Closed Captions: NOAA HSRP FAC Meeting, March 9, 2022

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TRANSCRIPT:
>> AUTOMATED VOICE: The broadcast is now starting. All attendees are in listen only mode.

>> JULIE THOMAS: I would like to welcome you to the HSRP review panel meeting. I am Julie Thomas. I'm the senior adviser at oceanography in La Jolla, California and the chair of the services review panel. My co-chair is Sean Duffy senior.
Before starting that meeting, I would like to acknowledge the many people and businesses operating during COVID- 19 pandemic and its impact on our work and personal life on our country and the great human loss. I would also like to take a moment to introduce and warmly welcome Benjamin Evans, the new Office of Coast Survey director and that National Hydrographer and that new designated federal officer for the HSRP team. We are so glad you could join us up-to-date and this is an important first meeting. So we are happy with your participation.
I would also like to warmly welcome our three members to their first meeting and look forward to their participation and comments. That is Captain Alex Cruz, and Nathan Wardwell. Admiral Evans, would you like to say a few words?
>> BENJAMIN EVANS: Thank you, Julie. It is certainly beyond bittersweet to be succeeding Admiral Brendan, who was a mentor, a boss, a friend to me and many of us throughout my career and a strong supporter and participant. I am honored and humbled to serve as the director of OCS with the opportunity to support and work with this body. As I have begun my work over the last few months, I have been incredibly impressed with the dedication and expertise all of you bring to advising the administrative and navigation services mission. And I'm excited for my first meeting as the designated federal official and I'm looking forward to our discussion over the next few days.
>> JULIE THOMAS: Great. Thank you very much, Admiral. We are now going to have our introduction of the HSR team members and the NOAA leadership. You will find the advanced materials on the web and I will be inviting 19 members including the nonvoting members. The DFO and leadership to do very short interest.
If you would provide your name, organization, job title and geographic location, that would be great. We will do these in full medical orders starting with Dr. Qassim Abdullah.
Are you there? He might not be on yet. Okay. We are going to get move on. We will come back to that him. And we will come back to him, too. Captain Alex Cruz? You are unmute still.

>> ALEX CRUZ: Oh. Make sure that you can hear me because I have technical difficulties.

Perfect. I'm glad to meet you all. I'm proud to be nominated for this.

>> JULIE THOMAS: You are dropping out. You are dropping out, Alex. We cannot hear you right now. Okay.
We are going to come back to Alex. Lynn, you might want to send him know that he has dropped out. Let's go on. He does not realize he has dropped out.
Alex Cappa we can't hear you anymore. Let's go on to Sean Duffy.
And we will come back to those first three. Sean?

>> SEAN DUFFY: Thank you to Julie.

Sean Duffy is -- navigation trade association on that Mississippi River, focusing on that ship talent based channel and excited to be gathering here today. Thank you, Julie.
>> JULIE THOMAS: Thanks, Sean.

>> NICOLE ELKO: I am that science director for the American Shore and Beach preservation Association.
I also serve as the executive director here in South Carolina of the state Beach advocacy group and then finally, the president of coastal consulting. Folly Beach, which is outside of Charleston, South Carolina and I'm keenly interested in increasing coastal resilience and excited about today's meeting.
>> Thanks.

>> LINDSAY GEE: My name is Lindsay. I managed the mapping operations for the ocean exploration trust and I get the benefits of sailing one or two times a year. I will do that later this year. And right now, I'm in Honolulu for work, where the rest of you should all be.
I get to represent you.

>> JULIE THOMAS: We are glad we have representation there.

>> ED SAADE: --
>> DEANNE HARGRAVE: Good morning. I am the geoscience manager. And I really relocated from Houston to New Hampshire. So enjoying the cool weather out here. Nice to see you all.
>> JULIE THOMAS: Thank you. Captain?
>> ANN KINNER: Good morning. Ideal on a daily basis with the members of the small vessel

fleets of recreational and commercial. And that is who I am representing.

>> JULIE THOMAS: Thank you, Dave?

>> DAVE MAUNE: Hey, I am David. I am the chief scientist for spatial technologies here. I'm the editor and principal author of the leading textbook on digital elevation models.
From a grant of the tree. -- photogrammetry. I'm working on two NOAA projects.

In Alaska and one of the 3D nation elevation requirements and benefits study. Thank you.
>> JULIE THOMAS: Thank you.

>> ANNE McINTYRE: Hey, I'm the business director for San Francisco our pilots in San Francisco. I have been in this position for about two years. Prior to that, I was maritime pilot on the Columbia River and I'm on the panel to represent the views of maritime pilot.
>> JULIE THOMAS: Great. Thanks very much.
>> H. TUBA OZKAN-HALLER: Hello, everybody.
I am a faculty member here in the College of the earth ocean and atmospheric sciences. At Oregon State University. I also have -- and I bring expertise in coastal engineering. This year, I am serving as the acting Dean of the College while on leave for my position.
>> Thank you.

>> ED SAADE: Hey, I've recently retired from the position. And the group directorate here in the Americas.
I just realized I'm the third member of the panel that is broadcasting from San Diego County today. So I'm glad to be here.
>> JULIE THOMAS: Okay. And Gary Thompson?
>> GARY THOMPSON: Good afternoon. I am Gary Thompson. I am in management. The flood in addition and alert network and also chief of the survey and I'm in Raleigh, North Carolina.
>> Thanks, Gary. Nathan? Is Nathan with us? There he is.

>> NATHAN WARDWELL: Hi. I am the managing partner. Based in Anchorage, Alaska. I

specialize in water level management. Currently, located in Kona.
>> JULIE THOMAS: Great. I don't know if the doctor is with us now. Yes.
Do you want to go ahead and introduce yourself?

>> QUASSIM ABDULLAH: Yeah, I'm the Vice President and Chief scientist.
I'm also an adjunct professor at an independent state at University of Maryland. I'm involved with NOAA. I'm involved. The transportation and a member of a few committees there. I'm also involved with the American's entire -- Society of funded remedy. I'm the author of the latest position. For special data. Thank you Julie.
>> JULIE THOMAS: Thank you very much. And Captain Cruz, are you still with us? We were muted last time. You dropped out. Don't know if you are back or not.
>> ALEX CRUZ: I am. Can you hear me?
>> JULIE THOMAS: Yeah, I can hear you now.
>> ALEX CRUZ: Good afternoon from my side. My name is Captain Alex Cruz. We do Marine service. I'm also a harbor pilot in Puerto Rico. We cover all the ports. I'm a member of the safety committee for the island and also part of the CARICOOS Board of Directors.
>> JULIE THOMAS: Great. Thank you very much, Alex. All right that we would like to move on to the GF oak at the nonvoting members and that leadership.
Let's see, Captain Andy Armstrong.
>> ANDY ARMSTRONG: Hello, I'm the co-director of the joint Center. And we are located at the University of New Hampshire in Durham, New Hampshire. Larry is not going to be able to be with us today. He is out at sea on some research trials. Thank you.
>> JULIE THOMAS: Thanks. Julianna Blackwell?

>> JULIANA BLACKWELL: Greetings. I'm the director of -- NOAA's survey.

The definition and maintenance and access to the system and also NOAA's coastal program. I'm in my home office.
>> JULIE THOMAS: Thank you. You are muted.
>> RICH EDWING: Here we go. Good day, everyone.

We acquire oceanographic data primarily physical and get meaningful information for the nation and we operate out of Maryland.
>> JULIE THOMAS: Thanks, Rich. Do we have Glenn?

>> GLENN BOLEDOVICH: Yes.

>> JULIE THOMAS: Thank you, Glenn. Is Nicole with us
right now?
>> NICOLE LeBOEUF: I am. Good day, everyone. It is great to be here. I'm the assistant administrator of the National Ocean service and I'm looking forward to today's meetings. Thank you.
>> JULIE THOMAS: Thanks, Nicole and Admiral Evans.
>> BENJAMIN EVANS: Hello, again, folks. I'm the director of the coast survey. I assumed this position in December of last year. And the coast survey is NOAA's nautical charting arm.
We do coastal modeling work and we do other navigation products and services. I'm glad to be here.
>> JULIE THOMAS: Thank you very much. So we really appreciate all of those introductions and we have a lot of NOAA staff helping us with other meeting assistance throughout our regular webinar.
The crew includes Amanda, Virginia, Jill, Galen, Melanie, and Lynne. And thank you all for keeping us in great shape and keeping us on time.
All right, we are going to move into the body of the public meeting. I would like to

welcome our assistant administrator Nicole. The NGS director, co-opts director. The co-director, Captain Armstrong.
Stakeholders orders and nova colleagues. And we have more than 150 participants today. Thank you for joining us on these two-day condensed afternoons of the virtual meetings. Please consider making a public comment to the -- that we can use in our discussions and also to recommendations to the administrator at the end of that meeting.
We would look forward to hearing your comments today and tomorrow. At this time, I would like to introduce Nicole on behalf of HSR, we are thrilled to have you on officially.
We are excited about your ideas and priorities and we hope they take root to support you in your excellent lead. We are as I were grateful for your attendance and active participation with the HSR P. We look forward to hearing how NOAA both align your patient with the data sharing interest. We will be hearing more about the data sharing this afternoon's session. And as you may know, the -- is engage in coastal resiliency and discusses the data float that that navigation positioning and observation portfolio bring to NOAA and your constituents. We hope for some actions for an OS and probably for the navigation portfolio services on the data side so Nicole, it is up to you now.
>> NICOLE LeBOEUF: All right, hello, everyone and welcome to the spring 2022 services review panel public meeting.
Julie, thank you so much for that introduction and a big thanks for your leadership as HSR P chair we could not do this without you. I'm very grateful for this group's hard work, valuable insights and all of the engagement that you have given to us and I do hope we can meet in person soon. But in the meantime, I cannot express how appreciative I am of your sustained engagement over the past two years despite the virtual environment. I know that you all remained extremely busy and that makes it even more impressive that you remain so engaged and involved in the network, the HSRP. I want you to know that your advice is so important to us. It is useful. It is used, it is valid and it is considered across our navigation programs and beyond.
So I also find myself busier and busier. NOS is moving full speed ahead on addressing our nation's conflicts and coastal challenges -- complex coastal challenges. We cannot ignore the real threat of sea level rise on our close. -- coast. You may have seen other news, NOAA on our federal agency partners released the 2022 interagency sea level rise technical report. This report in the headlines it grabbed across the country highlights how important the work is now more than ever.
It also highlights that the public is starving for this type of authoritative information and we are working hard to make sure that we can get our data in the hands of decision- makers as quickly as possible. All of this work is underpinned by our foundational data such as the national spatial reference and title data. These are the backbones of their products and services that support coastal decision- makers and I am working hard to make sure that everyone knows about our mission. This includes working across government agencies and that is why I served on the White House interagency working group on coastal resilience. One of five resilience working groups under the national climate task force. This is seeking to elevate, coordinate and accelerate the federal government's efforts to increase the resilience of our nation's coasts and coastal communities.
This is also focused on developing equitable grantmaking strategies that are more accessible to the historically underserved communities.
I also serve as NOAA's representative to the EIWG on flood resilience. This is focused on the work that needs to be done to reestablish the federal flood risk management standard across federal agencies.
All of this work is possible due to our foundational data from air navigation services programs including vertical land motion and the data. All of this is to say that we need the information that we will be talking about today and we need to use it across many applications and across the federal government.
Looking at the organization, I want to let you know that we are in the initial stages of

developing a strategic plan which will follow completion of strategic plans at the NOAA and Department of Commerce level. For the plan, our priorities include coastal resilience, diversity and equity conservation and restoration, and the new blue economy.
We will be reaching out to all of you and other partners in the coming months to get your input on the draft plan.
And what would be my remarks without a budget update? Today, we see that Congress passed a budget for the remainder of FY 22 at least for NOAA and those others that are in this part of the nation's budget. We are still pouring over the details. Generally speaking, I will say it is good for NOS of course, a wise man named Glenn has noted internally on the team that the devil is in the details and there are a lot of details. So stay tuned.
Now, you have also probably heard about the bipartisan

$1.2 trillion infrastructure law that provides major investments on our highway, rail, air, and maritime transportation systems importantly with a lens to the future. The I 1J a nearly calls for nearly $3 billion for NOAA including support for coastal mapping and significant support for several grant programs many related to coastal resilience.
Plans for the IIJA dollars are under review. It will have additional details including project highlights communicated out to the public. At a high level, NOS anticipates receiving at least $982 million over five years for some of our top priority areas. This includes coastal grant programs that restore habitats and ecological features that protect coastal cuties from flooding. These dollars will also go to assessing and removing marine debris and this legislation provides $150 million to enhance NOAA's observing systems to gather crucial data about our coastal ocean, and Great Lakes environment. Additional IIJA investment supports flood and in addition mapping floor testing and water modeling and including funding projects that the directors of the navigation, observations and positioning programs have already been discussing.
Through these funds, NOS and our partners throughout NOAA look to transform water

prediction by delivering the first effort coupled continental scale operational coastal and inland

flood forecasting and in addition mapping services.

We also hope to build on existing partnerships and other -- with other federal agencies as they seek to make investments that are resilient to climate change.
This is an exciting and unprecedented time for NOAA and we look forward to working with you to realize the long- term impacts and potential from these five-year investment resources.
With regard to the FY 23 President's budget, NOAA received a pass from 0MB in February and is looking to make adjustments to our budget and plan initiatives as a result.
So stay tuned for that as well.

Meanwhile, I continue to have the honor of serving as the representative on the interagency committee on transportation systems. And leverage my role in the CMTS to promote the inclusion of long-term resilience planning into MPS infrastructure needs.
In that regard, I'm looking forward to Admiral Ann Phillips joining the Maritime Administration. She will chair and will no doubt want to hit the ground running. A relationship with the Department of Transportation also continues to be important, especially as we respond to the administration's push for a whole of government approach to the climate crisis.
NOAA, while a leader in climate science and services, cannot do it alone. We rely on partnerships with other agencies, states, and local governments in addition to private sector and nonprofit partners. With this lens in mind, I'm pleased to hear about the ongoing engagement and information sharing at the regional level between NOS and that maritime administration. And I appreciate the contributions of our own HSRP members to keep this engagement and outrage -- outreach ongoing.
As we at NOAA continue to advocate for the traditional blue economy sectors such as

maritime transportation, I'm also thrilled to have the NOAA administrator to lead NOAA in supporting and promoting the new blue economy with blue economy activities at large expected to doubled from 2010 to 2030, NOAA's job of providing data and information to ensure the success of these industries will become increasingly important. I absolutely believe that we are about to see a significant growth in the scale and complexity of data products and services not just from government agencies such as NOAA but within the private sector.
There's a flurry of economic activities surrounding emergency -- emerging capabilities and four developing information and knowledge that supports sustainably harvesting ocean resources for economic growth and long- term prosperity. Just two weeks ago, NOAA held a listening session on the new blue economy. Some of you were present at that and I want to thank you for your time and your input. This kind of engagement is just the first step towards understanding the scope and scale of these activities. Rest assured, we will be coming back to you at and other key partners for input and feedback. A partner coming up next, you will hear from NOS program's directors who will touch on the past year's achievements from Admiral Evans and you will hear about the many sources of data from the bathymetric source project to efforts underway to establish data licensing protocols.
We are working to make access and use of our cutting edge products and services even more useful to the American public. From Rich at wing, you will receive updates on the program and marine weather Channel forecasts and I'm looking forward to an update from Juliana on the coastal mapping program and opportunities. Thank you again to Captain Andy Armstrong for joining us. I understand Larry cannot be with us today. But I do look forward to receiving an update on the University of New Hampshire's center. Your cutting edge work and additional navigation technology keeps us fresh and I thank you for it. With that, I'm going to turn the mic back over to you, Julie.
>> JULIE THOMAS: Thank you for your excellent remarks and your candor regarding the budget and we definitely look forward to hearing follow-up messages about that. It helps put things in perspective to hear about your administrative interests from claimant resilience, the new blue economy and diversity, equity, and inclusion and we will look forward to hearing these budget updates with the positioning services portfolio when it is possible to share them. And we hope you keep these requests coming to the HSR team. We will consider those interests and discuss them now and in the future. The HSRP is industry -- interested in the infrastructure bill. And when it is available for discussion and hearing about how NOS' foundational data and operations can tie into the requirement of the nation to support resilience to climate change.
So I think we will actually move on from here and we do just want to say, Nicole, that we want to know how the team had -- can be of service that you and we ask that you keep the communication going with us and if you ever see anything that you think we should discuss and into our priorities for the future, we would be really happy to take that up. Okay. Do we have Admiral Evans up next?
And Nicole, did you want to respond to anything there? Or are you good at moving on?
>> This is an excellent time if any of the members want to ask Nicole a question, we are early.
>> JULIE THOMAS: We are way early. So Nicole, sorry.

>> NICOLE LeBOEUF: I am fine.

>> JULIE THOMAS: We will open it up to the HSRP members. If you have anything you would like to request back to Nicole.
>> SEAN DUFFY: This is Sean. I would like to say, Nicole, I appreciate you wearing what was determined to be Mardi Gras beads and the spirit of Louisiana so we thank you for honoring us. Excellent remarks and I had to stop several times and take notes which I will hope to follow up on. But just appreciate you being here and you Josh Ess Julie said could really cover a great bit of topics.
As with all legislation, we look forward to seeing Glenn's notes as you mentioned

budget reference.
>> Does anyone else have anything? Nicole, as you know, we have already discussed some of these priorities with you prior to this meeting and it is just really helpful to have these discussions and help us kind of direct our priorities towards how we can really be of most value to NOAA.
So we appreciate the opportunity to do that and we will look forward to delving deeper into the coastal resilience and this new economy and figuring out what is most productive at this time. So okay.
I think we will move on now. And thanks so much, for your brief introduction there. We appreciate it. Okay. So now we will go to Admiral Evans.
>> BENJAMIN EVANS: Thank you, Julie.

I would like to start by also taking Nicole above -- thanking Nicole and offices that have a critical role in providing additional data which enables goals such as responsible economic development and equitable service delivery and conservation infrastructure and other areas where priorities are overlapping.
Nicole mentioned her hope that we can gather in prison once again soon. And I share that desire within the Department of commerce, we are certainly working towards reintegration into the office as pandemic conditions improve. Or however, at this time, we continue to do most of our work remotely through hard work and ingenuity that we have adapted to the challenges of working remotely. I would like to recognize the NOAA team and federal and private sector partners who have worked tirelessly to ensure that our nation's navigation services have remained up and running during this time, whether at sea, in the air, or in the office. I'm sure there are many among us who -- directly or person experienced COVID-19 and families and our communities.
We continue to keep all those impacted by this dreadful disease in our thoughts.

