Closed Captions HSRP meeting Sept 1 2021

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Good morning. Or good afternoon depending on where you are sitting. I am Julie Thomas, I am a senior advisor at the Scripps Institute of oceanography in La Jolla, California in the chair of the HSRP. Before starting the meeting I would like to mention a couple of items. First I want to mention the impact of hurricane Ida on our members and colleagues who are affected and so far we are glad to hear that they are all safe and sound. Also note that the mission of NOS and the National Weather Service is to track the storms in addition to searches and hopefully these data help save countless lives. I also want to acknowledge the many people and businesses operating during the COVID-19 pandemic. It's impacts to work and personal lives, to our country, and the great human laws that is occurred. I would like to take a moment and reflect on the recent loss of a colleague closely tied to HSRP , OCS and Noah. Rick Brennan. He was a rear admiral from NOAA, new director of the Office of Coast Survey and the do designated federal officer at the age SRP which has followed closely for years. He was gifted, a talented hydrologist, a creative thinker and a clever problem solver. His work presence is sorely missed. Even more than a talented leadership, he was known by so many as a caring person who was not afraid to show his genuine self. A loving husband, and a true friend and colleague too many at NOS, NOAA, and many outside the government. I'm going to invite John Nyberg, the deputy national I do refer at NOAA .

Thanks, Julie. Rear Admiral breaded was a friend, color, mentor and leader. He was incredibly ergodic technical expert in hydrographic community, I've had to step into issues as of late, I can't figure out how we managed to fit all the responsibilities it each day. The people we knew, the projects that he had not only worked on, but had deep technical knowledge of, and the groups that he worked with, like the HSRP, we will all miss him. He always helped us to find the best in each other and push technology to its limits. He was always going forward as he was fond of saying the art of the possible. We all loved our time with him at the helm and I'm thankful for the time I had with him and the impact that he left on us in the field of hydrographic.

Thanks, John. At this time I would like to take 10 seconds of silence to remember his contribution and to note that he has missed.

Thank you. Thank you for helping us acknowledge our collective loss. Are going to proceed with the intros of team members and the NOAA leadership. You will find the member biographies in the material distributed on the web. We will now invite the HSRP members including the nonvoting members and leadership to do a short intro. They will provide their names, organizations, job titles, and geographic locations. And we will do these in alphabetical order, remember to unmute yourself and turn your WebCam on and Dr. Abdullah we will start with you.

Good morning everyone. My name is Dr. Qassim Abdullah. I'm located in Maryland. Thank you.

Thank you.

Go ahead, Captain.

Thank you, Julie. I am Anuj Chopra the CEO of [indiscernible]. I'm also edging professor at university boosted knowledge of technology on the supply-chain program. Pleasure to be here, thank you.

Good morning. I'm Sean Duffy, cochair of HSRP and executive director of the big River coalition. Represent navigation on Mississippi River. I will be quick but I will tell you Julie I appreciate your comments about those affected by the hurricane. And both honor Frederick Brenna. NOAA should be proud on the response on the Mississippi River as people try to recover the channel in homes of personal things. You've all been there. And mentioned the on calls, everyone is doing a great job. I will leave it at that for now. I just wanted to extend my thanks to you and Rick Brennan was a friend, I miss him to the state. Thank you.

Thanks, Sean. Nicole?

Hello my name is Nicole Elko, I'm a science director of the preservation association, as well as the executive director of the South Carolina beach advocates. And I do all of that from my office here in South Carolina just outside of Charleston. Happy to be here today.

Lindsey?

My name is Lindsey Gee, I manage the science and mapping operations for the ocean expiration trust. And I also spend time on the [indiscernible] and I currently am working in Portsmouth, New Hampshire and unfortunately I am heading over to join [indiscernible] tomorrow. Thank you.

Good morning, good afternoon. I'm the geoscience manager for Atlantic Shores offshore wind. I will speak to you later on today as part of the wind panel. I'm based in Houston, Texas but will relocate to Boston soon. Nice to see while.

Thanks.

My name is Ed Kelly, I'm the executive director of the Maritime association of the Port of New York/New Jersey. I'm currently serving in my eighth and final year of being a member of the HSRP. My interest in representation on HSRP pertains to port, maritime operations, navigation, and representing the Northeast area.

Thanks. And?

You are muted, and.

Are you hearing me? Okay. New headset trying to get it squared away. Thought I had it. Its technology. Ann Kinner, owner of seabreeze books and charts, chair of the San Diego Harbor safety committee. Speaking primarily for the smaller fleets, I say boats up to about 120 feet. And the thought of experience working with those people from day-to-day for decades now.

Hi I'm David Maune , I specialize in elevation bottle technology and applications. And recently I've been specializing in the study of land subsidence.

Hi I'm Ann McIntyre, on the business director for the San Francisco bar pilots, former maritime pilot. On the Columbia River. And upcoming to you today from San Francisco. Nice to be here. And?

Do we have Ed page? We can't hear you either. Did we get it? Let's go on to South. To South. Let's see if we can get back.

Good afternoon, happy to be here and join you today. I'm a ship captain, [indiscernible] director. I am an expert in precise navigation, [indiscernible] navigation picnic you.

At?

I'm the president of grow and the group director for the Americas region. I'm dialing it today from San Diego California. Gary?

It afternoon. I'm the deputy risk management team.

We have Ed now. Ed Page.

I think I'm on. Ed Page, coming in from Juneau, Alaska. I've been involved with NOAA for about 50 years between the Coast Guard and my safety career. And the Maritime career. It is always been good to work with the NOAA programs . That's it. Happy that you cannot make it. We would now like to invite the nonvoting members of the HSRP and and OS and leadership to do self intros. And I would like to recognize John Nyberg who, this is his first meeting serving as the acting designated federal officer. We are starting with Captain Armstrong.

Hello everyone. I'm the NOAA codirector of the joint hydrographic center at the University of New Hampshire. We are located in Durham, New Hampshire. Thank you.

Giuliana?

Greetings. I'm the director of NOAA's National Geodetic Survey and I'm joining you from Northern Virginia today.

Thanks.

Rich? Do we have your WebCam on muted? Let's see. Do we have Rich? John why don't we, we will get you in a minute.

Thanks. John Nyberg, I'm the deputy Hydro refer in the Office of Coast Survey. And the acting [indiscernible] for today's meeting.

Good afternoon everyone, I'm the policy director of the National Ocean Service. And I'm coming today from Alexandria Virginia. Nicole?

Hello, I'm the assistant administrator for NOAA calling from Maryland.

Mark?

Good morning. I have the pleasure of serving NOAA as senior advisor for coastal inundation and resilience and I'm joining you from Northern Virginia this morning.

Thank you, I am the newly minted administrator of know and Undersecretary, coming to you from my office in the Hoover building, headquarters for the Department of Commerce in downtown DC. A pleasure to join while. Spectre we have Rich Edwin yet? Okay. I'm not sure if your WebCam is on or if you are muted? Okay we might come back to Rich in a bit. I believe, Rich, you are self muted if you would unmute yourself. Okay. I think he is having problems with his equipment. Let me just mention that serving in the background we have NOAA staff helping us with audiovisual, public comments another meeting assistance from our regular webinar group. That includes Amanda Phillips, Virginia Debra, just daughter, Scott, Melanie Platina, and Lynn merciless. Thanks all for keeping us in great shape and on time. Could not do this without you. A less we have Rich back, all right, we'll just go ahead as mentioned I am Julie Thomas the HSRP chair and the cochair is Sean Duffy. We would like to welcome Rick SpinRite, the cola booth, and Juliana Blackwell, Rich Edwing, Captain Andy Armstrong, fickleness, partners, and NOAA colleagues. Plus we have over 150 participants on the line. Thank you for joining us for this condensed two and half days of virtual public meetings. Look forward to hearing your public comments. A very big warm and congratulations to Nicole at her

appointment as the assistant administrator for the National Ocean Service. On behalf of of the HSRP we are thrilled and looking to your great ideas and support for new projects such as national documentary source, decision navigation, and the National Spatial Reference System. To up your resilience and climate change game for NOAA and the coast. Please let us know how HSRP can support you and stand by ready to assist. Mark, thank you for joining us again, we appreciate your modeling presentations at the last meeting. And we are looking for where our voices as HSRP may be most help to you. It is my pleasure to ask Jill, Senator Whitehouse, offshore wind energy and data sharing is a topic HSRP will address today. We look forward to hearing how NOAA will align the coastal data mission with offshore winds and possible data sharing interest. We will hear more on data sharing and offshore wind session. If we could have the video please.

I'm Sheldon Whitehouse Rhode Island, I want to thank NOAA and the hydrographic services review panel for allowing me to say a few words. Oceans, and Congress have been a successful area. Since I started the bipartisan oceans caucus in the Senate, you climb to nearly 40 members, and over and over again, in the Trump administration, and the Obama administration, and this administration, we have moved bills forward and got them passed into law. There is progress happening. And there's a some big bills ahead of us. The blue carbon bill, is one that would help with take-up of carbon in our oceans, [indiscernible] would really expand ocean data and monitoring, the rate of expiration bill to expand the capacity of our country to go out and support ocean exploration. And we have the [indiscernible] act which would send money to states and to oceans and coasts fund for the development of offshore wind. A little bit of the offshore wind equivalent of where money now goes from offshore oil and gas. All of these are moving forward, all of them are bipartisan. We have a lot of interest in all of them. And we have a record of passing good bills on fisheries, bipartisan good bills on ocean plastics, bipartisan, we have work ahead of us, but good things are happening and I look forward to working with NOAA and with hydrographic services review panel to make sure that as we move this legislation forward and Pasadena law, your expert voices are heard and considered. Thanks very much for giving me this moment with you. Good things are actually happening on oceans.

Great. We thank the senator for his video. It was nice to have it. Rich Spinrad we are thrilled to have you with this. We are looking forward to hearing about your priorities and any updates about the infrastructure bill that is out there, it might be useful for the HSRP. We stand ready to contribute to contribute to useful ideas to make improvements for your navigation services portfolio. As you may know the HSRP is engaged in coastal resilience and readily discusses the data backbone that the navigation positioning and observations portfolio bring to NOAA. And your constituents. We look forward to hearing your comments. It is all yours. Thank you.

Thank you. This is a real treat for me. Let me start on a serious and somber note. Thank you, Julie, and Sean, and the whole HSRP for your recognition of our good friend Rick Brennan. A good friend of mine as well. We will remember him forever for his diligence, hard work and expertise. Just being a great guy to work with, I assure you in my new capacity that we are working aggressively to fill in behind them. I take that role very seriously and make sure the HSRP is aware we are going to try to work towards a seamless a continuity of operations as we possibly can. Was thinking as I was repairing these comments that this is my first HSRP as no administrator. But I would point out that I was the and it was administrator when the HSRP started. Way back I think it was 2003 right after the Hydro services improvement act. And I remember thinking back then that this is such an important activity and it's really a good time to start thinking about the strategic, directionabout the strategic, direction for hydrographic services at large, and that was very much in keeping with the work the group has done in the last several years. I on the table a challenge that, in two years will be celebrating the 20th anniversary, let's make sure that they really well touted and highly visible activity. Needless to say, my friend and mentor Margaret Davidson back then, wish her to make clear to me all that the HSRP was intended to play and I'm delighted in retrospect to think Margaret, [indiscernible] here today. As many of you know, but I'm sure not all, this is actually the fourth job at NOAA. Having retired twice and coming back twice, I was the chief scientist, I was ahead of research,

and the head of NOS for several years. Almost 20 years ago now. It's for be an important opportunity to take a different perspective on the issues before us, the challenges, and opportunities to do some very important things. I would be remiss if I did not specifically thank Julie and John for your leadership of the HSRP. And I look forward to working with you as we move forward. I also want to take this opportunity to gradually the newest members will be joining us in January, several of whom are friends or former colleagues. That would be and Phillips, Dr. Pollard, for my own university organ state, and Nathan Wardwell. We look forward to welcoming them. And I also understand that three of the members with us today will be departing after having served their torpor, to specifically thank Captain Tomasello, Mr. Ed Kelly, and Captain Ed Page. Thank you so much for your diligent work in putting your effort into making sure that NOAA's Hydro services arm is the best they can possibly be. I also could save this is not the first time I have shared the podium with the senator White House. It's always a treat, he is a force to contend with. He's been such an extraordinary leader. And I think it goes, will notice bias at NOAA but our new secretary, also comes from the state of Rhode Island. And enjoys a wonderful working relationship with the Senate. We have unique alignment of leadership up on the hill and here at NOAA. And I want to thank all of the leaders who are participating in the event today you had a chance to meet some of them. We all know the Hydro services review panel has a specific focus on the work of NGS, co-survey, for that we have seen the fruits of your labor benefit the programmatic activities of those three offices. I also want to point out, and I think what we've just seen with hurricane Ida is just, the work of HSRP is directly relevant to a broad portfolio of responsibilities everything from how are office and operations conduct six activities, to the weather service activities to the fishery service, whether it is habitat, or, how we take hydrographic services and operations and transplant those two requirements for research. The work of the HSRP is critical to know what writ large. I also want to express appreciation for the contributions our speakers will have over the next several days on what is turning out to be increasingly relevant and increasingly important issues associated with data, data management, and of course offshore wind. The HSRP has had significant impacts if we look back at what has been done. Certainly in the area of coastal resilience, I know the March meeting of the past year focused on coastal [indiscernible] a critical component in resilience. I also recognize the work I was doing even before I was nominated for this position, that the HSRP is been critical on some very high visible activities. CeBIT 2030 or following up on the national mapping exploration characterization, effort, especially associated with the Alaska coastal mapping strategy. Recognizing this past great record, we are looking forward eagerly to the issues associated with offshore wind and shallow water mapping technologies. Would like to take a minute to talk about the priorities that I am emphasizing in my new role as no administrator. They are really focused on three main areas. The first of these is establishing NOAA's primacy, the role of the authoritative source of what I am calling mission agnostic climate products and services. But I mean by that is that any of the services, whether it is new charts, new maps, new hydrographic forecast products, are going to be relevant to a number of activities, shipping, homeland security, fishing, transportation, any number of different missions. NOAA will be established as that leader in climate as we already are for ocean products and whether products. I am working aggressively to ensure NOAA's capabilities are well understood. And I look forward to working with HSRP because I think you can help to identify that role in the future. The secondary throws is around economic development. I am a strong advocate for and will push NOAA's responsibility for balancing both are environmental stewardship efforts with new economic development. Something I call the new blue economy. The way to think of this is we have a robust blue economy built around shipping, oil, gas, fisheries, but we also have some new capabilities for providing data, information, and knowledge. Thick about the volumes of data that we are now acquiring just within the hydrographic realm. How are those data and the products that we [indiscernible] helping to cede new economic development? New economic opportunities? That economy built around data, information, and knowledge is what I call the new blue economy. And know it is so well positioned to take the lead in that development. The third area is really around equitable distribution of products and services. NOAA has such a strong and rich legacy development products, we need to start looking at how well we are doing in terms of providing those products to rural coastlines and places like Alaska and [indiscernible] territories. Expanding the same access to our vertical and land heights in Alaska and sea level trends, and coastal inundation is just one example of the work needed to provide equitable services to all Americans. We are also looking

