I think we need a heavy hitter number. And the number is quite small. But I thought in discussion with you it was somewhere around one percent. But I don't want to quote you. But we could say estimated, whatever. But I think the number is important.

But maybe we should qualify that number in the second part of the sentence saying, in fact, X number of the US maritime Arctic is, in fact, surveyed. But of course the qualifier is not to modern standards, as we know, off of Dutch Harbor for the lead line and the icebreaker grounding.

So maybe we just we just need to talk with you, Admiral, on that one, unless somebody else has a thought on that. But I think the point is important. The place is not surveyed to modern international navigation standards, if that's the correct --

MEMBER HALL: Having read this yesterday, I apologize, one of the concerns I have is putting that there. I know that's very important. I've been fighting for the bottom line up front concept, and I think this one needs it as well.

But there's no context for why one percent is bad. One percent always sounds bad. But when you get down to your, one, two, three, four, five, fifth bullet point, it's showing how much is going on, right. That's my assumption on that bullet point.

So is it not better to say here's the activity, and by the way, those activities are only supported by one percent charting, or mapping, or whatever. So I just, there's not a context for why one percent is neither bad, nor good, or is bad. I know you know that. But I think that there needs to be some context for that before you go into it. Thanks.

MEMBER MAUNE: Okay, keep going.

MEMBER BRIGHAM: Sure, we can tweak that, put a couple of words up on the first bullet. I really think that the first bullet must come right out -- I actually think the administrator, the whole chain of command, and anybody in the maritime community is going to understand when we say that one percent of the thing, or charts -- I hope that everyone can understand that.

But the other points, unless there is disagreement, these are the points that we had consensus on in our study and at the HSRP meeting in September, except that the list of Point 5, the list of bullets, I integrated some of Ed's comments.

Because he said, he added, appropriately, seabed telecommunications cables, ecotourism. I melded some of this comments about national security and Naval operations into it. What we did do in our survey was look at the commercial use. And I think you've added some points. We didn't focus necessarily on Naval operations and national security, but it was in the long list of uses of the area.

MEMBER GEE: Just one comment, I think it's a bit what Kim was saying, I think you list the operations. But isn't what you're really saying underlying that as the marine operations are diverse, but they're hampered by the lack of -- so it's kind of up front. You're saying there's a diverse, all these diverse operations, but they're all hampered by only X percent --

MEMBER BRIGHAM: They're not hampered, actually. There's a vast tug and barge operation around the coast. And they just do it without charts or not. I mean, some is charted, some is not.

So I don't think these operations today -- future increasing operations might be constrained by lack of charts. But there's a heck of a lot of operations today without adequate charting. I mean, we're quibbling over the approach. I get your point. I get your point. But we can --

MEMBER KELLY: Lawson, this is Ed. However, that being said, if there were adequate charts they may do it with a completely different, much more efficient approach. Because they wouldn't be worried about winging it.

MEMBER BRIGHAM: And, of course, in the 21st century, it's not business as usual. We are enhancing marine safety, enhancing environmental protection. So it's not like the past. The future is having a much more safe network which I think melds with what you and Lindsay were saying.

MEMBER HALL: So, Lawson, this is Kim Hall. Just really quickly then, is there something that can be stated in your first one? I understand that one percent is not good. But I have no clue how much of a percentage of the Arctic maritime is in use to understand how much needs to be covered. Is it 100 percent, is it 50 percent? Is one percent just really, we really only need 20 percent. So one's actually a pretty good, you know, amount.

So I think that's just kind of, you know, I understand that everybody in this room probably understands the Arctic issue. I'm not sure everybody else understands the context. And I just wanted to make that point again as Lindsay made his. Thanks.

MEMBER BRIGHAM: Well, I think in more than half the US maritime Arctic there are marine operations. There are some remote areas where there are not. So if more than half, I mean, I don't know how much we want to comment about what you're saying. But we can maybe, I don't know.

We have to come up with some numbers. I don't want the numbers to come, be pulled out of the sky and grasp that. That's why I'm pinging on this one. I want to say the right thing.

Because, I don't know, I'll bet 20 percent of the, 30 percent of the US maritime Arctic actually is charted, maybe, because, you know, some large areas, maybe 20 percent, I'm not sure, but charted to, you know, 1930 standards and whatever. Oh, we can work on that one.

If you'd go, keep going down the points, these all came again out of our report which had consensus. I don't think we want to run consensus again on all of these.

The last point in the challenges, a range of new hydrographic survey technology, tools have been developed, the challenge is to employ alternative strategies and maybe new approaches to current -- I don't know, we have to reword that last bullet. It's just some -- Let's go to the action recommendations.

We had, the first one, minimum $20 million, $30 million annual. We, the HSRP, in our study group and passed up to the administrator, reached consensus. And I think we said $20 million, line item in the budget for $20 million annual. But Ed seemed to suggest that should be a little bit higher. Because they always cut. I wasn't thinking that way, but I understand.

Is that -- I don't know if we want to adjust that number. Is it a realistic number from your perspective, Ed? I mean --

MEMBER SAADE: This is Ed Saade. It's realistic that everything -- when we say Arctic in this case I'm thinking the geographic Arctic, not just Arctic waters which is extremely difficult to operate in and extremely expense with a short window. So I don't think that $20 million or even $30 million is all that big of a number when you're trying to be productive for such a short season.

MEMBER BRIGHAM: I'm not, I'm a little ambivalent at whether it's $20 million or $30 million annual, of course, and whether we actually could ever get, NOS could get a line item budget. But the whole idea was to at least put it out there as an important item.

MEMBER SAADE: Yes.

MEMBER BRIGHAM: Should we, maybe we'll put in $30 million.

The third bullet is related to this annual survey rate of production. And we had 500 square nautical miles. And during the summer, as we discussed this with Andy and others, that's what we came up with.

But then it seemed that that's what the survey was accomplishing, was 500 square miles. So maybe we should up the ante there for something, a target for a minimum annual survey rate. Whether we have the ships or not, we should say, and we had talked about as much as, I thought, 1,000 square miles. But I don't know. Again, it's a number.

MEMBER LOCKHART: Yes. I guess, Carol Lockhart, I guess the only problem I have with that is square nautical miles, when you're talking about hydrographic surveys, is going to vary wildly if you go and survey all the deep water first and show how much area you're surveying. It's going to look great, but as you start to move in shallow, doing that number of square nautical miles becomes impossible. Because it's much more expensive, and it's a much slower process.

So it's square nautical miles is greatly affected by depth. And so it's a really difficult number to use to talk about survey rates, and progress, and things. I'd like to offer a solution, but I don't have one. I just want --

(Laughter.)

MEMBER LOCKHART: But I do think it's important that we understand that that's not always a great number to use unless your intention is to survey all the deep water first. And then it looks fabulous, and so you keep getting funded. And then you can go do the shallow stuff.

MEMBER BRIGHAM: Well, I go back to our working group and what we've reached consensus on in September. And one of the questions asked was this specific question and --

MEMBER SAADE: This is Ed. Carol's right. I mean, you can't, it's impossible to put a number on it like that. Because it may turn out that, for whatever reason, the most urgent thing to do is do hydrographic LIDAR, which is very shallow and very tedious. So it's much too unpredictable to try and put that kind of a number on it.

MEMBER BRIGHAM: Okay. Here's Question 4 from NOAA. "Given the realities of shorter survey seasons and mobilization costs, what are the realistic annual targets in percentage surveyed and charted over the next five years in Bering Strait?"

We can take it out of this issue paper, I guess, or have a point that says we should develop an annual survey production rate relative to the budget process or something. I mean, it should be something in here, I think.

MR. ARMSTRONG: Andy Armstrong. I completely agree with what they've said, although it seems to be the statistic that we're stuck with in dealing with our sort of superiors in the funding world there.

But, I mean, you could say some number of ship days operating in the Arctic, surveying in the Arctic per year would be --

(Off microphone comments.)

MR. ARMSTRONG: Yes. Well then, you know, then you're getting into a ship with four launches. So it's the sort of endless spiral of caveats. I guess I'm sort of winding back to square miles.

MEMBER LOCKHART: Carol Lockhart. I wonder if you can just qualify the square nautical miles with an average depth, like, just say the annual survey rate of however many square nautical miles based on an average depth of, which, you know, depending on if the -- it may not be necessary, I guess, because the audience for this may not understand that issue. But then we're back stuck with the square nautical miles that we can't justify later.

VICE CHAIR HANSON: That's actually a good point is, is you don't want to get too technical with this. We have the same thing on the dredging side. People want to use what's the price of dredging today, you know, it's a buck or 100 bucks, depending on what you want to do.

But you have to have some metric to sell that this is the expectation of what we plan to do in a given year with this equipment. The cost and all those others are things that are missing, I still think. But you have to have a metric to sell for comparison.

MEMBER SAADE: This is Ed. Do we do that now? Do you all go before whoever you have to go before and promise the number of square miles?

MR. ARMSTRONG: Our goals, our official goals are expressed in square nautical miles, if I'm not correct. I believe that's the case, the GPRA goals are square nautical miles. Our Arctic goals are square nautical miles. So that's what we have now. And we've been struggling with this for a long time.

MEMBER BRIGHAM: Well, we can take it out. There are plenty of other points and recommendations. I think, yes, I thought -- I would recommend, because we had it through the whole process of the working group and consensus before that we had a minimum survey rate because we were asked for one. But maybe you can help me qualify the point.

MEMBER LOCKHART: I think, I think based on this discussion maybe we are coming back to the fact that there needs to be a metric in there now. And if the existing metric is still square nautical miles, even though we all understand there's an issue with that, if that's what they're used to seeing, I don't know that we need to keep going around in circles about it. Maybe we just use it.

MEMBER MAUNE: I agree.

MEMBER BRIGHAM: And then the last point in yellow is what Ed brought up about a database for seabed gouging, ice gouging. I think he's thinking about the cable laying. Go ahead, Ed.

MEMBER SAADE: I mean, the cable laying was definitely what was on my mind. But it covers anchorages, it covers pipelines, which aren't going to be there now, it covers any science cables that might go in, which there are coming out of Barrow.

Everything you do from a construction point of view up in the Arctic, which there may be buoys put in, or there may be breakwaters put in, it always comes back to what's the activity of ice gouging. And everybody has to shrug their shoulders, because nobody knows.

MEMBER BRIGHAM: Well, I think it's an interagency kind of look. Because I think that's USGS. Well, maybe not USGS, but I don't think it's completely NOS who would be doing this. I see it as more of a research --

MEMBER SAADE: I agree that historically it hasn't been. But there's no reason why it can't be in the future. Because somebody needs to take control of it.

MEMBER BRIGHAM: Well, we can, sure, we can add it to our list of recommendations. We may want to tweak it a little bit on what cross-agency work is necessary in this one.

I think I should work a little bit on a few of these points, but is this paper in a reasonable shape to move forward?

MEMBER SAADE: In my opinion, it is.

MR. EDWING: I just wanted to note I appreciated the bullet at the bottom of Page 1 which recognized, I think, Julianne and I's contributions in terms of geospatial infrastructure.