There have been some membership changes since the last meeting. I extend a warm welcome to the three new members.
I also extend my country -- congratulations to Julie Thomas and Sean Duffy for the four-year term.
Greatly appreciate your time and commitment to the panel and that of all the panel members. Speaking of the panel, we are seeking very well-qualified new members for 2023 and beyond. The nominations are due on April 15th. In just under a month. I asked everyone listening to consider identifying one potential new member and encourage that person or yourself to self nominate.
Lynn Murray Felder Lewis on my staff is conducting briefings and is happy to speak further with you. If everyone offers one good suggestion, we will have an outstanding slate of candidates and there will be vacancies.
I appreciate all of the members' expertise and broad contributions to help us be better civil servants, helping us embrace new technology and paradigms and striving to meet the needs of. And large. And excited about this agenda and the following items we will discuss. First two technical sessions. Today, we have a session titled Mind the gap: Plans for data licensing and big data ingestion and use of products.
Tomorrow, a second technical session on bridge fights, what does that national spatial reference system, air gap sensors and navigation have to do with it?
We will also be reviewing four written products. First HSRP comments on data licensing.
A new paper on public private partnerships.

And revised updated papers on the national spatial reference system and ongoing needs for some classes of vessels.
Understand this represents an unusually high level of activity and output for the panel. I appreciate the work and planning by team members to jointly address the interests of panel members and NOAA requests for advice. I thank the co-chairs. And that chair and co-chair of the full panel for your ongoing work. Thanks also for suggesting this new issue paper on public

private partnerships Gary Thompson for the updates on the paper and Captain Ann Kinner on the rest are charts rewrite. Thanks to Lindsay Gee for working on the first draft of the comments on data -- licensing. They will discuss these products on Thursday afternoon.
This is indeed a very big lift to have four from this meeting and thank you for your engagement and support of their mission and I look forward to hearing more about these topics over the next few days.
And with that, as the designated federal official, I'm going to turn to some housekeeping items. The co-chair and I intend to make the meeting as straightforward and productive as possible. We recognize this fulfills part of the statutory requirements per year. I'm sure many of you agree that in-person meetings provide a preferable place for the dialogue that leads to productivity and conveys the most benefit to NOAA. I hope we can return to the person format as soon as conditions allow. We are planning to meet in September in Hawaii. Please join us virtually or in person.
However, whether online or in person, the goal of the HSRP's meetings is to discuss the current state, both positive and negative, of NOAA's navigation, positioning, and observation services. You will hear updates regarding the geospatial data backbone.
As it applies to NOAA's services as well as other missions. The team members and guest speakers will have a dialogue on topics such as data sharing bridge heights, air gap sensors, safe navigation, and more. I look forward to discussing the interests, possible considerations and recommendations for papers and the thoughts and recommendations for the administrator. I encourage all who are listening to make public comments to enhance this dialogue.
So a note on ethics. This is an ethics reminders. When participating in public meetings, you serve as a special government employee in your personal capacity as a subject matter expert. Please remember that you do not represent any group, industry, association, or other entity including businesses you may be ordinarily affiliated with. Remember to take off your regular work head and replace it with your NOAA hat as you provide your expertise to NOAA and to the administrator. Thank you for your service, strength in the observations positioning services portfolio.
NOAA and I greatly appreciate your vision and help. Regarding public comments, I want to thank the participants who have already provided comments in advance, to the stakeholders, staff, and others joining the webinar, I encourage your public comments and input. If you have a couple -- public comment can type it in that webinar. It will be read into the public record and/or put on the screen if time permits. All of the comments that are on topic will be included in the official meeting minutes.
When comments are received in advance, it will also be shared and highlighted at the meeting as well as become part of the public record.
I welcome and encourage comments from any group, directly or individuals during the public comment period. A note about privacy and disclaimer.
This session is being recorded, transcribed, and posted to the NOAA HSRP website. The stickers have provided their written permission to do so. Individual permission is required for use of your photo, video and voice or on audio. The meeting webinar will be retained and disseminated on that meeting website and accessible to the public. You can decline by abstaining from speaking or dropping off the webinar.
What we normally introduce the NOAA staff and our meetings, due to the condensed nation -- nature of the call, we will include them in the summary report of the meeting. NOS and NOAA have a variety of staff that provide subject matter expertise and administrative support.
28 NOAA staff that work and can assist you throughout the year.
I would like to echo Julie's thanks and the support including Lynne, Virginia Amanda, Melanie. Thank you for your teamwork.

So with that matter out of the way, it is my pleasure to introduce Mr. Randy to he retired

as a captain after a distinguished career which included services in both chips and aircraft track he returned in 2019 as deputy assistant every straighter for the programs and demonstration.
In this role, he is responsible for resource management, strategic planning, organizational performance management platform acquisition and corporate human capital management. His full biography is in that meeting materials.
He joins us today to provide an update on NOAA's recapitalization. Thank you for being here. The floor is yours.
>> RANDY TeBEEST: Thank you and good afternoon. Thank you for having me today.
This will be a pretty high level review of our fleet modernization recapitalization.
If you have my slide deck available. Okay.
As I said, I am Randy TeBeest, deputy assistant. That includes the capitalization efforts. I'm going to be speaking today as well as touch on some of the unaccrued systems that we have going on. Next slide, please. If you are not familiar with OMAO our mission is to provide ship aircraft and unaccrued platforms for the observation machines of NOAA. Next slide.
I'm going to start with vessel recapitalization. This is a snapshot of our current fleet.
15 ships in our fleet right now. Eight different classes. We have a 28 year average age of those ships.
If you can see this slide fairly well, you will see four ships that have red outlines. Those are probably of that most interest and probably the most familiar to this group. They are primarily nautical charting vessels. If you do recognize those vessels, you probably also know that the Rainier along with the Fairweather are two of our oldest vessels.
They were built in 1967. They are 55 years old and this is one of the reasons why it is so important to us.
We do have 15 ships located in 10 different ports. And as I said, there's classes right now on top of that. You can go to the next slide, please.
So our 2016 fleet plan was a monumental plan. It is what we are currently working off of and also updating at this point in time.
But that plan identified four new vessel plan -- classes. And emphasized multi-mission use.
You can see those four classes. That is where we look to the current more particular ships and look to consolidate and standardize our fleet for multimission classes.
This was also the start of a recurring annual recapitalization funding line. Monumental.
We had previously received piecemeal funds to build vessels where we could refurbish existing vessels and this set the tone for purpose built fleet multimission.
So you can go to slide five, please.

The first class is -- and we are doing these in alphabetical order in a recap. But we have class A underway.
It is for the purposes of our contracting fees. But it will be recognized as class A.
That primary mission is oceanographic monitoring research and monitoring.
It comes from the clearly general oceanographic vessel class. It is a Navy class of shifts. It served as the current design for our vessel and we are modifying it for oceanographic monitoring.
We are currently acquiring this through the interagency agreement. With Naval Sea systems command.
PMS through 55 is the unit that builds support ships for boats and small craft program's for the Navy and they have agreed to be the acquisition partner providing a lot of expertise to this acquisition throughout this.
You can see on this ship, we have the names, oceanographer and discovered and you can see some of the characteristics there, that we are building into this vessel.
The oceanographer, error plan date for that and we are currently in the design and construction phase. That is the contract that we are awarded. Actually, this date is wrong. It is actually December 31st. 2021.

So we awarded that contract and we expect the first ship, the Oceanographer, in July of 2022. And a delivery in August 2024.
And then the discovery is about six months or so. The second class. Air vessel.
And there will only be two classes or two vessels in that class. Next slide, please.
It is probably more near and dear to your hearts. Its primary mission is charting and surveying. It is going to have multiple lunches as well as some plans for unaccrued systems that support that vessel as well. This will not be quite the same as the class A.
We are going to lead this acquisition in NOAA level. Still using the Navy as a partner for technical and programmatic expertise.
So they are always near and dear to us in terms of assisting us in building these unique vessels.
The status of it is currently building the request for proposals. The RFP and that will be solicited later this spring summer. We expect.
This one will have -- this acquisition will have between two and four vessels depending on funding available at the time. And you can see again some of the characteristics we are going to build into this launch as well.
Okay. Let me go to slide seven, please. And moving to aircraft, this is currently, we have nine aircraft, four different types. When I started flying the aircraft 30 years ago, we had 15 aircraft and nine different types.
It meant we had a lot of specific aircraft and we actually flew last flight hours so now we have nine aircraft, four different types. That is really just like I talked about on the vessels, reducing the types and classes and focusing on applications and more standardized operations. That is the key to the plans and it is beneficial in staffing to read -- reducing training and maintenance cost.
As well as a lot of other areas. That is our focus in both ships and aircraft.
These aircraft are located in Florida. We moved a couple years ago from the Air Force Base where we had been for about 20 years and moved to the regional Airport, also a purpose built facility just for us. 156,000 square feet.
Wonderful facility. Great opportunity for the NOAA aircraft program to advance and move forward.
About 110 personnel are on that operation there. Next slide.
These are some of the recapitalization efforts underway. Just completed. I wanted to mention that. And what we have planned for the future. We have -- we do have a King air aircraft in our fleet already. And this one replaces an NWS mission. They are all aircraft.
They are designed to carry most of the sensors we know about and typically carried for most of those remote missions that we have including NOS.
Nautical charting and coastal mapping, things like that.

-- this particular one -- replace the mission with a camera radiation system. But again, it is available and able to do multiple missions. The other procurement that we currently have in the works right now is Gulfstream G550 high-altitude jet which is going to replace our current G4 which is approaching 24 years old I believe and reducing its availability. So we are replacing that. We built the baseline aircraft and are currently modifying it with several sensors that will help with the
high-altitude hurricane mission as well as other primarily weather service missions that will come online in fiscal year 24-25 for hurricane season, expected. And some of the future updates that we are targeting for aircraft that we are planning for the near future and this will be articulated in our update which is currently making its way through NOAA clearance now for aircraft revitalization. Looking at the second tech just like I explained.
The hurricane mission is really expanding. The demand is greater than what we can provide.

And we believe there's quite a bit of support and effort necessary for the second one. Also having to replace our P threes. They were built in 1974, 1975. They are getting up there in age and needing replacement.

We are looking at, again, four engines for that replacement. So the options are limited. That mission as well is -- has a great demand signal and we are targeting probably four aircraft.
The current aircraft were -- and about 20 -- and that should take us through 2030.
We are starting that procurement process, the acquisition process right now to look at opportunities and which aircraft are available as well as what we should target for replacing the P3. By 2030.
Also, 13 air, as I talked about the remote sensing aircraft. That will be available for coastal mapping as well as other remote sensing.
Other types of remote sensing missions. Also looking under the aircraft which is a very good utility aircraft for us in our fleet. They are relatively cost-effective and just very useful aircraft.
We will try to get a fifth one of those. Okay, moving on to the next slide.
You want to touch on some of the unaccrued systems primarily then crude systems operations center or OC the first year that that was funded fiscal year 20. A couple years into that now up and gently speaking to you can see some of the activities and responsibilities in there, oversight policy guidance, consolidation, management, and ultimately operations, meeting unaccrued aircraft, unaccrued surface vessels and possibly crude, underserviced vessels as well as we look into the various technologies that are available.
The partnerships and collaboration. It is generally underpinned by the C-note act or the commercial engagement through motion technology act.
When we partner with other organizations for the bipartisan legislation that advances NOAA's unaccrued maritime systems. It also encourages private sector research and velvet and ensures that it is readily available. Moving to the next slide.
I wanted to show this slide. This is really our transition into operation strategy. It is taking the research of particular platforms and demonstrating, planning, and going through a testing evaluation phase and right now, we are doing that for 9 particular projects.
Through fiscal year, 24 and you can see we have the oversight Board, which is involved in selecting the projects that we were going to investigate that test, and evaluate.

And this year. We are doing the budget for and initial capability.
Moving and transitioning from high readiness level to actual operations in the fleet and if you go to the next slide, these are the nine projects that were selected.
To -- two highlighted in blue are of particular focus, probably to this panel but in the NOS world and mapping and charting realms. We wanted to highlight those and talk briefly about those two in particular. Go to the next slide.
One of them is the use of unaccrued surface vessels to increase survey efficiency. The objective is to focus on diesel power USB's working in tandem with the force multiplier.
Ink surveys as well as mapping.

That single USB working in tandem has the potential of reducing ship time requirements. Fisheries, acoustic trawl, and ocean mapping surveys. Here you can see the necessity and the advantage of using diesel power USBs that can operate at relatively the same speed as the mother ship.
What we have done is acquire diesel power. Some of you might be familiar with that.

It is pictured here. And working on the acceptance testing and training throughout 22 and then moving to integration. Oscar Dyson as well as Thomas Jefferson. In the long-term ultimately is to transfer the operations. Okay.
The other admission that I wanted to mention, this is really facilitated and supported by -- it is really focusing on a different type of mission right now. But it is to evaluate the mapping potential of a fixed wing vertical takeoff and landing aircraft and the interest there I think in the hydrographic realm or the coastal mapping realm is the fact that it is fixed wing and will also look to beyond line of sight type of operations. Right now, you are probably familiar with

the typical Quadra copter UASC mission, the reason people use those types of platforms are because you have to keep them within line of sight to operate and most U.S. airspace. They are looking to break through and have regulations that allow the line of sight. There are of you -- if you've barriers to that.
And more popular and it gives a lot of use to things like mapping or coastal mapping.
They use a number of these types of sensors. You can see the RGB and sensors. All of those things, when I was flying man aircraft accrued aircraft, decades ago, were hundreds of pounds each. Now they are under a pound. That location and that technological advancement is pretty great and pretty -- leaves a lot of room to use these assets in a number of different ways. I just wanted to end up with some of the -- reiterating some of the value of the assets. They are national assets and essential to national products and services. Next slide.
These are some of the benefits under the OKR research realm. Weather service. A lot of it is in hurricane tracking and intensity but also winter storms, which is what they do in the off-season.
And you may have heard of the atmospheric rivers.

That is a popular admission these days that is getting more and more traction. And then finally, last slide, fishery stock assessments bring great value to those types of things. That is what they do as well as an OS with charting and many of the things that go with that type of capability.
So with that last slide, that is all I have and chairwoman Thomas, I will turn it over to you.

>> Thanks, that was a nice overview. That we collect -- we capitalization has -- from the beginning.
So let's open it up to members. And see if you have any questions or -- for Randy at this time. David Quick apart.

>> DAVE MAUNE: This is Dave Maune E. I have a question about unmanned aerial views of those vehicles. Are they limited to having UAVs that are made with all components in the United States so that we don't rely on China?
>> JULIE THOMAS: --

>> RANDY TeBEEST: I think it is called the drone. Understanding is part of that limits the use of foreign-made and foreign-owned aircraft, for and provided as well as some of the parts. I don't know to what level that we are prevented from having aircraft parts that are made in other countries. I would have to look at that. I would recommend or expect that there's a lot of interest and I would recommend that Captain Phil Hall come and talk to you and tell you some of the more detailed operations and also limitations. He gives a great presentation, I think. To have him at some point in the future.
>> DAVE MAUNE: Thank you.

>> JULIE THOMAS: And Saade you have a question?

>> ED SAADE: Thanks for the presentation. It is great to get that update. You are probably aware of the fact that there's a great debate in the industry about over the horizon operation of the surface vessels.
Do you have any updates on when -- first of all, who is going to set that rule? Do you think it is going to be NOAA or that
U.S. Coast Guard? And secondly, do you feel that it is close to allow us to send these vehicles over the horizon without having that adult supervision, you know, with the vessel looking at them all the time?
>> RANDALL TeBEEST: You are talking about surface vessels not aircraft. I would suspect that they would definitely be involved in whatever rules come about. They are a little bit different than aircraft. The aircraft rules are pretty stringent already and they have been trying to build these UASC probably longer with surface vessels and maritime applications.
There are less rules in maritime operations. Most certainly going to learn in terms of what USX

OC recommends. On the conservative and going to be highly looking at risk assessment when they determine what is available and what is, I guess, whether we are risk averse to it or not. Some of it will determine where it is operated. I don't suspect that there will be general broad rules that apply to every single operation. I think there will be less risky operations with less busy areas where we can feel accountable going on that line of sight. That will take some time to get there and probably will take some time to get actual regulation that regulates that as well. I would suspect. They can talk to that a lot better. I'm sure he would have a more concise answer.
>> ED SAADE: Thanks a lot.

>> JULIE THOMAS: Lindsay, I think you have a question.

>> LINDSAY GEE: I have countable going on that line of sight. That will take some time to get there and probably will take some time to get actual regulation that regulates that as well. I would suspect.

They can talk to that a lot better.

I'm a couple comments and what we always do in the industry is very interested in that.
And in one year I see the industry already does provide data service, providing over the rising already. And there's one person about connecting to those groups doing that already. I will answer my question.

They are really comments and questions.

One of the things, I know -- notice you talked about multimission. I did not see the details. Maybe we could get a more detailed briefing later on.
But about the mapping systems and that includes seabeds, sub bottom, you know, water column at making sure that we kind of meet that requirement.
So having a ship out there and making sure we are getting all of that. I would be interested in seeing that eventually and then related to over the horizon and generally, I think on infrastructure you know, we are talking about telepresence and haven't said it led to mutations at sea.
I believe that should be standard now. It is not just the special telepresence or loan some things. It is every vessel, you get 50 -- up and down now and it should be part of the standard. And hopefully that is going to be harder. But in that said communications content that is for a number of reasons, I think that is a support for that. Limited in those sorts of things. So you can get the extra sign, the support you need a short and also from equity and diversity could not everybody can go to the sea and this -- provide also that -- addressing that. It provides the opportunities to do that as well. I think.
And bring that on board. But I think that is key to now. It is almost part of -- like, we talked about always being separate and all of that was expensive because we have to print said lights out. But I think that now and the cost of vessels and operating vessels, it just shouldn't be a standard component of making sure you have a great you know, a satellite connection to get that just brings you into that whole infrastructure and environment.
So that was the general comment.

>> RANDALL TeBEEST: Great points, and thank you for data in particular, I would agree. I think a lot of people agree about the -- we are already building out our capability with our current fleet and looking to position ourselves as much as we can. A lot of it comes down to affordability and which requirements we can attain and which ones we have to reduce. That is always the trade-off.
But understanding both and I love your equity and diversity perspective. That is a great point but also from a true quality of life standpoint. We don't just use it for transmission of data. There's -- connector for the crew, too. That is a big concern for us now, too. It is attracting

and retreat -- retaining our workforce as technology increases.
We want to make sure that we are building that in and building the capability and the framework for our vessels, even if we don't have full funds right off the bat. We have a way to step up to that as we expect to keep these vessels for many decades.
So it is trying to position ourselves for now as well as decades to come. But thank you for your remarks.
>> LINDSAY GEE: And one of the things is the cost. The cost of ship time now versus the cost -- it is almost like I think I will get so many horsepower engines versus another.
It is just the capability that should be part of the industry through those connections and again, I think we have discussed the influence and NOAA doing that working with industry is something that can help those costs. That is a standard bit. Yeah, thank you very much.
>> RANDALL TeBEEST: Great points. Thank you.