inward in the sense of diversity, equity, inclusion, and accessibility. I'm concerned that we move out aggressively to make sure our workforce is as diverse as the American population itself. You will have a chance to hear more about FY 22 budgets infrastructure issues. But I tend to be more excited about everything that is happening, the FY 22 budget is historic if you look at it, not just in size but in terms of attention to the kinds of products and services that we are providing. One of my good friends often talks about NOAA having Toby and dollars worth of requirements but this year we've been about five and half a $6 billion agency. This new budget that is gone in and close to $7 billion represents a significant increase and significant recognition of NOAA's needs and ascites needs for NOAA's products. I will tell you that the [indiscernible] on the budget is equally encouraging. And demonstrate significant support for our products and services. If you look at what passed the Senate in the infrastructure bill, this also is remarkable. Let me just give you a couple of items that are in that bill. I do recognize, as we all do, this is just one step in what is a long process, legislative process associated with getting those resources in. But would you look at identification of half 1 billion with a B, half $1 billion for coastal and inland flood and inundation matching and, next-generation modeling activities, including modernize precipitation, and probable [indiscernible] studies, that is huge. That is extraordinarily valuable for the American public and it's a high bar for us. If we get these resources over 10 years, understandably, we will have to have our act together from the nuts and bolts of acquisition and procurement, to the processes we use for establishing priorities of those investments. $100 million to support improved and enhanced coastal lakes and serving stations, think of things like our belief systems, all of those things which are in dire need of improvement, increasing capacity capability, have been recognized. And is another 50 million identified for procurement and construction accounts. Associated with coastal and Great Lakes. You heard my priorities, you heard the opportunities that are being discussed in very real terms. In terms of appropriations and infrastructure budgets. We have some serious challenges. First and foremost is the effect of climate change. Whether it is sea level rise or coastal flooding or managing stress certain 2016 22, 2020, there were more than $600 billion worth of damages to the U.S. from weather and climate related disasters. Pick in the parameter. High tide, sunny day flooding, increasing frequent and remanded to, the impact supports, trade, and commerce. In 2017 we saw $1.7 trillion, dramatically impacted by these changes we see in climate. We are already seeing that just in the last two weeks, with hurricane Ida, and the impacts they', plumbing estimates that I heard this morning were $60 billion in damages. I suspect that is on the low end, we are going to be seeing more and more of that. The other big challenge that I have been personally passionate about during my peppered NOAA tenure has been research to operations, applications and commercialization. There are a number of successes within the remit of the HS RP, the work using robotics, calibrations, forecast development, how we are working with the private sector, to develop products that can be commercialized even further, it is important to me. And of course the national spatial reference system is another area where we have close ties to the commercial sector. I'm excited about the position remain Marine navigation program, and where that will lead us with respect to commercial opportunities. That we can do more and I think, I take it as a personal charge to me, working we work in the department of , I take it as a personal charge to me, working we work in the department of commerce we ought to be very aggressive about that transition to commercialization, or transition operations, and the transition to applications such as regulations. Let me close by pointing out that as I look at the agenda for the next couple of days, with issues like offshore wind, shallow water mapping technologies, and data management, I am challenging, I would like to challenge HSRP to think about how know I can meet today's challenges by partnering and encouraging innovation, new business development, and also please keep the focus in mind and at the front of your thinking how we can ensure equity and racial justice in the products that we are delivering. I ask you to think about how new technology will support resilient infrastructure. Were going to get a lot of questions about that, and we already are. As we look to support the American public, and the other federal agencies in climate [indiscernible], how do we fit in? How does navigation, observation, positioning going fit in? Going to throw it back to Julie. I really appreciate your giving me the microphone for a few minutes to give you some sense of what I like to do. I will close with one point. Is the argument that I made to the secretary would you first talk to me and asked me if I was interested in being considered for this position. And I said I am, and I think I can bring to the table perhaps better than other people, is that I could hit the ground running.

That I know the organization, I know but he had to brief me on what the HSRP is, I already knew that. Nobody had to brief me on the dynamics of working with that. Nobody had to brief me on the dynamics of working with our agency

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Had to brief me on whaton what these things are. How to use lidar. I was ready to hit the ground running. And what you want to realize that I don't need spin it, I'mI was ready to hit the ground running. And what you want to realize that I don't need spin it, I'm ready to work with you day one. So thanks so much for this opportunity, I look forward to a great meeting.

Thanks very much. We really appreciate your excellent and on target remarks we know that you are involved from the beginning and hitting the ground running. It helps us put things in perspective for the members to hear about the incoming administration from climate to economy and especially the new blue economy and the budget updates. They tie in well to the navigation observation and positioning services portfolio. And your request to the HSRP, we will consider these interests and discuss how we can address these and how we can respond in the future to you. I so appreciate your candor. The HSRP is very interested in infrastructure bill, the budget legislation, and hearing about how NOS foundational data operations can meet the deeds of the nation to support resilient to climate change. We would like to continue to be of service to you. And we are going to consider these priorities. And hope to see you and discuss our priorities of the next meeting which will be in March, 2022. But we hope to have communication before then. And once again, we thank you so much for everything. Did you want to say anything and closing Dr. Spinrad?

I think I've had my finger on the transmit button long enough. I want to go to listen. Next.

Julie, I think you wanted to ask him how the HSRP can be of service to him and his tenure?

We did do that. We did talk about that. And we definitely do want to know how the HSRP, I think you outlined some of the items that we can think about and respond. I've made a few notes. If there's anything else you want to add there?

Thank you. I also believe that in my comments I try to fold in some of those civics. I just add one other word and that word is dialogue, I am a strong advocate for the role of the federal advisory committees to be in dialogue within the constraints of all of the backhoes and regulations. And they want to make sure that we are just waiting for each meeting of the HSRP , we are actually working issues pretty actively between my leadership team, and the HSRP. Thank you.

Great. I look forward to the communication. I think we feel the same way. We have noticed the priorities that you laid out. And we hope to discuss them and get back with you on that. Thanks again. Are right. I think John Nyberg, you are up next.

Thanks very much. I would like to start off by offering a huge thanks to Dr. Spinrad. It was excellent to hear your priorities and updates. We look forward to engaging on issues and I hope I get this right, like providing mission agnostic [indiscernible] to support climate services, economic development for the new blue economy, and equitable service delivery. As well as in areas such as data resilience, precision navigation, infrastructure, and other areas where your priorities and the HSRP interest might overlap. Wanted take a moment to recognize the team, including NOAA, and our federal private sector partners, for [indiscernible] the impacts of Hurricane Ida. I like to give a special shout out to NOAA's remote-sensing division, navigation managers, navigation out to NOAA's remote-sensing division, navigation managers, navigation response teams, who are working on the ground and in the air as we speak. We recognizethe ground and in the air as we speak. We recognize that getting back to normal his cloak as possible, is extremely valuable to both the Gulf region in the country as a whole. Another extremely important tool, congratulations to [indiscernible] for their 30 year anniversary of the oceanographic real-time partnerships. Which offer a special regulations to rich Redwing and Chris who worked hard on that. I'm also thinking about the NOAA staff, colleagues,

family members, stakeholders, and HSRP team members who've experienced hardship with COVID. My thoughts are with you. Some of us have about hit the 18 month mark about working from home. I like to recognize the first responders and those who are keeping things moving. Healthcare professionals. Teachers. Parents who are making sure their kids do not fall behind in school. The mariners at sea. For sure, the door workforce, the contractors, were working to make sure that our nations navigation services remain up and running during this challenging time. My thoughts are also with you who have lost someone precious to COVID. There have been some HSRP leadership changes. Those are some of Dr. Spinrad spots. First, welcome to the new HSRP Jericho chair . They are both reappointed to the HSRP this year. And big banks to Ed for fantastic years of chairmanship. In addition to Julie and Sean, I would like to warmly welcome three new members. And Phillips, Nathan Wardell, and Dr. [indiscernible], who will all start in January 2022. Also want to give special recognition and thanks to three outgoing members. All three of them dedicated HSRP members and we greatly appreciate their time. Please don't be strangers. I hope to see you at future HSRP meetings or otherwise. I appreciate all of the members expertise and contributions to help us push, help push us to be better civil servants, I joining us to different ideas, helping us to embrace new tech knowledge he and paradigms, and striving to meet the needs of the public at large. I'm excited about this week's agenda. There are two main sessions including one on data. One on technology and nearshore waters. Under 40 meters. Those are planned by HSRP meters members, they are the result of requests and interest from HSRP members. Thanks to Dr. Qassim Abdullah and Anuj Chopra as well as speakers and members , the discussion on fog and limited visibility for navigation imports and that includes waterways over the past year. I would appreciate hearing from you and the working group. Julie and I tend to make the meeting a straightforward and instructive as possible. Recognize that it feels part of the HSRP requirement for two public meetings per year. I am sure along with many of you believe it in person meetings for HSRP provide a preferable environment for the dialogue that leads to productivity and has the most benefit to NOAA. I'm hopeful to have an in-person meeting in March of 2022. In Oahu, Hawaii. Please join us virtually or in person. The goal of the meeting is to discuss the current state, positive and negative, of the portion of an OSS portfolio that includes navigation, positioning and observation services. You will hear updates regarding NOS' data background especially foundational like personal modeling and resilience blue economy and climate change. The HSRP members , NOAA, and guess speakers will have a dialogue on topics such as data sharing, and offshore wind energy, technology for surveying and nearshore under 40 meters. We look forward to discussing the interest, possible considerations from issue papers, and the thoughts and recommendations for the administrators. I have the duty of providing a [indiscernible] reminder. When participating in the HSRP each year, the HSRP members, you serve as no employees. And in your personal capacity as subject matter experts. You do not represent any group on industry, association, or other interest. That being said, we welcome public comments from anyone directly. Please remember to take up your regular work at and replace it with your go-ahead as you provide your expertise, questions, comments, and guidance. Thank you for your service and strengthening NOAA's hydrographic portfolio, no and I greatly appreciate your vision and help. I want to thank the participants have already provided 13 comments cancer to the stakeholder staff and others during the webinar, I encourage your public comments. If you have a public comment, or question, please type it in the webinar and of the questions tab. It will be read into the public rector record or click on the screen. All of the comments from the meeting will be included in the official meeting minutes. Comments are received in advance, they will be shared and highlighted as well as become part of the public record. A note about privacy, the second be recorded and transcribed and posted to the NOAA HSRP website. The speakers who provided the written permission to do so, your individual permission is required for use of your photo, video, and voice on audio. The meeting webinar will be retained and disseminated on the meeting website and made accessible to the public. You can decline by abstaining from speaking or dropping off. I normally two introductions to the NOAA staff . But due to the condensed nature of the call, we will include them in the summary report of the meeting. NOS and NOAA does a variety of staff that provide subject matter expertise, program and administrative supports. Approximately 20 NOAA staff [indiscernible] the work of HSRP can assist throughout the year. This is a shout out to them, thank you. I echo Julie's thanks to the staff for helping with the webinar as well as others providing ongoing HSRP support. The big thanks to Lynn,

Virginia, Amanda, Joe, Kaylee, thank you for your teamwork. Nicole? I think I speak for HSRP when I say that we are thrilled to have you on board as they do NOS [indiscernible]. We are excited for your ideas and priorities to further take root and look forward to supporting your already excellent leave. We are, as ever grateful for your attendance and active participation, the floor is not yours. Thank you.