And you picked it up in the challenges in the back in kind of the third bullet from the bottom. However, my concern is it seems to be separated from the funding request which is your first bullet.

And, you know, Coast Survey makes the charts, but it's kind of a systems approach between National Geodetic Survey, CO-OPs, and Coast Surveys. So we just need to make sure we're taking a systems approach to the funding.

So I think some of this needs to be carried up and, you know, included under that. Because there were clearly some of these activities under that Congressional, you know, line item that you're looking at in that first bullet.

MEMBER BRIGHAM: Okay. I think what I meant to say, or what we meant to say, was associated geoid observations covered all of that. But we need to expand upon in the first bullet.

MR. EDWING: Geodetic and Oceanographic. I think it doesn't take much to kind of --

MEMBER BRIGHAM: Yes, yes. So --

MR. EDWING: -- fix this. Or, you know --

MEMBER BRIGHAM: Maybe move that bullet up and expand the first bullet a little bit.

MR. EDWING: When that was put together, the budget proposals, these things have all been put together, you know. So everything's moving forward commensurately.

MEMBER BRIGHAM: Yes. We did not mean that, in the original point, that that budget line item would just be for hydrography.

MR. EDWING: Yes, okay.

MEMBER BRIGHAM: It was meant to be more expansive. So we need to clean that up, okay.

MEMBER MAUNE: Okay, Brigham, you think you can go with this then?

MEMBER BRIGHAM: Maybe not tonight finish it, but it doesn't --

MEMBER MAUNE: It's something that we can coordinate though in the next month or so?

MEMBER BRIGHAM: Oh, sooner than that.

MEMBER MAUNE: Sooner than that?

MEMBER BRIGHAM: Sooner than that, I mean, if we want to attach it to the letter it's got to be a couple of weeks from now, right?

Is it, just in general, is the paper fine to move ahead if we flesh out, I'll try to flesh out the first point about the one percent and that there are lots of needs.

MEMBER MAUNE: Is there consensus here that this paper would be ready to go?

VICE CHAIR HANSON: Can I add just one request, that the partners -- You've added a lot of folks, whether it's cable people, you mentioned tug and barge people. So is there any way to get Crowley, or towed, or some of these cable people onboard as partners as well? Just having other government agencies on there, I don't --

MEMBER BRIGHAM: We had commercial survey companies, commercial tug and barge operations.

VICE CHAIR HANSON: Once again, those are people with skin in the game, right?

MEMBER BRIGHAM: Yes. They're under the partners. What did you want done? I'm not sure. The list of partners is pretty expansive. I added the survey companies. And I added, we added the tug and barge operators, Marine Exchange, regional corporations. I mean, there are others, maybe the tourist industry or the cruise ship industry, maybe.

VICE CHAIR HANSON: Just that you listed some examples, I mean, TAC's there. And if they were partners it would be great to have that backup.

MEMBER BRIGHAM: I'm not understanding, I'm sorry.

VICE CHAIR HANSON: Okay. You mentioned cruise, you've talked about cruise in this thing, and can we get the cruise industry to say this is necessary as well?

MEMBER HALL: It's not that we're not a stakeholder, but we're not the major stakeholder, that's for sure. We have operations in Alaska. There's one ship going through the US Maritime Arctic this August. So I don't want to say that we're a huge demand signal, but it's not that we wouldn't want to be included as a stakeholder, yes.

VICE CHAIR HANSON: Okay. And the Red Dog Mine folks?

MEMBER BRIGHAM: Sure. We could have a long list of partners I mean, it could be everybody in Alaska. Yes, sure. Red Dog Mine, fisheries out of Dutch Harbor, there is a long list of maritime stakeholders who need the charts. I mean, it's just endless. Recreation boating public, fisherman, I mean -- sure, I'll try to add some more points.

VICE CHAIR HANSON: Maybe I'll come up with some suggestions as well.

MEMBER BRIGHAM: I would say that the cruise ship industry is not one of the major stakeholders in the US maritime Arctic.

VICE CHAIR HANSON: Okay. Thank you.

MEMBER MAUNE: Scott, it's now 3 o'clock. We've gotten through two of the five ones with a paper submitted, well, two of the sects with paper submitted. Do you think we can take a 15 minute break?

CHAIR PERKINS: Yes, absolutely. I need one.

MEMBER MAUNE: Okay. Please come back at 3:15.

(Whereupon, the above-entitled matter went off the record at 3:03 p.m. and resumed at 3:20 p.m.)

MEMBER MAUNE: Dr. Maune. Larry Atkinson is going to be up here with his presentation on Hampton Road Pilot Project.

MEMBER ATKINSON: Is it on? Okay. We're going to do this quick. I'm going to give a little bit of background for you newcomers about why Hampton Roads.

So let's start. Okay, so the Hampton Roads pilot project, it was something that you will hear about from a very distinguished person not in the room in a few minutes, just to wake you up. And it's about a whole of government/whole of community approach to coastal flooding.

And this all came about through, I can tell you over a beer tonight but it involved the Office of Science and Technology Policy and the Defense Department and Senator Kaine writing letters to all the agencies that got their attention and much more political activity.

Though I'll just go to the next slide. This just the same point is in fact people from this area, same old curve. Sea level is rising, we're not sure what it's going to do but it's not going to be the bottom curve. It's going to be the higher curve and we live in a very flat area so it's very, you know, we're seeing much more flooding.

The term nuisance flooding is very routine with us, too. In the next slide, there's a big difference. Those aren't petro-chemical plants. Those are DoD facilities, everything from Camp Perry nuclear weapons, Fort Eustis, Langley Air Force Base, biggest Navy base in the world with five aircraft carrier groups that are not shown, but the only place where we can build nuclear powered aircraft carriers, Dam Neck Special Forces, Oceana Navy Base, Navy air, more air bases and all the kinds of 50-some facilities.

So the Navy's really interested in all these assets that are sitting near sea level. So for us, it's kind of how do you work with the Navy. So this whole process started with trying to get the Navy involved and all the community at the same time since recognizing about $2 billion per city, and there are 17 entities in this region, the dollars start to add up if you're going to start protecting things.

So it gets really expensive. So it's federal money. So how do you get all the feds to work together with 17 jurisdictions who don't work together very well themselves?

So the next slide is this guy that's going to explain this to you in the next video. He actually talks.

(Video played)

MEMBER ATKINSON: Okay, who's in favor? No, this was amazing. He came down for some other reason and we fed him the words. And he was amazing. He said it better than we ever have, though it was our words.

So he really said it. What I suggest is you write things down. Let me back up just a little bit. Why are we doing this? Because this has got a lot of attention in DC as a model for how federal agencies might work in hand including DoD might work with other communities like here and New York and all around the US.

So think of it as a model. So I've tried to put some background which I can change a bit. And then we've got these federal actions needed and we can change these title words so it's consistent between these different ones.

So I've tried to just make it fairly general. We're not asking for money, you know, like these others. But we're asking for coordination and feds to pay more attention to these communities.

Support the region, and you can read in your region in there. I just realized I should add in more extreme events also in this. For an inter-agency working group that's probably too strong a word. I'm going to tone that down because we don't need any more inter-agency working groups but we need somehow to coordinate.

I'll give an example. We have a lot of subsidence. So we have NASA, NOAA, several parts of NOAA, USGS, several parts of USGS. And we're getting funding to major subsidence with altimetry.

So we need to coordinate all of this stuff so everybody can get at the data. And it really has to be led by feds, have to be, have to lead the coordination.

So set up some kind of way to interface. And of course federal agencies have an issue that how can they coordinate with all these different communities. But they do have people in these communities and maybe we can figure out how to do it.

Let's work with the agencies as they develop resilient strategy. Most of this is pretty non-controversial things. Recognize each urban area's different. Your petrochemicals here were DoD.

And continue this emphasis on whole community/whole government. This was something from the Obama administration. But regardless of how you want to phrase it in the future, it still means you've just got to work together with all the governments and the communities, and the underserved communities and all that, and apply the lessons learned from here.

This pilot report will have a report out to the White House and DoD in July. And I would love to be able to say this was something that was turned in. So any comments, red flags? If it's minor stuff, just write it down and hand it to me.

MEMBER MAUNE: Do you think you can get this to fit on two pages?

MEMBER ATKINSON: Yes. Yes, I'll do that.

MEMBER MAUNE: And can you add federal partner share, not just --

(Simultaneous speaking.)

MEMBER ATKINSON: Yes, sure. Yes. Yes.

MEMBER MAUNE: Any comments from anybody out there?

MEMBER BRIGHAM: I had one, Dave.

MEMBER MAUNE: Lawson Brigham?

MEMBER BRIGHAM: Yes. No, I just, can we say somewhere in here that this is, the strategic aspect, the largest naval base in the world and large shipyard that builds aircraft carriers, could we add in that, a couple words about that?

MEMBER ATKINSON: Yes.

MEMBER BRIGHAM: Just to add the strategic part.

MEMBER ATKINSON: Yes, yes.

MEMBER MAUNE: Any other comments? You think you can have this cleaned up? How long is it going to take? 5 o'clock tonight? I can't ask for more than that. Thank you. And look, we didn't even spend ten minutes on this topic hardly. Okay, Ed Kelly is up next.

MEMBER KELLY: Ed Kelly, thank you, Dave. I don't think we'll be quite that quick or that non-controversial but we'll give it a shot.

Just coming out of the gate with this, ports and harbors, we just had a sidebar, Anne and Sal and myself, that a lot of the issues regarding crews, make of ships, you know, are really all the same issue.

It's a question of needing the proper tools to navigate safely in harbors. So we're going to collaborate and work on some of these together and we'll reformat some of this.

One of the things that was nice, when we sat down here we were passed this that NOAA had already put together, which directly addresses focus on ports and US waterways which was really great. But it just failed to bring in, and this speaks to the complexity of port and harbor requirements, this talked about a very narrow swath of it.

It didn't talk about security resiliency, social issues i.e. costal management, inundation, neighborhoods, beach management, et cetera, tourism. It didn't talk to environmental issues, it didn't talk to recreational issues, it didn't talk to the extensive Government usage of all of this data from the Coast Guard to the Navy to the Corps of Engineers to the State Municipal first responder communities or other users, academia, industry, power companies that all use and rely on a lot of this port data, particularly the PORTS system.

So what we're really looking at is if we can maybe run down to what are core challenges but are really the recommendations.

Here we go. You know, we've got a list there of some of the things we feel need to be done. But as I said, Sal, Anne, and I will work offline on this to kind of integrate the crews, the make of ships, and the ports and harbors because it's really all the same issue.

The key issue is that we do need to, you know, adequate resource provided to update the surveys and all the major navigational areas. The key issue here is larger vessels are using limited channels, and they'll need highly detailed bottom surveys to understand navigational respond and hydraulic impacts.

Security concerns also require precise surveys. In New York Harbor we're having an issue with security in several restricted navigation areas because of security issues. They want to come in and do the bathymetry on the bottom to be looking for security threats.