>> JULIE THOMAS: Thank you, Lindsay and Randy and Nathan, you have a question?
>> NATHAN WARDWELL: Yeah. Randall, thank you for that briefing. That was great.
I have one question N/A comment I believe. I may have missed this in the briefing. But I'm curious if any of the oceanographic vessels have holes for doing work in the Alaska and Arctic and then I will follow up with my comment. I noticed that USB -- USVs are being required, they are planned for vessels that don't work in Alaska.
So it is -- Thomas Jefferson, I believe. From the surveys.
And so multipliers with USVs in Alaska. You know? A good opportunity to address mapping needs for the seafloor.
>> RANDALL TeBEEST: Thank you, Nathan. Great points. That's your second one, first, I agree. Those are the first two kinds of integration platforms. We suspect and can only imagine the other areas of impact and other areas of value that that capability would have on many missions. Those are the first two where we try to prove our readiness levels and make sure that the testing evaluation phase is successful and actually integrate them in transition into operations. But I agree. There's probably a lot of opportunity up in the Arctic for sure. With regard to the ice strengths, they are being constructed to a specific design constraint for ice operations. I cannot tell you. I don't have the expertise to recall exactly what that level is and what it means in terms of what type of ice operations. There one -- were some envisioned by the integrative process -- project team and they did build some eye strengthening capability. Thank you for your questions.
>> NATHAN WARDWELL: Yeah, thank you for your comments.
>> JULIE THOMAS: Thank you, both, and custom did you have a question? We have time.
>> NICOLE LeBOEUF: Yeah, thank you, get ready. Just a comment for Randy with all of this budgeting and we look at the -- the sonar mapping. Have we considered that satellite - - I mean, to fill some gaps to enable us to see which one we are going to need, resources and which is not because satellite definitely is capable of the things or the aircraft we are planning. So I'm just wondering whether this was in the equation, when we consider the coverage we need or --
>> RANDALL TeBEEST: Yeah, thank you Dr. Qassim Abdullah. I don't recall hearing much about that but I'm not a member of the actual project team. I may have looked at that specific type of capability and how to address it. I'm going to bring that back to my team. I will have them respond back to the panel with a remark. A little more insight on that.
>> QASSIM ABDULLAH: Thank you.

>> JULIE THOMAS: Thank you again, Randy, for that presentation. As you can tell, it is of prime interest because of the panel and near and dear to our hearts. We will enjoy following future development on the fleet.
>> RANDALL TeBEEST: Thank you for your interest and thank you for having me.
>> JULIE THOMAS: All right. It is time to start our directors session and Sean Duffy will be moderating the next session. Sean?
I think you need to unmute and show your camera there.

>> SEAN DUFFY: All right, thank you, Julie.

>> JULIE THOMAS: You're welcome.

>> SEAN DUFFY: I'm going to move right along into introducing Admiral Evans and he is -- has welcomed some new members. Unfortunately, fighting myself as being one of the older members at different times, I would like to welcome you in new --your new role to the HSRP. It has been a pleasure to get to know you some through the different encounters along the way.
I still have to take a deep breath when I think of my friend, Ric Brennan. So I really appreciate you mentioning him again and you have big shoes to fill and I know you are on your way. With that, I'm going to be simple.
I have time constraints. I was told to be that kind of referee. But with that, I don't want to cut you short and I open it up to you and really appreciate your input and being here.
>> BENJAMIN EVANS: Thank you Keshawn. Yes. Fully appreciating the size of the shoes tonight I'm attempting to fill here.
I wanted to jump back to Qassim's question. I think I might be able to address it.

It is -- it is actively investigating and utilizing both the contract and internally.
I don't think that that probably falls within Randy's portfolio. I wanted to take that off of his plate a bit. If there's interest in learning more about the activities, I'm sure we can arrange velvet that. And with that, I will pivot to my remarks.
I'm certainly happy to be able to provide an overview of some select activities and priorities since our last meeting which was in September.
Before I dive into those details, I would like to share an overview of the strategic vision. Next slide, please. Since coming aboard last December, I have emphasized three broad focus areas, which I will summarize here. First we are focused on completing the transition. This shift, I think, is critical to remaining relevant, nimble, successful. The unique value lies in our integrated role? Understanding and abilities in cartography, GIS modeling and the information and knowledge these disciplines produce. It must honor its core mission of safe navigation and nautical charts and we will. We will do that while providing a wider range of projects and services. Focusing on data and workflows, preserving the value and enabling this and an example of that, you will hear about that when we talk about data licensing this afternoon. The second broad priority, we must continue to increase our love for it -- our relevance and capacity.
We have much to contribute not only for charting and maritime transportation but also the broader range of critical challenges facing this country and our planet. To me these ambitious goals, sustain, and lead lid those relationships. Our sister agencies and beyond the public, academic and working together, we will build -- we will be better positioned to secure resources and innovate more efficient techniques to build capacity for the future and I think the issue paper on public private partnerships is a great example of how we might achieve greater success there.
Third and probably most importantly, as Randy mentioned, NOS, no different.
We must sustain and build our workforce. This means stepping up in preparation for that generational shift in a way that expands our talent pool.
To ensure we have expertise that we need. As we seek diversity, it is essential to emphasize the principles of respect and inclusion that we cannot afford to leave any voices unheard or leave them behind. We heard Nicole -- we heard from Nicole earlier about coastal resilience and the renewed climate economic and conservation goals. The priorities I have just described will position them to provide the additional data to enable the success of those priorities. This does not mean we will deemphasize charts. Quite the opposite. By focusing on data, partnerships and people, I believe we have positioned ourselves to better deliver these products and much more. With that big picture from context, here are some more specific updates. Next slide, please.

First, the budget picture. And much of this was talked about by Nicole earlier. I will breeze on three.

And in effect, this is already a little bit out of date. The FY 22 annual appropriation, we have been planning to fund the operations at FY 21 levels based on information up until today. And speaking frankly, we expected this to be a very challenging year. We are still digesting the appropriation that has just been passed. Certainly if additional funds are available, we will be prepared to act on them quickly. Nicole touched on the disaster supplemental and deep infrastructure investment and jobs act. Spending plans, as she mentioned for both of these bills, are currently in review with Congress. There's not a whole lot that we can say about that. What I can't say about the activities is that we have been heavily involved with the provision three which is focused on flood and in addition mapping and forecasting water modeling and precipitation studies in support of that, working with NGS plans to collect high-resolution topographic data to advance flood and mapping capabilities.

Working with co-ops plan to expand geographic coverage of the coastal models.

And thirdly, planning to where the national hurricane center of the weather service to enhance storm surge capabilities. In addition to improved services to the marine navigation commute is that the outcomes of this will support coastal committees as they plan to prepare for flooding an indentation. Providing more accurate water level prediction and providing coast to coast within their retreat for coastal areas.

So those are the sentinels and then looking ahead to 2023, we are awaiting news about the budget and also beginning to plan for the FY 24 budget. So next slide, please. If you want to see a bit about transformation and -- because I'm very happy that there is interest and the issue paper on the chart transformation. Thank you for developing that and four your ongoing attention to the subject.

We believe that the EMCs are a superior project. With the most up-to-date and complete information. We also acknowledge there are still some needs for printable charts. Three general use cases that we have identified include backup and other forms of electronic navigation. Voyage planning and situational awareness. This is a discretionary tool to augment training and certification. We are planning for the NOAA custom chart tool to support all of these use cases by providing a printable restaurant like product. We expected to rely heavily on the private sector partners to identify and meet demand for these products. We will be releasing improvements to the custom chart tool. We are aiming for quarterly updates.

With -- which will address request functionality, and fixes. We have a new version that we are expected to release in the very near future and a version to follow which will add capabilities that create accounts and save the charts they create to easily reproduce them again at a later date. We are working to accelerate the rescaling of our ENC sweep and it will improve the functionality. Next slide, please.

Data sharing and licensing. I don't want to spend too much time on this. But I want to express my thanks for developing thoughtful comments on this topic. It is important to NOAA.

I will say briefly, RRB focused on data licensing? With increased collaboration and data sharing we are seeing a dramatic increase in the amount of data that we are ingesting. They will increase in the future and this is a good thing. But our current data infrastructure and coat protocols require too much manual intervention to keep up with this growth. We must make these systems more efficient, particularly at the data handoff points. It is important that we -- particularly if that data is subject to any new restrictions or user observations. Data licensing is an objective and can help us achieve this goal. So how will the data licensing help us? We see data licenses that are machine-readable so that when a license is assigned on the bathymetric data, it allows for automation of the applications and distributions while also improving communication to end users. This makes data reporting more efficient and reduces the risk of any errors or mishandling. The national bathymetric source is the curated authoritative model that we have underdevelopment. This was designed from its inception to accommodate its licenses. We are set up to realize the benefits of data

licensing. It adds additional value to our public domain data, whether collected by NOAA or externally sourced. An open it up license removes any ambiguity with regards to copyright and intellectual property. It unlocks the full value to a much greater user base and encouraging products and innovation.
Again, we will be talking in much greater detail about this this afternoon from a far more impressive group of experts. I look forward to that. Next slide, please.
Some other project updates. I mentioned that national bathymetric source. It is the authoritative high resolution model of U.S. national bathymetry. We are in the process of building this out. It has been completed for New England and the western Gulf of Mexico by the areas that are referenced.
Build up plan continues for the rest of the East Coast followed by the Great Lakes, West Coast, Alaska, and Pacific Islands. Areas that have already been built out are also maintained as new source data is made available.
The NBF was a part three product navigation.

Navigation products and services. Navigation products, that navigation product enables both the ENC is giving effort and that position marine navigation program. This is the chart.
And all the sources which meet the standards for application are part of that realization.
There's an internal realization which supports our internal assessment of where the -- to serve eight next. Of the debt service that we consider all layers, whether they are qualified for charting could not qualify for charting and sensitive sources, which are all those only available on our NCS network. We have a public facing version with really two sub flavors. Both of these include all of the data except sensitive data. We maintain an internal version of this for character models and based on hard data.
And then the product which we are very excited about which was just launched, these products are on the data which is not chart data.
It is the crux of a shift to a data focused organization. Multiple users who need this foundational data for their work. And we are excited about that. So next slide.
So the link is and the very bottom of the screen there. It includes information, data specifications about the product and these are part of the big data program. Just some examples of how it could be used the National Ocean service, is based -- is a plan to be released in spring of 2022. Maine, New Hampshire and Massachusetts were used to create a seascape map including segmentation of the seafloor.
Rocky areas, shoals and rains. The products together show how seafloor components and habitats across the region are distributed and they will support numerous ocean related products in the Gulf of Maine like sensitive habitat permitting and a general understanding of the habitat. Next slide, please.
No update to be complete without discussing position marine navigation. We are working on developing additional products.
Our focus this year is to develop prototypes in the format, the high-resolution bathymetry and S104 water level information. I know this is something they follow closely.
And thank you to Julie Powell for keeping us updated. Next slide, please.
b with that, I took the role this year.

NOMEC Council. I would like to thank Ashley Chappell for covering that while the director position was vacant and her outgoing support for this effort. We are continuing public engagement and partnership following engagement opportunities like the decade laboratory event featuring Secretary Carrie.
We are focusing on tribal engagement based on feedback received last year. We also successfully conducted the NOMEC project focusing on both mapping and exploration using in-house and private sector resources and we are in the process of identifying 2022 flagship projects for this year.
>> SEAN DUFFY: I wanted to let you finish this slide. But we are running out of time. And if you

could wrap up.
>> BENJAMIN EVANS: F Lily, Sean, thank you. I appreciate that. Let's move on to mapping the gaps. This is an exciting new report which we have just released which indicates where we stand with the NOMEC goals. Bottom line, we have increased the area mapped by 1%.
To 52% unmapped. This is an increase of 1% from last year. On the face of it, you might think that is small progress and it indicates that we have a significant way to go.
And I think it demonstrates that we need to continue to share all available bathymetric data because if it does not make it, it does not count. We need to participate in regional campaigns and we need to continue to innovate. Next slide, please.
I'm going to skip this slide because we heard, I think, fairly thoroughly from Randy on unaccrued systems. There's more that I could come back to if there are more questions and I think that is my last slide.
That completes my report. I'm happy to address questions if there are any.
>> SEAN DUFFY: I think we are going to move to the next director to go to Juliana, if I have the order properly. We have Juliana. So Juliana Blackwell, the director of the survey. And with that, I will provide you your time and look forward to hearing from you.
>> JULIANA BLACKWELL: Thank you, Sean. Let's get the slides pulled up for the national survey, if you would.
Excellent. Let's go on to the first real slide. Thanks, everybody for the opportunity to give you an update. As we away our final decisions on the appropriation, our final budget numbers and hopefully some supplemental funding opportunities. NGS is poised to execute whatever funds come our way. I wanted to highlight the program activities in which supplement to funding could enhance our activities and support the administration's priorities. I will mention the very high level that we were -- we are planning for and are able to -- we will be able to provide some additional coastal mapping work in the areas of shoreline energy as well as the surveys that would support our work as well as support the efforts of the national weather services national water center.
We are doing some collaboration to identify other areas that are of interest. We would also be looking to provide additional funding for our airborne gravity collection, which is our key data set for the development of the new Geo potential for national spatial reference system modernization effort. And also looking at how we can provide more support for measurement of vertical land motion and help we can integrate land motion in particular along the coast into data and in addition projects. In other words, we all recognize sea level change in the importance of being able to update information about the levels of sea. But we also have to include what is happening on the land and whether there's some uplift and so some of the areas that we are looking at, improving upon his being able to provide vertical land motion and it is going to take a while.
But we know that there's some opportunities there with that development of that model and also with the -- being able to connect the national spatial reference system, more precisely with the international reference system. So that would be through things such as the foundational network which I will talk about here in a few minutes. And the rest of the slides, I will focus on a few of their key areas within our coastal mapping program and within the modernization effort. We will provide a few updates on key areas of stakeholder interests. Next slide, please.
I will start with our planned work under our coastal mapping program.
I.e., shoreline mapping is how it is often referred to. Here on this slide it may be a little hard to see unless you have a big screen. The information is there if you zoom in. The FY 22 planned photogrammetry lidar operations are shown here. I will start with the demographic lidar work on the left. The areas that we are planning to collect are in yellow. It might be a little hard to see. I will mention some of them for your awareness. We are looking at the Alaska area. Along the coast. In Florida. There's an area.
Chesapeake Bay. We also are collecting areas about and -- in the northern Hawaiian Islands. And so those areas are yellow. Areas that are -- are in blue. You see them scattered along

the coast and that areas that are already completed are 1n green.
So just mentioned that on the photogrammetry side, we have got the image on the right-hand side of this screen that is showing areas in planning, planning phases are in orange and areas that are planned operationally to be executed are in. Or Pincus depending on how it shows up on your screen. Those areas, I would just mention, areas in Alaska. They are scattered throughout Washington, Oregon, including the Columbia River.
The multiple locations on the East Coast and the gulf of Mexico. These are all based on requirements in our annual survey of priority areas in the workshops that are conducted internally to collect information about where updates are most needed and prioritized based on operational requirements. So again, this is within our planned budget whenever we get it, that we are planning on executing. Next slide, please. Another area that is also collected using remote sensing in a sense, this is biplane.
And that is the collection of airborne gravity data or gravity projects.
We are making project -- progress even to the pandemic in order to be able to collect 100% of the U.S. and its territories in order to update the vertical data.
So this airborne gravity data is the basic data set for the potential data on the 2022 modernization effort, which we are behind on. We will still go 2022, but it is not going to be rolled out about -- until 2025 at the earliest. It could even be later than that. The areas in green are all done. The areas in blue are being processed.
The area of blocks that you see in Orange are under way. Many of the lines have been collected.
We are trying to complete those blocks and then the one area you see here in white, over Guam and -- those are areas that are planned. And if all goes well, we are expected to get out to Guam and start collecting here very, very soon. And if we are very, very lucky, we will get to complete Hawaii along the way.
So we are hopeful that we will make our 93% completion goal for this year and maybe even more and if all goes well with flights and aircraft and people and everything else, we will get ahead of schedule a little bit here this year if all goes well. So anyhow, this will be the basis of the new data.
Let's go to the next slide, please. I mentioned foundation.
This is the highly accurate super precise subset of the NOAA CORS network. We hope we can make these the best of the best stations for the national spatial reference system and make them -- install them or upgrade them so that they are to international standards and can be part of the international network of genetic stations. We are working very collaboratively with the national -- with NGA and also with NASA and if those of you other federal partners in order to, locate with them and build out these sites and do it all at once, one time, and hopefully have a truly federated network of highly accurate genetic stations. We have some of the stations that have already undergone reconnaissance. Those are shown here in Orange. We have some stations where we are tying together these different genetic techniques. You see a picture here on the lower right that shows a big antenna.
We have got a number of things that we are trying to connect with our stations. And those are called International Earth rotation and reference systems surveys that we are trying to make all of those connections there.
We are also planning on installing a few new foundation CORS. Those are shown in blue. And if all goes well, we will continue to tried to build that next new foundation CORS in those areas that are highlighted in green.
I don't have a lot of time to go into too much detail. The good news is, we are making progress and we are working very well with our federal partners and hopefully I will have some more updates for you on this soon. Next slide, please. All right.
Just going to go through a couple of updates, more on the stakeholder side of folks who

have you are tools and our GPS surveying applications.
Our online positioning user service, we have upgraded that to 4.0 version which enables users to Blue Book their GPS projects. So this is streamlining the way this is done for our stakeholders, customers.
And a new user manual has been released and training material is in development. We hope people can utilize this on their own time and are looking for ways to streamline building the knowledge and expertise on how you can provide data through opus and how those have your data into the database.
We are also working on a new project five-point oh that will allow users to add real-time network observations and use the new exchange file format. If you are not familiar with that, I apologize. Maybe it is, -- if you are interested, you could follow up with me later and I could give you details on what all that means if that is new to you. Next slide, please.
>> SEAN DUFFY: Dr. Black will -- Dr. Black well, can you finish up in a minute please?
>> ED SAADE: Yes. Okay get this is a highlight, people are providing GPS on benchmarks.
We have had great success starting with 27 -- through this past year.
We can click on it one more time. And advance the admission here. We had a huge campaign that is shown here. It is showing the number of people who have responded to collecting data to help us, help them build a better model and transformation tool. Click one more time, please. Here in 2021, we have had tremendous support and additional data that has been shared with NGS. And it is only helping us to build better products and tools. Next slide, please. I will show Kate -- showcase it this way so that you can see what I'm talking about. We have all of these areas in green. We have had users contribute that data.
They have helped us improve our knowledge of what is happening in this location. And to provide fresh coordinates on those sites. We have a number of sites that are also identified. We are asking for individuals in those areas that are able to collect data to supply those to us. The campaign is open until the end of this calendar here to help us with our coordinates and transformation tool that we will be updating here after the end of the year. Next and final slide. I will just say that feedback is a gift. And so we are asking for feedback on a number of our products, services, web pages we have added these little banners on each of our pages and if you happen to be on our website and you have some feedback, good, bad, or indifferent, please share that with us so that we can continue to improve our web pages and products and services and with that, I will end my presentation. Thank you.
>> SEAN DUFFY: Thank you. I really appreciate it. I'm starting to understand more the connection to all of the challenges faced related to that. As we move over to Mr. Edwing.
>> RICH EDWING: Okay. There I am. Good day, everybody. Glad to be here. Let's move on to the next slide, please. I'm want to talk about some things we have been up to in FY 22. This looks like it might be an old version. Lynn.
>> LYNNE MERSFELDER-LEWIS: We will see what we can do about that. Virginia Tech can you check?
>> GIN DENTLER: Yes, I will check. I think this was loaded into Google drive.
>> SEAN DUFFY: Can I share from my screen?