Thank you, John. Welcome everyone to the fall 2021 meeting of the Hydrographic Services Review Panel. Thank you for allowing me to take a bit of time to welcome, to acknowledge if you folks, and to share with you some of what is top of mind for me as we begin our discussion. First, at the devastation of Hurricane Ida comes to light, our thoughts are with our friends, family, and colleagues in southern Louisiana and surrounding areas impacted by the storm. Sure I am not the only one who spent part of Sunday watching Hurricane Ida come ashore. But we do people who were there writing it out. A special welcome to our colic and I do HSRP cochair, Sean Duffy. Sean was at our last HSRP meeting we had in person, two years ago, that you graciously hosted in our home. Have not forgotten your generosity and I certainly hope that you and yours are safe that you are largely spared from the storm impacts. Thank you so much for being with us today with everything else going on. NOS had 37 personnel in Ida's path and I'm grateful that they are all accounted for. Although I know that people across the region are struggling, including those who evacuated and are finding it difficult to return home, particularly underserved communities, multiple verbal to these kinds of personal hazards. Recovery from item will take time but I'm confident that the navigation services community including those within NOS and all of [indiscernible], will make every effort to reopen our ports and waterways as soon as possible. Having grown up in hurricane prone area, I know what it feels like to be compelled to do everything you can to help others once the storm passes. With that sentiment in my, NOS is simple emergency response. The National Geodetic Survey is collecting data in coordination with the Coast Guard and FEMA and others to identify priority targets for imagery. Images are already posted on the NGS website and more are coming as we focus on getting essential commerce and transportation up and running again. As you heard, whatever navigation response teams has arrived in Port LeShaun is already on the water today conducting surveys. Another from Bernadino Beach Florida, who is headed there. The U.S. Coast Guard in has requested our support for pollution so our office of response and restoration will be activated as well. And our disaster response center in Mobile Alabama, is operational and supporting the response activities. It takes everyone pitching in to help her cover from these events and NOS is committed to bringing all it can to bear in these times. But that I would like to switch gears and say how pleased I am to have do no administrator, Dr. Rick SS [indiscernible]. To engage with committee members and stakeholders for NOS is navigation and observation program, as you heard from him, he is no stranger to the HSRP. Door to NOS is mission I look forward to his time with you all today. Give him a glimpse of our could work and I love that he has put a challenge on the table as we were per approached the 20 her mouth stop it from her ice sitcom the challenges accepted. I also like to acknowledge our outgoing chair, incredulous Julie Thomas and Sean Duffy on their first meeting as cochairs and on their reappointment to a second term to the HSRP. I look forward to working with both of you and the entire panel. And of course John Nyberg, serving in his first meeting as the designated letter officer, congratulations to you. And what a wonderful message from Senator Senator Sheldon Whitehouse. Senator Whitehouse is a fierce advocate for ocean and coastal issues and a leader in promoting ocean-based climate solutions. Is really nice to have, I would be remiss to not mention my, after dealing three years serving in an acting capacity, I am so grateful and honored to finally be officially the National Ocean Service assistant administrator. I am absolutely thrilled to be here in that capacity. I just want to say thank you for your kind words, HSRP has welcomed me for the very beginning of my time and NOS and I thank you for support throughout. Also on my mind, like many of yours today, is that we continue to feel the loss of a key member of our community and our dear friend, rear Admiral Rick Brennan. The co-service director and newly appointed officer, we will not forget his commitment and dedication and service to NOAA and its hydrographic mission. All of us who knew him continue to honor him as we move the mission forward. Know what to make sure that you all know that the Office of Coast Survey has made available an innovative magic mapping fund opportunity and is named it after the Admiral. Rick knew that working with our nonprofit academic and local government partners is essential to our patients

mapping needs. This matching fund symbolizes the commitment to working across organizational boundaries. Is open until October 29th. And I encourage you to reach out to Ashley Chapel if you would like more details. To outgoing members, and you'd thanks for your service to the HSRP and to NOAA's mission. Your insights have been invaluable. And you've made this panel one of the most relevant and valued advisory committees I have ever worked with. I encourage the outgoing members, as Yorty heard from John, to remain engaged and to help us continue to build on the successes you advance during your tenure's. And like Dr. Spinrad I like to knowledge and congratulate our three new members joining us next year. Welcome aboard. You may have noticed that the word climate and the word resilience been in the news a lot lately. Changes in the coast and across our nation are being acutely felt and acknowledged for the risk that they represent to our very way of life. NOS is at the forefront of the U.S. government efforts to create a more resilient climate ready coast now and for the future. The HSRP is already contributed to this work with its recommendations highlighting the roles of programs under your purview in supporting coastal resilience and climate change annotations. No doubt you will hear more words of thanks from Mark Rosler as senior advisor. He is following me today on the agenda. We know that tackling sea level rise and inundation as a defining problem for coastal communities and industries will require and all of government approach along with partners from many sectors. I spent the better part of this last year catalyzing the NOS and NOAA's engagement with others coastal resilience. Stakeholders testified on the hill and build relationships with federal partners in other agencies. It is crystal clear to me that this work will be hard. But I know that we will rise to the task. Speaking of things that are rising, with the current spending here, the fiscal year '21 budget, NOS received its largest appropriation ever. The president FY 22 budget proposal is even higher. With increases proposed, that we propose for foundational observations like the National Spatial Reference System and coastal modeling we propose for foundational observations like the National Spatial Reference System and coastal modeling because we know they are cornerstones of our resilience work in preparing the nation.just for the changes to come, but those that are already here. That said, enacting the FY 22 budget may be a bit delayed in large part due to the other funding efforts you have heard about including addressing the pandemic, infrastructure, and now budget reconciliation. As we heard from Dr. Spinrad, a bipartisan 1.2 trillion dollar infrastructure investment in the Senate, that includes nearly $3 billion for NOAA , including support for coastal mapping, observing and modeling, with significant support for several NOS grants and many other programs related to coastal resilience. The Senate fall the passage of the infrastructure go with the package of the residence Ilyushin bill and houses taking out later this week. There are so many activities and play right now, I have to tell you that it is hard to keep up. But it is clear to me that NOAA's role in protecting and protecting our nation from the impact of climate change including our coastline, is a bigger priority than ever before. Keep your fingers crossed and your advocacy active because we are all in this together. I'm pretty optimistic about our nation's ability to build more resilient climate ready infrastructure, particularly as we increase our coordination within the NOS program offices, across NOAA, and with her other federal partners. The newly formed White House care agency working group on coastal resilience is a great example. This group of 11 federal agencies is designed to elevate and coordinate and accelerate federal government efforts to increase resilient over coast and coastal communities. Mark Rosler, Dr. Nick scans them, and I represent and support know and they work on this group I'm confident that NOS foundational programs will be integral to it. In addition the White House office of science and technology policy will be reestablishing the interagency Ocean resources management group which will likely deal with some of our nation's most pressing ocean juice issues like offshore wind development. I am pleased to say that I will be representing no on this important group and I look forward to our conversation on energies. Although I am still working mostly from home, and not traveling much at all, I wanted to let you know that I chose to make an exception to participate in the change of command ceremony for the NOAA Thomas Jefferson on August 6th in Norfolk, Virginia. Is one of our flagship in the hydrographic fleet and getting to meet with officers and crew in person was worth it. I'm delighted that the commander who just finished your tenure as a commanding officer has joined the office as the chief of hydrographic surveys division. Under her leadership, as well as that stellar NOAA personnel on another ship, and are equipment, will be able to successfully execute our mission drink I. Thank you all for your service and dedication. Now, you're about to hear from our

program offices. And our directors. And they are going to give you some updates on significant achievements that the programs have made over the last year. I hope that you will stick around to hear about the foundational program, and all that they do for the nation and for NOAA. Rick will talk about the 30th anniversary. And this year's installment on the NOAA high tides flooding report and annual Outlook. You will get updates on collaborative mapping and interagency work on the standard ocean mapping protocol. This panel's work and recommendations last year, on the NOMEC and Alaska Coastal Mapping Strategy were instrumental. Will also hear about how the modernization of the national spatial records is a big step forward for the National Geodetic Survey. We are working hard to make sure our federal colleagues know that. Just last month, Julianna Blackwell briefed the newly formed Department of transportation climate change center on the importance of NGS and the national reference system for climate ready infrastructure projects. Captain Armstrong will gives an update on the achievements of technology innovations happening at the NOAA University of New Hampshire joint hydrographic center. And I also like to welcome new partners at the South Florida center for ocean mapping and innovative technologies. I look forward to working with you as your activities wrap up. With that I will have the floor back to the cochairs. Thank you all, have a productive meeting and I sure hope I see you in person in Hawaii. Thanks a lot.

Thanks. We are keeping our fingers crossed that we don't have to do this virtually anymore. Now we are pleased to have Mark Rosler followed Nicole on this climate and resilience topic. Mark?

Thank you. Thanks to the group, it is a pleasure to be together. I valued my pass engagements with HSRP most recently in spring. It really is a blast to see so many familiar names online with this. It's good to be back in the discussion. At our spring meeting in March, I provided remarks for a panel entitled date information systems for resilience. In that panel I talked about how National Ocean Service information systems and data serve as the foundational backbone for coastal resilience requirements for a nation. And west sides plays a critical role in providing observations and monitoring and modeling prediction including the foundational geospatial data across the nation that enable an integrated understanding of changes in our physical environment and particularly with respect to our built environment. The national bathymetric source, National Spatial Reference System and the [indiscernible] system are indeed the bedrock of our nation's coastal observations. These foundational data are provided primarily by statute to support NOAA's navigation services mentioned. And also the same data are foundational to advance our nation's resilience in coastal areas. As this group does better than anyone, the navigation services and coastal resilience missions both rely on a common set of technologies, observations, modeling, and the nationally coherent spatial reference system. Is both Dr. Spinrad and Nicole mentioned earlier, there are exciting developments afoot with respect to opportunities, reflected within the FY 22 budget for NOAA , my bipartisan jobs at, and within the interagency coordination space, writ large. I want to spend some time highlighting those activities that are relevant to this audience. When we last talked I mentioned to NOAA reports · coastal resilience that were requested in the FY 21 budget. To be offered and passed back to Congress. Both of these reports communicate the importance of NOAA's ability to advance an integrated suite of coastal data information and services all of which are underpinned by foundational data and a world-class spatial reference system. Beyond these reports, we are able to successfully communicate this concept to members of Congress who have included authorizing language for NOAA entitled the national coastal resilience data and services act, that is now reflected both as part of a very large ocean base climate solutions act, and also as a stand-alone bill sponsored by Representative Vasquez of New York. I know the HSRP members heard about this in more detail last week when they had time with Glenn. Encouraged by this febrile dialogue with lawmakers, both with respect authorization and potential pending budgets, our attention is turned sharply to focus on coordination and execution. As Dr. Spinrad Nota, we are going to really need to have her act together. And there's a lot of effort being spent on figuring out what that will look like ensuring that new investment is not just being increasing business as usual. But that that investment enables us as no and of the federal family to make advances to improve our nation's resilience that we have not been able to make in the past. For more than a decade, the lament around a lack of progress in improving her natural coastal resilience has been a refrain building a perceived lack of political will

and lack of funding. It is not naïve to anticipate that those excuses will not be relevant for much longer. With that in mind, I am pleased to share some of these from the front lines of this coordinated whole of government effort. Ethical mention, there is a new White House interagency working group focused on coastal resilience. This is one of five resilience focus workgroups within the White House national climate task force. Coastal resilience stands alongside challenges related to heat, drought, mud, and wildfire. Which is national billing [indiscernible] for him with a way that has not happened before. And I think it reflects the importance of the work that this group and many others across the federal family are engaged in. The priorities for this group include aligning federal involvement coordination coastal resilience, developing effective and equitable grantmaking strategies to improve and enhance equitable outcomes on the ground from federal grant may grant making agencies. And also to facilitate the use of federal data sharing and mapping resources to improve coastal resilience decision-making. I hope you will see in that a very purposeful focus, not just on research and delivery, but on those connections between the modeling and research ensuring that those advances make a difference on the ground to those in need. The first item on that list from the working group is aligning federal involvement coastal resilience. And what to highlight two other areas within which those coordination discussions are happening within the federal family. The first is to highlight for you that in June of this year the subcommittee on Ocean science and technology hosted a coastal resilience workshop which included more than 400 phone representatives across 27 agencies, many from NOAA, including the ocean service and from our offices here in the HSRP community. This workshop brought together federal agencies to identify shared interests capabilities, ongoing activities, and I am pleased to be working with a group of steering committee members to draft a white paper outlining a road map for future federal agency coordination around coastal resilience. There will be a public summary of this workshop as well coming out in the coordination with the federal only white paper for those recommendations. That is work within one group, the second and last group I want to note, is a new one, if you are a fan of acronyms, then listen up because we also have a new federal court anybody that is called the interagency counsel for advancing meteorological services. This is a venue established in the weather act, that is focused on helping federal agencies convene on the executive level and coordinate around service delivery. Not just policy and budget priority but the delivery of services on the ground. This group, ICAMS, has redefined the structure of the federal neurological enterprise market the most significant restructuring in the past 60 years. It is really encouraging to note that in this context, the word meteorological is much more than just whether. The ICAMS charter expressly addresses topics ranging in timescale from minutes to hours across the sub seasonal annual Centennial timescales. We're talking service delivery, as Dr. Spinrad noted, from weather to climate timescales. And on topics ranging from the atmosphere, to the oceans, to our codes, and watersheds, and I'm particularly excited about the focus on or donating federal service delivery. It is equitable access to authoritative data and services and our boots on the ground regional and local staff and partners outside of the federal government who represent the vital link between enteral science, academic, and in geoscience, and connections with risk informed decision-making in partnership with the private sector. That linkage there, where ICAMS is focused on service delivery coronation, is a new and valuable addition to the existing federal coordination bodies. And right here within our own National Ocean Service, under Nicole's direction, I've set up and convene a Tiger team of experts across each program office within the ocean service. To talk specifically about coordination on coastal resilience. This team has been serving as a point of contact and a trusted brain trust for me to strategize and set policy and priorities convening regularly to help coordinate, advise, collaborate on projects with near-term outcomes. This work group of subject matter experts includes some fantastic leadership from our offices including [indiscernible], our own John Nyberg. The west and from the survey, and it kinsman from NGS. I would like to take a moment to thank those members, to think their offices and supervisors and the office directors for their support of this initiative. Try offices are crucial contributors to the next steps of the working group, of this working group, and coastal resilience and no writ large. Working groups like this within the ocean service and/or writ large and across the federal community, are the key to ensuring that improve coastal observations data and modeling are seamlessly passed along to advance equitable access and service delivery on the ground. That is across all U.S. states and territories. I'm excited about the future directions of this group, federal coronation groups, and the opportunities they provide to

advance communication and integration across all scales of our federal endeavor. In conclusion, as Dr. Spinrad owner, a work of HSRP is important to a very broad no audience. Similarly the work of the newer programs that we support directly, that work is vital to our nation now more than ever. We cannot quantify coastal risk without understanding where the land and water and C4 are, how they are changing relative to one another, and how they may change in the future. How these changes impact important assets including our navigation infrastructure, our built environment, natural infrastructure, and document endeavor at the coast. Within my prayer life in the private sector there was not a single flood study computer model or engineering design where I did not start first with no it data and data is. I'm grateful for Tran HSRP support and wisdom in finding ways to enable these core programs to excel in their long-standing mission remedies will also continue to offer leadership in our shared endeavor to enable a more resilient nation. Thank you again for the invitation to be a community together with you, it is a privilege. I look forward to our continued collaboration going forward. Thanks.