The Navy and other people are talking to us about doing that. So that's all key stuff. As an example, in New York we've just finished our 50 foot channel. We have dug a 50 foot channel through the Kill Van Kull. But the channel has gotten deeper but it has not gotten any wider.

So all the hydraulics and the meeting and passing conditions are all going to be very different. We're actually setting up some simulation, you know, work to be done that's funded by the Port Authority on New York Shipping Association and some others.

We're going to model that down in MITAGS. We had Gerd to come up and meet with our Harbor Safety group. He's going to have a NOAA engagement as we start to roll that detailed analysis out. So I think that will help with the precision navigation on next generation, whatever it's being called.

We do believe the charts have to migrate to the newest and most detailed and versatile electronic models and be formatted to allow usage on both sophisticated vessel based systems and mobile devices.

This is where we, you know, we need to not only address the mega-ships that have this critical need to have this data, but we also need to get better charting information to recreational users, casual users, et cetera as well as the tugs, the barges, all of these people that are also users that will not have the sophisticated systems that are on some of these larger vessels.

I love PORTS, I just want it to be funded properly. And PORTS must be installed in all major ports and should be funded from federal sources due to the wide usage by federal, state, municipal, commercial, and general public usage.

PORTS data should be used as a basis for creating models that will provide usable metrics for current and projected conditions at any point in the port.

If we know what the wind is doing in one section of the port, we don't necessarily know what it's doing in another. And one of the foibles of bringing in these new ships, they can only operate and move within the 50 foot channels.

Once a vessel and a pilot is committed to entering the port, it can be four to six hours before they're actually secured at their berth and they have to go through very narrow channels. If there's a shift in the weather or particularly invisibility, modeling would help us to make decisions because once we make a go/no go decision, these big ships are inside these restricted channels and they cannot turn around and there's no place to bail out and anchor them.

So it's really creates a real safety and environmental issue for that thing. So that's going to be very important to model some of that for future visibility in particular.

Adequate survey platforms must be maintained to perform emergency recovery services after severe storm or terrorist activity. Needless to say, New York has had terrorist activity, but most recently Sandy was there.

And without the NRTs, we would not have been able to get our port back online as a functioning deep water port as quickly and as efficiently and safely as we did. They were vital, and we really need to ensure that they continue.

Adequate data must be obtained, recorded, and analyzed to facilitate planning for the contingency of future climate change impact on port conditions and infrastructure.

You know, we are an area that is subject to sea level rise. And although we kind of, you know, laugh and say that the extra draft would be nice, the impact on terminals and whatnot is real.

We would also make a point on recommendations to assimilate non-NOAA data for validation and inclusion in NOAA products. We've done a little bit of that with Steven's Institute and a couple of others up in our area. There were a ton of things that were in the water. Some are very valuable and usable, some are not.

But I think, you know, where NOAA has started to make some outreach to some of these and looking to QA/QC that data, evaluate if it's the right data that they need and the right location, et cetera, et cetera. But there's a phenomenal amount of data out there, not to even mention what getting near crowd sourcing or anything else that's a potential that could also help to give us some additional information.

In partners, I would also add, shame on me, I'm the co-chair of my IOOS RA. I forgot to put that on there. The IOOS RAs are also a very valuable source of partnering data as well as, you know, the access to a mix of academia industry, commercial mariners, et cetera. And that's also very attractive.

But since this does sort of key into a lot of what Sal and Anne had put into theirs, the three of us will work together to try to revise and incorporate that into this.

I know we're all, we just had a quick sidebar and we're all kind of up to our noses but we can probably commit to get it out for the rest of the panel to take a look at within three weeks so that it would still be available to be whacked out one more time by the panel overall and then also be, you know, a piece of paper that would be able to be included in there with the resolution letter and recommendation letter that we would have from this meeting if that's acceptable.

And we're open to any comments that anybody might have, observations, recommendations, chastisements, or as you please. But if you hit me, I'll hit you back. That's all.

MEMBER MAUNE: This is Dave Maune. I have a question on recommendation number one.

MEMBER KELLY: Yes.

MEMBER MAUNE: This seems like it's partly NOAA per issue and partly a Corps of Engineer issue. Is there a way to separate out the part that's relevant to the NOAA administrator? Or is that not necessary?

MEMBER KELLY: I don't know if that's necessary. You know, one of the challenges to doing this, and on many of them I think, is to resist the urge to go into the weeds because if we start getting too detailed on some of these particular recommendations.

The people in NOAA are aware of all of these issues. I mean, they're smarter than most of us are when it comes to dealing with what they can do and how they can do it.

Just personally, I would be a little reluctant to try to dig and make it too finite as to what we're asking for because some of this stuff, even if some of it is Corps responsibility and some of it is NOAA responsibility and they kind of share a footprint in a lot of spots, I would still say that that's answered by down the bottom, partners.

And the first partner I did list was the Corps of Engineers. You know, so I think this is what we need. And if NOAA needs to engage partners to achieve it, well then that's part of the charge we make to them.

MEMBER MAUNE: Thank you. Joyce?

MEMBER MILLER: Yes. I would say one of the things that the Panel has seen over and over is that, you know, going straight at PORTS has not been successful. And in LA/Long Beach we saw the precision navigation. And it's really not PORTS per se that is needed. It's much more precision navigation capabilities.

And I think PORTS should be mentioned, but maybe it should not be the emphasis that especially since coast survey seems to be highlighting precision navigation as a new capability, an advanced capability. I mean, I think what you really need is precision navigation in PORTS.

(Off microphone comments.)

MEMBER MILLER: Right.

(Off microphone comments.)

MEMBER MILLER: Yes. So that would be, and I'm not sure that labeling the paper or including precision navigation in the title and perhaps up front saying that what we need is in ports and harbors for large vessels is precision navigation.

MEMBER KELLY: My only comment in on this is that this goes way beyond just the larger vessels. And you know, I saw Susan shake her head when we said that we also need this type of data for recreational vessels.

We need this for, not mega carriers, but I mean there's 8,000 TEU ships that fit in these things and that they need this type of support. Tugs, operators, ferries use this. I mean, we've got a very extensive ferry system.

All of that is necessary. And this is not restricted only to large or mega vessels. I think we need to address the entire port capability because port congestion and shared usage of the waters is a very important issue and an emerging issue.

We're seeing more and more recreational boaters just in April 16th come on up. We're having taken out on a ferry, we're taking about 150 people where we're bringing pilots and commercial navigators onboard to mix with recreational, primarily motor, sail, human powered, to talk about how we have to share the harbor, crossing situations, you know, wakes, et cetera, et cetera.

And the last Coast Guard parcel we had, the Port and Waterway Safety Assessment said we were the most highly congested waterway in the United States and that unless we took additional mitigation issues, we were going to have some very nasty outcomes.

So I think all of that plays into these large ports. It's not just how can we fit mega-ships into the port. Everybody has to use the port. I mean, from human powered people right up to the mega-ships.

MEMBER MAUNE: Dave Maune again. On other papers we have tried to put the main heading point in the very first sentence and the prove it throughout the remainder of the paper. Do you have some idea in mind on what your main point is that you might want to put in the first sentence?

MEMBER KELLY: Well, you know, the first sentence is, "The ports and harbors of the US are vital to the American way of life, and the transport of freight and people is important."

We all have to periodically remind NOAA that they are part of the Department of Commerce. I mean, you know, a lot of this is about doing business, whether this is tourism, cruise industries, or moving freight, people, et cetera.

You know, so that's what I thought was the best. If somebody else has another idea, there's no pride of authorship. I would be more than happy to steal a better idea.

MEMBER MAUNE: It doesn't seem hard enough hitting to me to say that the ports and harbors of the United States are vital to the American way of life. Yes.

MEMBER HALL: That's a justification for it. So the bottom line up front really is we need precision navigation in light of larger ships, more ships, shared usage of waterways by all sizes of ships.

There's a way to say that of why, because what I think the Chair had said earlier when I said hey, it's more than just the cruise industry, it's more than mega-ships was they were looking for the hook this time to bring precision navigation back to the Administrator.

And so is it because we're seeing a flurry of activity, bigger ships, more ships, that kind of thing. I think that's what your bottom line up front really is. We need this precision navigation and we need it because XYZ.

And then I think your justification furthers on with your issue and status here of what you put. That's why, it's vital to the US.

MEMBER KELLY: It's just all about the big ships, though.

MEMBER HALL: Right, exactly. And that's my point though is that, but what are the three, four main points of why. Like I said, it sounds like the rec boats, you know, being in the same waters as the big boats, as the mega boats is really what it is that we're looking at here.

It's not necessarily a new issue, but I know that the Chair had explained to me earlier that that was kind of the hook that Ben Franklin was a bit of a hook to bring the issue up again.

And so I'm not, I'm complete agreement with you, Ed. I don't want you to think that I'm not. I was just trying to figure out what the bottom line up front here for the administrator, why is she reading this paper?

MEMBER MAUNE: Lawson?

MEMBER BRIGHAM: Yes, I think this issue paper is broad. It includes the whole range of issues. But I do think that the precision navigation is a separate kind of special issue that we're going to talk about tomorrow that doesn't necessarily have to be an issue paper in itself.

But we should as HSRP give attention to it because it's gotten global attention. So this paper, I agree with Ed. It's broad, it covers a whole host of users, it's multiple users, it's shared uses in confined areas. And I agree, the precision navigation thing came up from the last meeting. And we'll talk about it tomorrow and see where it fits.

MEMBER KELLY: Precision navigation for the larger vessels is definitely of tantamount importance in this to be able to make the big ships fit in these ports. But that's not the only people using these ports.

And I think if the broad issue is ports and harbors, then we have to address everybody that uses them, including security issues and resiliency issues. And there's an awful lot of that.

And ports, paying for ports is never popular. Talking about the benefits of ports always is. So I can take out the federal funding piece, although it will break my heart to do so. But the ports, the data that's generated by ports is so widely used and it's so much value to so many people, and the PORTS as it's been called, the backbone of the system to build upon that is just essential for the ports and the harbors. Precision navigation builds on PORTS backbone.

MEMBER MAUNE: I don't disagree with anything anybody has said. And my point is that some people only read the first sentence to decide if they're going to read the rest of it. And the first sentence as written --

MEMBER KELLY: Doesn't do it?

MEMBER MAUNE: -- does not entice me to read the rest of the paper. Something needs to be harder hitting up front. That --

MEMBER MCINTYRE: Anne McIntyre. Oh, sorry.

MEMBER MAUNE: -- should then be built upon.

MEMBER MCINTYRE: I'm sorry, I thought you were finished there. I couldn't have said what Ed said better, and I mean that literally, everything that you advocated for, the issues that we face in my region.

And again, I agree with what Kim had said as far as the mega-ships are a hook. But Ed is absolutely correct. I mean, in my particular port, you know, our bread and butter is a Panamax ship.

And the parameters that we're being asked to operate under right now are two foot of under keel clearance. You know, again going back to the fellow from the Port of Galveston, can you move this ship in the fog.