>> GIN DENTLER: Yes, we can make you be a presenter if you would like.
>> RICH EDWING: If that is easier, let's do that.

>> GIN DENTLER: Okay, thank you.

>> RICH EDWING: Can you see my screen?

>> GIN DENTLER: Yes, we can.

>> RICH EDWING: Okay. Sorry about that. I will first -- the things that have been going on with our observing networks, which require data, the water level observation network and the partnership program and I will talk about the products and services that we are able to put out through our model, through the use of the tools. So let me start off with the title.

We conduct surveys around the nation every here to update title current productions.
We were able to do that for a little bit. We are very excited to be able to do a survey in the latter half of calendar year 2021 and complete it in November. We were able to update 35 locations and something new we have been doing every time we go out and do a current deployment that we are also acquiring that requires conductivity at the location as well. That is a much-needed and fairly scarce type of data. Because of the issues of maintaining a sense of long-term. The other thing about the survey, there was a lot of correlation with the U.S. geological survey.
We worked to make sure that it met their needs as well. That was a good collaboration.
We are actually just this week starting doing a two-year survey in the club get River.
It was driven by the channel being deepened a number of years ago to get into Portland and Vancouver and we have people on the water meters.
Observing at 32 locations, you know, along the whole Columbia River, all the way to Vancouver and Portland. It's next year. And two of those are going to be in the whole time. Okay.

So with that, we were able to complete recapitalizing Dauphin Island.
The wooden platform that you see in this picture is no longer there. That has been taken away. That was built in 1980 with hurting supplemental funds from hurricane Frederick. And it was to ensure that you could get continuous data through a storm. And it was the only one in the Gulf to have been elevated like that. It was doing good. Hurricanes Katrina and Rita came along and destroyed almost all of the stations in that area.
So it became a bit iconic for us at least and helped lead to the design and funding of 10 new single piled platforms which I have shown pictures of before along the northern Gulf and Texas coast.
You could not get a hurricane to knock down the old Dauphin Island structure. It was getting ready to fall over due to storms, eating away at it. So Congress was kind enough to provide funding to prevent -- replace it. We can no longer do the single pile structures.
With that thick steel that needs to be used. This is designed, this is the power platform that is designed to withstand the same hurricane wave forces. So it is going to do just as well. It took us longer than we hoped because of COVID. There's going to be you out there with the instrumentation on topic.
And we hope to start providing data in about a month or so. I don't have any supplemental findings. But it is a very, it is a topic of discussion. And we were hopeful to get some fun stuff at that to rebuild some other platforms, not necessarily like this, but a number of other stations. Okay.
So that was two bases funded programs. Current surveys.
And the ports partnership program, which continues to thrive and grow. We are up to 36 capital ports which can cover, you know, long capital ports. It can cover multiple lowercase seaports. There's always something going on. You enhance systems like sensors that need to be moved or replaced. I don't want to read the list here, but you can see there were four ports that we did some work at and I'm sure there will be more work being done throughout the rest of the year and to the red, you can see the new ports that are on schedule. You can see our partnership with the U.S. Navy through Puget Sound. That one is just about done. But I believe the sensors are installed and undergoing shakedown right now.
And then we are in the process of completing the agreement with -- we hope to get that one this year and in Pearl Harbor and Brownsville next up on that list, those are in the agreement faced with the partners. So those will hopefully be established next year.
Something I'm very excited about is the implementation of a Marine channel forecast capability.
This was a capability that was developed by the weather service in Tampa Bay in 2017 and it allowed us to integrate weather forecasts with oceanographic -- oceanographic forecasts in one model. And the navigation committee most needs it.
But it has taken this long to now bring it to another location because a couple of things have

that to happen. We have to improve our models. We got higher resolution models and the rhythmic service had to establish the national database, called the national database where they could put all sorts of observations to record the weather forecast post from.
So we worked directly with the Mobile Bay Pensacola weather forecast office as well as Tampa Bay, established or developed the model to implement this capability in Mobile Bay, which is now in operation. Again, it is an integration of weather service and NOS information.
The other, I think, thing of interest to the HSRP is its visibility probability forecast that is put out as well. And that directly speaks to the interest you have had in looking at observations, forecasts and technology that allowed mariners to navigate in low visibility environments.
Okay.
I have spoken to you at past meetings about the coastal inundation dashboard.
We had version 1.0, quickly continuing to make enhancements. You may remember we used to also put out a separate product which when a hurricane would approach, we would pull the storm graphics and. That up with that water level state -- stations that were being affected and updates that product every six hours or so.
The dashboard does that as a layer within the dashboard. You click on that later and it does the same thing. The dashboard is really for the coastal in addition community, the storm surge community, global water levels are referenced to mean higher water.
Higher water is where letting can start to happen and we continue to make enhancements to this.
We have an internal plan to do that and we are bringing the end of their High Tide products, our sea level rise products. It will have to -- I will say past, present and future information that we have put out about water levels delivered through this webpage.
Okay. Oh.
Let's see. Nicole mentioned the sea level rise technical report. I won't say too much about that. It is an interagency effort. A lot of people are involved, not just my office. But certainly my office' mission was core to this report in terms of the data along with satellite data from NASA. The projections and the other thing we have been doing is we have been creating a lot of APIs and programming interfaces to make it easier for people to access the data that is kind of behind this report so that they can do their, you know, they can do analysis. They can develop their own tools and do what they need to do to use this information to help them prepare and mitigate for sea level rise. These APIs are for the sophisticated user, if you will.
And again, this report, significant, you know, media attention. We see significant media attention when we release that report
with this one. This certain one -- this one certainly eclipse those.
This is my last slide. So --
1 was hoping to avoid the hook. I almost made it. So anyway, I thought I would show the eruptions for 2 reasons. One is it does highlight a contribution we make.
The network is a part of the system.

Our stations provide specialized high-resolution one-minute data to weather service.
You know, for -- so they can improve their forecast in the mornings and up in the upper right-hand chart there that you seek the data visualization. It is kind of fun. You can see the tsunami arriving at different stations. And that weather service uses this to validate their forecast or if they need to make adjustments in the full forecast and it is used for go, no go solution backpay situations. Evacuation is not only costly, no post not a good reason, but it is also -- can have had a cry wolf sort of effect.
If you are putting up too many evacuation calls that don't pan out when the real one comes, you know, some people may not pay attention.
But the other very interesting thing about this that shows the larger value of observing networks is the volcanic eruption that puts out a shockwave. It went around the globe. The lower left-hand graphic you can see a Pacific island station which in the top, these were -- had the hermetic make sure sensors. You can see the spike that is circled.

That shows the wave passing the station. You can see the tsunami arrive in the water level craft right below that. On the right-hand side, this is the station in Puerto Rico that shows that same atmospheric wave, you know, passing through and on the lower right-hand side, it causes what is called a meteotsunami. It is the value of observing systems and understanding the system. With the atmosphere and the oceans. And I think that was my last slide and I know we are not taking questions. So – Do I have to stop sharing my screen now?
>> SEAN DUFFY: I believe so. I see we have Armstrong on. I believe Larry is in the water somewhere.
>> ANDY ARMSTRONG: Thank you, Sean. Larry is in the water so I will be providing the report today. Larry is in Hawaii. He is not in the water. He is aboard the -- doing some equipment testing and system trials for that ship's upcoming ocean exploration visions.
Our ocean expiration is our NOMEC partner in mapping U.S. waters.
We also have the project on -- in July and August during which we will evaluate the ocean expiration Cooperative Institute, uncrewed surface vessel that Randy TeBeest mentioned. We will be evaluating it for coastal waters bathymetric surveys work in the national Marine sanctuary. So that mapping project we will be junction ink with the NGS remote-sensing division that Juliana mentioned in her presentation.
This project will be an application of the multisensor shallow water bathymetry concept that was presented and discussed at our last HSRP meeting.

And we will hope to report on that project at our next HSRP. So report now, as you may recall, the center has three major themes.
Advancing technology and mapping U.S. waters, advancing technology for additional navigation services and developing and advancing Marine geospatial and soundscape expertise.
Today, I will be sharing with you some of the center's research into digital navigation services. For this presentation, we have a video prepared and narrated by Dr. Tom, the director of the sender data visualization.
And Breanna Sullivan also developed and provided some of that material in the video.
So could we have that video, please?

>> We study how we can provide for July she send to support ocean mapping and ocean technologies in general. We do interactive touch screens to 3D stereoscopic monitors, weather visualization, ocean mammal tracking.
We do a lot of virtual reality and augmented reality. And then we also have this large-format towel displayed that we used for collaborative visualization and outreach events and presentations. One of my research interests is how we can use augmented reality technology that increases the safety of navigation.
Augmented reality is a technology that superimposes a digital content on top of your real worldview. This would have a great implication for mariners because they don't have to take their eyes off of the water to get navigational information and keep it one prophesies on the water is the number one factor in avoiding ship collisions. This is a first generation AR device. We wrote our own navigation software for it which is what you are seeing in the background here. One of the big problems we ran into is it is not bright enough to be used outside during the day.
Another shortcoming we found with the first generation units is that they have extremely narrow fields of view. You are only getting a digital concert in the center of your vision. That cuts down on that situational awareness of the user.
And we wanted to do an experiment to figure out what is the strength of that affect how will -- and what kind of field of view do we need out of future AR devices for them to be useful for ship navigation cracks to do that we created a ship simulator using virtual reality and we were able to play around with all kinds of AR overlays in the virtual reality.
Our ship simulator allows us to conduct studies in any environment or weather condition without the danger of giving undergrads control of a real boat. We are able to simulate a wide

range of potential AR devices and try out different overlay designs without dealing with hardware hassles such as registration or brightness issues. We found some navigational data such as track landscape feature locations and compass bearings or great in heads up displays while other data types such as surface currents and bathymetry are not very useful when displayed in a first- person perspective. We conducted a human factors study to determine the restricted view for ship navigation.
Study participants were tested with piloting the virtual boat from but we took a belief using both AR overlays and traditional electronic charts displayed to find the target beliefs and navigate between them. By using an eye tracker inside, we were able to measure how quickly participants located targets, how many times they took their eyes off of the water to protect the electronic chart, and how much attention they paid to the surrounding kayakers. When no augmented reality was provided, it took participants much larger -- longer to -- we saw that buffet water fields of view, targets were acquired and the factor goes faster. The overlays were very effective at keeping mariners path eyes on the water. Went there was no augmented reality overlays, participants looked at the map over twice
as often and took their eyes off the water for over twice as long. We found that field of view did not have an effect on this. Even restricted field of view augmented reality devices can greatly increase marine navigation safety.
So now we are moving beyond simulating augmented reality and virtual reality and we are trying to create a true augmented reality prototype that we could use both here in the lab and on our boat. We are using these AR glasses.
They are much less obtrusive than hollow bends or anything that we have to strap on. They accomplish that by being run off of a cell phone. This is a break out the battery and the communication are offloaded to. I could just stick that in my pocket and then what we do is we have the visuals from our simulation up here on out display and I can get actual AR overlay imagery within my headset and then we should be able to also take this out on the boat and we can use it there and just look into the boat's navigation and positional system.
These color lights are scans of the bridges and shorelines along the lower 230 miles of the Mississippi River. They were likely to help support NOAA's position navigation efforts. This data can be extremely useful for navigation, but first it must be cleaned to remove lots of noise and extraneous objects that were captured during the scan. To help with this process, we have developed a virtual reality cleaning tool which has been experientially shown to be significantly faster than existing desktop applications.
Once it has been cleaned, this data can then be integrated into electronic chart displays and portable pilot units to provide highly detailed information about shoreline infrastructure and potential hazards to navigation. Or it can also be used to calculate real-time vessel clearances and provide helpful visual reference.
For example, this is our web-based visualization interface that is streamed to the shoreline lidar data and NOAA tiles directly to your web browser.
We also use these lidar scans and our position navigation, assimilation.
>> Here, we download real-time air gap sensor data directly from the website and use it to dynamically set the water level in the simulation. By loading a 3D model of your ship and entering its draft, we can then calculate and display real-time clearances to the bridge span and pilings.
Nautical textual information such as notice to Mariners sailing directions and coast pilot help mariners improve situational awareness while navigating an unfamiliar water. We also need to digitize this information. Until now, the best anyone has done to digitize this text has been adding links to the PDF versions of the information or your referencing paragraphs from the text. Our research efforts here to digitize this text have focused on ways to restructure the data to be more user-friendly by breaking down the text for categorization, specific components that are relative to the different tests and needs. These efforts are done in conjunction with the IHOP S100 standardization process.
Our joint work allows the center to assist in setting standards and to become early testing --

testers that highlight what works and what might still be lacking. They have been using the coast pilot as the primary source for factual information and have shown benefits of having it separated into categories and linked together. For example, we have developed proof of concept portrayals that integrate textual service current information directly with S- 1 11 model data. This allows us to show the usefulness of this textual information to fill gaps where S1 11 data has not been modeled. We also digitized Harbor infrastructure features that are described in the Mississippi River coast pilot text into the new S131 I show standard which can be plotted, filtered and viewed in advanced charting and piloting interfaces.
Such as our web-based visualization that is shown here. We have also produced the first valid sample of standardized data for S1 27 Marine traffic services that has been tested in a system. These results of our ongoing efforts demonstrate the many ways that digitizing medical actual information can add value to increase the capabilities of the chart of the future.
>> Thanks, Sean, that wraps up our presentation.

>> SEAN DUFFY: I have to applaud the inclusion of the Mississippi River. I will have to also mention that. There was a chart of the Mississippi River in the presentation. I appreciate that. I think we have a couple minutes for questions. I don't know if we have any.
>> LYNNE MERSFELDER-LEWIS: Not yet, but members. This is time for questions for members.
>> SEAN DUFFY: Thank you, Lynne. Question from HSRP members. Any questions? --
>> QASSIM ABDULLAH: I have one, Sean. Yeah, thank you very much. I just want to know whether NOAA actively promotes cloud source by private sector NGOs.
Community of practice and that local geographic area of -- I'm pretty sure probably they are. That would relate to the public private partnership.
If we are already tackling it that way, that would take us to the example of the -- of local government, private, to build the typographic model. Thank you, Sean.
>> SEAN DUFFY: I'm not sure everyone of the directors, properly comment on that or maybe --
>> QASSIM ABDULLAH: I think it will be probably best -- [Inaudible]
>> BENJAMIN EVANS: I'm happy to address that to the extent that I know the answer.
I can follow up with details. With respect to the two pieces of your question there, one with respect to crowdsourcing imaging. In a bit of the public private partnership as well and organizing that linkage there.
I do want to address -- so as I think the panel has been briefed, we have developed the bread and matching fund for Admiral Brennan and so that is a means through which we are working with state and local government entities in the public sector primarily to leverage combinations of funds from, again, those local and state governments as well as NOAA funds to collectively together, work on mapping priorities.
Not sure if that was the focus of your question. It was more deep traditional crowdsourced bathymetry kit that we think of as, mariners collecting data, mariners are not high drug refers to collecting data, which would potentially be -- to nautical charts.
And we certainly have looked at that in fairly good detail over the last couple really going back to our partnerships at the Paris quadrant. 20 plus years ago. Currently, though, we are still actively engaged in the crowdsourcing bathymetry community. NCII manages an archive of -- a process for ingesting crowd sourced data. And so that is primarily through NCEI because of the integration of those data sets.
>> SEAN DUFFY: Sorry. I will keep that process going. Any questions? Lindsey can you talk --
>> LINDSAY GEE: Yeah, could I ask a question. About the lidar coverage and I wanted to check with you. The coordinator with USGS on the -- that lidar coverage. So of both the typographic and -- and particularly thinking that Pacific and around the way. I guess it is all thought to the data's technical side, making sure that if they are going out to do any topo lidar where that you can do that at the same time. Thanks.

>> JULIANA BLACKWELL: Yeah, Lindsay, I believe we do have a very good coronation effort with USGS. And looking at especially along the coast --
[No audio]

-- for us to share and support each other in the collection. It is something that we strive to do

and in the locations.

We have also got a lot of coordination going with Army Corps I think Mike has mentioned -- and actually has mentioned this. Just trying to cornet our project areas. So I think the answer is yes. Also just pause to see if there's -- if there's anything else that he would like to add if he is able.
>> MIKE ASLAKSEN:. This is Mike. Just one thing to add. Especially with the Pacific island, with basic foundations that they are, we strive to collect the whole area that we are doing. The topographic survey. In fact, in the case of the Pacific Islands, they have the contract with NOAA to do the -
- as well as the contract for typographic lidar. They are very well coordinated. We understand trying to -- the most bang for our buck when we are up there. And we also look at overlap with USGS, especially the coastal zones that we can have that seamless typographic collection into a typographic collection but then goes out into -- into that --
>> Thanks so much.

>> VIRGINIA DENTLER: Sean Penn, I think Nathan has a question, too.
You are on mute, Sean.

>> SEAN DUFFY: You can go ahead, Nathan.

>> NATHAN WARDWELL: Thanks, Sean. Excuse me there. Yes. Just some comments asking for feedback on some of the products and services and the -- very exciting to see the possibility of being able to do bluebooking directly out of the projects.
Now that is something we have supported for a while. And that has been a limitation for the process. It makes the process much more efficient.
And then hearing the possibility of integrating the use of our GX with the processing. It is exciting. I know the State of Alaska is working on building out a network and the national Park service is also working on building out that network in the state of Alaska. That will help us leverage that data statewide. And I'm a big fan of the opus dashboard. So thank you for all you do.
>> SEAN DUFFY: I don't know who is supposed to say it, but I think we are on a break.
>> JULIE THOMAS: Let's take a 10-minute break and then we will come back and we will have the next session. Thank you very much. 10 minutes.
[Event is on break until 3:10:00 p.m. Eastern Time]

>> JULIE THOMAS: We will go ahead and start the next session in what minute here. I think we

are a couple minutes late going into our break.