Thanks so much. It's a nice encouraging words that you've given us. It rings a bell with the coordination and integration and execution. We really want to thank you and Nicole and Dr. Spinrad for joining us today and your candid comments would provide some thoughtful discussion until our next meeting. And the HSRP will be as objective as as objective as possible and provide you with recommendations as part of the outcome of these meetings. John to do have anything that you wanted to add? Before we move on to the next section?

I don't think so. Thanks very much, Julie. I just definitely note the themes of equitable access to data and service coordination in the run-through of the talks. I'm excited to hear more about that. And thanks very much for the comments. I really appreciate it.

It's great. We are glad that you are involved in all of these efforts, and these panels and committees moving forward. Thanks again to you.

Thanks.

All right. I think we are ready to start our director session presentations. And these will be about 12 minutes on each. You will get a two-minute warning from Lynn. The very first person that we are going to hear from would be Armstrong.

Thank you. I'm going to present the hydrographic center reports today. Are the slides up? I can't see them.

Not yet.

There we go.

Okay. My codirector is on the way as we speak in the Arctic. On the icebreaker. He is the chief scientist on a research and mapping crew running across the U.S. Arctic and then to the Northwest passage and onto Greenland. And their team, working with Larry, are collecting data in unmapped areas as they go along the route. We are contributing to our mapping of the USEC and supporting our friends and colleagues in Canada with there mapping as we go. So today I've just selected a few topics to talk about. If we can go to the next slide. I wanted to report on our annual review, we usually do this in person. But this year, again, it was virtual. We had over 100 people attending. Many of you attended and thank you for your attendance. This year, we recorded reported on the activities of two grants, we are in an extension year of a previous five-year grant for which we got a no-cost extension because of delays from COVID that interrupted our field activities. And we are in the first year of a new five-year agreement. So in that five-year agreement, we are tracking 48 tests, and those tasks are in three main categories. Advanced the technology to map U.S. waters, advanced the technology for digital navigation services. And develop and advance marine geospatial and soundscape

expertise. We are looking forward to some productive work in some transition to operations from all of our research. The day after our annual review for our government sponsors, we repeated the presentations for our industrial partners. There is a list of our partners. Our UNH partnership is now at 58 different organizations and these industrial partners have a relationship with the University of New Hampshire that is distinct from the UNH/Noah partnership enjoyed by the graphic center. These partnerships allow productive collaborations between university researchers and the private sector. I want to highlight, one of these partnerships today. That is the collaboration that UNH has with there industrial partner I explained. Is a manufacturer and developer of among other things, un-crude service vessels. And with them, as with some of our other partners, we are working on advanced autonomy development and a particular interest with this partnership is that they are working with the university to set up a U.S. manufacturing facility for their USBs or ASP's and the advanced manufacturing center. Josi, [indiscernible]. Here is the iXblue underway . You can see, it has tremendous speed allowing it to keep up with a ship, ship operations in the background, it's the universities coastal surveyor. I think and previous presentations you saw some work of this, this is another one of their USBs. So are un-crude service vessel covers the full range of autonomy and research from the vessel systems to situational awareness in the operating area, and to the mapping itself. You see here a slide showing the remote operator display. With this and other USBs we have a collaboration between the Office of Coast Survey and the fishery service and the office of Marine and aviation operations. In these collaborations, we are working on developing the capability for USVs to be a force multiplier for both hydrographic and fisheries acoustic surveys. The important part of that is the actual shipboard operations including the launch and recovery. And here you see the direction, the launch and recovery system being lowered into the water at the pier. We are also at the center collaborating with OIR and ocean exploration through UNH's membership in the ocean exploration Cooperative Institute. In addition to mapping that includes the development of the capability for cooperative operations with multiple vehicles including AUVs and ROP's. So shifting gears, I want to talk about our educational mission. In that regard I would like to report on our just completed summer undergraduate internship. For this inter-chip, we had to UNH engineering undergraduates spent their summer aboard the hydrographic ships Fairweather and Thomas Jefferson participating in mapping activities and all the other activities of the ship. They reported that it was a great opportunity for them and we look forward to continuing that. We hope that this provides a new pathway for young people into Hydro Murphy. Thank you very much. I appreciate the opportunity to present today.

Thanks, Andy. Always good to have the update. The next one is a John Nyberg.

Thanks, Julie. I will wait one second for the slide to come up. I'm very happy to be able to provide a short overview of just the survey activity for the past meeting in March. Of course, the survey is currently moving assets for surveying the entrance channel in the aftermath of Ida. Are central Gulf Coast navigation manager is fielding survey requests and coordinating with the U.S. Army Corps of Engineers. We have three navigational response teams on the ground and [indiscernible] in the water surveying. The surveys also working on contracts to survey the entrances outside the bar for [indiscernible]. The pictures that you see are action shots there now. These just came in I think this morning. We are moving forward on that response and I hope that it continues to go well. A quick update on navigation response teams. We are currently staffed for five navigational response teams. We responded to four main storms during hurricane season. They are in the process of wrapping up the uncreated response team. This is upgrading one of our two echo boats to a larger bottle that can handle rougher see state conditions. Will have a longer [indiscernible]. We've had eight contract projects planned for 2021. That's including Key West, Freeport, Green Bay, whitefish Bay, et cetera. I really want to emphasize the challenge that COVID has been levying on all of this work for the second year in a row, we've been able to execute multiple hydrographic survey contracts despite these operational limitations. And really want to recognize our contract partners for taking those very seriously and following guidelines as we have been doing as well. Since that March '21, the contract projects include Key West and you know Matt, they have been completed. A note on the national source project, we continue to collaborate with our external source data source teams to build out product branch keep which is the Gulf of Mexico region. And their plan is to have that completed by

the end of this fiscal year. I want to also share a short note about work we are doing in the Bering Sea with [indiscernible]. We have a partnership with the office of oceanic and atmospheric research specific environmental lab working on conducting autonomous Arctic surveys in the region. So that's underway now and should end I think in September. And we will be collecting information for forecasting models as well as depth data for uncharted waters. Our rest or transition re-scheming project is underway. The transition program will gradually [indiscernible] in traditional products beginning this year. It still expected to be completed by January, 2025. As you know this allows the focus come to focus resources on improving coverage and content of the digital chart format. That is used throughout the world for navigation. Six months ago, the charter when into last position, it is now retired. The process is dumping used to transition line charts, from Lake superior, 15 charts in [indiscernible]. Mariners, will be officially notified of cancellations for the U.S. Coast Guard. And a note in the lower left corner, it will state that it's the least paper chart addition. As a part of this process, NOAA will also shut down its restaurant navigation and [indiscernible] service, and the online viewer. This will happen on October 1st, 2021. The NOAA seamless raster navigational chart service will be shut down on January of 2020 [indiscernible]. You received an update on the global extra topical surge and tied operational forecast system, in July, of this year, we upgraded to version 2. And when into operation on the National Weather Service weather and climate operational supercomputing system. This provides model forecast guidance, combined water level storm surge, and globally. Thanks very much to close collaboration with the university of Notre Dame, this version 2 includes many enhancements and improves model performance, resolution, and coverage, including the implementation of levees in Louisiana, and improves spatial resolution in Puerto Rico. A note on precedent precision navigation, surveys position navigation program is publicly announcing a new website shortly. It will be Marine navigation.gov. And we intend for it to be a central hub for all of NOAA's Marine resources including links to data sources, forecast, prediction tools, nautical publications and more. To mention a couple that we are continuing to be pleased with our partnerships with university of Southport and university of New Hampshire, a quick mention of two university of South Florida projects, on the shallow water mapping off of St. Petersburg coast and beaches, and they are working on a detailed mapping plan for the area around the Tortugas, University of New Hampshire is actively involved with the ASV and so far they have conducted extensive testing and training of personnel from fisheries, [indiscernible]. And having participated in several joint meetings, I'm really pleased, I'm excited for those updates and pleased they are working together very well. I really appreciate that relationship. A short update on the standard ocean mapping protocol, timing and request for public comments, the interagency working group on ocean and coastal mapping has submitted a draft of the SOMP for review for the interagency counsel for their initial review and clearance. The SOMP is a key deliverable in the strategy of NOMEC on mapping and it's brings together strategies and the next level of ocean mapping through '24. SOMP intends to serve as acquisition guide for any and all contributors mapping data to ensure the widest feasibility of the data, minimize duplication of efforts, and move data efficiently from acquisition to archive. The public release is still tentative but there will be an opportunity for public review and we are encouraging comments and input. I think that ends my presentation. Thank you very much.

Thanks so much. Thanks for the update. I think we are going to hold questions until the end of the director's presentation. So we will catch up with you afterwards on that. Juliana is next.

Good afternoon. I will make sure you can hear me. Okay. I have a number of updates on National Geodetic Survey's FY 21 accomplish and some highlights of what we are looking forward to doing in the upcoming fiscal year. I will mention that in early May we held a geospatial summit and an industry workshop. The summit was successful in the first 2000 20/10. It was a virtual event. We have more than 1000 people attend each day. That is a two afternoon summit. And we had participation from all 50 states and territories and the District of Columbia. There was an opportunity for stakeholders to hear the latest and greatest about our about our progress on modernizing the National Spatial Reference System. And also give them an update on the timeline for this the timeline for this which originally was planned for completion at the end of 2022. Obviously with events in the recent past we know we can't make that deadline. So we are looking at the 2025 time frame for the modernized

NSRS to be available. We also had a smaller event, about 34 people participated in the workshop from the geospatial software develop ministry and survey equipment manufacturers. If you would like more information about those events you can check check out our website, the link is down there for the work for [indiscernible] data.] data. In response to industry feedback, and industries interest in working with NGS on NSRS modernization and making necessary upgrades to the software, we took some major improvements this year in trying to sync with the commercial software vendors. We started using GitHub, so that software companies could take our software, take a look at it and see how it is made, see if there ways that they can test against information that they are utilizing their software, and also allow them to provide some feedback in ways that we could also improve software that we are developing. Now we have two things that are available, the NGS and cat and [indiscernible] out there but we know we we will be putting out additional code for folks to use in the near future. Very quick update on air GRAV-D effort. It underpins the effort from the vertical your potential side. About eight in half percent of the areas that we intended to cover, to build the Geo potential datum for all of the areas that we are covering, of four different plates. The areas that you see in green are complete. The date is available for individuals to look at and for research to be done. The areas in white and orange are underway or plan. The areas of blue are collected but not quite available yet. We've done a great job in collecting this year. Were able to target some tough locations to try to get some data and were able to see about 50% of the Aleutian island chains. That was a huge accomplishment. But we still have to go back in the next couple of years to finish that workup as well as getting out to finish up Hawaii, and areas in the Pacific. Those are challenging places to work. We are crossing our fingers and hoping that the stars align so that we can get those collected sooner rather than later. One of the other things we are doing related to crowdsourcing and asking our stakeholders to help us help them is our GPS and benchmark campaign, we started this back in 2007 as a database sharing opportunity. It is continue to grow over the years, we are highlighting this as a national surveyors event. And then we started building on that to try to improve our models that were released in 2018 and beyond. And also to use this for improvements to our transformation tools. As we continue to build support for this, and demonstrate the value of having updated information on benchmarks in particular areas across the country and territories, we are seeing an increase an uptick in contributions. I wanted to highlight, continuing to increase and how this is only going to help us build better bottles and better tools for our stakeholders. Thanks to everybody who has been contributed. These keep up the great work so that we can make our data better for you. And tools. Just a few general coastal mapping updates. We have had some internal as well as contract projects that have been ongoing as mission-critical activities throughout the year. Basically, in support of hydrographic operations. Collecting data from nearshore to the areas where the instruments no longer can detect data that we need. Projects that are ongoing in Alaska, Hawaii, Maryland, Virginia, one of the greatest accomplishments is that we are able to upgrade our camera system this year. There some technical details on the new system, which is up and running. That we had a chance chance to test out test out and I will talk about that and just a few minutes. We were able to make our [indiscernible] this year thanks to the hard work of the mid sensing group and the support from aircraft usage. And/or contract support as well. I want to show you a few projects that are being done to support the increasing safety and efficiency of our hydrographic operations. We are collecting nearshore with typographic lidar to allow the hydrographic platform to say offshore for they are more efficient and stay away from weight dynamics and obstructions near the shoreline. There's an increased efficiency with us being able to provide this data, and that equates into numerous ship days because they collect the data from airborne platforms. Just looking at the images, from left to right, the left side we have French frigate Shoals some of the products we are able to do there. These are used to assess data acquisition conditions and initial data quality and to identify any other issues that might arise in these areas. The center image illustrates the lidar position in one of the projects we have in Southeast Alaska. It's also be used to support hydrographic operations in the region. And the image on the right is a quick look at a project in the Eastern shore of Virginia. Again, to support the updating of outdated charts and to support other efforts for the Army Corps, [indiscernible], and the nature Conservancy. Their efforts to look at mall aircraft for mapping applications and vibrating for shipboard operating procedures for Crystal Mountain. The images here, Alaska looking at the capability to survey small ports more efficiently. And were often. With use of everything with you