It's just, our economy requires us to move the ships faster, it requires us to operate the ships in areas where the port infrastructures aren't designed. Our channel now takes ships 1,200 feet long. It was designed for a 500 foot ship.

Again, it was deepened, it wasn't widened. And what we do today we couldn't do without the tools that we have now, the electronic charting tools, the accessibility of surveyed data from Army Corps of Engineers, from NOAA. We need all those things in order to continue to do that.

And I did before I came here, I reached out to the San Francisco Pilot Association and also the Puget Sound Pilot Association who were both involved in bringing in the Ben Franklin to their ports.

I asked them what the most important NOAA product was that they needed and where they needed to see improvements. And the first thing they said was PORTS and what do we need to do.

There's a lot of misunderstanding out there amongst the user stakeholders as to how we can help fund and bring the most benefit from those systems. But to not focus on PORTS as being a critical part of it I think would be a big mistake.

MEMBER KELLY: Sal, did you have your hand up before?

MEMBER RASSELLO: Yes, just continuing with Ed said, precise navigation is dictated by the fact that the ships are using electronic charts, ECDIS. ECDIS requires that a passage plan need to be done berth to berth.

So that includes also the passage in narrow waters. So therefore, it's a requirement that the charting and the surveys in the narrow waters are adequate to perform a safety passage of any ship, not just a mega-ship.

Mega-ships has more requirements, has more issues because of size, the wind. But I think that the whole thing is driven by the fact that we are moving into electronic navigation which is not traditional one.

So we need to probably also include a coordinated effort between the ship's operator, the pilots, and vessel traffic services that work under one common platform.

MEMBER MAUNE: Okay. And were you saying that two of your papers are going to be merged into one?

MEMBER KELLY: Sal, Anne, and myself are going to talk and see because a lot of it is just the physical configuration of the channels and the harbors, and how do we deal with that combination of the electronic charting of the ports of the various pieces and how that plays out to a broad host of harbor users, not just the mega-ship.

MEMBER MAUNE: Bill?

VICE CHAIR HANSON: Yes. Ed, can I take the PORTS discussion just one more level?

MEMBER KELLY: Please do.

VICE CHAIR HANSON: I know probably not for this paper, but we talk about it every meeting, so I think we've talked about it six times already this meeting officially.

So if somebody asked you how would PORTS get funded from a federal, do we have a clue which pot that would come from and how it would be administered?

MEMBER KELLY: Well, I would believe that it should be funded through NOAA since it's their system. As far as the, you know, how that moves through the federal budget would best be handled by NOAA.

VICE CHAIR HANSON: Okay.

MEMBER KELLY: But, you know, we've done the same discussion over and over. It's virtually impossible for a fair allocation of cost among private interests. You know, just in New York and New Jersey and Connecticut, we have three states.

We have the City of New York with a budget bigger than the State of New Jersey. These vessels transit all these waters, we have academia, we have first responders, state, municipal people.

One of the biggest users is the government itself between the Coast Guard, NOAA, and National Weather Service. I mean, but they come to us as a commercial deep sea operation, not even a domestic operation.

VICE CHAIR HANSON: So that's the same thing in every port. It's probably one of the best things NOAA's ever done, most visible, and always gets --

MEMBER KELLY: It's a wonderful product and it's essential to safety, security, inundation, resilience. It is, it's a great system. The only thing anybody ever has a problem with is that it's not funded properly.

It's impossible for private sides to find an equitable way to get everybody that should be at the table. And the role of government is to do that which people are incapable of doing on their own.

VICE CHAIR HANSON: So the question would go maybe to NOAA. Have you ever developed a plan to manage PORTS as a federally funded system?

MR. EDWING: The answer is yes.

VICE CHAIR HANSON: Okay. And so is that something you could add as a more specific bullet point to something that we can add as a specific bullet point to this paper? NOAA needs X amount of dollars to be funded through a specific account to handle the PORTS system.

MEMBER KELLY: We would probably need to get clearance on that. I'll look at Glenn for that. Glenn, you listening? Do we provide cost estimates in here?

MR. BOLEDOVICH: Funding, the great barrier.

MEMBER KELLY: The best part about funding is it starts with fun. Come on, Glenn. It's supposed to be fun-ding. You know?

MR. BOLEDOVICH: We would have to be careful.

MEMBER KELLY: Yes. And I don't know if this paper's the right place to go into the weeds on that.

MEMBER MAUNE: Probably not.

MEMBER KELLY: Where it creates, you know, a debatable item or something. You know, I think, I made a glancing passage and I would be more than happy to take it out about federal funding.

But the reality is as you hear in every port, PORTS is a wonderful product that is essential to safety of navigation and to environmental. And everybody likes it, everybody uses it. The only thing anybody has a problem with is how it's funded. So, you know, we can take that out and --

MR. EDWING: So perhaps an alternative instead of getting into numbers is to talk about this. It's certainly not being implemented in a very strategic way because it's really a first come/first serve basis and whoever has money steps up, it's in some cases maybe not a sustainable business model. So maybe we talk about it needs to find a better model.

MEMBER KELLY: And I don't know, like I said, I tried to just minimize that. But you know, what I just said, it must be installed in all major ports, should be funded from federal sources due to the wide usage by federal, state, municipal, commercial, and general public usage.

I mean, that's just out there. I didn't think that this paper was really designed to be the, discuss the funding mechanisms for PORTS. We've been down that road before. Maybe that's a separate topic as we move along again.

MR. BOLEDOVICH: We have been down the road before. That's why I'm hesitant. But again, this panel can certainly see its view that this model isn't working. We think federally sourced is the way to go. You don't need to hear my opinion on that.

The Panel is free to state its opinion to the Administrator about how it thinks this program should be supported. That's why you're here, to some extent, right? We've just been down this road --

MEMBER KELLY: Yes, I tried not to make that a focus of this paper. But just, you know, to put it in there that that's an issue that should be addressed.

MR. BOLEDOVICH: You know, maybe you want to be a little fungible with your funding, fun, and say one alternative that we think should be strongly considered is something more sustainable and the sustainable federal source of funds. Couch it a bit somehow maybe.

MEMBER KELLY: Yes, yes.

MEMBER MAUNE: Lawson?

MEMBER BRIGHAM: Yes, I might not agree that it should be all federally funded. Might be public/private partnership or might be regional government. So I actually think it should be partnership between the region including private.

I mean, it's just like the Arctic. Taxpayer can't fund all of that infrastructure. It's got to be public/private partnership. Maybe not the entire PORTS thing should be public/private but regional, state governments. Local governments can kick into the pot too. And that's just my view.

MR. BOLEDOVICH: I think the gentleman yesterday from the Galveston had kind of an opinion on the matter. And I think he stopped a little bit short. He just said the current model isn't quite working very well and that we might want to reconsider how this cautionary is shaped and formed might be a little bit different formula for how it's set up or something like that. I don't know that you want to get into all of those details.

MEMBER KELLY: Just an example, in New York, I mean, our funder is the Port Authority of New York and New Jersey who has told us that they are going to stop paying and will never pay another pfennig past 2018 when the bridge is finished, when the Bayonne Bridge is finished because the only reason they paid this last time is I said well then I'm going to the New York Times to discuss how you're not paying and the Coast Guard is going to shift our two foot air gap, two foot under keel clearance to four and four and that will stop this many ships from getting into this port in the meantime.

So they said okay we'll pay it until the bridge is done. And all of my compatriots all over the place are kind of in the same place. They come up to the brink of these things going dark. And I know we have gone dark in one or two ports in the past because of a lack of funding.

It just seems unconscionable for what is on the grand scale of national security, safety, environment, it's a couple of million dollars. You know, so let's not make this all about funding PORTS. You know, key issue, probably not a focus in this paper.

MEMBER MAUNE: Thank you, Ed. We don't have a whole lot of time left, but we have a number of topics. Do you think maybe, Susan, you can go through in five minutes or something, explain what you're working on?

MEMBER SHINGLEDECKER: Sure. No more than five. What was circulated to you all is I would call it an early working draft. I would not even call it a rough draft at this point. It was organizing some thoughts.

But I was strong armed into sharing it. So there, you've got it. All these things I'm still prioritizing. They're not really in any specific order. And feel free to discuss now or send me comments electronically or catch me later. That's fine.

I start off with the issues and the status just kind of talking about the number of recreational vessels. Certainly, you know, we don't have the commercial impact that Ed's constituents have. But we've got the numbers.

But one of the challenges, as you all know, is the needs. The needs of those 12 million plus boaters is, it varies greatly. So whether these are challenges or are they future federal actions or are they current activities, that I haven't quite figured out yet.

But these are kind of the main points that come to mind when I think of the issue. Data and products need to continue to be available in a variety of formats. This gets at the diversity of this group and how they take up the information that they have and how they use it.

And so far NOAA has done a good job in this area. But as priorities shift, we just want to encourage them to continue to have a variety of formats. Access to the most current data needs to be easy.

Making the point here that recreational boaters are not commercial mariners. They're not going to work for it. I hate to admit it but they're not. You've got to make it easy for them to get it.

And in this age of technology and data and automatic updates and wireless connectivity, we think that whatever we're looking at on our phone is the most current. And as you all know, especially when it comes to charts, that's not always the case.

The automatic updates are not necessarily automatically happening. So we need to provide data in formats that are easy to download over wireless connections and file sizes that are manageable to enable ease of access.

This one, I might have been responsible for some of those eHydro questions earlier to our friends in the Army Corps. Authoritative data needs to be available in one place.

Maybe I'm dreaming. I think I've heard from some that possibly I'm dreaming. But when I talk to our members and I talk to boaters around the country, they have no idea what Army Corps district they're in, especially if they're transiting waters that are not their home waters.

And thinking that they're going to go to more than one place to get a chart, I mean, that's assuming they even got a chart to begin with. So how can we get data sets like what the Army Corps has in a format that can be incorporated by NOAA in the most efficient way possible and have this data so that people just have to go one place to get it.

Like I said, that's assuming that they don't, you know, maybe they updated their charts three years ago. It's a big ask just to get them to try and have current charts on their boat today. If they have to go to more than one place to get it, it's not going to happen.

This one probably goes up at the top of the list rather than the bottom of the list. Near shore data sets need to be more robust to meet the needs of recreational boaters. You heard that from the gentleman Chris, you know, a new sailboat owner and just the age of the data in the areas where recreational boaters are occupying.

But we certainly understand it's a financial, the financial constraints of that. And then especially when we're looking at prioritizing the Arctic and making gains in those areas, how do those near shore areas fall out, or fall in?

And so what can we look at to help fill those gaps in the recreational areas, whether it's using more LIDAR bathymetry, using unmanned technologies or using crowd sourcing. I can't seem to go a meeting without saying that word so I'll get it in there.

The original title for this paper, I think it was Mapping: Recreational. I would probably expand that to just Navigation Services in Recreational Boaters. I want to make sure that the last two bullets more speak to co-ops and to height data because the needs of boaters go beyond just charts.