So I'm going to wait one more minute and then we will get going.
All right. Let's go ahead and get started into our next session. And really excited to introduce commander be ultra
-- in a Hillstrom and Deanne Hargrave, who will be leading the next session and you see that title, might be the gaps. I will let you go ahead. Thank you so much for taking this session.
>> BRIANA HILLSTROM: Thank you. I would like -- my name is Bree Hillstrom. I am from the office of coach survey. My group plans to acquire just reviews and curious seafloor and lake floor mapping data by the Marine chart division. All of our products are also publicly available through the national source that Evans just mentioned. I'm excited to be hosting this session. We have four great speakers lined up at four great commenters ready to stand by to offer their thoughts and opinions. Their bios are on the web. Look at them in that.

They are great subject matter experts.

Personally for me about seven to 10 years ago, I was in -- still working in the office of coast survey at the bridge and we turned to opening our minds or hydrographic mindset ensuring the best available data is charted rather than only the highest quality hydrographic data against the highest specifications. I think what we did not realize at the time was that we should have added that we can legally use the line. We have evolved over the course of that years, but during that time, we have ended up with hard drives and copying raw files from grad students under various research cruises or ships donated from other hydrographic offices, paper memos, PDFs, all flavors of data that in sources that took our folks down a wormhole of some time and exposed to potential legal action. But so when I first heard the term data licensing I thought it sounded like more work, more bureaucracy, more lawyers. However, after brushing up on the topic and reflecting on the last seven to the 10 years, when we have been going down this externally sourced pipeline route I'm excited about this topic and what it can do for us. With that, I will turn it over to my co-moderator Deanne Hargrave and geosciences manager. So thank you, ON.

>> DEANNE HARGRAVE: Thank you. I appreciate the introduction and four setting the stage. So the part that I can add is how this relates to private industry and my particular focus is offshore wind.

It really translates to the other private. As you saw last September, when we had our wind panel, the volume of data and the quality of data that is being acquired for offshore wind projects is immense. And the opportunity is there for the data to be acquired and used many many times. And so -- but the heading up over the years it has really been, how do you share that data? The part about offshore wind and what we heard from pedal members Perry and Betsy Andrews last September is that when developers are very willing to share this information. We want to make that most of the available information that we have. And so didn't licensing is something that not only can be beneficial for interagency but it also can be beneficial for this and it ties into private public partnerships as well. Being able to transfer information quickly but have that assurance that the data is -- the use of the data is understood and that it does not end up being used in a way that it was not intended to. It should also intend. It should also streamline not having to have individual memorandums of understanding or other agreements in place between the various entities in order to share data.

So that is kind of the private industry perspective on that. Bree, I will pass it back to you to kick off our excellent panel.

>> BRIANA HILLSTROM: Excellent. I'm introducing Mr. Tony LaVoi. He will be talking about NOAA's data licensing landscape as part of the bigger NOAA data strategy goals. So Mr. Lavoie?

>> TONY LaVOI: Great. Thank you and thank you for the intro. I will, my slides up. So my name is Tony LaVoi. I am the chief data officer. It is an honor to speak with the HSR team today. It has been about three years since I have had a chance to participate in an HSRP meeting. Back in 2019/2020 -- I gave an update on the spatial data.

It was a new piece of policy.

So for today, though, the open data licensing purpose of this session is to really frame into provide a landscape of any of the current and ongoing visual development and the data policy. I'm going to go through the slides. I also want to introduce Eric Hanson. So. Many might you -- he is an attorney. He has been actively involved in a number of these today. So the next slide.

>> Tony, we would ask you to turn on your WebCam if you can.

>> BENJAMIN EVANS: I'm sorry. I thought it was. There we go. Hey, everybody. Sorry about that. I wanted to start with this slide. It is a slide that some of you may have seen that is used frequently to talk about NOAA's mission and priorities and what I want to do is used as an -- as an opportunity to emphasize the critical role in access to the NOAA's data and supporting

that mission. If you look at our priorities of climate and climate data, balancing our environmental stewardship in areas and providing equitable access to their products and services, that is underpinned by heaven equitable open access to our data. That is a key component. So next slide.
I'm guessing many of you are not deep in that weeds of federal data policy as I am. It has been active the last decade when it comes to open data within the federal data landscaping. You go back to the 2013/2014 time period, where the open data policy was released. The 2018/2019 time period. We have the passage of both the foundations for evidence-based policymaking as. It is referred to as the evidence act. As well as -- as well as the geospatial data act at the first ever data strategy.
Those work priority initiatives of the administration. Within the larger community, though, we have the introduction earlier in the decade. And interoperable uses.
Huge effort underway but now with open data and specifically equitable data, long-standing anchors of freedom of information.
So when you look at the CEO perspective and you look at the landscape that there's a lot that is pointing in this direction. On the right-hand side there was probably the most tangible, specific guidance that we have at this comes out of the evidence backed -- act. This is not finalized yet. It is not critical. These are five specific actions that the agency is supposed to take. And I wanted to highlight the second.
Specifically mentioned the evidence act, making public data assets available. So next slide.
So how are we taking that federal and state and turning it into a reality into specifications. In 2020, we created our first ever NOAA data strategy focused on the best minds and the value of law data. You see all of five goals for the data strategy. This, leadership goal governance. Governing and managing our data strategically. I will talk about that more a bit. Open data. That is really an anchor of the data strategy doing everything that we can as an agency. Obviously open licensing is a key component there. Building capacity is what we need to invest in and our internal workforce and our partnerships are highlighted.
That is that strategy. It is available on the web. Next slide. It is critical that it is not just a strategy and a drive towards effective change. The progress in the organization. So we have also created an action plan. It is in the final, final stages of approval. We go from five goals to 23 specific actions into 70 milestones. Next slide. But again, when you think about open data licensing, it really finds its home in the area of data.. I wanted to speak to the value of governance and open data priorities.
If you are not that familiar with data governance, it is the process of implementing the policies and building up and managing their data. It is mindful of the fact that it includes both people, processes, and the systems and ultimately, especially for an agency as large as NOAA with the data as a foundation, it spreads across all of the areas. It provides that foundation for communication collaboration and hopefully it results in career decision making. So there are three primary components with data governance. One is a committee. One is the system officers and one is the policy. So next slide, please.
So looking at this a little bit more in-depth, again, I think it is important because this is how open data policies report. First we are creating a new data governance committee.
Back in 2009, there was an environment data management committee. We had the opportunity to work with them in the past. We are expanding that to include not just the environmental date of the organization but all of our data. Specifically, we didn't require licensing testing of which Derek Hanson was on the call.
The second key component is the establishment of chief data offices. It is very effective in the organization within our chief information officer cohorts. We have one chief information officer at the enterprise level. And we have the mission lines.
We are looking at doing the exact same with our chief data offices. Right now, we have one that has been selected and others are in the process to be put in place, hopefully by the -- the beginning of next fiscal year we will either be permanent or active in each of my offices.

And the third component, the data policy framework. We have an existing set of procedural directives for the organization. Many of them are updates. And this is work when the discussion takes place. So next slide. So going back to the evidence act, the open data requirements and then tying data specifically to the strategy and action plan, you will see the five primary evidence act requirements on the leftmost column and you will see that each of those map to one or multiple specific actions in our plan. And you will notice that the second row is available under open license, under the specific strategic plan graph action or developing and maintaining the data licensing guidance that is consistent with open data policies.
So next slide.

So this is my last slide. It is a slide that transitions to Matt, who will talk to the data licensing efforts that are taking place.
So under the goal, as I mentioned, open data, specifically data licensed. We have the action on the right-hand side. Start with the technician of both -- that Bree and Deanne engine.
-- mentioned. It is important to recognize that NOAA is looking at this from both perspectives. So when we make our data available under what lessons or licenses should be applied to that? And as a data consumer, what licenses should be except? So that was released the starting point and the primary objectives and in terms of the -- this is the work that has really been led. A big thank you for the leadership for moving on this. The establishment of the initial -- with the General Counsel. And I'm not going to get into much detail because Matt is going to talk to that specifically. Really trying to take these items at the top and providing access to licenses and how that will play out.
Pendant long-term, obviously, the establishment of the overall NOAA data licensing approach with the ultimate goal of creating a series of data licensing policies and guidance documentation.
So with that, I will pass it back to Bree and I think Matt is up next.

>> BRIANA HILLSTROM: Thank you, Tony. That was great. I'm going to pass it on next to Mr. Matt Wilson. He is a physical scientist at the hike -- higher graphic surveys division. He will talk about what he has been working specifically for co-survey and within the pipeline to dive more in detail.
So take it away, Matt.

>> MATT WILSON: Okay. Thank you commander Hillstrom. You can see my slides. Thanks to you Bree and Diane and Tony for those really great introductions to this topic. I will be able to get into more detail into this presentation and this is regarding our implementation of data licensing.
Why do we need data licensing and how will it be and permit it? Next slide, please? So Tony and his presentation set the stage for the larger data governance Netscape within NOAA. So I will talk now about how this applies to the office of co- survey and specifically our bathymetry. Let's start with that question. Why did we need data licensing? I will talk about this in two different capacities. The first one concerns open bathymetry. We wish to be as open, accessible and usable as possible. This is data that needs to conform to the evidence act and the open data requirements that Tony just spoke up and it is our bathymetry. That is the bathymetry that NOAA collects.
That all falls into this category.

A lot of external data files in this category, too. What we have always done with this kind of data is to state that the data is in the public domain and there's a perception that that is good enough and that is all we need to do. But I have learned that is just not true. There's a lot of users and a significant part of the industry who can't use that data. Who are these users? They are private industry folks that the vagueness of public domain labels is not good enough. They have a fear of lingering copyright. It is too risky for them.

Internationally, users as they look at different countries have different definitions of what public domain actually means. Update may not be able to use that data either. The application of an open data license on the bathymetry removes all of the ambiguity. When I say opened license in this context, I'm referring specifically to the public domain, dedication licenses and the ones most calmly known are CC zero from trade of comments or open data Commons.

Cc zero has been recommended explicitly by the U.S. government for U.S. government work and these licenses legally remove copyright and give all users the assurance they need to freely use the data. This makes us much more aligned with the evidence act and the open data requirements and therefore we are achieving the objectives within the NOAA data strategy. Next slide, please.

So let's talk about the other major thrust and this is related to external data. That is data that we did not collect but rather we acquired it opportunistically or it was a semester -

- submitted to us voluntarily. External data is eight at least increasingly important to us. The importance of external data is underscored further. It is in the Seabed 2030. All of these initiatives underscored collaboration in data sharing is the only way to achieve our mapping objectives.

So when we receive external data, what happens is that we ingest it and then we execute a research phase that involves an addition to standard review and verification of data quality, we need to find out who that data actually belongs to and what we can actually use it for. So this takes time. It requires meetings, a lot of back and forth. The answers that we get are not always clear. If we are able to or if we feel competent enough can use the data for the -- so who are the external data providers? Very long list. They are federal partners, academia, foreign country hundred graphic offices, cities, states, parks, courts from the private industry survey companies, engineering firms, et cetera.

And know that very few of these are covered under any kind of data sharing agreement. It is mostly that they just want to submit their data and then move on to do other things. The big problem is there is no way to standardize how we handle the data particularly if there's any restrictions. So next slide, please.

That leads to the next part. What if there are restrictions on these external data sets, this is where the process can really bog down. There's a reality that there's a new mark -- a tsunami of data coming at us, as you can see, the image on the left, it is applicable. The numbers are really accelerating. We anticipate submissions to increase in the coming years as we have more and more collaboration, which is excellent.

That collaboration is exactly what we want. It just means more data and plus, with the proliferation of autonomous technology, the data streams are picking up and they are picking up fast. And we don't have a standardized way of handling data that may be subject to some type of restriction and this has been identified as one of the biggest impediments. When we receive external data, we need to know clearly and unambiguously, who owns the data. It sounds like a simple question. But it is not always simple.

Trust me. There's been times in the past when we discovered weeks or even months after the fact that a particular data set we received actually belongs to someone else other than who provided it to us.

That resents real risk. We also need to know, can we share that data? Can we make it publicly available? Can we make products from the data? Can third parties use that data?

Can they use it for commercial purposes? It answers all of these questions very clearly. We may not even need to have a meeting. We may already have answers right there. They are clearly defined in the license. Next slide, please.

So here's how David -- data licensing works. They assigned the data license. This license is specific to a data set, not to a provider. This allows for flexibility that it is not constrained to an overarching agreement. It could be very specific. So now all of the terms mean how we can use the data, how we can share it and that they are all clearly defined and all machine readable. When we are in just it, that distribution and the ensuing applications are all

automated. For public dissipation, third-party users get that data and that license and they know exactly what they can and can't do. There's a much clearer communication that at the end users with the lessons put it. And for the open bathymetry, the terms on the open license totally resolves that issue with the ambiguity with public domain and what that actually means.
Users have the assurance they need to use the data for their intended purposes. And of note here is the national barometric source, the office of co-service database for the bathymetry, accommodates data licenses, and to the credit of the team, they had dated licensing in mind from the inception, so they are ready to realize the benefits of using data licenses in terms of automation and scalable processes related to the data handling. Next slide, please.
Okay. What else is pushing us to data licensing? It is a critical part of the NOAA data strategy. Also.NOAA science advisory Board recommended licensing for federal government aid with language that is nearly identical to our own and Tony mentioned as both the U.S. government recommended they did licensing for U.S. government works. And also, the International hydrographic organization has given recommendations on its licensing stating that an open license application is what you need to enable users the freedom to experiment, explore, innovate. So of course those are things we want.
Next, please. Okay. The recommendation for dated licensing is quite clear. The question becomes, which data licenses to be actually adept? We propose the license options from Creative Commons for many reasons. They are very well- known, internationally recognized and already used throughout a wide variety of industries including our own.
There are already prominent examples of Creative Commons licenses with the data sets.
Also Creative Commons licenses were recommended explicitly in several of those references I had on the previous slide.
For external data submissions, we always encourage that data to come in but sometimes providers have restrictions, as I already laid out. For data with any restrictions, the options of the creative Commons license encompass the various sneers we see. Those restrictions you see there in the blue font you can select attributions that just means that you have to give credit to the data provider when using their data. It is a pretty common one. The noncommercial tag is pretty self expiratory.
Share-alike restriction means that any derivative projects need to maintain that same license. And finally, that now derivatives tag means you can't make products from the original data. And positioned marine navigation are all considered products. Next slide, please.
Okay, the table on this slide tells the whole story of implementation, the various licensed conditions are in that first column. They are matched up against our various uses of perfect data on the top row. Those uses in broad terms are as follows here. You know, can we use the data for internal use such as survey planning? Can we share that data publicly and quickly pop up and finally, can we create derivative products from the data for example, the ENC and so forth? We have a custom-made internal use only licensed that will apply to any sensitive data that we may receive. That is nothing new. We have always handled sensitive data submissions. This is not for public archived due to historic property or the provider does not allow it. That kind of data we are only using when entering the professor of a planning or informing us. Next point share and the share-alike and no derivatives conditions that prohibits us from using that data for other derivative products. And data under any other license is used for all purposes. It depends on whether or not they maintain source attribution or noncommercial use tag. So there we go.
This is what we want. This table right here, disability tells the whole story and it represents automation frankly, the data all comes in and it is going to have one or more of these license conditions so we already know, exec at how we can distribute it, exactly how we can use it. It is clearly defined.
In other words, all of that data is falling neatly into one of these little grid squares. This means automation. It means standardizing data handling. It can scale. It can scale up to

meet the ever increasing data volume. It also has the benefit of increasing access to a much broader user database. Improving communication to end users. Next slide, please. Okay, and that was my last slide. I want to thank you for your attention and thank you for your engagement and comments. This process has been constructive. So I look forward to the remainder of the discussion today. Thank you.
>> BRIANA HILLSTROM: Thank you, Matt. Next, we have Dr. Brian Calder. He is the research professor and director of Center for coastal and Ocean mapping and the hydrographic Center at the University of New Hampshire and a former professor. So it is exciting to get to know you -- once. Thank you very much and reminder, we will be taking questions at the end. Thanks.
>> BRIAN CALDER: Thank you very much for that introduction. I wanted to look at licensing from the academic perspective.
And particularly how we go about doing the socialization piece as Matt described. I think it has been clear that there are big advantages to having the licenses. But academics and other data providers tend to be a little wheezy at times. And we don't necessarily want to be involved in that and doing science. So we have to be convincing about why it should just be a normal piece of science. I want to illustrate the problems that we may have with the process. By looking at an example from our own history at the center. And what we learned in the process about illustrating how we are going to communicate this to other members of our community. Next slide, please. Since the very start of the center, we have been involved in collecting data for the project. So since 2003, we have been at sea collecting a whole bunch of data. We send all of our data to NCEI in Boulder. But we do make products available and we made it available just on our website and the academics have been the best available data we could. And then we discussed it with Derek Hanson. That is fine. Next slide, please. Until one of your colleagues at Google comes along and says to you, great, we would love to use your data. What is the license?
And we scratch our heads and said, well, we will get back to you.
And so this is not because we did not know about licensing. If you go to the next slide, please, we do a lot of data licensing. In fact, some let the people on the panel have signed licenses with things we have done. Mostly for software. We have dumped commercial licenses like what you see in the left here and we have dumped source licenses depending on the appropriate choice for the systems or software that we were using.
So we knew about licenses. We just did not think about it in the context of data. We went to our university lawyers. They said, -- we said, what do you recommend? If you go to the next slide, this is what week recommended. And they asked us to go to a website. That is a wall of text. I'm not going to ask you to read it. I can translate it for you. If you go to the next slide, this is basically what it says. If anything goes wrong, it's not our fault.
Now, that is not a license.

What we are trying to do is protect the university. That is their job. We asked them if the wrong thing is the honest truth.
This is not useful. What this does is make our data more difficult. It is because anyone who looks at our data has to read that and gets to have a lawyer and have their lawyer read it too. We made it -- and the data goes out.
Goes out with a use case statement and the method data. We were proud of the metadata. We did isometric data. We worked with Boulder to work out how to do this at NCEI. This is the use statement. We are kind of getting closer to a license. If you move to the next slide, I will highlight the piece that is sort of a license. It is not quite a license. It does not say it is a license. They could be interpreted as being approximately an attribution license. The problem is that it does not say it is a license.
It is an interpretation. It is a custom piece of text that you have to go and interpret and it is mixed in with other things which makes it difficult at understanding what it is that you want to do with the data and so if you want to use the data you have to go through this whole

process of having a meeting with us are asking us what we intended and having lawyers involved. Trying to make our data more useful because we actually made it harder to use. Like I said, we got it wrong. So in practice, if you go to the next slide, please, we made the wrong decision to start with. In effect, we asked the wrong question. And we can't blame the lawyers. They tried their best. We have a good relationship with them. We asked them to get us to our goals. The problem was our goals were not clear. And they did their best to get us there.
And that was our fault.

What we could have done with if we move on to the next slide, please, is a clear list of what it was that we should be asking for. And in fact, that is what Matt just gave you in the presentation. We want clear communication at the end user that minimizes ambiguity.
We want ideally to have well known agreement terms recognized terms so that you don't have to go and ask your lawyer to read text. You can say, for example, this data comes with that cc zero license. Is that okay? The learner can say, yes, that is fine.
And we can just move on.