severe. And the demonstrating how we can launch and recover from from ships, and that looking at how the capability will enable shoreline surveys, situational awareness, middle detection, and a host of other applications. So continuing to persist and figure out what we can do with the technology that is available and continue that is available and continue to collaborate within NOS and other areas outside of NOS of NOS to come up with new ways of implementing and utilizing small [indiscernible] aircraft systems. I will briefly talk about our efforts with the recent hurricanes. Starting with Hurricane Henri, we did do some flights [indiscernible] Nantucket along the Connecticut, Rhode Island, Massachusetts area. This work was primarily done to support our requirements to ensure safety of navigation information and management interests and resilient [indiscernible]. It was also a great test of our new camera system. So that we could do this in a conservative event which is a good thing. And then see what is happening as far as our processing and the use of cloud services. So we are able to get about 500 images, about 500 square kilometers, with a minimal amount of [indiscernible]. The bottom line is that with the new candor systems, the initial look is much higher resolution and a wider swap and requires fewer actual images itself. Great feedback from our stakeholders with use of this test case. Thankfully that was not a major event. The images that you see her on the right are along the South Shore of Martha's Vineyard. It was a before/after so you can see some impacts. We will go to the next slide and obviously, as you know, we are collecting data in areas as of yesterday, we collected over 4000 images covering 2000 square kilometers. And they continue to support NOAA, the NOAA mission and also FEMA mission assignments for damage along all transportation routes and major waterways pick. The bottom left is the image of the white lines, and then also to mention that we did have some processing challenges with this event. Basically come up with using our cloud services and being able to disseminate the data on our website. We are working through those issues, and [indiscernible] to make sure we can have workarounds available. The image on the right is showing there is something large on the Mississippi River. Obviously there are a number of images, the beauty has gotten a number of them also out there for folks to see before and after imagery so they can see the effects of what has happened in the areas impacted by Hurricane Ida. Just a closer view of the damage to port facilities and Port Fourchon. I won't go into detail. The picture says it all. I want to just mention some of the feedback we have received from folks about this current imagery. I note that it is helping the Louisiana National Guard with search and rescue response efforts. They are using imagery to do rapid damage assessments in support of the tribes living in the areas along the islands, the imagery was used to enable the teams to hit the ground running today at 7:00 a.m., to protect houses from additional rates. The blue tarp teams. And is also being used in integrated with ocean target identification. Of course, our friends and colleagues the Coast Guard are using it to map waterways and determine areas that are open in areas that are blocked and respond appropriately. I know that Nicole and Mark mentioned, the new interagency working group. I want to highlight the third bullet, the third goal, recognizes foundational geospatial data, strategic asset to decision-makers, taking to become more resilient to the impacts of climate change, it's good that we are able to see ourselves in there, especially the work we do in mapping the coast in providing the [indiscernible] for the nation. Also I mentioned that NGS Alaska region, is presently serving as the lead NOAA staffer . We are really excited about having Dr. Kinsman be able to be a part of this and help us get our message into the work that is being done. We will get into a very brief overview of FI 22 priorities. The first thing Alaska coastal mapping is still a priority. We are breeding for for final approval and implementation plans, we have not heard anything recently. Work continues know. And we are, Alaska coastal and Ocean mapping summit that , Alaska coastal and Ocean mapping summit that is planned for December 1st and second there will be an opportunity for stakeholders to engage the minute talk more about the Ocean mapping.

One minute left.

Okay. Next slide. I will highlight thatthat we are continuing to integrate our field operations branch with the CO-OPS field operations division , moving our field unit from the north upper facility in the facility in Chesapeake Virginia. Is now a lot of planning, a lot of hard work on this year. And we expect at the beginning of the next fiscal year we will be able to get our folks in all of our equipment into one facility

and support increased operational awareness and collaboration between our groups. We are also developing a mapping tool showing operational status of projects with infrastructure, a lot of the work that we do has been in the past to different databases we are integrating the different data sets that we have so that we can share those, not only between NGS, but with other so that we have, [indiscernible] what's happening, changing over time and help to improve other tools, and the last slide, is just some of the other high-level things that are happening in '22 including the conclusion of a comprehensive plan, additional direction, hopefully the [indiscernible], and updates to our projects and processing software. And lastly, a new code library.

Always nice to have the updates. Glad to see progress and come progress with GRAV-D. You're getting there. All the opticals, it's pretty impressive. Okay. So now we have Rich, who we missed earlier. Glad you could join us, rich. It is all yours.

Thank you. Good day everyone. Director of CO-OPS. It's like the other directors, I'm going to talk a bit about what we've been able to accomplish this year and look forward a bit, I have one slide, some organizational changes within co-ops that are relatively significant. And I will move through the program, observing systems, harmonic structures to help provide products and services no talk about how we are moving some of those as well. The images here, on the right-hand side, in South Carolina, it was recently rebuilt after being destroyed a hurricane a couple of years ago. We put our in-line station back there. And you can see the microwave sensor, that is the white cylinder on the side, and one think we have done is, is innovative, and places where we are establishing a station and a public access peer we designed a shelter to look like a kiosk. A public service kiosk. It just kind of blends in with the surroundings were nicely and helps us disguise the fact that it's a station and not be vandalized. That the beginning of the process, the observing system but of course, the modeling, the products and services, are you like this visualization which is showing a salami, arriving at five different time stations around the Pacific, it provides hybridization data to the weather service mommy warning center, you can see that ball starting to bounce up and down. That the tsunami starting to arrive at the stations. So, we have two organizations. We had a tumor branches to the oceanographic division. We kind of needed to do that because we had some span of control issues, too many people reporting to too few supervisors before we took the opportunity to be a minor oceanographic division, and priorities, by forming a coastal hazards branch which focuses on that sweet of resilience and hazards products. And, you will recognize ODRA, she was a successful candidate and was hired. Congratulations, ODRA. And the other branch we created with our stakeholder services branch, to kind of enhance and improve our ability to engage with stakeholders and understand their needs, sure we are providing the right products and services. And I'm sure you probably know her was a successful candidate for that and is now the branch chief. In addition to that we established a new division of business operations division to kind of Poland and consolidate and match more effectively and efficiently the activities within the office. We were very fortunate to be able to hire Jennifer Rhodes, who has a long career across NOAA , holding progressively responsible positions. The weather service and [indiscernible], other places as well. We are very happy and fortunate to have her on board. Okay, one thing we did this year was we sat down and developed and published a recapitalization plan which looks at the lights cycles of the NWLON starting with electronics and working its way up to some core components and closures and stuff and looking at the platform, the underlying platforms. And laying out a plan and schedule for how we can recapitalize the system in such a way that it would keep it and they stated what they call operational readiness. We been doing that somewhat reactively having this plan allows us to plan more proactively, and it was good timing, it helped to think and form the FY22 budget process there some funding proposed for in this proposal. So that is good news. We reestablished two stations,, and that every year, we get some calls from people who say K about to renovate my peer or whatever you have to move your station, and sometimes we get a couple minutes notice and sometimes a couple of days, we will have to scramble, sometimes we get two or three of those calls, this year we got nine, which is not great considering:. But anyways, we were able to kind of get the stations relocated. And still operating. Here's where Nicole mentioned, the funding proposals in the budget for the NWLON which is helpful. And to some degree were dependent on this funding proposals, how much we can actually do. But if

we get that new funding in FY22 we can put into effect that recapitalization plan. Hopefully we can start fully maintaining the NWLON, we have not done that the last few years. Harshly due to the budget. More recently due to COVID. So we really need to do that. You've also been doing a little bit of work in terms of the gaps by partnering with people and some funding in FY22 allows us to

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Spent on that, we've also been doing work on trying to do, microwave [indiscernible], gathering and reporting observations. And there is some funding in FY22 to help with that. Those are I think some very exciting things to be done with the funding. In the lower side, that's one of our single pile platforms which is in need of some work. You see in the other breast and stuff around the water line. That needs to be addressed. And on the left-hand side is a great like station which is a fairly substantial structure, it does take quite a bit of funding with those come to for rehab. We did not do any surveys last year. We cannot because of COVID. And so, the good news is we were able to do, the first half of our Delaware Bay survey this year. It's right in the middle of the first phase right now. USGS is doing something called a next-generation observation program. Modernization, they have a pilot, we were able to help address some of the survey, some of the locations that we are doing current observations at or solidity observations and so forth. And we also, this is the first time we were able to deploy our CD, our sub service, that was developed for use in deeper water. And looking forward to next year, we are going to do the second half of the Delaware Bay survey, which will be done this fall and will be done by the end of the calendar year. And hopefully we can begin our multiyear, current leader survey which was delayed from last year as well. All right, ports, going on, we only had one Newport and it was up in the east. This was interesting. There already a couple of buoys that had been deployed by the local community, currents, and meteorological and other parameters. Getting all the data in one place. So one challenge we had, how do we get that data from the buoy back to us? In some of the meetings we were using were not quite standard once we had tested. By working with, we came up with a solution. Because it pulls in the data from these current meters, from these buoys I should say and they quality-control it. According to the published documentation. So that allowed us to established a level and say, we can bring in the Stata, and integrate it and put it out. That's exactly what happened. I think that was, that was a good solution for that. And that as we know, once you establish a Newport it doesn't mean you are done. Overtime, the partners want to add more sensors because they have the requirements, a new system for a multitude of reasons. But this past year we added 19 sensors to nine different port systems around, that was a level of effort. And looking ahead we were to have six new sensors. I'm sure that will grow as we get into that fiscal year. What's coming up around the corner? A partnership with the Navy, that is under construction. I believe the water level station is in. And the meters are imminent. That will be done early FY22. And then on the next two, we don't have signed agreements yet but those agreements are in progress. Report, Texas, Report, Texas, and at Pearl Harbor, Hawaii. That's another Navy when we are excited about that because it is our first separate island of port systems. We are We are looking forward to all of these. Coming online. And as John mentioned, thank you for the congratulations. It is a 38 anniversary of the PORTS system. We are doing a wide array of activities to market. We have sent video around which was well done by the InterWest communications team. We traded a new [indiscernible] page and done briefings, and graphics, a whole array of outreach activities to mark that celebration. Was a big year for her modeling program. We delivered, one may be a modernization, depends on how you look at. First one is anyone. It's a West coast operational forecast system. It's a big deal because it's the first model to use real-time data simulation. We are evaluating that to see how well it works. And hopefully that is something that will show benefit and that we can start building into some of the other models, the older models or newer models. And then ending of the course of in the northern gulf of Mexico, we took three existing models and merge them into one, also extended the boundaries down to the Mexican border and up some of the river systems, we close the gaps to eliminate the gaps with the river forecast models. And they are high-resolution models. It is want to bottle that is made up of some of the existing models. And then looking forward to next year, we don't have any no [indiscernible] coming online for a year or so because is a moratorium right now. This of high-performance computers being upgraded. But in the meantime we are working with the weather service to take the Tampa Bay Marine channel forecast, it includes a visibility forecast as well as a probability visibility, as well as

other parameters. And start replicating it. And know that other places along the coast, Mobile is the first place we will do that as a pilot. We should be able to wreck will replicated easily. You heard Dr. Skinner a talk about operations. We have a number of things going off going on. Slowly but surely, we've been converting our NWLON to the microwave water level sensor. We just hit 100 of those as last year. We still have a ways to go. Again, making steady progress. I mentioned, the sub service buoy that we developed, our evaluation program, improving those systems for conditions that are being countered out there. And this is one type of seating. And then we collaborated with the office of response and restoration, we developed a deployment buoy, that measures currents and other parameters that they can deploy and need that information to help inform objective models. We use it as well. And we built these now we are getting ready to train them to deploy, fully deploy done at the disaster response center in Pensacola where we have an office. The coastal inundation dashboard, I have talked to you about this before. We rolled out version 1.0 a couple of years ago. We also have a five-year plan in place to help guide air enhancements and two of the enhancements we did this last year attic multistation capabilities to look at more than one station. Instead of just looking at one tab. Again, the dashboard is about delivering past, present, and future data, forecast data, we are adding in a lot of some of these other capabilities this past year. We added some of the statistics from our high tide flooding reports. That information is in there now. There I just listed the hurricanes, the QuickLook product feature over the past year. Here is Hurricane Ida. Again, I would say this is the most significant storm today. I just pulled out a graph to the right during the storm from one of our offshore hurricane hardened platforms showing the rising water levels against the weather service flooding thresholds. And while the storm did not set any records, and number of the stations had elevations that were in the top five elevations over there history. So, most of our product development efforts have been on the coastal resilient the psychic we continue to improve statistics behind the annual high tide flooding Outlook put out every year.Outlook put out every year. And again we are continuing to build in some of those climate capabilities into the dashboard. Adding some of those capabilities.capabilities into the dashboard. Adding some of those capabilities. We don't have the Great Lakes represented, there was no we will bring in the stations next year as part of the upgrade. We are working on a multiyear project to do a 40 year reanalysis of past water level data for national assessment of contemporary and future flooding. So we will be able to do grids for other models another capability's.