And I haven't flushed out my co-op's recommendation there, although I think it's kind of incorporated in some of the other more general data mentions.

And then lastly, the last one I added was boaters need accurate and accessible height data and storm search prediction. In the insurance world, you know, only a certain portion of homes or cars or businesses are going to be in the coastal zone.

With boats, yes there's those inland trailerable boats. But the vast majority of boats, we can't get them away from the water's edge. They're always going to be there.

And so knowing height of nearby storage areas. In Sandy, we moved boats out of the water into areas that just flooded. They weren't high enough because we didn't, people didn't know how high that storage area was.

And the importance of storm surge predictions for protecting boats, not just from an insurance perspective, but also, I mean, we look at the hit that the recreational boating community has taken in New York and New Jersey and how long it is taking that industry to recover as a whole and the economic impacts of that on marinas and other businesses as well.

So want to make sure I cover all three offices in there and how that breaks up into current activities and future federal actions. I struggle a bit with the what is the bottom line, what is the biggest ask for this community.

I know we've gone back and forth with the directors over the last few years on at what level are we making our recommendations. Are we getting too in the weeds telling them how to do their work and how do we stay up at the strategic level.

And so hence this is a working draft and I'll still try and figure out what the appropriate level for the ask is. So that's kind of my summary on that. Welcome any comments, but in the sake of time if you want to just email me your comments too, that's more than welcome.

MEMBER MAUNE: And is there anybody else that's interested in helping Susan with this topic? I don't see any volunteers. Gary?

MEMBER THOMPSON: Yes. Gary Thompson. We're doing a lot of work in North Carolina storm surge and first point of elevation. So I'll be glad to work with you and provide you some information on that.

MEMBER SHINGLEDECKER: Great, thank you.

MEMBER MAUNE: Okay. Thank you, Susan. Bill, you're up next to give us some ideas on what we might do with the defense community.

VICE CHAIR HANSON: You're going to catch up some time here, aren't you?

MEMBER MAUNE: Yes.

VICE CHAIR HANSON: This is the one that's so far got a big fail on it. I'll do a couple mea culpas here and also look for some advice. Since Scott already successfully punted and got a great partner, I do believe I'm the mentor for Ed, not the --

There you go. Ed will be a good partner on the defense. And the reason is it's a huge topic and it's kind of morphed in my mind to the national security as well as homeland security type issues that we actually spend a lot of time on these days when talking about the nation's waterways and channels and getting folks to consider our ports, US ports and waterways as national security and homeland security important points.

And Glenn did turn me on to some folks with the Navy who have also turned me on to some folks in the Coast Guard to be able to address some of those issues. And just trying to get arms around what that all might mean and where that leads is probably going to take a little bit of effort here.

But I actually think I would like to continue to tackle it, but I could use some help and some suggestions as well.

MEMBER MAUNE: Am I correct that the Navy has hydrographic survey? Dave Maune. Am I correct that the Navy has hydrographic survey capabilities and are conducting surveys that they're not sharing with NOAA? Is that a true statement?

RADM GLANG: Gerd Glang, Coast Survey. No, that's not my understanding, Dave. So Navy operates, Naval Oceanographic Office operates six global class survey vessels that operate in other oceans, not in the USEEZ.

On occasion they do certain survey missions in US waters and they've always been forthcoming and shared that data. Any survey data Navy acquires which they feel they can make public and share goes to the NOAA archive.

And we've over the years received LIDAR surveys from them and other hydrographic survey data when it's in areas that we have charting responsibilities for.

MEMBER MAUNE: Okay, thank you. Any other questions? Did Ed volunteer to help you?

VICE CHAIR HANSON: He did.

MEMBER MAUNE: Okay, good. Ed's volunteered for two. And Ed, next topic is technology. Want to give us a few ideas on that? I'm sorry, Lawson?

MEMBER BRIGHAM: Just, we want to weave in somewhere in this defense security kind of issue the Arctic because I know there are some transits and some information that's probably still classified that could be declassified. We'll just be mindful to kind of roll that one into the topic. I'll input.

MEMBER MAUNE: Okay. Anything else, Bill? All right, thank you. All right, Ed, did you want to talk about technology a bit here?

MEMBER SAADE: Sure. Thanks, Dave. Basically, I just captured some of the ideas that were around when we spoke about it earlier for five or ten minutes.

As a lead in for the issue is the backlog is incredibly huge and we have to find a way to accelerate the way that we can work down that backlog. The status is there's lots of vessels and contractors and procedures and existing technologies that are faster than they used to be.

But of course that doesn't help us knock down the backlog. So the goal is to identify new technologies to adapt to help mitigate the backlog within existing funding or slightly higher funding levels.

In addition, identify those technologies which provide tangible improvements in one, five, or ten years. So basically, to talk about technologies in a multi-year sense.

Not necessarily just focus on what can we fix tomorrow but to, as somebody mentioned yesterday, what are the types of things that we can go back to NOAA with, with five or ten year plans, and technology seems like a really logical one to address.

So I tried to break it out into the big ideas. There's no pride of ownership or we can hack this all up eventually. But the phases are how do we improve the acquisition part of it and autonomous surface vehicles, vessels, whatever you want to call them, autonomous underwater vehicles, unmanned aerial vehicles.

All those come into play and none of them are very productive right now. No one would argue the fact that we're not going to solve any issues with those devices right now. But I believe everybody agrees that five or certainly ten years from now they're going to be doing a lot of activities that relate to this.

I just put the second one in there as an idea in the future that our company has is a UAV with a gravity meter and a LIDAR in it to actually have multiple applications. But that's nowhere near ready to go either.

UAV-based hydrographic LIDAR. There's actually one that's built by the Navy that we're helping test right now. That's the 30 pound hydrographic LIDAR that obviously for those applications in a UAV would have a profound impact on cost, therefore productivity.

Next generation tide gauges was mentioned. We can see everything on the list. There's all these different ways that we can build a discussion on it, but it is going to be by definition this particular topic is going to be real techy and geeky and maybe we have to find a way to talk about it without all the technology.

So then there's data transfer. As we mentioned, there's lots of ways to get the data off of the vessel a lot faster. So maybe you don't have to have as much manpower and as much capability on the vessel or one person in the office or back at NOAA headquarters can do the work of what used to take two people on two different boats, those type of things.

There's a whole push in industry to doing cloud based solutions, cloud based storage, cloud based automated processing of everything and anything. Ultimately it will be hydrographic data as well.

How to push out the final product. Again, the cloud becomes part of that. That's certainly where we see a lot of technology going. And then the ability to present it in both 3D and 4D which goes back to a lot of the topics that you all were talking about earlier.

How do you make this timely and in real time? Partners, to me there's no end to the list of partners starting with UNH. I don't know how DARPA interacts with NOAA legally or not. It certainly interacts with contractors easily and legally, so I assume it's easy with NOAA.

Multiple contractors with good ideas, the different agencies that are doing this anyway, and the multiple agencies within NOAA that overlap nicely. State agencies have proven to be another source of innovation and funding.

Topic specific, from my point of view, every single hydrographic survey is a fisheries habitat study, it's just the fisheries people don't know it. And, I mean, we've done things as simple as map off California and discover tremendous areas of whale feeding scars that nobody knew about, but it was a hydrographic survey that led to that.

So that's a big awareness type of a thing. Global warming, global climate change, I put that in there because the big activity in industry right now is intentionally looking for sea bed seeps. These are all hydrocarbon seeps on the sea floor.

And by the thousands, you know, they may be by the millions. What's the impact of all of that until now not mapped hydrocarbons seeping into the water and into the environment and can there be other sources of funding that seem to be well funded at least during this administration to help offset some of these costs.

Another reason to do a hydrographic survey that has multiple applications. And the Arctic-focused applications that Lawson always talks about, that's a pretty easy connection.

Challenges, challenges lead to the technology advances because all of us that work on the ocean are finding it difficult to find qualified personnel now, and it's just going to get worse in the future.

Vessel replacement and maintenance we talked about before. That's always going to be a challenge. It's never going to be easy to get the money, so what happens if you can do it in more efficient and cheaper ways.

Current activities is endless. I'm not sure what we have to even mention along there because that's all, that's what we're really focused on.

There's a long list of federal actions required, but one of the things that Carol and I talked about was let's say we come up with really good ideas that can be implemented quickly, how do you go back to the contractual language on existing IDIQ contracts that many of the contractors have and allow for that transfer of knowledge and transfer of technology back to NOAA in a way that can be paid for. So that's the start.

MEMBER MAUNE: Amazing. And to think you just volunteered this morning to take a step in for Scott. You've come fully prepared. Thank you, Ed. Anybody want any comments on technology? Yes?

MEMBER BRIGHAM: Lawson Brigham. Yes, I think it's a good overview and we should have an issue paper with all of what you just said. But I think the topic is larger than just the issue paper. And I think we should explore and think about in HSRP that this is a working group topic.

If one of the working groups can go into sleep mode or something and we have one on technology, I think we should discuss that in concert with leadership here because I think it's a continuing and essential and critical kind of topic to talk about and not just in an issue paper.

And we have, I think, I sense, a core of people now that we haven't had in the past in the HSRP that could address some central issues. Thank you.

MEMBER MAUNE: Thank you. Gary?

MEMBER THOMPSON: Gary Thompson. Since non-technical people are probably reading this and all those acronyms, can we define all these acronyms in them so they'll understand what they all mean?

MEMBER SAADE: Most of the A's mean autonomous.

MEMBER THOMPSON: Second comment is I know one technology, it's probably more in building out, I don't know if we should include it or not, is BIM. Does BIM have any impact in this arena?

MEMBER SAADE: I'm not sure I understand the question, sorry.

MEMBER THOMPSON: New technology, Building Information Modeling.

MEMBER SAADE: Okay. I didn't know that term. Sorry.

MEMBER THOMPSON: Yes, it's the new --

MEMBER SAADE: So you hit me with an acronym that I didn't know.

MEMBER THOMPSON: Well done. So BIM is many, it's mainly in construction so that multiple professionals can work on the same product at the same time.

So if you change a beam here and it affects other beams, the software will change the other beams too. So it's, I was at a meeting where one large company by 2017 all their, they'll go completely BIM.

So I don't know, it's mainly construction, building. I don't know if it fits in here but it might be worth mentioning.

MEMBER MAUNE: Lindsay?

MEMBER GEE: Yes. I think I agree, there's a lot here in technology that -- Lindsay Gee, sorry. There's a lot in technology that's hard to address in a single issued paper. A lot of the things that Ed is saying, you could maybe take them up a level to tactical and strategic if you like.

There's the technology that's kind of there now that could be implemented, and there is some, it's getting it into service and I think it's what NOAA can benefit from the transfer back from some of what industry has done.

There's then technology that's, you know, it's not there yet and it's way out. And that recommendation is okay, so that might be a shared research that would be across industry, the academic partners and also NOAA, right, to be able to do that.

And then the other technologies related kind of to the recreational boaters. I think we see the, we're very slow to adopt technology and particularly in the mapping area because of the safety and we're a really conservative bunch of people.