And we want to have a license move. So we could have made this list a decade ago and it would have made things much clearer for us like I said, it was not clear to us even what we should have been doing. And so we just did not do the right thing. I'm happy to say, however, if you go to the next slide, as of now outdated that goes out with this in that usage statement.

So basically we are seeing, the data that is going out to speak goes out with that cc zero license. We should indicate what our license is. And there have been -- readable.
It is obvious what the license is. It is a pretty standard license. You don't have to ask for a legal opinion. And you can minimize the effort involved in actually using our data. Hopefully that makes our data much more valuable for people to use, including our colleagues at NOAA who funded it through grants that the center.
So I want to finish up by looking at some things we have learned through this process. You can go to the next slide. There are four basic groups here. The first one is awareness. We were not aware of data licensing with even something we should be considering.
And we need to make sure that everybody is aware. And that is something where we basically have to be evangelists. We have to talk about this to our colleagues and make sure that we know that this is something they should be paying attention to. And, you know, the policy and the data strategy and so on are great ways of doing that. It is something where we want to get individual scientists to also do. We should talk about it and make clear that we do apply for licenses.
The second piece of commonality. What I mean by that is that you should have standard licenses that we can refer to and recommend. Whether that is accretive common zero, which is what we prepare -- prefer, but the important thing is, I don't want to have to recruit a lawyer to read and understand the license and interpret it. Scientists tend to be manic about their science. and lazy about everything else.
Because I'm a scientist, I get to say that. What.
What we are trying to do here is to provide for them the easy option, the easy button. Where they can say, I have to do it didn't license. Which one do we use? That was when it was recommended. Fine, let's do it. The more we can do that, the better it is. There are exceptions. But it should be truly exceptional. We should not just do it because we want to. There must be a good reason not to apply for the CCO license. And by recommending hopefully we can 8 the habit.
Support. There's a concern that adding extra data licenses will make things difficult and require more effort. We don't particularly want to do that. But I would suggest that we try to make it as easy as possible for people to apply. If you look at a software license, it is quite often work that you get a license and it will say afterwards how to apply this license and it will give very clear instructions to say, here's what we do if you want to apply the lessons to your software. You should be doing the same thing for their data licenses. Make it as easy as

possible, easy for the data provider to think yes, it is possible. And we can provide support to do that. The final piece of reinforcement, not my favorite toys. This is more of the carrot than the stick.
But it is an option. NOAA could provide a special award condition that says, you will apply for a data license. Most academics will grumble about it a little bit. But they will do it because it is how they are going to get their funding after all, that is the important piece.
So it is simply something that we could do. And we could build that into a good hammer. We could say if we can't use your data are you actually doing active data management the way that we requested that you do it and that you said that it would be your application. Data management protocols, standard piece of any Grant request. Making it a license part of the data management protocols would wrap it all up and that we could quite easily say, we would love to fund you. But your data management process is not adequate because it doesn't have a data license. That, I think that would motivate many people to say, okay we got to do this. And then we go back to the carrot piece and say, here's -- which license is for our use? Oh, there's the recommended license. Okay, now we are good. I think we have to do both sides of that. Let's move to the next slide, please. Just to sum up for you, you can see I'm happy to talk about our experience or answer questions later. I think in the academic community, we want to do the right thing. We just need to know what that thing is.
That is what I'm hoping we can process as we move forward. To be able to provide recommendations on what we think is the right thing is to make it easier for academics who are busy doing their science to do the right thing as part of their science. So thank you and breed, I will hand it back to you.
>> BRIANA HILLSTROM: Thank you, Dr. Calder. Interesting perspective from the academic side.
Next is another former professor of mine. So Dr. -- Dr. Kurt Schwehr. Affiliate associate research Professor at the University of -- hydrographic center. Always a mouthful, but excited to hear the other side of the coin. So thank you.

>> KURT SCHWEHR: Thanks for having me. So my name is Kurt Schwehr. I am a software engineer at Google. I will talk about my particular story from my view of everything spanning several different organizations and situations. I will talk to you about managing spatial data and this is my perspective from being an engineer on Google Earth engine. Next slide. The question is, who am I? Before that, I wanted to say thank you to Matt because this story rests on their children. You should keep those stories and mind and I will build on top of that. Next slide.
Going back in time to 2010, I was at the University of New Hampshire. I worked with -- I will call out Brit Bennett because he was an author on this work. Taking NOAA's catalog and turning it into a catalog that users could start taking advantage of. It is, how do we scale data it uses and we try to present one way of doing that to have it be built on top of Google Earth. It was fun to do, but we did not get very far. Next slide.
Since then, I joined Google as a software engineer be your -- engineer. In the cloud cover for managing petabyte scales of data. Said lid imaging and on the slide get the other spatial data is fun. That includes Ocean stuff. So next slide.
So what is this catalog? There are 600 data sets so far and it is about 50 petabytes of public data. The majority is in satellite images.
Modus giving you -- we got weather and climate and the rest of my team had the next part. Let's go to the next slide. And this is one of my favorite data sites. This is the hi calm global ocean model.
Since 1993. And you can -- this is live so people can jump around and do analysis. This is just the beginning of the process of where the engine is going. We are 10 years old. We just have -- we have -- the Microsoft computer. This is just opening up.
It is, how do we deal with data at scale across huge numbers of users. Next slide.

Let's talk about working through a data set and how we might get work done with the update. So here we have a lot of aliens driving around doing stuff. That is how we view the cloud. Next slide. So let's go to Brian's example. Say you want to use a couple data sets? I have been at CCOM. It is awesome. It is an amazing mapping. Let's see if we can go ahead and do this for our work. Next.
If you go in and you pick up the specific data set, okay I think I will try to work with this data. Let's take a what, the copyright statement double OPEC pop you combine both of these statements a little more. Let's go to the next.
Okay. Now we are in the details of the copyright disclaimer thing. And you can click it here. And then go to the next slide.

And it may be unfair because Brian showed you there are actually different webpages for all of the terms. This particular data set that you hit on the page not found. For a lot of people, I don't know what to do, and quickly, and then I'm done. I guess I'm not using this data. We want to use the data. We worked with CCOM long ago and we actually created and got lawyers to send it. It took quite a while. That data is now visible and that is the current layer. You will see this ocean data in there. This is the story of not success, but if we had to do this for every single data dissent that we work with, if each one takes months of back-and-forth time, we are talking about an inordinate amount of time spent with lawyers. I talked to lawyers more than I ever want to. I would love to do more things with data at last with lawyers. So next slide.
So there's better ways to do this. And Brian talked about metadata. In terms of the work that I do, it is a different story. There's two things. I will go through what each of those are. How do we catalog and track the licenses that go with data? There's one thing that the SPDX and STAC specs. If you don't know what to do, you just write the word Preparatory. We will see what that means later on the next slide.
So what -- and I'm going -- of the company that is going to where a bunch of data to do some stuff. What if I could write a little tiny bit of code and something I did to try out and let's filter licenses. I think I know what I can do. I know what I want to do. Let's see if I can use the data in the Earth engine. Let's sort by the number of collections and what their license is. The first one is.
Tree. 617 licenses. Oh, dear. Each one is going to take me a long time to figure out. Of the company. What should I do? Oh dear. Then comes a whole bunch of PBL. And we have a sense that this is the public domain. So yes, I can use it. And we have -- that means I need to keep track of which ones I'm using because I will have to make some statement of what is in my final product and I'm getting tires. Fourteenth necklace 14 of these. I don't know. We figured this out. And then there's something, I'm not sure what that is. It probably sounds okay, but I need a lawyer again. Those are great. And then it says no commercial work. I'm a little company. And out. I can't use that data. We have done a summary of what is going on in that catalog. And we have said, okay, we can use some, not others. We have to work hard to get them. Next. So how do we keep track of figuring this stuff out? The top thing to think about is something called the software package data exchange or SPDX. I'm not sure how you pronounce the acronym. It is software materials that we use. Software is not always exactly the same. But they are close enough that some of the stuff matches and the categories, the catalog of licenses is actually what we want to cover in data. For months, it works equally well for software or they'd. Some are just purely software. This is actually an I.S.O. standard. This is something we are fairly comfortable with and lots of copies and organizations have good knowledge about this and the lawyers may have worked with this stuff. Next.
So what is SPDX license catalog? It has more than 100 licenses. It's one that is put into a table as an identifier. You could state with a few characters, I need this license.
It has some general guidance on it. It is the software foundation or is it OSI approved? Those are things that yours may care about. As an organization category, the catalog of licenses is actually what we want to cover in data. For months, it works equally well for software or

data.
Some are just purely software. This is actually an I.S.O. standard. This is something we are fairly comfortable with and lots of copies and organizations have good knowledge about this and the lawyers may have worked with this organization may have a bracket position ahead of time of what these licenses can and can't do like what you start with maps. Those types of charts that show you what licenses and what processes you can do. They are certainly possible. However, this is kind of overwhelming. There's more than 100 licenses, if each one takes lawyers serious amounts of time to deal with it that is a little overwhelming. So next slide.
So if you can boil this down to the critical ones like we saw in Matt's table, SPDX has entries for each of those. If you can say with the CCO -- one, I mean this license. You don't have to have to have the entirety of that license in there.
That means as a human, I can increase at Beckley which license. Next slide.
And I would like you to, right? That is crazy.
Licenses are big and that is why we have SPDX being this powerful entry.
We will go to the next slide. I'm not going to read that much textbook.
So the real question is, why do you need SPDX? The answer is, if I see a lesson on a webpage, what everyone says is different. It could be -- that might put that sense of that license completely. And if that is the case, if you see the text and it does not exactly match CC0-1.0, it is a little bit different.
You have legal counsel. And that is now fun. We took all our time with lawyers and we will never Axley do any data processing, which is what I want to do. Next.
So when your provider gives you a license code that you got some data from. You have one of these licenses here. Pretty much done with your analysis and you have seen them all before. You have already made the decisions like less on one, note on two, whatever is done. In this context -- context, you must only use these licenses. That is great. This process that was taking months and months for each one turned out to be a 52nd job and that is where I'm excited. Next?
So this only works when it is used across lots of organizations. This is coming from all of -- over the place, going through groups and organizations. Getting back out to the public getting mixed up again, back and forth.
Data can have a very tumultuous life as it goes to its lifecycle and then dropped progress and et cetera.
As a part of this, there's a fascination called spatiotemporal acid catalogs. It is trying to capture this process differently. But this is about programmers and use of data being able to manipulate that and to be able to ask the questions in the data without having to do a lot of work.

I like to call that -- that little itty-bitty I, at the bottom right. It says Google Earth engine. We have that catalog and we tried to make the specification better. So it is a wide diverse set of folks. We make data processing easy and have data licenses be a part of the ecosystem. You bring us that catalog. You can save data from those licenses. Shall see what you got and you mix those. It goes from being difficult meetings that I have in my system. I just press the button and then we are done. Next. And being that Google -- as a software engineer, I just use the code. Here is a look inside of a step catalog entry. Even if you can't read code, you can see license colon CC by 4.0. It is usable for your product or lot. -- not. I think we are getting there. And with more persistence, I think licenses are going to be part of the tool that helps you get your work done and it is not really a big deal. Thank you for your time. Up to is it. Trench --
>> BRIANA HILLSTROM:. Thank you for a great perspective. If I could bring all the commenters on, I think we are on time, Yan. I think you can double-check me on that. We will bring in Lindsay a guy now, and Derek Hanson who are commentators for this panel. If you each take two minutes, we would love to hear your perspective. I think we should start with Lindsay.
>> LINDSAY GEE: Thanks, Bree. Something that I know licensing is something that sometimes

people will initially, their eyes will glaze over. I wanted to bring this back to the start of doing this and I totally agree that we support this and make data accessible and use more. This is a national investment that NOAA has the corporate we want it to be used easily and by many. One of the things that it should also facilitate is others contributed.
So I think some of the things Kurt and Brian have addressed is really important, that unit as I said, people who are good about licensing and first off Mike think, oh, my gosh that this is a real overhead that I will have to write about. It should not be that. It should be easy for them. They should not have to worry about the software engineers and others that can look at the sort of stuff and when they are contribute and encrypt it should not -- it should encourage them to do that. But one of the things that I think gently across the discussions is engaging with industry and I think again, there's an opportunity here in part from those users or distributors of data there's those initial mapping systems and the software produces involved in processing and that sort of stuff but we should encourage NOAA to engage with them to be able to have those licenses inserted right at source. So it becomes -- again, it lowers the barrier for people and then also at the other end, knowing clearly as Kurt in his case and business case I guess showing that, yeah, the easier that is, the more available to data is. Is to use.

I think an important part is going to be for the NOAA outreach organized group that you have there to public affairs or whatever that is called to really be able to promote those stories about how Brian, this example about, it is not that hard, but we just need to know about it. So being able to say, please do that and that is something that I would encourage NOAA to do with this. Thank you.
>> BRIANA HILLSTROM: Do you want to offer your comments?
>> GUY NOLL: Sure, thank you. I agree that although this session can be seen as a little bit esoteric to those that don't deal with data all the time, and licensing thereof, it is super important and has received additional focus over the last decade as more data becomes available and maybe more data than lawyers over time.
In the case of Esri, we have sort of recently had our living to be a 16 source, I guess, as an alternative source for authoritative. Data under the fair act principles or findability, accessibility interoperability and reuse.
So, you know, thankfully, the preparation was passed for NOAA and you are not getting shut down and has caused certain websites to be and accessible and don't have the data for making decisions and at the state of -- state and local government level, that would cause problems. This allows us that this kind of licensing structure that is being talked about, it allows us to maintain that secondary source for folks to use from other agencies that may have funding. So it is a very critical subject and something that we look forward to supplying data to and resourcing from.
>> BRIANA HILLSTROM: Yeah, I thought the comment about working with vendors and software dedicated to licensing as early upstream as possible seemed relevant from your side.
>> GUY NOLL: Yeah, going back a couple decades, when we made the decision to release the ENCs for free, and we tried to have a safe and secure purchase, which probably would have cost more money than we were able to raise through the sale of the content. That free ENC content then became a source for all kinds of innovation.

We are still seeing that today. So certainly having an easy use licensing structure will improve the ability to create innovative solutions.
>> BRIANA HILLSTROM: Another good point. Mr. Saade, what you'd like to share your perspective from breaking both on -- but with that as well, both as a data provider and vendor.
>> ED SAADE: Sure thing. Sorry, I had to step away. I assumed it was my turn to talk and someone showed up, the front door with a shipment.
Anyway, so we are -- I will speak as "we." We were big advocates of wanting to donate data.

We started doing with CBID 2030. We continued to advocate for it wherever we could relative to some of the projects that we work on and getting cooperative clients and supporting that. And never thinking about what anyone was going to do with the data. We thought it was a good idea to send the data into NOAA or whoever it might be. And let people do whatever and of course fill in the gap, as we talked about. So short?
Response to what everyone talked about. It could be really intimidating. And certainly intimidating to me if you want to get into the details of everything that was discussed and all of the what-ifs, but I am certain that there's a lot of clients that -- or a lot of companies that wanted to donate a lot of data and part of that is as basic as the fact that many, many big corporations are going to be required to do -- to demonstrate sustainability goals in order to sustainability goals as donate data and be part of the community and a means of an obvious sustainability issue. You don't have to get a vessel and a bunch of people and burn a bunch of carbon, but the real point is to make it as easy as possible for everybody to get on the pathway and start to do this. On the user side, I don't think there's a lot of these licensing concerns about accuracy of data and all that. You touch the seafloor and it is moving. -- talking about that seafloor, and it is moving, and it is moving daily sometimes. Particularly if there's a big wind event like a hurricane or something else. You, -- you got to find a way to

collect the data and let people use it and this connects the fact that it may not be exactly the same way that the seafloor looks today as it was when it was collected yesterday.
I'm not sure where that fits in with what everybody just presented. But it is reality.
>> BRIANA HILLSTROM: Yeah, that is a good question for one of our panelists to pick up on. I think it is important to have a conflict quality with just the use attribute. You know? You took all of the attribute's together and sometimes they can get muddled together. It is important to hand drop them.
>> ED SAADE: That is a very good point.

>> BRIANA HILLSTROM: Mr. Hansen, I'm really sorry to ask you to comment. We have a lot of sort of, you know, you are an attorney. We have had a lot of comments on trying to keep you guys out of it. But we appreciate your advice, as always, keeping us on the straitened Aero. I would love to hear your thoughts.
>> DEREK HANSON: I was going to know that bashing. But I agree with it. I really enjoy working with my colleagues at NOAA and our partners but I enjoyed working on novel exciting things. You know? We are pushing the boundaries on the legal side and on the partnership side and this is something that should not be that exciting and novel. It should be a pretty group -- routine. So I greet them with the desire to keep lawyers out of these things because it really inhibits things. And I've seen that in my work here.
I have examples that match, you know, the example of the user. So I myself have spent months and, you know, more than a year in some cases trying to negotiate access to someone else's data and trying to assure in commercial
user that they could use NOAA data without restriction. And it is most frustrating when everyone agrees that they want to be open and it is a matter of document and it. I think these tools would, you know, hopefully we can make it easy and I enjoyed working with them and the rest of the team there. I think this is a great proposed path forward and I'm looking forward to hearing feedback from the panel or -- yeah. It and also hopefully taking lessons learned and applying it with Tony at the NOAA level so that we can really sort of hopefully follow the leadership and take you know, hopefully apply this across NOAA, consistent with statute and what has been pushed in this direction. So thank you for having me.
>> BRIANA HILLSTROM: Thank you for being commenters. I was going to pass it over to Deanne for panel questions as we have time I think.
>> DEANNE HARGRAVE: Thanks. I think we already have Qassim lined up to ask a question.
>> QASSIM ABDULLAH: Thank you for that. That was great information.
[No audio]

>> JILL STODDARD: We seem to have lost you.

>> QASSIM ABDULLAH: I'm sorry. I thought -- the button on my headphones was off. Very impressive that is E where NOAA is going with the updated policy. It is really important. But again, with what you guys have presented, what Matt presented is very impressive. My only hope, like, weak emphasis -- put emphasis on -- I think and touched on the accuracy, which data quality.
I'm an if we are dealing with it as a clearing house policy, really, we should not look at just the data sharing.
I mean, with this great effort, if we include the forecast on the metadata itself, because that helps the user a lot. The technology guys have presented, what Matt presented is very impressive. My only hope, like, weak emphasis -- put emphasis on -- I think and touched on the accuracy, which data quality.
I'm an if we are dealing with it as a clearing house policy, really, we should not look at just the data sharing.
I mean, with this great effort, if we include the forecast on the metadata itself, because that helps collecting from a courtesy of a few centimeters to meters now without providing that, I mean, it is not enough to give it free or four open access. It would be nice if there is a

direction. What does this data produce, for example? And we are not asking NOAA to commit to that. But at least when we accept these crowdsourcing or whatever data we ask the provider what you categorize it for? Which data accuracy, for example. Vertical and things like that. Thank you. That is all I have.
>> JILL STODDARD: Thanks. --

>> DEANNE HARGRAVE: Thanks.