[Captioners transitioning]

[Captioners transitioning]The next slide. I think that was it, yep.

Saved, okay, thank you very much, Rich. Good to have the update. I can tell you have been busy. All of these areas, we see a lot of progress. We have time, we have about eight minutes before we are going to take a break. I think, it is time to have a discussion with our members. Unless you have any burning questions should be go to the numbers for a bit?

Yes, please, I think that would be excellent.

Okay. I see your hand up.

Okay, is Mark there? Is Mark present, yet? I have a question for him.

Are you still on Mark? I don't think he is on right now, you guys.

Okay, well, I have a question for the panel, then. In several coastal communities that I have studied, when it comes to coastal resilience, the magnitude of land subsidence is greater than the magnitude of sea level rise. Meaning the land is sinking faster than the seas are rising. Subsidence is largely caused by the extraction of groundwater. We mapped the rate of subsidence by using interferometric synthetic Aperture radar. We did that in the roads area, several years ago. It is subsiding at a rate of about a centimeter a year. I have, I recently did an evaluation of several communities to see what

they are doing and Hampton Roads is not absorbing subsidence is unavoidable. I gave a great of a to the Hampton Roads sanitation District because their sustainable water initiative for tomorrow, the research center, is replenishing the Potomac aquifer deep underground with 1 million gallons of purified drinking water, daily, with a goal of five major plants pumping 100 million gallons, daily, into the aquifer to hold land subsidence. My question, to Mark, pertaining to HR 3228, I was wondering maybe somebody else could answer the question. Is it within the realm of HR 32284 them to investigate if swift water is -- Baltimore, et cetera. Where grounds subsidence from water extraction is causing severe rates of subsidence.

This might be a good question.

It is, thanks for the question. I don't know that there is anything in the bill that would target that specific phenomenon. The overarching goal, the bill, is to identify and address whatever the challenges are. Whatever the cause and effect are, right? Whether we can go in and assess whether their efforts are working or not, I would assume they are investing in the systems, and their undertaking that for themselves so they know whether their investment is worthwhile, right? I don't see anything that would prohibit it. I think, the whole goal of the act is to deliver services that are supportive of people trying to plan and work toward resilience. I think the bill would be supportive of such an effort. I am not quite sure it would be our place, as the federal government, to come in and monitor and tell folks if their local efforts are successful or not.

We already have an issue paper, from a couple years ago, that recommended we do things to improve, to monitor what events are. The entire coastline of America, but especially the coastal communities. We can do that, by the way, when we are in Hampton Roads, we can see if they have succeeded in changing the subsidence range in that area. It is really two issue papers they already have, actually.

Legislation, the intent is pretty clear, in terms of the federal role vis-à-vis these programs and that bill. It is to provide people with better data to inform their decision-making, right? The decision-making, as you know, under our system of government are all state and local, right? Zoning commissions are not federal. We are trying to be careful about that line. We have some of the key data and services. Many of them, associated with these programs, here. We want to make that available at a level of familiarity with Dr. spinner, I would say. Right?

Right. Okay, I will let somebody else ask questions.

Does Nicole want to comment on that? I see she shared her webcam.

Very briefly. Dave, I wanted to thank you for that question and your work, already, in thinking about that topic. Not just the governments, there, but all organizations there are standout leaders in the it is issue of addressing coastal change. Another good reason we are excited to have her join the HSRP. She has the experience. I agree with Glenn, nothing in the bill speaks to that or precludes that. You better believe we are in touch with folks on the ground that are doing all kinds of innovative ways, not only to address the changes and work with the communities, any of those best practices that we can, either uptake and share around. We are going to be looking to do that. I appreciate you raising that to our attention and letting us know that we know those issue papers are out there.

Thank you.

Should we go on to Sean, I think you had a question. One question that we have to go on break.

Sorry, Julie. There was a lot of mention of the efforts in Louisiana in recovery after the hurricane. Seeing those survey vessels have been on call the last couple of days. There is a lot of great coordination with NOAA and the core directing assets to the proper places and making sure they are

combining to cover certain areas so that they can fill in the gaps and report back on the surveys. It is a lot of information and I heard Julia Powell's name mentioned, today, in coordinating the and RT is properly. A lot of big data imagery. We are all looking at that and, when Nicole mentioned the party, it is hard to accept that I haven't been home for four or five days, now. Lots of challenges. I appreciate, NOAA should be proud of those upgrades and it is great to have the support, they are. I know Louisiana really appreciates it. Some of them know that and some of them don't. People get their help resetting things and getting things moving. Really appreciate it. Thank you, all, for the comments and support.

Okay, Sean. John, I will turn it over to you. I think you're going to take it from here, and I didn't know if you had any closing comments on this action?

Thanks, Julie, and thanks to the panel. I think I will save comments for later and, I think, we are ready for a 10 minute break. If you all agree. Maybe we will come back on the East Coast at 3: 10, if that is okay.

Great, thank you.

Thank you.

I just want to mention, we are live and hot. If anybody wants to chat, please feel free. Also, we are going to test a presentation and, also, Mary.

Here on my side. It is just blank.

That means something is wrong with your camera. You might restart. Exactly.

Sorry. I got out of the meeting and logged in back, I thought maybe that would solve it, but it didn't solve it. I'm going to reboot my computer. Thank you.

It is also possible you have your camera open in another application, that will make it go black like that.

Yeah, but I don't have any. Thank you, though.

It is definitely turned on on the icon panel under the microphone? You have it turned to green.

The icon is green? Yes. I see the window, it is just black.

We will go ahead and test out Mary.

Mary looks good.

Mary, how about your audio?

I just turned it on.

I am giving you the mouse, right now.

Okay. Yes, it appears so. Yeah, wish me luck.

You're going to do great. You're going to do great. All right, I will go ahead and take the mouse control away until we get to your session.

All right.

Back here to Virginia.

We might want to ask if he has a cover over his camera, like a slide to cover his camera. You would sometimes see video coming through if it does. It looked like there was another app blocking his camera. We will see if he can get it to work.

Julie, are you ready, do you think?

We are ready.

Just to call it back to order, I would like to, I'm really excited to pass the mic over to Ashley Chappell who is the program manager for integrated ocean and coastal mapping. She is going to get us started on our next session on offshore wind energy and sharing. Ashley?

Okay, great. We just need Nicole on. And then we will turn it over to Ed, after that. Is Nicole there?

I'm here.

Okay, great. Let me say, very quickly. Thank you for that introduction, John. I would like to welcome everyone to this afternoon's session on offshore wind energy and ocean mapping. We owe a big things to Dan and Ed behind getting this organized and on the agenda. Thanks, also, to our panel members, whom, Ed will introduce in more detail, shortly, for their upcoming talk. The goal of this session is to provide some background and context on where offshore wind energy stands, now, in the U.S. and where we are headed. My personal favorite topic, ocean mapping and observing data. Whether it is meteorological or oceanographic data or biological data. Things you can acquire, out there at sea. I think our panelists will provide a great picture of the potential for sharing and leveraging both NOAA and industry data to support offshore wind from coastal resilience and more. Now, I would like to turn it over to our ocean service assistant administrator for some remarks from the NOAA perspective before she turns it over to Ed to introduce our panelists. Thank you, and thanks Nicole.

Of course, Ashley. Hello, again, everyone. I'm looking forward to today's panel on offshore development. Since the president launched a major initiative to expand offshore wind earlier in this year I have been educating myself on the topic to make sure NOAA and NLS are fully engaged in the conversation. NOAA recognizes that offshore wind energy will be a key part of our nations clean energy solutions. We are here to support our nation's goal of deploying 30 gigawatts of offshore wind by the year 2030, while protecting biodiversity and promoting uses. Investments in offshore wind will not only help us adjust the climate crisis, but will help us fuel economic recovery for the entire nation. Its effects will be felt throughout the domestic supply chain further in the U.S. economic prosperity and modernization. We have to recognize that we move with speed. There is so much momentum with regards to offshore wind. We have to keep up with that, and we also need to move deliberately to make sure we are making the best possible decisions driven by data and other key inputs. All of NOAA's client service in stewardship missions. This includes weather and climate production. Fishery management research, satellite data management. Coastal, economic support. Among others. We are also working across NOAA to understand the potential impacts to our mission from offshore winds such as, the potential for wind turbine blade interference with our high-frequency radars in the coastal zone. Because, we wish to enable and mitigate any impact to our mission going forward from offshore winds, NOAA has got to have a seat at the table in this conversation. We do. Within NOAA, we have established an offshore wind team to strategically advance the administration's offshore wind goal. And to coordinate offshore wind activities and equity internally and with other federal agencies. In addition, we are planning to invest new NOAA resources to advance offshore wind in the 2022 presidents budget, there is $20 million for NOAA to fully engage in federal interagency planning,

siting, and permitting of offshore wind energy projects. In doing so, to minimize the impact of our resources and constituencies. These investments are heavily focused on NOAA fisheries, however, they could be expanded to investments elsewhere within NOAA, including within NOS where we have considerable expertise in offshore wind. I am working very closely with Janet, our new NOAA fisheries system administrator and the NOAA policy team to expand and solidify our relationship with many of the federal agencies within this space, especially our colleagues. We have collaborative very closely for over a decade providing science support including maps, models, data, and other products showing how proposed wind energy areas on the outer shelf of the Atlantic and Pacific may impact protected species and other communities like fishing and shipping and recreational boating. NOS also collaborates through our long-standing Marine disaster partnership and through the ocean reports school which is an essential screening tool that can be used to help D conflict ocean uses like, from other activities like the offshore wind development. I was thrilled to learn of the signing of the MOAA. We have an agreement with or stead wins between NOAA and or stead. Hopefully, this will be the first of many such collaborative agreements between NOAA and our private sector partners in wind energy. NOAA looks forward to adding new partners to advance the collection of relevant data to offshore wind planning. I have been working with our own experts at NLS to get up to speed with all of the opportunities available to us for data sharing. You heard about the significance of the new blue economy, and I would like to reiterate that our partnerships with the private sector will be the only way to meet the challenges that he outlined. Offshore wind included. While listening to today's panel, I invite you to think about how their experiences can apply to other aspects of ocean observing enterprises, as well. The wind energy sector is only going to continue expanding as a part of the new blue economy. NOAA welcomes the chance to work with long-standing partners and new entrants into this industry and into the ocean space, generally. At NOS our role of enabling X businesses to thrive and not be understated. We want to support the provision of foundational data to those new actors. With that, I am excited to sit back and hear from the panelists. I will hand the mic over to my good friend.

Thanks, Nicole. Thanks John, thanks Ashley, for the introductions. I will introduce the speakers, one at a time. Then, about 15 minutes each, I will give you a two minute warning, if needed. I want to thank you, all four of you ahead of time, because it is going to be an eventful and useful educational hour. I just want to throw in one fact for everybody to let you know how fast the world is changing. A company like ours did a calculation in the month of July, and realized that 80% of what we do, related to industrial type mapping for the entire region of the Americas, is related to renewable offshore wind farm work. If we would have done that analysis five years ago it would have been 80% deepwater oil and gas exploration. That is how fast things are changing. We hope that this will get everybody a good foundation to what is going on. With that, I would like to introduce Mary. She is a PhD science coordinator with the office of renewable energy programs of ocean and energy management. Mary, take it away.

Okay, thank you very much. Good afternoon, everyone. Again, thank you for inviting me to present, today. My name is Mary boatman. I work at the Bureau of Ocean management in the office of renewable energy programs. I coordinate our science efforts in support of renewable energy development along the Atlantic. In particular, offshore winds. Today I am providing an overview of the renewable energy program and its current activity. For those of you who aren't familiar, we are the Bureau within the department interior that oversees the development of our energy and mineral resources on almost 2.5 billion acres of the nation's outer continental shelf or OCS. The OCS extends from the three mile line jurisdiction out to the full extent of the exclusive economic zone. Approximately 200 miles offshore. We are responsible for the expeditious and orderly development of the energy resources of the OCS. Including renewable light winds. It is our job to ensure this development is done in an environmentally and economically responsible way. Executive Order 1408 issued in January, called for a review of offshore renewable energy. During a White House forum in March, the department interior of energy and commerce submitted to a target to deploy 30 gigawatts of offshore wind by 2030. This would create nearly 80,000 jobs. This action represents the governmentwide approach to offshore winds permitting, taking stakeholder ideas and concerns into