But boaters just want to go out and boat, so they do things. And there's, you know, the technology of apps we all have in our phone, you know, that hasn't really come to our industry. It's in other geospatial areas.

And so I think there's that other bunch of technology that we need to look at that's like, okay it's in other areas of geospatial, how do we bring that across. And so that's another challenge I think we've got.

So things like ActiveCaptain is out there and boaters use it but they don't have the base level of the pilot or the sailing directions within that. It's like why can't that be a sort of underlying infrastructure that then everybody can comment on, and okay, some of those things that have got changed are there.

And that immediately then has an impact of getting, we're not talking about pushing stuff out to the, to clients from NOAA, but that's getting information back quickly and incorporated. I think that's a particular area that we need to address. And I think that's generally in the industry people are trying to do that.

Another area, we always talked about data standards. And you know, it's important for interoperability and all those things. I think one of the other areas is in the technology and software particularly which is one of my recent background is open this in the platforms that you, that NOAA deals with.

And this is not just standards because you can talk about standards now but because we have so much data coming in, standards just mean export and import, and actually add time sometimes to the, that you don't have.

And they just add to the workflow. So I think you've suffered I know in some areas just not having openness from platforms that you have.

And just my last point, I think as Ed mentioned that when we've talked, we have discussion at lunchtime with Juliana I think, resources, human resources are really critical to technology of getting the young resources in and then retooling the people that, you know, really need to that life is changing. And it seems like you're not getting that. And they go hand in hand. Thank you.

MEMBER MAUNE: Thank you. Lawson recommended that you thought this needed a working group rather than just a short term paper, and I wonder how many people agree with that recommendation. We're down to just two working groups now, are we not? Or do we have more?

CHAIR PERKINS: That's true, we have two working groups in place.

MEMBER MAUNE: And I wonder how many people feel we should have a working group on technology. Looks to me like we have pretty good consensus there.

Ed, you may have volunteered to be heading a working group with a bunch of people.

CHAIR PERKINS: You know, the working group issue, we do have procedural by-laws here. So I've read them while sitting here. It sounds like we need to actually have a formal motion from the Chair. So the Chair will make a motion that we form a working group on technology. And then we need a second.

MEMBER MAUNE: Seconded.

CHAIR PERKINS: Okay. And now we need a vote. All in favor?

(Chorus of ayes.)

CHAIR PERKINS: Okay. So the Chair, let the records show that we had a -- did anybody dissent? Okay, good. So we have a unanimous vote on that. I think we need an official action.

MEMBER SAADE: For the new guys' benefits, could you describe what the difference is between a working group and the other groups?

RADM GLANG: I'm not sure I understand your question, Ed.

MEMBER SAADE: I mean, from my perspective, everything we've been doing is kind of a working group. I don't understand why a working group is unique to the position papers?

RADM GLANG: Oh, I see. So under the planning and engagement working group which was formally established, chaired by Dave Maune, he had collective input from his working group.

So in a way, there were many ad hoc participants in his working group to develop these issue papers. If we want to break technology away and say we think this by itself deserves a focused working group which is the motion that the Panel just agreed on, that's fine.

What I would ask is that we define a little bit, perhaps draft some terms of reference or a purpose paragraph of what we would like to get out of the working group, kind of what its scope is so it can stay focused on accomplishing something.

And that can evolve over time, but we don't want sort of an open ended technology working group that stands up forever and then drifts into inattention and non-participation.

So it would be helpful to have a little bit of a focus on what the working group would like to do in the near term.

MEMBER GEE: Lindsay Gee. So is there normally, do you set a timetable for the working group, like, next meeting one year or something like that or is that what you've done previously that you found worked?

MEMBER MAUNE: Lawson's went on for years on the Arctic.

MEMBER BRIGHAM: Lawson Brigham. We should, if we mobilize on this we should think down the road and work with the NOAA staff about again, asking some questions of some areas of technology that you might want to have the working group address.

But that could be down the road once we get the terms of reference. But I think this connection to the questions and what the needs of the staff is also important in the working group dynamic.

MEMBER MAUNE: We have I think two more topics to cover yet before 4:45 and one of them was Gary Thompson's topic on tides and datums and things like that.

CHAIR PERKINS: Before we move on though, I was incorrect. We have four existing working groups. We have legislative and policy, we have planning and engagement, emerging Arctic priorities, and coastal intelligence and resilience.

So that's four, and that's here in the book. We should maybe consider, you know, the efficiency of combining legislative and policy and planning and engagement into a single working group.

MEMBER MAUNE: That's okay with me.

MEMBER MILLER: Legislative is pretty much on the back burner right now until we need to redo the charter or whatever. And so I could work with Dave in the planning and engagement group.

MEMBER MAUNE: Okay.

RADM GLANG: I was just asking the Chair if maybe he would like to recap which working groups will sustain and which ones may be consolidated just sort of as a course of business tomorrow because I would ask as well for the technology working group then who are we asking to chair it or co-chairs and who's taking the action on the term of reference or a purpose statement.

CHAIR PERKINS: Yes. If you don't know who's in charge of these existing working groups, Joyce had legislative and policy, Frank and Dave had planning and engagement. Of course, as we know Lawson had Arctic, and Carol and Larry Atkinson had coastal intelligence and resilience.

So give that some thought of how we can maybe restructure what we want to do going forward.

RADM GLANG: Okay, great. Gary?

MEMBER THOMPSON: Gary Thompson. So I'll go over my issue paper on the replacement of the North American Datum of 1983 in the National Geodetic, the North American Vertical Datum of 1988.

As you heard from Juliana's presentation yesterday, 2022 NAD 83 and NAVD 88 will be replaced with a geometric and geopotential reference frame.

So the first paragraph is just the basic information about some technical information about the new reference frames. Key difference is we're going from a plate fixed datum to a reference frame that includes the velocities of the coordinates.

So I was involved in when we went from NAD 27 to NAD 83 and NGVD 29 to NVA 88. And it was a learning curve. And so we need to do the same thing. We need to prepare our users for this because this will be a little different transformation than when we've gone from previous datums because those were both plate fixed to plate fixed.

So you see on the, go down to the second page and there's a graphic. You can see the extent of the change or the estimated change in the horizontal will be approximately one to two meters. And then the ellipsoid height, the component of the height component as you can see in the Florida area it goes from zero to almost one meter on the west coast.

So our challenges are all the information that's in the NSRS, National Spatial Reference System, when NGS does the, rolls out these new reference frames, all that data will be provided, you know, on that new reference frame.

But there is going to be a lot of data that's local that will not be included in that. So whoever is the holder of that data is going to have to make the transformation.

So one of the challenges is to make that transformation. And one of the ways NGS can help is provide transformation software or packages, one being V-Datum, be modified so that it can handle the transformation.

Have an impact on all new surveys because one of the key components you'll need to do this new reference frame is metadata. You need to know when that data was collected so that for future surveys, that transformation will be done correctly because of the velocity component.

And a lot of times, metadata is the last thing, sometimes that's left off when you get a product. So we need to stress that as we build up to this change in 2022.

Datum entitled software will need to be modified, both all commercial and government software will have to be modified to handle the transformation parameters for 2022.

As I already mentioned, the metadata for all macro products. And one of the big items that we need to stress to especially governmental agencies that are still referencing their heights to NGVD 29 that they shouldn't make the jump from 29 to 2022. They should go to NAV 88 and then 2022.

So I know there's some federal agencies that you can still find data that the height's on NGVD 29. So those are the challenges that I've listed.

Future, the federal action that we need and one of these is already built into Juliana's plan is that once they go official with this, they will put that in the Federal Register and the federal agencies will then I guess soon be required to make the change in a timely manner.

The tools, it will be I think very, very critical that they're user-friendly tools that everyone can use to make this transformation and also help with the advent of more use of GIS software that the vendors, the users of GIS software or that build GIS software has that transformation built into it so that can be an easily done transformation as we work on this 2022 reference frames.

And the last one I think is the most important one. I know in North Carolina we've put together a working group of a variety of professionals, local government, state agencies to bring them together to plan how we're going to make this transformation in 2022 so that it will be a very smooth and efficient process and that we don't get caught off guard.

We actually worked with NGS probably three or four years ago because the agency I work in also is responsible for all of the flood maps in North Carolina. We produce and maintain the flood maps in conjunction with FEMA.

And we were concerned that this new reference frame would require a lot of effort to make the transformation. So we did a pilot project with NGS to see what the impact would be. And there's a report out there on that.

So I think this ad hoc committee that we would ask they put together could help bring all the users of height information, horizontal information together and determine how is the best way to approach it, and also prepare them to make the transformation.

One thing I don't have in my paper is current activities. And NGS has a lot of current activities. So I will modify that and work with Juliana to get and see what information they could put in there.

MEMBER MAUNE: Okay. And I think Juliana is a member of the FEMA TMAC. And so she may know what issues FEMA has traditionally had in transitioning from NGVD 29 to NAVD 88 because their old flood studies were done to the data when you make some modifications they don't want to change all the engineering behind it.

And so that has been our big issue for years with FEMA. So I know that's going to be one of the challenges there. Thank you, Gary, for volunteering to do this, and I assume you will continue to work on this for the next meeting? Yes?

MR. EDWING: Rich Edwing with CO-OPS. So two things. Good job, Gary. But I'm going to request, suggest, say pretty please that we expand this to include the Tidal Datum Epoch and IGLD updates.

And for the first time ever, these are all going to be updated coincident with each other, and there are connections between them all. So I think it would be important to address -- you know, the land and the water here all at the same time.

MEMBER THOMPSON: I agree. When you told me that yesterday, I thought about that and then I forgot to mention that. So yes, it needs to be added.

MR. EDWING: And I would just add one thing to your challenges, and it might be the biggest challenge of all and that's an effective communications and outreach campaign to, you know, inform people this is coming, why it's important, what they need to do to prepare for it, et cetera to cover both sides.

MEMBER MAUNE: And if you could make your opening sentence more hitting on why they should read the rest of the paper, that's always good.

Carol, did you have a question? Carol, did you have a question?

MEMBER LOCKHART: Carol Lockhart. Well, more of a comment. I'm wondering if GRAV-D needs to be mentioned in here somewhere because we're talking about the new datum and that allows us to get to that new datum. And it's an ongoing program, but we don't actually even mention it.

It doesn't need to be a big mention, but I feel like the name should be in there somewhere.

MEMBER THOMPSON: I had it in there and I took it out. And probably it should be. I was trying to keep it to two pages. So I think on the front page and the -- kind of the quick definition of that, then I could add something there.

MEMBER MAUNE: Yes?

CHAIR PERKINS: I have a question on this. And maybe, Juliana, this is a question perhaps for you. But will NGS be the authoritative source for the conversion to the new datum because we have Army Corps who plays in that space with their datum tools as well.

So is that committee helping coordinate that or is there going to be the NGS solution and the Army Corps solution?