>> LINDSAY GEE: There was an issue about internal source data I think you gave on that matrix table.

And I just wondered and trying to encourage people to provide at least that there are data available, is there any way to show publicly not the data itself, but that there are data revival, what -- whether that is -- and I don't know if that is a derivative product or a separate data center like a polygon of work with there was something. That could be commercial data or it could be updated that they don't release. We know the data for internal use. But publicly, we know that there is data available so we don't go there and potentially if NOAA, at least provide the owner of that source data, it allows the parties to then negotiate that separately and that would again not directly encourage, you know, encourages knowing where there is data as opposed to the data itself. The second point. I wanted to make a comment related to Qassim. There is that second issue of quality and we have that matrix, as we discussed later on. I think that is something else we are seen as we encourage and reach out for people to provide data or licensing, hoping that does facilitate more. I think there is a pipeline that we need to look at addressing they could to help, you know, how that can be improved as well. Because we can keep reaching out for NOMEC. We need to get it through. So I think that is a separate topic and maybe can address Qassim's concerns in that discussion as well. Thank you.
>> DEANNE HARGRAVE: Thanks very much. Matt, did you have any further comments?
>> MATT WILSON: Shirt. Thanks for the comments. We get these a lot. Can we discover this data in our national biometric source or what about these data types? What about these types of questions and the answer is, if it already had a license, we would -- we would already have the answer. We would know exactly where it can go and what we can do with it.
And so I think that really gets back to this point I heard a couple times, actually, Dr. Calder made it first, commonality. That is where we can go with this once organizations start really coalescing around that use of one of these well understood license types.
Then it becomes more and more easier to share data. And yeah, Dr. Schwehr reinforced that as well.
And you are done with your license analysis. I think that is really where I see this going. You know? In the future, are these well-known license types. We start coalescing around those and so crowdsourced bathymetry. We came up with that and I think that will be under an open they don't license. We know what we can do with it and so many of these questions. We already know the answer to if it already had that license on it.
>> DEANNE HARGRAVE: A follow-up question, Matt, how do you see you know, reaching out to private industry and making them aware of the tools how to use the tools, I guess, kind of the education aspect to that. Is that part of the plan?
>> MATT WILSON: Yes. Certainly. I think it is just daunting. If you're not used to talking about licensing, it seems daunting. I understand that natural reaction people have. Is it smart work? Is this just more overhead, it is -- that is the whole point of that licensing, is removing that work, removing that overhead.
You see that license and you say, oh, okay, there you go. And we do want -- yeah, the outreach will be ongoing. It will get better. Once this becomes more ubiquitous throughout the industry and once we start coalescing around one of these well-known license types and that is why we went toward -- we gravitated towards open source because it is already internationally known and we already see it used a lot.

So that is already popping up a lot. Once we see that more and more, then it is just going to get easier to share data. That is my hope.
And my hope for the future.

>> JILL STODDARD: Any other questions from HSRP members for the panel. Yes, please, go ahead.
>> BRIAN CALDER: For me?

>> JILL STODDARD: Yes.

>> BRIAN CALDER: I think for the outreach piece, it is the requirement that we have now as academics on a NOAA grant. Thank you, by the way.
It is to send all of the papers that we published into a central library as the repository for publications.
This is something we could have been doing for years. But we never did because what they asked us to do, they came to -- 1 want you to take 10 minutes of your day to send this form of entry to the central library.
It became a special work condition in our current grant, which was last year.

Or to start last year and we do particularly, when it first came out we went, really? Something else I have to do put in practice, it was simple. All we do is we e-mail it to an email address and the Central Bank takes it care -- takes care of it for us.
Do you want their funding? You got to do this. And then really? Okay it is that simple? Okay. Let's go on with that. And it is easy. I think it could be quite easy really.
As long as we can do the support piece and say, you know, we need you to do this. Here's how you do this and this would be easy. As long as we can do that, I think we will be okay.
>> DEANNE HARGRAVE: Absolutely. I fall into the lazy category.
If it is easy, then I'm more likely to do it. Andy, I see that you have another comment?
>> ANDY ARMSTRONG: Yeah, thank you.

So I noticed in Matt's presentation that he had the green checkmark by the no commercial category.
Assuming that when we do it for our purposes, it is not commercial. It seems like there's a whole downstream list of people who take our data and make commercial products.
If those now commercial data are embedded in our product, which is not commercial, does that -- is that restriction care he alone and blow up the system down the line?
the original Dave --

>> LYNNE MERSFELDER-LEWIS: --

>> MATT WILSON: If you are talking about products made from the data, they don't maintain that license.
So only if it is that requirement. Then they would have to maintain that license. In which case, we could not use it for charting and all of those things. It is clearly specified in the license terms as that shakes out..
>> ANDY ARMSTRONG: Thanks for that.

>> ED SAADE: You think about, what does the term commercial mean? Navigation charts? Commercial fishing areas, commercial recreational areas recreational diving, commercial somebody who wants to build something on the seafloor.
It is a pretty broad definition. That is a good point.
>> ED SAADE: And there's a lot of uses where you want to get all -- ballpark indication of what

the seafloor is like.

No one has any intention of constructing anything there yet. But where's the best place to make the cable route? Where is the worst place to put a cable route? And the general data is perfect for that. It is a good general indicator of -- you might as well avoid it altogether and

not waste your time.
So just general trends are really important to saving money and having a real meaningful application for somebody.
>> LINDSAY GEE: Teen I couldn't agree more. That is a big part of our external data.
It may not meet our needs.

>> Citgo specifications for hydrographic survey but it is still valuable for those kinds of things that just informing us where we might want to goat survey or whatever purposes it might have and so all that going into the national biometric source with the appropriate metadata and licensed as both can make all those applications downstream automated and the highest use.
>> JILL STODDARD: Thank you Brache much, Matt. Thank you, panelists and common plus. Very key topic here and lots more coming soon. I think Julie, are we out of time for this session? Thank you all very much again.
>> JULIE THOMAS: Yes, that was a great session. Thank you so much for leading it. Go ahead. Yes. Oh. Okay. And definitely to panelists and the commenters.
It was really very pertinent and we will be discussing outdated licensing comments later on. So -- and Matt, thanks for all of your help in getting us to this point, I guess. Okay. Thank you all very much and we are going to move on to the next section now. So at times, I think Anuj, are you with us now, one of our panel members had to join us late, maybe you can undo your camera. Thank you. And welcome and do you want to introduce yourself?
>> ANUJ CHOPRA: Sure. Absolutely, Julie. My apologies. Something urgent came out. I have been there for the last part and my name is Captain Anuj Chopra. We provide consultancy to the industry. I also teach at the University of Houston in the supply chain program. And I work with a bunch of NGOs. Background as I have seen for about 15 years.
And I did commercial risk and operational risk including sustainability. That is my experience, privilege and pleasure to be here and the progress. Thank you, Julie. Thank you so much.
>> JULIE THOMAS: Great. I'm glad you could make it. I'm going to turn it over to Admiral Evans now and we are in our public comment area.
It is all yours.

>> BENJAMIN EVANS: Thanks, Julie. I want to say also, how much I appreciated the data licensing session. I was looking forward to that and you did not disappoint. It was a lively discussion. Both technical and administrative points made. So this is the public comment period as Julie said.
We request public comments at all -- and all present are encouraged to put comments in the question box, in the GoToWebinar chat.
Please target your comments to the HSRP members and focus on what NOAA can improve for navigation, and positioning.
Products, data and services. But this is not a request to ask the presenters a question. This is more --
[Indiscernible - low volume]

And we have a number of written comments that we already received. I'm going to turn this over to Lynn to read and summarize those comments and show them on the screen and they will be in the document shared with members and the NOAA representatives to purchase -- posted to the website and included in the public record. So Lynne, if you have that summary, share your screen and take it away.
>> LYNNE MERSFELDER-LEWIS: Sure. I'm hoping one of them could show their screen because I got also the questions box open and I reiterate what Admiral Evans has said, we would love more comments directed toward the HSRP members to discuss. If you have additional comments. And I'm happy to walk through the advanced comments and the recent comments we got today.

And if Amanda or somebody else, show your screen, that would be great. To show the live document with comments. That document will also be put on the -- in both the meeting materials and on the website as soon as the meeting is over.
So from Mark Luther, can infrastructure bill funds be used to expand and fund NOAA ports operations and maintenance?

From Charlene Sylvester, hoping to learn that data licensing will not hamper federal coronation efforts. Jason Show Lander, please make that NOAA custom chart to export extents adhere be able to accept the chart equivalent extents. From -- please improve Web services and APIs. From Evan to make data more accessible to more people.
From Bob, more nearshore bathymetric surveys for the safety of navigation and environment. Recreational anglers driving direct that the hotspots. From John Schneider, keep improving the chronic charts used with systems. From Matt Holland, does NOAA have targets to increase the use of USVs for data collection that improve safety and lower if I environmental impact?
From Paul DeVine, I am interested in how we can better facilitate the collection of oceanographic and hydrographic data on a ton miss platforms.
From Perveen, broke can provide reliable geo-data effectively into the highest standards to contribute to safe navigation and development.
From Denny Haynes, a couple of comments.

One, thank you for the great opening remarks by Nicole above. It is great to see that all vessels class beside class B are all charting and serving a secondary mission.
And the saints of airborne and unproved platforms. This is a great plan. Question one, for Randy TeBeest, acknowledging that these re-capitalization assets are first and foremost for the U.S. priorities. To what extent are you open to share your plans and resources with neighbor countries where U.S. share an initial band read with including the Arctic and the Great Lakes?
Question two what about satellite-based data platforms? Are they a part of the plan or on a separate plan?
Denny Haynes also says, off of the information of all HSRP participants, thank you Lynne Mersfelder-Lewis, Dr. Qassim Abdullah, Ed Sayed -- and that fun 26 of the international hydrographic review of November 2021. The no address that people could read. Thank you for that plug.
Rhianna Sullivan, a question for Admiral Evans, with the focus on being data centric, especially with the great progress being made with the S100 products. It seems appropriate to restructure the nautical publications ranch to follow suit. Are there any plans to restructure it? I'm specifically talking about converting book managers for the mind bugs of the Coast pilot into data managers of expertise in specific data layers that supplement the truck. Number 14 from John -- look exciting use of the color laser scan data on the Mississippi River. Great job. Question number 15 from Denny Haynes, by external data, do you mean including cats was a symmetry and trusted Coutts -- crowd sourced bathymetry nodes? Is data licensing permitted to cover potential liabilities or four data quality assurance? And last is from Guy Knoll. He had made some comments about their principles. And as he says there are some links to those.
I don't think we have had any additional comments. Here it goes. We have had one additional low priority. In addition to bathymetry, surveys often have ancillary images of data of features and substrates. Is there any value in making those images more discoverable for the public?
I believe this is an issue of the cost of data storage and maintenance but perhaps asking the question to the larger community could generate an opportunity.
And those are the comments so far. If there are additional comments, including the members themselves, please feel free.
Otherwise that is our wrap up for public comments right now.

>> BENJAMIN EVANS: Thanks, Lynne. There will be time for additional public comments tomorrow. Please send them in advance. With that, I think we will conclude the public comment period. And I will turn it back to Julie. If there's anything further.
>> JULIE THOMAS: Anybody who wants to make a comment, you are welcome to. Whether it yourself or one of the members once to make the comment, you are welcome to. I would just open that up to anybody who has a minute or two.
>> BENJAMIN EVANS: I'm happy to address a couple of these. Certainly not prepared to address all of them.
I don't want to monopolize the floor. Any panel members or NOAA personnel who would like to address any of these comments, please make yourself known.
>> JULIE THOMAS: I think you are good, Admiral. We could take a few minutes for that.

Thank you.

>> BENJAMIN EVANS: Sure. I wanted to jump specifically, I may be missing a couple here that I could address. I did not want to jump specifically to question the coast pilot because that is an area where we do have a lot of interest in improvement.
And the short answer is, to the question, yeah, absolute. We see tremendous opportunities for improvement there. I think the challenge we face is a matter of resources.
And the opportunity to -- we are making some incremental gains on the coast pilot. I'm happy to refer you to the folks who manage that, who can go into more detail. The ideas for a wholesale reimagining that you suggest that challenge we face is maintaining, because that is a statutory requirement to publish those publications and make them available for carriage both maintaining the current product and developing the new product simultaneously is resource intensive. Your point is very well taken and I would love to be able to connect with you directly or connect with folks that can talk about it in more detail. The short answer is a matter of resources and prioritization. That is the one specifically that I wanted to address.
Are there any other members, the panel or NOAA personnel who would like to tackle any of the other questions or comments?
>> RICH EDWING: This is Rich. >> Go ahead. I will read the question again.

Will they expand the operation/maintenance. I will answer this in two parts. The infrastructure bill was a huge bill. It provided trillions of dollars to multiple federal agencies and estates and other folks. I can only talk to the two sections that our office was able to work within and so the answer there is no.
Because first of all, within the coastal flood mapping pot of money, the portal system was not really appropriate. It did not meet the guidance.
It is not a storm surge system. It does provide data that could help with that. But it did not fit the criteria for that. And then the coastal observation system. The section as well.
But again, the port system did not really meet the criteria because that was really to recapitalize existing systems, not to expand them and not to provide, you know, maintenance, operations and maintenance funds. An interest or bill is a five-year bill for the defining goes for 5 years and then it stops. And so long-term maintenance funding does not really fit within -- with it very well. Again, there are other federal agencies that get funding that may get grants.
They already put out a lot of grants for improvement projects and things of that nature and it is certainly possible that you might be able to get funds through one of those programs to establish or expand, establish or to expand an existing one. Probably just looking for maintenance is probably not appropriate as funds are typically used for that purpose.
Hopefully that answers your question.

>> JULIE THOMAS: Great. Thank you, Rachel. I think we just need to mention that those commons will be addressed and written responses will be provided.
To those that asked the question. All right. Yes. Okay.

Let's move on, then, and we are going to move on to every last section. We have a little over a half hour. 45 minutes. To -- this will be a panel discussion now.
And with the panel and the leadership to -- we will be going around to the different panel members and actually getting their comments on that meeting, sharing ideas, and also remember, if you have any specific ideas that you would like to see in the letter to the administrator, please add those today and we will do the same thing tomorrow. So you will have another chance. We are going to start with Nathan.
We are going to go and -- in reverse alphabetical order. Nathan, this is your first meeting. But if you have any comments, impressions from today's meeting, this is where we can speak very frankly and kind of catch up with an air panel to see any directions we might want to go in the future.
>> NATHAN WARDWELL: Sure, yeah, great. Or as a new member, I guess I start off here.
>> JULIE THOMAS: You get to start off.

>> NATHAN WARDWELL: Great. I have a few comments. I will run down my list here.
So Admiral Ben Evans mentioned trouble engagement, I believe he was talking about the national bathymetric data source and that is great to hear. In Alaska, native corporations owned large sections of the coastline. And so I encourage that type of engagement when we consider private partnerships to address the state.
Juliana talked about vertical and motion and measurements and collaborating with co-ops which is really encouraging to hear leveraging Global navigation Satellite systems to look at both relative sea level rise and land motion goals to get absolute sea level rise. And improving the geospatial advert for cope -- coastal observing. Amazing.
I was very excited to hear about the updates to opus. I mentioned this earlier about the bluebooking opportunity and integrating Archean. I would like to encourage or I would like -- it would be great to get a briefing on the sea level type -- technical report that came out with Lee. It is a great report and I could get into more details with that.
And earlier on, Nicole LeBoeuf mentioned building relationships and I was just going to throw it out there, you know, is there anything HSRP members can do to help improve, build that relationship?
And then the mapping with augmented reality, you know, blended nicely with some of the discussions we had this morning and that type of information.
>> JULIE THOMAS: Great. Thank you very much for that summary. All right, moving on, we will go to Gary. Gary?
>> GARY THOMPSON: Yes, great session today. I was very interested in the discussion about the bath he and that is very important to coastal states like North Carolina. That information is very beneficial for us to develop our own models for pre- and post-storm information and also for their resiliency program. It was great to hear that information and information about the co-ops and very critical of us like North Carolina Union and the coastal states.
I know they are doing some work here. I really appreciate that. That is, again, very beneficial. Julianna stressed the -- we have been able to test opus five- point oh and we are looking forward to that to go through to being active, just curious about a timeline when that will be available.
Question about the infrastructure funding. With any of that be available for the support of our CORS or the gravity data collection.

Great sessions. A lot of good information this afternoon.

>> JULIE THOMAS: Great. Juliana, are you on?

Perhaps you could comment on the timing for opus if you are here.
>> JULIANA BLACKWELL: I could try, but I don't have a definite answer. I will try to look into that with my team and find out.
We got a plan for that. I apologize for not knowing, Gary. And I appreciate the question about infrastructure funds and whether or not that would be available and at this point in time, I

don't think there are any plans for that.
And again, we are still waiting to see how the plan rolls out and what is approved. I could follow up with you more. Okay?
>> JULIE THOMAS: Thanks, Juliana. Okay. Ed Saddi, you are next.
>> ED SAADE: Thanks, great session and good meetings. It was nice to see the excellent participation by the members. I think it was Lindsay that connected the dots between the operations and remote data collection along with the benefits of diversity and equity and inclusion.
I never thought about that before. I think that is an important appointment, the way that business is trading and where we are going.
It is good to hear from all of the NOAA leaders and directors, especially to have Admiral Evans participate and Nicole's nice long list of updates for fighting and all of that is good news for a great organization. Finally, I had one complaint, we did not see any data.
Just for whatever reason, the panel members, with their very subjects. We talked a lot about data. But we did not see any of the latest and greatest fantastic examples of what -- what everyone is capable of doing. That is a really minor complaint.
>> JULIE THOMAS: We saw the Tonka earthquake. That was pretty cool.
>> ED SAADE: You are right. That gets the reward.

>> JULIE THOMAS: Yeah.

All right. Thank you. Tuba?

>> H. TUBA OZKAN-HALLER: Thank you for the opportunity. I, too, am a new member. I benefited from the meeting. I appreciated the opening remarks, especially the updates on the modernization and efforts. I had not, up with that. That was great to note.
I also appreciated the update from -- about all of the different NOS navigation service portfolio priorities.
The discussion about the data licensing is really, really interesting. This is an issue that I have thought about for a while. And I also really like the topics of the meeting. I heard a lot about diversity, about workforce development. And understanding committees. So thank you for bringing that lens to everything that we do. It is not just an additional thing.
Thank you.

>> JULIE THOMAS: Okay. Yeah.