consideration every step of the way. There are three pillars to success for offshore wind. Strong winds along the coast, foundation technology that can be built in the environment, and market demand. The northeast coast, along the Atlantic, has all three pillars and is the furthest along in the process. There are 16 acid patterns, you can see in the orange. These are more desirable from an economic standpoint. The renewable energy authorization process has four phases. The first phase is planning and analysis. This includes identifying areas to lead. The second is leading. The third is site assessment, which is conducted by us. This includes geophysical and geological surveys, as well as, assessment of the offshore winds. Finally, there is submission about construction and operation plan. If approved, they submit engineering reports which, again, we review. If that happens they can construct their facility which can be out there for up to 25 years based on their lease. Eventually, there will be decommissioning. Now, intergovernmental coordination and collaboration, including government to government confrontations, are key elements of our program. They may occur at multiple points in the offshore energy development process. Our planning and leasing process, we have intergovernmental task force is comprised of federal, state, local, and tribal entities. They gather around the table and help identify areas that are best suited for offshore wind leasing. We, also, have plans specific once the construction operations plaintiff submitted. Of course, they go through the process where we have cooperating agencies reviewing those documents. We have mandated consultations. And we, also have program coronation. At a program level we interact with other federal agencies. We have joint issue focused workshops, process agreements, we work with state working groups, we help identify guidelines, and we also work with joint studies and research across the federal government and with the private sector. Our intergovernmental engagement is important. We regularly coordinate, communicate, and collaborate with intergovernmental entities including federal agencies, state, tribes, fisheries, and management councils. We also participate in the regional ocean partnership such as the Northeast regional ocean counsel and the mid-Atlantic committee on the ocean. As I mentioned, earlier, we have our offshore wind subgroup that meets monthly. That includes all federal agencies that have a role in permitting offshore wind. Then, we have our intergovernmental state and regional taskforces are led by the various states such as New York or Virginia. This involves a lot of public involvement. There is a lot of involvement from the public. We also believe that regional collaboration is key to our success. It is all driven by the states. The states along the Atlantic have renewable energy pull. They have specific offshore wind goals which, at this point, is about 30 gigawatts or 31,000 megawatts. We also have offtake. Or power purchase agreements that are in place. As well as scheduled, potential offtake's. That currently represents 20 gigawatts. We have, not quite enough area, out there, to meet this goal, but we are working on it. Right now, we have completed 17 commercial leases, we have approved 11 site assessment plans, we have approved two general activity research plans. Now, we also have construction operation plans which we are reviewing. Currently, we have 14 submitted. We expect to have two more within the next year, perhaps more. We also have other activities such as, developing guidelines or regulatory guidance. We also have new leasing under consideration. Finally, we had our first field on the water in the OCS in 2020. There lots of issues and opportunities for us to address, as we move forward with this. One of them is employment, of course. There's a lot of different types of jobs both on the water and onshore. There are industrial synergies, for example, with the oil and gas energy. This platform was built for the Block Island wind farm which is on state waters off of Rhode Island. We have the turbine site that are constantly increasing. We have transmission, we have to figure out how to do that in an efficient manner. There is no transmission offshore. We just heard about radar issues with VHF, but there is also radar for the Department of Defense. We have wildlife concerns. People don't want to see these things, necessarily. Of course, we have navigation. We are working with the commercial industry, commercial industry to make sure we can share the ocean. As well as commercial and recreational fishing. Again, we all have to share the ocean. The technology has grown since the beginning in 1991. It is now at 68 megawatts. We are looking towards having 12 megawatts offshore. That means a larger turbine using more energy and less space. We have also proposed 50 megawatts. That is an engineering dream. Currently the projects in the pipeline, as I mentioned, we have 14. We also have a final project that was approved in 2020. We have skipjack off of Maryland, we have projects off of Delaware, Virginia, again. North Carolina, South Carolina, all of these projects are being reviewed and are, hopefully, going through the process by 2030. As I

mentioned, we had our first field on the water, this is from Virginia's offshore wind project. It is a research lead be granted to the Virginia Department of mines, minerals, and energy. It is operated by Dominion. This is on the small end. They are quite large in the off-season, but we are looking to have much larger ones, as I mentioned. We also just approved our first commercial offshore winds project. That is off the coast of Massachusetts. The concept was approved in 2021, this summer, and we're looking to have the engineering reports to review. We anticipate construction of the turbines in 2023, if all goes well. On the horizon, as I already mentioned, we have wind. We did a supplemental EIS that looks at the effects from all of these projects along the coast. We have South work wins off of Rhode Island that we anticipate approval this year. We have a lease sale plan. Virginia, there is a 2000 megawatt project proposed off of Virginia. We also have potential leasing off of the Carolinas, the border of North and South Carolina. That has been in the works for several years, we're hoping to have a lease, next year, in that area. We are looking at California to have a lease sale in 2023. Gulf of Mexico, formed a task force in discussing where they can do offshore wind. We have Hawaii, there are two locations in Hawaii that are under consideration. Finally, and lastly, we have the state of Oregon. They're actually talking about wave energy and renewable wave energy off the coast. With that, I say thank you very much, I know that was fast. Things are fast and furious right now. I hope you got a feeling for that energy. With that, I will say, thank you, and turn it over to the next speaker.

Okay, thanks a lot, Mary. For everybody's benefit, we will have all the speakers complete their presentations, and then we will hold the questions until the end. See how we go. Okay, next up is HSRP member Dan. I have had the pleasure of working with Deeann for a long time. She will talk about what goes on the technical side of data collection and how that ties back into the interests of the HSRP members , but also the ability to share that data is going to be spoken about with the other two speakers. Deeann, over to you, thanks.

Thank you very much, Ed, I appreciate it. Take you, Mary, for that excellent overview of offshore wind in the U.S. It is fast and furious, as you say, and it is a really exciting time. I am Deeann Hargrave, I am a HSRP member and I'm also the geoscience manager for Atlantic Shores offshore winds. That is a offshore wind project. I'm excited to talk to you about the enormous wealth of geoscience information. Data can advance our understanding and enhance our blue economy. Today, we will be looking at a number of questions. Next slide, please. Just to take a look at, what is, kind of, geoscience 101 for offshore wind development. What are the tools, how do we collect the information, what kind of information are we gathering, what is the difference between geophysical and geotechnical data, for example. How is the data used to inform regulatory and design considerations. When does it occur in the development process, and then we will touch a little bit on the data sharing opportunities. Some of the sharing is already ongoing. Let's start with data-gathering. Next slide, the data gathered during the surveys can be categorized, really, into physical and geotechnical. Geophysical data is gathered with full mounted or toe sensors that emit sound in the water. The sensors allow us to map large areas without touching the seafloor. They're limited to interpretation of the data. Geotechnical data is gathered through the geophysical interpretation. Geotechnical data includes physical surveys of the seafloor in subsurface using various coring techniques. This is used to carry out this work, I typically build this work to stay offshore with a large technical crew for 3 to 4 weeks at a time. In order to protect species that are sensitive to the acoustic admissions of these operations, protected species observers are on board the vessels. Their job is to watch for protected species and assists the survey vessels with avoiding these animals. Sometimes this means shutting down operations until the protected species are far enough away to not be impacted. The onboard technical teams include 20 to 30 personnel depending on the specific personnel. Be it geotechnical drill ships, which require more personnel than geophysical survey vessels. The teams are made up of a plethora of technical experts including geologists, geotechnical engineers, geophysicists, equipment technicians. Protected species observers, archaeologists, data quality assurance, and project managers. A wealth of talent is on these vessels. In addition, the vessels are supported by a considerable onshore contingent of project managers, operation logistics, and quality assurance. Much of the G and G work requires specialty crews, there are opportunities for developers to work with local fishing vessels and sure flight support facilities. Many of the smaller survey vessels working

over the past few years have had shoreside operational support from local fishing docks, laydown yard, and storage facilities. Many developers are working with local fishing liaisons to use their vessels to scout for fishing gear in areas that are to be surveyed and help work through cooperative solutions. Next slide. The data sets that are required for each lease, and associated export cable routes includes, surface and subsurface data, such as, for surface data, we collect side scan sonar, transverse radiometer, graph samples, profile imaging. For subsurface data we collect some bottom profiler, single and multi channel sidetracked, to name a few. To focus on dosimetry, for a moment, as interest to the panelists. That is acquired with dual head multibeam echo sounders operating at 400 kilohertz. It includes backscatter. Typical line spacing in the offshore lease areas is 30 meters. This provides for 150 to 200 percent coverage. This is incredibly high resolution information. Lease areas off the East Coast range and water depth from 15 to 50 meters, with some of the new leases pushing into deeper water which will eventually lead to floating turbines, similar to what will be off the West Coast. The acquired dosimetry data allows for detailed modeling and analysis of seafloor geometry, which helps with planning for cable and foundation installations. The detailed data helps developers understand potential challenges for construction, including mobile sediment intergenic debris, and other hazards that could make cable burial difficult. All attempts are made to avoid these challenging areas when selecting cable routes and foundation placement. Next slide. Side scan sonar is collected and operated in the 600 to 900 kilohertz range. The same 30 meter line spacing leads to over 300% coverage. The data is used to map extensive C4 conditions, including areas of mobility, debris, and shipwrecks. Sediment profile images are used to test soil material. Debris is investigated for consignment with magnetic anomalies to help identify the debris type. Developers use this information to avoid installing cables or foundations where infrastructure has been located such as buried communication cables. These locations are communicated to us when they are found, following the regulatory reporting protocol. It has been interesting to see the areas that dredged cars can be seen in the side scan sonar data and can remain for years. Or they can be reworked within days in areas that have mobile sediment. Next slide. Taking a look at the subsurface, we collect high resolution seismic data. It is collected with two sources that meet the regulatory and design requirements for archaeological and geo-hazard characterization. The image shown, here, is a higher frequency some bottom profiler which typically maps the subsurface of depths to 10 meters below seafloor. This data is instrumental for planning the route and depth of burial of either array and export cables. A lower frequency, single, or multichannel seismic system, using a 400 to 800 kilojoule sound source is used to map the sub service to about 100 meters below the line. This, typically, is only in the lease area, and the data is used for foundation design and location planning of the offshore wind turbine and substations. Since the data is acquired at 30 meter line spacings, the resulting ground model is nearly 3-D, which results in very detailed mapping of channels within the units. Some lease areas are within the maximum and are lush with glacially consolidated sediment with occasional borders. Others are more prone to pay Leo channels and ridge features. It is exciting to see how the overall understanding of service geology over the East Coast is expanding exponentially as a result of the data we're acquiring. Next slide. Geotechnical cores are selected with a few metals that often result in recovery of soil that can be tested for things in the laboratory. Alternately, tests can be completed with shallow seabed tests. CPT's are tools that are pushed into the soil, the tools have sensors on them that measure how much force is required to advance to the. The strictly translates how strong the soil is. These tests provide continuous profiles of soil strength, whereas laboratory testing only occurs at discrete locations. The geotechnical data is critical and not only provides engineering properties to the design team, but it is the key to ground truth and geophysical data. This leads to the next slide, where we talk about the ground law. Data are gathered and brought together into the ground model, which is used to inform layout designs, foundation types, and burial depths. The data are gathered in the lease area and along export cable routes, and used for geo-hazards, archaeological, and dense clearance. The image, here, shows all of the sources of data that are input into the ground model. Ground models are primarily built in IHS kingdom and developers share the horizons with the extended project team, including providing these to us as part of the construction operations plan. The software is specialized, extensive, and requires experience to operate it. This restricts the usefulness of the ground model. One innovation that is evolving as we speak, is the availability to push the full ground model, with all the underlying data set, to web apps that can be

viewed by anyone in a user-friendly environment. An example of this is the Gaia hub that has been developed in collaboration with Atlantic Shores. This is been demonstrated, in the hope that this is moved is the preferred method to deliver ground models. Next slide. When, in the development process to the surveys occur? Geophysical and geotechnical surveys are an integral part of a project from first conception to decommission. The greatest efforts occur during the development stage, also coinciding with the defined stages of a project. Typically, this is completed in a phase approach that includes collecting preliminary or reconnaissance level geophysical data of the full lease area during the first season. This first investigation provides a basic understanding of site characteristics. This data is the basis for the ground model, which helps inform the preliminary layout, including which portion of the lease to develop first. If taking a phased approach. The ground model is used to select and clear the first round in geotechnical investigations, and these investigations typically include maybe 15 to 20 boreholes with CPT's. This information is fed into the ground model, resulting in a tool that can be used to select foundation types for turbines and silt stations. The next phase of geophysical surveying provides full coverage of the area potentially affected at the regulatory required resolution for geo-hazards and archaeological grants. Each time a new data set is collected, it is incorporated into the ground model to improve the robustness and usability for design and engineering. Finally, with version 3 of the ground model, the foundation location that is selected and discrete geotechnical investigations are completed at nearly every location. This whole process can take as few as two years, but more generally requires three to four years of sequential work for full completion. The data is used for various purposes. You can go to the next slide. Throughout the entire project lifecycle. For planning and development short of decommissioning. The largest volume is collected during the planning and development stage, but in addition to this, early data is also necessary to survey the precise location of the cables and foundations to develop data sets. These are critical for managing the integrity of the infrastructure. It will be used for the baseline to measure change over time. For example, the depth of burial cables and potential scour will be measured with geophysical tools throughout the life of the project. Finally, during decommissioning, geophysical surveys will cover the area of operations to confirm that decommissioning is complete and that these conditions are met depending on the stipulations set for it. Last slide. The construction operations plan, we talked about a little, it is like a project blueprint. It details what will be built, how it will be installed, where it will be located, and how it will be operated. Site characterization is a large part of the talk. As we have demonstrated, it can take several years to complete. Campaigns are expensive and some of the vessels cost 50 to $100,000 per day depending on their make. One challenge for developers is phasing this data-gathering in line with the project landing timeline so that the required information is available, when needed, to project decisions and conversely that project decisions are made to inform the investigation. The project develops slightly out of sequence, which can lead to having to resurvey areas if the design changes. Data collected during these various physical and geotechnical campaigns results in terabytes of data to review. The data itself in the interpretation of the data in the generation of maps, charts, reports, statistics, and models that allow us to consume the information and understand what the data are showing. The resulting interpretation of reports are included. It is also delivered in coordination with the Continental volume of data that is so large that it requires multiple hard drives. After we have received and reviewed the data it is made available to the public. Some information is sensitive, and is kept confidential, for example, archaeological reports that have details of historically sensitive resources. Develop rules are always looking at ways to share data for common benefit. For example, all data is available through the lighter buoys that are depleted through Atlantic Shores and Mayflower. Also, data sharing agreements are in place or underway to incorporate dosimetry and sonar data into NOAA's portfolio. We will hear more about that from Elizabeth, in a moment, and also from Ruth from Schell, who was part of the first memorandum of understanding. That concludes my presentation. Think you, very much, I look forward to the next presenters. Things, Ed.