MS. BLACKWELL: Okay. Juliana Blackwell. Yes, we are the authoritative source. And I'm pretty sure Army Corps will be happy to say that as well. We are working with them on a number of activities related to that including the conversion tools that are out there now which have kind of swapped back and forth between us doing a new update to them and them putting a new face on some of the conversion tools that were done in previous years.

So the short answer is yes, NGS is the authoritative source for the transformation, and yes, we are working with Army Corps and other federal agencies and non-federal agencies to ensure that we're making that tool accurate and easily usable. So we'll provide other updates to the HSRP and other stakeholders as we continue through this process of developing this tool.

MEMBER MAUNE: Scott, this morning you had a topic you said you wanted to discuss in lieu of yours that we needed ten minutes extra to talk about this topic? Remember that this morning?

CHAIR PERKINS: I have absolutely no idea.

MEMBER MAUNE: I thought it had to do with recapitalization or something.

CHAIR PERKINS: That was a long, long time ago.

MEMBER MAUNE: I've been saving you ten minutes.

MEMBER SHINGLEDECKER: I think the other issue that we might have still needed to discuss was the responses to Dr. Callender's questions.

MEMBER MAUNE: Okay. I didn't see that as part of the issue papers, but maybe it was.

MEMBER GEE: This is a question for Gary, or a comment really. One of the things you mentioned was outreach and then the other commercial software.

And a lot of the people's exposure to this change is going to be through the commercial software and that's kind of important I think. I don't know how that sits about being able to -- you can't force them to do anything but it's kind of knowing that they're getting it right with those test data sets or some outreach or working group to be able to do that.

I think similar to, I don't know whether you're familiar with OGP or APSG have their -- you have their, you have in the all-in cache, the software actually has to be certified that it meets the requirement of the various things and that may be worthwhile addressing as a way to see how the software all gets updated.

MEMBER THOMPSON: Just to answer that, I have one more year on the National Geospatial Advisory Committee, and there's software vendors on that and so this has been a working topic in that. So hopefully through that committee we've provided the information to make them aware of it; that this is coming.

MEMBER GEE: Geospatial software now is kind of becoming omnipresent with geospatially enabled. And it's just beyond that professional kind of software that's everywhere now I think that we need to be aware of.

MEMBER MAUNE: Okay. I would like to now recap what I think we agreed to today. On the first issue paper with Joyce, we are going to meet tonight, a number of us who raised our hand to volunteer.

MEMBER MILLER: Can I get a show of hands again --

MEMBER MAUNE: 7:00 or 7:30 or something.

MEMBER MILLER: -- so I know who's on it? Dave, Lindsay or --

MEMBER MAUNE: Kim?

MR. ARMSTRONG: Dave, I --

MEMBER MAUNE: Yes?

MR. ARMSTRONG: I took the liberty of drafting for the Panel's consideration a separate urgent letter for the Administrator. Hopefully we'll have that to look at before too long.

MEMBER MAUNE: All right.

MEMBER MILLER: And I also -- I took a lot of the suggestions that were made in this session.

MEMBER MAUNE: Okay.

MEMBER MILLER: And I have sent Lynne a paper and I thought I would make copies for the working group tonight and maybe that could facilitate -- could speed us up somewhat.

MEMBER MAUNE: Did you still want to meet this evening, or do you think it's not necessary?

MEMBER MILLER: Well, I do have a comment. We have from 8:15 to 10:45 tomorrow to have ongoing discussions, and so we could just -- if people want to -- if the people that volunteered want to take a look at what I've done and what Andy's done, we could potentially discuss it. Andy, do you think we need to meet tonight?

MR. ARMSTRONG: If we have an opportunity to meet tomorrow, I would rather do that.

MEMBER MILLER: I'm sure your wife would rather you do that too. So we could also discuss the -- what Susan was talking about, the -- Dr. Callender's six questions at that time too.

MEMBER MAUNE: Okay.

PARTICIPANT: They're up on the screen.

MEMBER MAUNE: Okay. I'm going to wrap up here. So we don't need to meet tonight on yours. Lawson Brigham, I think you had a few things you were going to clean up on yours and you were going to have that done by tomorrow?

MEMBER BRIGHAM: I don't know by tomorrow, but --

MEMBER MAUNE: Not by tomorrow. Larry Atkinson said he was going to finish his by tonight?

(Off microphone comment.)

MEMBER MAUNE: Okay. And Ed Kelly is going to work on his and it's going to take several weeks I think you said?

MEMBER KELLY: No more than three weeks --

(Simultaneous speaking.)

MEMBER MAUNE: Okay. And all the other ones are longer distance ones that you'll have more time unless you think you can have yours ready.

MEMBER THOMPSON: This is Gary Thompson. I'll have it by Monday, next week.

MEMBER MAUNE: Okay. All right, then we can switch to the other topic, if it's okay with you, Scott.

CHAIR PERKINS: Yes, sir.

MEMBER MAUNE: Thank you.

MEMBER MILLER: So this is a compilation of things. There were two working groups in -- was it LA Long Beach or was it -- I can't remember. It was LA?

On coastal resilience and coastal intelligence. And there had been working groups in previous sessions. And there was a fair amount of confusion about what -- just exactly what coastal intelligence and coastal resilience really was and so in some of the working groups, we partially answered some of these questions and then Lawson's lengthy Arctic report really took care of any Arctic-specific questions.

So what I've tried to do here is just summarize what came out of those reports. And then I've had several discussions about coastal intelligence and coastal resilience with various panel members. And I had some opinions about it. And so I put some of those -- and I have entitled all of those, this is Joyce's comment but it really was from discussions with other panel members because there was such confusion about coastal resilience in particular.

So how does coastal intelligence make coastal resilience better? And one of the things that, I mean, kind of obvious is the first point, the basic information that NOAA Navigation Services collects is fundamental to coastal resilience. That's kind of a no-brainer.

The second two, I'll just -- I'll summarize. I think that -- and we discussed this somewhat in past sessions -- I think that navigation services by itself is an important element of what NOS does. And my opinion is that it should be marketed as such because it's core, it's key to the Department of Commerce in terms of safety of navigation and transportation and so forth.

And then the third point was that -- and Bill brought this up at a breakfast, is that as we saw once Dr. Sullivan came in, something called ecosystem-based management which had been a huge hot topic for a number of years, those words, I never see them anymore. And I wonder if coastal resilience and intelligence might go the same way.

I mean, we would still need the basic data and we still need to make the coasts more resilient, but those concepts per se may go away. And feel totally free to disagree with me or whatever.

But I thought important that the Panel, if we agree with that or if we want to make some other statement, should get back to Dr. Callender with an honest opinion on-- you know, I just think navigation services by itself is a key part of what NOS does and it's mandated by multiple federal statutes.

So discussion, please feel free to disagree. Larry, you were chair, co-chair of that.

MEMBER ATKINSON: Co-chair.

MEMBER MILLER: Yes.

MEMBER ATKINSON: And you who are new on the committee or Panel, take caution.

(Laughter.)

MEMBER MILLER: That was good.

MEMBER ATKINSON: I had no idea what I was getting into. I think it speaks for itself that we don't quite understand what this is and what we should do. So I agree with what you've said.

And trying to shoehorn things into these categories, I don't know if that's our job. You know, we're speaking well for a lot of the requirements of the community and what NOAA can do.

And I don't know when we waded into this it just -- I mean, either we're really stupid or it's a difficult topic to get your arms around and we just couldn't do it. So maybe there's somebody here that does and they would like to -- deadly silence.

MEMBER LOCKHART: I guess I'll add to that. I think, you know, a lot of those questions that were direct to the coastal intelligence and coastal resilience, I kind of think the same thing, Joyce. I think they're just buzzwords that we're using just now for stuff that we're already talking about.

And I understand that, you know, those words are brought to us so that we know the right words to use when we're trying to ask for funding and things, but I don't know that it should be a driver for what we're discussing. I think we're making really good progress with these issue papers and things.

And I think our time is better spent that way because I think we are addressing those questions, just not necessarily specifically going through them one through six but we're addressing them by doing those issue papers. And I think our time is more effectively used that way.

MEMBER ATKINSON: Yes, some of you haven't heard me say, but the Sewells Point tide gauge which costs, I don't know, $20,000 a year -- no, $5,000 a year to run?

Whatever. Not much money. You know, there's billion dollar decisions being based on that simple tide gauge. That's coastal intelligence supporting coastal resilience.

MEMBER BRIGHAM: Lawson Brigham. Yes, no, I don't think the words are going away. Actually I think, I go to different workshops mostly related to Arctic and coastal resilience and intelligence come up all the time.

The ecosystems-based management is a sound and emerging principle. It's not something we have to deal with in HSRP. They actually have a task force in the Arctic Council dealing with ecosystem-based management.

However, navigation services or tracks and traffic and all of that are integrated in ecosystem-based management, but it's not something that we have to deal with directly here at HSRP, but it is moving forward. It's not disappearing as a concept.

MEMBER MILLER: So should we modify those last two comments? Should we just say we don't understand them well, our time would be better spent working on things we do understand?

MEMBER LOCKHART: I don't know that it's that we don't understand them, we're just talking about them in a different way.

I mean, we refer to foundational data instead of coastal intelligence. We're talking about resilience all the time, we're just not calling it that. And so I think, you know, we can keep our discussions going in the same manner. We just have to be aware that when we write the letter or write our issue papers if these are the words that we need to use, at the end of the day then we can use that. But it doesn't have to drive our discussions necessarily, if that makes sense.

MEMBER MILLER: Would you guys want to take a cut at modifying those statements or just getting rid of them?

(Off microphone comment.)

MEMBER MILLER: Larry and Carol, they were head of the coastal resilience, coastal --

MEMBER LOCKHART: I actually think we should just abandon that workgroup to be honest. That's my opinion.

PARTICIPANT: I second that.

MEMBER MILLER: Okay. Let's go to the second question. Lynne, can you page down or can somebody page down to number two?

How do we leverage the NOS foundational data moving forward? Okay, these were -- like Susan was saying on the Army Corps data, I think ease of accessability will make it much more -- or will help to leverage it.

I recently was asked for a survey that I had done, but it had gone under hydrographic surveys instead of multi-beam data and nobody could find it at NCEI. And there's just too many repositories and too little understanding of where anything is. So that was a comment.

And then the second one was from the coastal intelligence working group. This was based upon something Juliana was saying about how they determined where to do GRAV-D. And these were just a bunch of questions they ask about getting the data or planning for data acquisition. Is there a C there? No, okay.

Go to number three. I think that's the Arctic one. Can you page down to three? Oh, this was national charting priorities. I quoted the NOS website and then adding the need for data for environmental surveys and inclusion of areas that are of interest for recreational boaters and fishermen. Susan's smiling. Discussion? Yes.

MEMBER GEE: Just go back to two for a second.

MEMBER MILLER: Sure.

MEMBER GEE: Everybody talks about data and sort of having it available when it's hard to even find. But if you're talking about moving forward and leveraging the data, it's almost now coming to people want products from it.