It is interesting how I think we are all -- we have become so sensitized and so -- realize how much attention is needed to get out to, like, Lindsey Eaton said, remote access to touch base with some of these underserved committees. It is interesting how it has become a theme that goes through all we are talking about. Captain Cook you are next.
>> ANNE McINTYRE: Thanks. All of the data stuff is above my head. I really support the licensing and just make you know, whatever -- whatever makes data easily exit those available to the folks just the product end user. But I think it is really important.
I wanted to thank Rich Edwing for the work that is being done on the Columbia River.
That is what that is very needed and I'm sure I can give you a big thank you on behalf of all the stakeholders on the river and the third thing that struck me was the price on the water because the augmented reality navigation, as you know, as 30 some odd year mariner, I have a big concern about tunnel vision into screens. And people not looking out the window and I thought that data was very interesting and a step in the right direction for having mariners keep their -- it is funny because it is an augmented reality. But keeping their head really in the game of what is actually happening instead of watching it happen. So those are my comments.
Thanks very much.

>> JULIE THOMAS: Yeah, I was intrigued by that, too because the idea of having this tunnel vision here was something, you know, does not really sit right when you want to be looking

all around.
But it was interesting data that they had there. Okay. Dave Maune?

>> DAVE MAUNE: Good afternoon. I'm always interested in hearing what NGS is doing. And I had one topic on the importance of expanding in Alaska. Only Southeast Alaska has that. When you collect all the data that we don't have any way to transform it into bathymetric Eta to a title Eta.
We need. We need to expand it in Alaska. And Qassim mentioned accuracy standards. That is how the data sets need to be produced and then --
Are we tested? Is the -- so I'm also interested in anything dealing with accuracy reporting as part of the data licensing thank you.
>> JULIE THOMAS: Thanks. We did talk to Matt about it. I think they are trying to separate out that effort between quality control and accuracy and then actual data license. But what we have done is at a priority line to our matrix on data control and accuracy and that is, I think we would like to delve into it a little bit deeper and find out exactly how that is being handled right now.
But as I understand it, we are doing it as two separate efforts. Yeah.
>> DAVE MAUNE: And I agree. It is part of the meta data.

>> JULIE THOMAS: Right. Right. I will discuss that in a little bit. I think in future sessions, we will help to delve into that a little bit because it is important, obviously.
Okay. Captain Kinner. Are you unmuted?

>> LYNNE MERSFELDER-LEWIS: Ann, you are still muted.

>> ANNE McINTYRE: I think I'm unmuted now.

All right. A couple things and I echo Anne McIntyre on the idea of people looking out the window, please. Not just at the screen in front of you. I have been in a number of interesting incidents that result in that. Did you focus and I appreciate that you wanted to have the best possible information. I'm concerned that all fleets have the ability to access basic navigation products. Whatever they are. And that NOAA understands the needs of the end users and the end users' capabilities. This goes to my small vessel fleets. Also to the issue of uneven digital communications in remote areas, I think it was Nathan who talked about that and there are places where the digital flow is not quite as smooth and I don't know to what extent that creates a problem for navigators on the bridge of a vessel.
But it is something I think we need to be aware of and be looking into making sure that it is something that is not a problem for certain areas geographically or politically even. Also on the NOAA custom chart tool, I continue to look at it and I will continue to ask about topography because topography is as important as bathymetry that the navigator who is trying to find his way into out of around a port or a hazard.
So I am continuing to push to see that. I hope that NOAA will continue to bring topography into the product as it continues to develop and I'm looking forward to seeing what this new -- I made that note about the version 1.0 something or other.
I will be looking at that to see what that looks like right now. So lots to do on that one.
>> JULIE THOMAS: Great. Thank you, Ann. Moving on, Deann, you are up next.
>> DEANNE HARGRAVE: Thanks, Julie. It was so cool to learn a number of new things today. It is always the case when we get the updates.
So just really thank you for all of the excellent work and four sharing what is happening with us. One thing that has not been already discussed in this wrapup is bluetopo and is new to me today and I'm super excited about that. It looks like it may be the tool that I have been kind of visualizing as the way that all of the information is brought together from the different data types like bathymetry, lidar satellite, as well as the different sources, be it NOAA, other agencies. It looks like the tools that really address this big task. And I'm curious to learn more about it. And when that will be more available. It looks like it is coming soon.
I may have gotten that wrong, though. And the other part is that I just -- it just blows my

mind as the augmented reality. I think it is just so cool and what strikes me about it is I think we could entice a whole set of new generation to be interested in maritime activities because, you know, you think about Pokemon go and deep augmented reality, we have a whole set of people coming up, will understand how that all makes sense. To me, it blows my mind. I thought that was kind of cool. Thanks.
>> JULIE THOMAS: I agree with you. My nine-year-old grandson by the way has a virtual reality headset. He is into it. Okay.
Next one is Lindsay. [No audio]
I think you are still on mute. [No audio]
>> JILL STODDARD: We are not hearing you for some reason.
>> LINDSAY GEE: How is that? Sorry about that. Yeah just circling back to inclusion and being able to bring more people in. I think that is just one of the reasons I think it is very important and I think COVID the last couple of years, it has been a disruption. That is one of the positive things that it -- we are all remote and that way we are all equal when we are remote. And so what do we learn about that? We can do a lot of things remotely and that extends.
I think we experienced that at the exploration, being able to explore with limited on board and it has been going on, you know, 20 years. And that is something now. It should become the norm. It should become part of that IKEA infrastructure. Just -- I don't see it as the cost prohibitive when you what, the cost of operating at running ships. It was really good to see that. See the ship upgrade. We have seen that.
I hope with the unaccrued systems that OMAO are looking at that. Not the manufacturers of systems and I know they are working with those sorts of things.
Looking at small businesses and we had them at the large reading. They make money on things and Eric read stuff because they make money and they are efficient at doing that.
I don't think we want to reinvent the wheel on all of that again. And one of the other questions because of that technology, I think we should really look at data as a service as an array of doing it -- another way of doing it. That is something that is important and should be addressed as part of those plans as it should be a significant part of that, looking at the data as a service and what is already in place and operating for 4 or five years doing that. That licensing, I think, is one thing we learned and I joined that team.
We got to accommodate the lazy. I don't even -- I can even send an email. I want to check a box when acquiring my data that says, this is my level license. And I don't have to do anything when I send in the archives. I think that is a message that should be clear and we should also use the licensing, I hope that actually facilitates and gets more contributions of the data that makes it easier. Thank you.
>> JULIE THOMAS: Thank you very much, Lindsay. Okay. Nicole, you are with us. Thank you.
>> NICOLE ELKO: I have been listening all day and it has been a great day. Thank you for contributing to this afternoon. At least it is afternoon from here. I appreciated the leadership updates as always. Nicole's comments were excellent. I agree with Nicole's request. It would be great if we could get a briefing on the sea level rise report at some point.
I, pretty excited when Admiral Evans showed the blue slide and my excitement was because there was a coastal resiliency peace and I saw a bunch of sand moving around. So I went to the website and I did see that coastal resilience is mentioned in that. It talks about enabling simulations of sea level effects on coastal ecosystems to help identify sensitive marine habitats. And that is a great reason how bluetopo can help. There's so many other ways they could help.
Understanding impacts of sea level rise and so on. Excited to continue this conversation and all the ways NOAA does contribute and finally, just say, Deena and others, great job on the licensing session. It seems like you are well on your way to implement that and I would encourage you to, you know, find a way to overcome those concerns. A lot of concerns were voiced and I think that suggested -- suggestion to pick a framework and go with it is the best thing that I heard. How can we streamline implantation?

I appreciate this afternoon once again and look forward to tomorrow. Thank you.
>> JULIE THOMAS: Thanks so much, Nicole. Okay, Sean, you are up next.
>> SEAN DUFFY: Thank you, Julie. Of course, a lot of comments today, really caught my attention, having just survived Mardi Gras in New Orleans, augmented reality is a term that I may use again. I may not use it as it was used today.
But one of the more interesting presentations and of course, incorporating some of the virtual-reality aspects and looking at ship systems and management.
I also really enjoy the video that Captain Armstrong provided, you know. I was looking at a bridge thinking, I know that bridge. I know that bridge. But it made sense until -- I did indeed note that bridge. That was all very interesting. I agree with the importance of a briefing on the sea level rise. As we all do, I find things I bring up, you know, with can -- what concerns me, what I'm seeing here and sea level rise to coastal resilience, we talked about sediment management, I think Nicole mentioned that earlier.
You know, it's something that we really practice here but segments of resources. I still to this day object when someone calls beneficial use dredge spoils. There's nothing spoiled about it. It is a valuable commodity that we need to use more of and I really, you know, think for me, that was, like, relate what, my attention.
Again, good to hear from all of them. Well done and thank you.
>> JULIE THOMAS: Thank you, Sean. And thank you for leading that session earlier. Captain Alex Cruz, argued with us? I'm not sure Alex is with us right now. We may come back to him and see.
Captain Chopra, I can see you. How about you go ahead and take it? Truck --
>> ANUJ CHOPRA: Thank you so much. I apologize. And I will try to catch those recordings. I agree completely with the suggestions earlier, for example, on the sea level rise in the subsidence that we get a briefing on it. That is what is dictating our future at this time. I want to focus on diversity, equity, inclusion and acceptance. The implementation side industries adopt it.
Regarding the situation awareness and Lookout environment. I thought it was worth it for us to appreciate the -- after COVID at what is happening in Ukraine and Russia. This is going to change our supply chains completely or sniffing then there's going to be a lot of first-time callers coming to the United States. So the information which is being given out by NOAA for the depths, topography. We need to keep that and make sure there's enough socialization and management of change, especially with this big change which we are going to see in our supply chains happening.
So I'm looking forward to meeting tomorrow and enjoy the data part of it and the data licensing and plans on that. It makes great sense. Thank you. I'm looking forward to tomorrow.
>> JULIE THOMAS: Thanks, Anuj. And thanks for bringing up the supply chains. We may bring that up at a different time.
Qassim?

>> QASSIM ABDULLAH: Thanks to all of the directors for the information and update and their continuing efforts in advancing NOM's goal kick supporting the industry and I would like to give a special thanks to Julianna. Our annual conference was in Denver and we needed the update on that data. So she sent us the last-minute request and he did an excellent job there to brief us on the modernization program. Thanks, Juliana.
I really applaud Larry and all the members of the hydrographic center. The joint hydrographic center, your work on assimilation and augmented reality is awesome. It is a great introduction to the two topics, which is precision navigation and the digital -- really combine it. For people who emphasize augmented reality and looking from the window and understand, I mentioned this kind of capability during a fog, with visibility. That is what opens a lot of opportunities for us if we go that way. So we definitely need to talk with you on that. for all the national programs for the NOMEC strategy, I just want to bring in and use not to market -- but just announced recently that the moment of the bulldog and the joint

partnership with government agencies by the way. The reason I mention it is because I'm involved in promoting, trying to promote and -- new lidar technology, and Tiger for 10 years. Seeing it in action is very exciting and Bulldog is at a high altitude. You can 4 from 10,000 feet. All with the current system you fly it much lower. So this is very -- you get a wide swath. It has been great. But it is -- I just want to bring it to everybody. And finally, I just love the BlueTopo term. Whoever came up with it, I think it is cool.
But we really also need to look at how we work with NGS on adding it to the -- database because Ann earlier mentioned we need the digital chart that would be a great service, definitely.
The national elevation for the United States. So it would be nice if we add the BlueTopo, so you get a contiguous transition to -- for example. That is all I have. And thank you for everyone's efforts and the speaker and the commenters. Thank you.
>> JULIE THOMAS: Thanks, Qassim. I will add again, if Alex, Captain Cruz, are you with us at this time? No. Okay.
We know Larry is not here. So Rich, we will go on to you, then.
>> RICH EDWING: Thank you. Can you hear me?

>> JULIE THOMAS: Uh-huh.

>> RICH EDWING: I thought this was a great first half of the spring meeting. Despite not having a long career in this area, I always learn new things at these meetings and today was no exception.
The term "digital twin" jumped at me. As the father of -- that one really, my attention. Digital twins. But something like everyone else, we will look into it and see how we can use that to our advantage.
I also found data licensing panel very interesting. It is not something we have been involved in yet.
It is certainly on my to-do list. And I don't think we have some of the same challenges. But we will see. I am very much forward-looking to tomorrow's session and the bridges and dams and those sorts of things. That is directly in our wheelhouse, so to speak. I think that wraps it up for me. Thank you.
>> JULIE THOMAS: Thanks, Rich. And I have to say during the data licensing panel and Tony Lavoi was talking about, I wonder if you know, our program has been talking about the port system for quite a few years now. And does this really affect existing data and what types of data and to what extent does it really cover.

I had the same question and I thought, we are not going to win the coach right now.
>> RICH EDWING: We bring them into agreements. [Overlapping speakers]
I think we have a lot of the things covered that are trying to be resolved --
>> JULIE THOMAS: Okay. You will have to let us know. Okay, Juliana.
>> JULIANA BLACKWELL: Thank you. I would like to address a couple of things that Dave and Nathan brought up. One of my notes was work that we are doing collectively upon the model for the Alaska region and I know this is a five-year effort that his plan to continue to work on getting the Alaska title collection data as well as observations. The plan is between this year, 2022, and by 2026 to have the region complete and the models released. I know this is going to take a while.

But it is a priority for us. We are working it amongst our offices and we do have it in our plan and hopefully we can stick to the plan with the resources that we are allocated. The other thing, thank you, Qassim for your mention of Dr. Drew Smith's presentation at the event. We have a number of things that we do to provide updates. And just encourage folks that are

interested to take a look at our website and sign up for any of our webinars or outreach opportunities.
We are not holding a geospatial summit this year and could not hold a virtual geospatial summit. But we are providing updates at different points during that year, through our. Please continue to look for that. If you want to provide feedback, please, again, use any of the tools available on our website to give us feedback or ask questions and we will get back to you. And just as far as today's discussion goes, the things, again, learning more about those Digital twins and what that means and how you know, we can get smarter about that. I will just say, I think it was Ed's comment. The federal government is usually not early in these types of things. We are slow to transition and adopt new technologies and new ways of doing business and I think we are just kind of designed that way. In fact, here we are, still waiting for our budget for this year. Never out in front, but you know, slow and steady. And I look forward to learning about this together. So thank you. And that is it for me. Thanks.
>> JULIE THOMAS: Thanks, Juliana.

Lynne, you just sent a note about Alaska.

Do you want to -- is this a good place to just inspect -- insert what you put in the complex.
>> LYNNE MERSFELDER-LEWIS: I think Juliana just kind of addressed it. We had two late breaking comments. One was talking about the need to expand in Alaska.
The program is working to obtain data and ties to fill the gaps to enhance and expand the great transformations. And the other comment was from Starla Robinson. Targeted to Deanne and Kurt, saying that she likes to use augmented reality and they are for her hydrographic projects in Google Earth to plan them and I imagine the value would apply to any planner including windfarms. 3D evaluation can really add to the understanding of an area.
>> JULIE THOMAS: Great. Thank you. Okay. All right. And then we have Captain Armstrong.
>> ANDY ARMSTRONG: Thank you, Julie. I want to know that my pictures on the screen are probably for today because it has been snowing continuously here throughout the meeting. And so Deanne and I are under inches of snow.
>> DEANNE HARGRAVE: Right.

>> ANDY ARMSTRONG: I would like to thank everyone who commented and just say that we certainly look forward to following up with any of you who are interested in fine- tuning and course correcting anything that we are doing in that regard and finally, to ease Qassim's concern, I think we are -- one of the reasons we are looking at AR is incident we can continue to look out the window while we still get the information. So it is not a matter of losing focus on the waterway and trying -- the means of keeping focus on it while we still get the information.
So just want to be sure everybody had that little bit of information added.
So otherwise, I thought it was a great meeting and as usual, the HSRP members are clearly tuned into providing great assistance to NOAA. So I appreciate it. Thanks.
>> JULIE THOMAS: Thanks. I think your video was the hit of the day with the VR display. So we are doing really well. We actually have five minutes left.
Admiral Evans. A whole bunch of time here. Would you like to provide some closing comments?
>> BENJAMIN EVANS: Sure. Thanks, Julie. And just before we do I want to confirm that neither Nicole nor Glenn are available and would like to offer --
[Overlapping speakers]

>> JULIE THOMAS: I did not think either one was on. [Inaudible] confirm that.
>> BENJAMIN EVANS: I think if --

>> LYNNE MERSFELDER-LEWIS: Confirmed.

>> BENJAMIN EVANS: Okay. I had pages of notes here and was planning to touch on a lot of

things and then the pages were too luminous to do so.

This being my first full meeting as DFO, I'm incredibly impressed as I expect to be. The energy in that room is reminiscent of our procedures workshop, those who had the opportunity to participate in that and just the energy of which I deeply appreciate compassionate engagement and the clear intent to help us improve our products and services. I do -- I wanted to touch briefly on the data licensing session which really excited me and I think as usual, Brian's comments.
'S comment about incentivizing participation and the carrot and the stick sought was powerful. I was thinking about, okay, once we incentivize this and make it easy, then we start to see some real benefits and I talked previously about how we are frankly struggling a bit to meet our goals and our mapping by 1% this year. A lot of that data is out there and getting access to it in a way that we could use and simplifying the procedures in which providers might give us that data. That was great. Also, keyed in on -- I can't remember who made this point but that point about community and industry outreach. We have had this briefing today with similar briefings. It is clear that we need to do more there. I take that comment to heart. There are going to be skeptics out there. While we may have convinced some today, I think we need to take that show on the road. I also wanted to comment on Captain Kinner's comments about looking out the window and all of her comments.
As someone who has the honor, I appreciate that. And Andy's comments about how the electronics help you look out the window. I think that is a nuance that is important to recognize that we certainly want to employ these techniques to improve our situational environment and if they are not then we have not succeeded. And then lastly, I wanted to address Ed's comment about not having enough data. I agree.
I took a note even before you said that. I think for us at least, a function of the spring meeting, what we have been largely informed and in the office for the last six to a months. I hope by the September meeting, we can provide some more examples. Certainly looking forward to surveys and getting new data for Guam and the Commonwealth of the Marianas cruises. And then similarly, in the Great Lakes, with that response teams and contractors and Thomas Jefferson will be working this year. Making a big push into some of the new mapping data in the Great Lakes. So I look forward to sharing some of that at that follow-up meeting. So that is all. Thank you.
>> JULIE THOMAS: Thank you very much.

And that is -- we have gone through all of the panel members and leaders and I would just say I have taken so many -- and got them all. There are so many ideas and a lot of good discussion. Thank you all for your comments and your participation. And Lynne, thank you for helping us put this together. And Ben, do you have any closing comments before we adjourn?
>> BENJAMIN EVANS: Now, ma'am. Thank you.

>> JULIE THOMAS: All right. Then we will see you tomorrow, at 1:00 p.m. We hope that you can join us, to those that are participants. And the rest of you, we will see you tomorrow. Thanks, again, for everything. Bye-bye.
[Event concluded]