And so we talk about technology and cloud services. I don't want to just go to an area and say well I want to get the bathymetry and I want to get from -- I want to go up and get on a DTM within my area and then maybe I want a slope map, maybe I want -- you know, so this is products that I think leverage the foundational data.

But it's kind of not just the data, you know, since we're talking about information and data. But I think that's the change we see is if you really want to leverage it for those other uses, it's not -- it's having it available and easily providing products. So you don't drag down the data and do it on your desktop. You potentially --

MEMBER MILLER: So you're suggesting we add something that says --

MEMBER GEE: It's a more of -- it's related to technology of having cloud sort of services that allow you to produce more useful products from the data.

MEMBER MILLER: So cloud-based services that provide more useful products?

MEMBER GEE: And information, yes.

MEMBER MILLER: Okay, thanks, Lindsay. Okay. Anything else on bathymetry?

CHAIR PERKINS: Can I interrupt for a second? Would it be possible just to ask if we have any public comments?

MEMBER MILLER: Sure.

CHAIR PERKINS: Just out of courtesy to the public that may have a --

MEMBER MILLER: We could also finish this tomorrow morning if we want.

CHAIR PERKINS: It's just thought we should do that out of courtesy in case somebody has a 5:00 deadline that's here from the public.

(Off microphone comment.)

CHAIR PERKINS: So we would like to open the public comment period.

PARTICIPANT: Public comment at this time?

(No response.)

PARTICIPANT: Hearing none ---

CHAIR PERKINS: Okay, great. Thank you. Just didn't want to be discourteous. So please continue.

MEMBER MILLER: DO we want to finish this? Okay. Go to three, please.

And also, Gerd talked a couple meetings ago about OCS being penalized for doing surveys that were not on their top absolute bullet list. Even if a survey was in a very remote area, and so I thought that was worth mentioning that, you know, that surveys should be piggy-backed if at all possible, especially in very remote areas.

Okay, four all came out of Lawson's document. So do you think we need any discussion on that?

MEMBER BRIGHAM: No, just for the new -- Lawson Brigham. Just for the new members, the major question was how do I prioritize the Arctic compared to Port of Charleston and this place and all the other major ports that are related to commerce and whatever.

And you can't prioritize. It's a frontier area, it's different. It needs line item budget and all the rest of it. It is different. And because of politics, the regional politics, never going to get funding for the Arctic over Charleston. I just picked Charleston.

And so that was one of the issues. I think we just took the words, Joyce, out of the working group report and merged it in. So I think we're okay.

MEMBER MILLER: Okay, go to five, please. What are ways that Navigation -- all the programs are good at engaging stakeholders, how can NOAA better connect?

I've really noticed that Navigation Services, the blogs that I get and the links and so forth have really expanded information over the last few years. And we've heard a lot of different stakeholders say that the CO-OP sites are very good. I would encourage any time it's possible, we've heard time and time again at almost every meeting that, you know, the Navigation Response Teams walk on water and that they're -- you know, they're a blessing. And so I think anything that can be done to show them off is a good idea.

Go down one more. I don't know if there's another one there. Continued expansion of blogs and websites. It's kind of a no-brainer. Back up one, or back up just a little.

Yes. This is my own observation. If I ask a taxi driver in an average city what NOAA is, none of them know. And you say weather service and they say, oh yes, they do the weather. But I think it would be -- you know, to better engage is that -- I don't know how but NOAA should put out some sort of a uniform message that -- because nobody really, you know, NOS, CO-OPS, NGS, we understand that but I don't think the public does at all, you know?

As far as they're concerned, NOAA is the weather. Susan?

MEMBER SHINGLEDECKER: Yes. I would say with this one, I mean, the people who know NOAA know NOAA, and then there's everybody else. I mean, we've said many times you can walk into any sailing bar in the country and saddle up to the bar and ask the guys who prints their charts or where do they get their charts from and they're going to say WestMarine.

So I think -- they do. I tried really hard. I think the question is who's the audience, who's the customer? I've said a couple times NOAA did a great job at the Indianapolis Boat Show a couple years ago holding a seminar for app providers and web companies that take their data and repackage it for the boater.

And, you know, they did a great job with that. But reaching -- it takes a lot of effort to reach every single individual person. And so I wonder, you know, how much is it their responsibility to reach every single taxpayer with this is what your money paid for versus the intermediaries that those people are already talking to that can use that data in a more -- in a way that's packaged better for them.

So I don't know, I think there's a ton more that could be done, but I think on limited resources what's the strategic best use of the money and time?

MEMBER MILLER: And the final one, we pretty much answered this in the coastal intelligence. Gerd and Rick were there. And we passed on -- Ed was the one that came up with they should look at the PAWSA model.

And then he also mentioned the Army Corps -- Lynne, go down a bit more. The Army Corps cost-benefit analysis. C is, again, some of the things that Juliana mentioned.

Go on down, how to market the product and this was a discussion that we had that the marketing model for precision navigation, that means that it's a cost shared. NOAA pays for it initially and it's cost shared, as we've discussed many times, has not been working very well because that's the PORTS model. And it might be a good idea to develop a different marketing model for the precision navigation.

And then finally this was an Ed question. If a commercial entity decides to finance PORTS and gets the information, can they sell it and should it be made available to the public? And that was just kind of an open question, no answers.

MR. EDWING: So we operate under the OMB guidance that says if taxpayer dollars are used to acquire data it's to be made freely available, you know, to the public.

MEMBER MILLER: Yes.

MR. EDWING: So we would not be able to engage in that kind of partnership.

MEMBER MILLER: No, okay. No, that's a succinct answer. So suggestions on how to go forward? Should we make a few changes and give this to -- and just submit it? Does it need to be in a better report format?

CHAIR PERKINS: I don't think that -- I think the format is fine. So let it be written, so let it be done. You know, submit it and --

MEMBER MILLER: Larry and Carol, do you want to make -- do you want to suggest any changes?

MEMBER ATKINSON: Well, we'll clean up that first one.

MEMBER MILLER: Okay, you'll clean up. Thank you.

MEMBER HALL: I have one quick question, and it could be a dumb question. I know there aren't any such thing, but there really are.

As I look at question six -- sorry, this is Kim Hall -- and I look at the other factors that are not in the model, and I was looking very quickly over the model, is there any piece here where it's the demand signal or is that what you mean by who is ready and willing to partner?

And what I mean by that is kind of the stakeholder input. I know I hear from Sal and his colleagues in the cruise industry quite often of where they need precise navigation and I know we're a small sector, but we come in and out quite a bit.

I just wanted to make sure that that's included here where there is an actual demand signal. I'm sure everybody wants PORTS, but there's different levels of demand and I just wasn't sure that was covered under number six.

MEMBER MILLER: Did you guys get that? So you want to go ahead and restate?

MEMBER HALL: Yes. Sorry. As I looked at the need to consider the next 20 PORTS for precise navigation, obviously there is a whole private sector out there or people who operate private who have a demand signal.

So like I said, for me, for cruise industry, I've heard from Sal and his colleagues and his brethren at other lines of where they would like to see it. I just wasn't sure if that was included, I didn't see it in the model and I didn't necessarily understand if it was covered under the other factors that aren't in the model.

So where you have stakeholders who are signaling a demand for the next precise navigation because those differing levels of demand can also have an impact.

(Off microphone comment.)

MEMBER MCINTYRE: Anne McIntyre. I think what you're trying to say is are you hearing from stakeholders that they need and want the product in their port regardless of how they might fall out on the matrix that you see here.

MEMBER HALL: Right. And I just didn't see it as covered under the answers that were provided here, or the questions to answer the question.

MEMBER LOCKHART: I guess Larry's just pointing out that that was never under our purview. So that's why we weren't paying attention. Sorry.

MEMBER MILLER: So we maybe just add something about --

MEMBER HALL: The stakeholder demand, as simple as that because I think that if you have something and you see it fits most of these but nobody wants it -- which I know that's not going to be the case but there might be somebody who wants it more somewhere else and they're two very even, that's one more criteria for which you can determine and do the assessment.

MEMBER MILLER: Okay. So just a bullet under that that says stakeholder demand. Under --

MEMBER HALL: The other factors.

PARTICIPANT: Item C.

MEMBER HALL: Item C.

(Off microphone comment.)

MEMBER HALL: I don't know who owns it, so I'm just putting it out there and maybe Lynne can help us put that in there.

MEMBER MILLER: Actually, go back up, Lynne and I'll tell them where to put it. So that's under 6C. And we'll add just a bullet. We'll put in stakeholder demands.

(Off microphone comment.)

MEMBER MILLER: Demands, needs?

(Off microphone comment.)

PARTICIPANT: Stakeholder demand signals.

MEMBER MILLER: Signal.

MEMBER BRIGHAM: Yes, Lawson Brigham. There's a --

MEMBER MILLER: One second, Lawson. You got it, Lynne?

MEMBER BRIGHAM: Yes, Lawson Brigham. Could you scroll back up, Lynne? There's a point about marketing the entire organization called NOAA. And they have -- because they're a multi-mission organization, I mean, I don't think we should comment on other than nav services marketing.

I think strategies for the overall NOAA where they've got to market to the fisheries segment, the environmentalists, the coastal people, Nav Services, the weather, I don't know. To me that's too holistic, it's outside our range of points.

MEMBER MILLER: It's a good comment. We can take it in.

MEMBER BRIGHAM: But marketing Nav Services and the relation, with our issue papers, that's what we're trying to do, highlight the points. I don't know, it just seemed a little out of place to me.

MEMBER MILLER: So we're just removing up there, remove --

MEMBER BRIGHAM: The taxi driver thing.

MEMBER MILLER: Yes.

MEMBER HALL: Sorry, Lawson. Is there still a point where it should be at least NOS or navigation services? So leave that in there but take it down to more advertising whatever engagement on and showing people that NOS exists and why it exists.

So Lynne, can you put it back in just to see what it said and then we can maybe make it a little bit more related?

(Off microphone comment.)

MEMBER MILLER: Why don't you go work with Lynne, yes.

CHAIR PERKINS: Okay, very good. We're at 5:05. I don't want to have us go into overtime compensation for the court reporter.

So with that, those of you that are interested, there is a very nice roof top bar at this facility. It might be a nice place to go and decompress, you know, after a very hard day's work and good effort by all.

We did receive an invitation from Niels Aalund, for those of you who don't have dinner plans, there is an all you can eat shrimp and catfish dinner at the Knights of Columbus Hall at 1912 Winnie. You know, right down the street here. So that may be a dining opportunity. Lawson?

MEMBER BRIGHAM: Just for tomorrow after your overview and summary of today, we'll start with Larry I guess and then go to myself and Captain Rassello and Captain McIntyre, is that right? Just to make sure that, you know, we've covered the Arctic priorities already before coffee this morning. So we would go to Larry and then my team and Captain Rassello and Captain McIntyre, right?

CHAIR PERKINS: That's correct. Okay, with that being said, it is 5:06 p.m. and let us officially adjourn for day two.

(Whereupon, the meeting in the above-entitled matter was concluded at 5:07 p.m.)