Okay, great, thanks. Appreciate the details. The incredible extent of work it takes to develop the sites. We will move on to the next speaker. Ruth. She is the business and environment adviser, shall renewable energy solutions focused on offshore wind Americas. Thanks, a lot, for coming in and presenting, Ruth, I will hand it over to you.

Thanks, can you hear me okay?

Yes.

Great. Thank you, I know it is a bit of an odd title. You have seen me move through many degrees of Schell, basically, I have moved over to our offshore winds business full-time given how large that portfolio is growing, which you have heard Mary talk about from the federal side. I had all of our regulatory affairs for shells offshore wind project in the Americas from Canada down to Brazil. Today, I'm really going to focus on the opportunities that we see in the U.S. and give you a perspective on shells Outlook on offshore winds. Before I go to the next slide, I would like to think Deeann and Ed for the opportunity to come present. As well as administrators for the opportunity to come and work with the national Ocean service. We are looking for opportunities to work together between the private sector and NOAA. I look forward to giving you a perspective on that, today, and you can go ahead and go to the next slide. The next slide you will see is just a disclaimer, we can move past that very quickly, I'm not going to talk about any commercial or financial interest. None of that would impact any stock or other type of ownership in the stock. We are going to move ahead and talk about shells renewable energy solutions business. That is a big new part of Schell. It is an exciting part that Deeann and I get to be part of and, I think, it is quite a bit different from the shell that you are used to. I love Ed's statistic because it really shows that there is a rapid transformation in the energy sector, broadly. Meaning that, you are having renewable companies, but also energy companies that are transitioning and offshore wind is a major part of their strategy for transition. Next slide. Why is Schell transitioning? A lot of this is being demanded by our customers. The need for more and cleaner energy sources. We know that many parts of the world are fast-changing and that climate is impacting many of those areas, globally. Energy has always been a defining feature of our economy, lives, and livelihood, and the communities that rely on affordable energy. Whether that is our coastal communities, to disadvantaged communities to our more fortunate communities. All of those rely on reliable and affordable energy. As the population continues to create that demand for energy it has grown and we have certainly seen that global demand for clean all renewable energy. This is exciting for us, as an energy provider, that we pride ourselves on our safety and our environmental responsibility to deliver that energy. We see an opportunity to help enable a growing renewable energy market that can address the stress of the environment, especially climate change. Next slide. Our ambition and purpose is really focused around power and progress together. We are looking at this across a portfolio, meaning, we are looking at it from how we generate renewable electricity to how we deliver cleaner product and how we deliver affordable energy to our customers. So, our own operations, we intend to reduce emissions from the manufacturing of all of our products by the year 2050 or sooner. In the Gulf of Mexico we are proud of the fact that, that is one of our largest oil and gas producing areas, globally. Those are some of our cleanest admissions per barrel. We have set that Mark in the U.S., and we intend to do this across all of our product lines. We are a strong supporter and advocate for the Paris Accord and how we can work with society to achieve the goals of the Paris Accord and address accordingly and, like I said work with our customers to reduce with and ensure the energy we provide is affordable. You will see quite a bit of this, you can learn more about our strategy and how we intend to do this across our entire energy portfolio by 2050 on our website. I am happy to follow-up and provide you any more information about where we see the renewable side of this building next slide. Focusing in on the offshore wind part of our business, this is only one part of our renewable generation portfolio. We are looking at onshore winds and solar, as well, and then advancing capture technologies, looking at the production of hydrogen, like I said, across the entire energy spectrum but really going to dive into our areas of offshore wind. You can see we have global interests in offshore wind from South Korea all the way back over to the U.S. We have two joint ventures, like Deeann said, she works for Atlantic Shores off the coast of New Jersey. Our second joint venture is off the coast of Massachusetts. We are certainly excited and eager to expand that portfolio to the Gulf of Mexico, hopefully next year in California. We are continuing to grow our portfolio, grow it quickly, and we want to be enablers to help scale this industry in the U.S. Next slide. I want to move on because, I think what you hear with offshore wind is quite a bit on the

East Coast is offshore wind is state determined. Meaning that the states are driving targets of offshore wind power that they want to secure for their states, but from a shell perspective, they see both the delivery of generated power, but also, utilizing offshore wind in what we call an anchor investment as part of a broader integrated energy basin. So, this includes building the supply chain for the renewable industry, as well as using offshore wind as a source to power existing facilities, to reduce admission, or to power a new generation of sources such as hydrogen. We look at offshore wind as one part of an integrated energy basin. Not solely a generation delivering two states. This is the unique approach that we have, within shell, and it is a unique area that we are growing. It also provides opportunities to work with communities in different manners of what those communities, actually need. Whether those communities are looking at hydrogen because they have, primarily, manufacturing supply chains or electric vehicle, where there may be interest to have that power source. So, it can be tailored to what our society and our community needs are, when we look at offshore wind as one part of an integrated energy system. Next. I'm going to switch to more of, my favorite topic, really getting into the science and data part of offshore wind and where we see that growing into the U.S. economy. Next. We, as a six planes, we are transitioning both in our domestic and foreign policy. We really support NOAA's efforts to address climate both, from a solutions and science initiative and product. All of this is aligned with the U.N. decade of ocean science for sustainable development, as well as the U.S. decadal priorities under that broader U.N. decade. Shell has the fortunate opportunity to be part of the U.S. national committee. This has been a large part of our activities over the past year, helping to enable the U.S. and really focus on how we can promote economic prosperity. You see on there, one of those is energy. Bringing in the renewable energy industry as a way we can promote economic prosperity, as well as contribute to some of the other priorities that we have at the U.S. level, but, also at the global level. Next. I like to show this one because, before I get into the collaboration, we have been a strong proponent of private partnerships and we feel that that is a role and a mechanism to really advance sustainable development. It is a science that we want for the ocean that we want. It requires transformation, which means, you know, utilizing our expertise in the pelvic and private sectors together to, really, transform the science and data that we do or the data that we collect, as well as, I like this, with inclusion. It should be inclusive of all ocean users. The full realm of the public and the private sector. I think, when we put those together in partnership, we have the ability to finance the transformation and we have the ability to generate the capacity for delivering the science for the ocean that we want. I thought this was a really nice graphic that captures all of those pieces together, and how we can work together to develop, sustainably develop, our ocean. At the same time, respecting, protecting, acting, and conserving our resources that are so important that those oceans provide. Next slide. From a shell perspective, we have been working with NOAA in different parts of NOAA since prior to me coming to shell. Formal data arrangements go back to 2008, where we really focused on different categories for our collaboration. First is, advancing ocean technology and capabilities. This is focused on using autonomous vehicles of underwater survey vehicles to improve hurricane forecasting and production. In the Gulf of Mexico, the loop current accounts for a majority of offshore oil and gas progression downtime. Monitoring that current is very important, and it also delivers the heat energy that can drive the intensity of many of the storms, we saw that play out this weekend. Hurricane Ida. We have been working very closely with NOAA, national buoy Center, national Center for environmental information, as well as university partners from the Caribbean all the way to the East Coast. [Captioners transitioning].Now that has become the major program with anywhere from 10 to 20 that are deployed, Caribbean Gulf of Mexico, and the East Coast to do this monitoring and provide that data in real-time. In addition, we have been working on opportunities to provide offshore data from our structures. This includes not only gas, but future buoys. We have instrumentation that is physical, chemical, geological and even biological on our platforms and being able to share that data, through NOAA channels that can be used by NOAA scientists as well as the public community to look at changes in the environment is very important, we want to share that information in real time. That has been a lot of my work prior to coming to shell and while at Shell to figure out how we can utilize our platforms as opportunities and share information from those platforms that can continue to contribute to know omissions. We continue utilizing the same model as you will hear, to advance the data collection that we can deal from offshore wind facilities considering that these wind facilities are going

to be built and operating for 35 years provide an opportunity to think ahead and figure out what time, what type of long-term data series we would like across the disciplines for biological, chemical, physical, et cetera. It provides real opportunities. Closely what I hear from the programs in this category of, we wish we would've thought about this 30 years ago before these stressors were in the water. Now we have the opportunity of offshore winds. If we can put the right minds together, we can think about how to utilize these structures as platforms of opportunity to collect data. That can be very critical in looking at some of the climate and other environmental changes to the areas where offshore win would be deployed. This is one where we have a lot of GPSonBM. They can go do deep-sea biological assessments in areas that are typically hard for scientists to reach because they are too far, or too deep. It requires specialized equipment, vessels, and I feel know how expensive that gets, we have offered of our ROP time. This is a global program but we have the Gulf of Mexico program that has been very successful and we look at opportunities like this to see if there are other types of data that the oil and gas industry may be collecting for tools that the oil and gas industry has that can be used to scientists. The last one doesn't need a lot of explanation, but it is an important one in terms of the communities that we work within, the communities of our people, we are really supporting that next generation through education, research, and competition to engage them in the oceans. And then, I think my last two slides, we see the offshore wind industry. The first one in data sharing as Deanne talks about. We're already doing this, you will hear that in the next presentation as well where we are deploying buoys for assessment and sharing that data. We hope to expand that to other sources of data like the geophysical, geotechnical data histories, et cetera, monitoring is the next category where I see emerging partnerships, that is really around, what can we do for platforms of opportunity and how can we leverage the existing work that will look at impacts of offshore win. There's a lot of opportunities in the monitoring space and there is just a lot of activities that we have already started including the detection and monitoring of sensitive species such as the North Atlantic well, I believe there was a bone study that just released a video today looking at those changes in the Block Island facility off of Rhode Island and how the artificial facts had played around those particular structures. There will be a lot of monitoring, that creates a lot of opportunities to generate data that could support various know omissions and offices. The last one is research. There are local project efforts underway to look at site-specific species or to do work that will inform construction and operations plans to industry and other ocean users, like the environmental community, the NGOs, the fishing communities to come together and establish regional research organizations, taking the responsible offshore science alliance which focuses on looking at the effects of offshore winds to look at how changes are going to happen over time, both changes that may be happening now from climate to changes that may result as we build offshore wind. I think on my last slide, it is really just more of a visual, visuals of opportunities that we have for these partnerships, the data collection, and really to generate the science for the ocean that we want to address climates, and I want to highlight that offshore wind to is they're not going to be people and large platforms, it really is an opportunity to look at how we monitor these facilities using autonomous technologies and so, it provides a lot of new opportunities that we have not explored in scale. We are starting to have these conversations now, but I really see that accelerating in the near future. I think the last slide, I like to show this image from NOAA in terms of all of the different ways that we can use Marine technologies to observe the ocean and collects the science for the oceans that we want, I like to throw in the offshore wind in the middle of that just to remind everybody to think about the opportunities that we have in front of us even though this industry is moving rapidly, we can also move rapidly as the science and data community to utilize the opportunity. I will end there, Ed.

Thanks a lot, Ruth. A tremendous amount of information and it is relative to the theme of the sharing and partnerships. We have one more speaker to go, and then we will get into the questions which I'm sure there is going to be a lot of. So, with that, I will introduce Elizabeth, Becky Andrews, she is the lead geophysicist here in North America and we just learned she is currently based in Rhode Island herself. We have got all of the different states represented as well as the different topics.

Thank you so much, can you hear me? Goodness, I am Elizabeth or Betsy Andrews. I am the assistant for the portfolio. I am delighted to be a part of this panel today. My team and I really echo

the energy you have heard from my fellow panelists today. We are truly sometimes even embarrassingly passionate about geoscience data and about the growing offshore wind in the U.S. It is our commitment to help the world run entirely on green energy. We're really excited to have the opportunity to speak about this with you today. Can we go to the next slide please? It is the first of its kind between NOAA and the offshore wind developer in the U.S. We are really enthusiastic to not be digging into the details. Our commitment is to map a smooth and productive process which will pave the way to similar sharing agreements with the other developers. Agreements of this kind that we see is really critical to achieving safe and healthy oceans as you work towards the goal you have heard referenced a few times today of 30 gigawatts of offshore wind energy by 2030. We all want to be in the best shape possible. Next slide, please. Building on this lovely quote, this partnership with industry will develop -- to deliver meaningful data, accessible to Americans for business, for science and education whilst at the same time working to mitigate the effects of climate change. We do set the bar high. To that ends, every thing we require for both engineering and for permanent requirements. It is going to be available for uses outside of our industry. Tran 43 believes this can build a complete data set to better protect our planet. Next slide, please? The data shared themes covered under the MOA or as listed on the theme now, air quality and omissions, biological communities, meteorology, coastal and ocean currents, circulation and waves, hydrologic services and mapping, physical oceanography, and this overall fostering of preeminent science and technical innovation that can support NOAA and the Department of Commerce is goals to stimulate sustainable growth in the U.S. boom economy. We will be pulling on that theme of hydrographic services over the next few slides. Next slide, please. We hope that this partnership between NOAA to coordinate federal agency policies needed to advance. To support collaboration with both nonfederal and nongovernmental partners and stakeholders of the finalize their implementation strategy. At instead, we are standing by and ready to duplicate. Next slide, please. Picking up on that theme of hydrographic services and mapping. Data handover is complex. The data is logged to very high specification. However, it is not logged as a part of a single polygon covering the area or all wide areas. It is built up over a series of campaigns, specified for the process. This introduces complexity in delivering a meaningful data package to NOAA, it introduces complexity and compiling a meaningful package for consumption. Our objective is to facilitate the end-user's ability to access the value of this very high specification data. These integration data issues are not insurmountable, they just require some careful planning, alignment on expectations, and of course some really good metadata. Looking at this example on screen right now, the different colors represent different survey years in different survey campaigns. Within each of these colors are multiple survey vessels, and also different types of equipment model specification of these surveys, they also defer. You can see that this data can't really and really shouldn't be graded together in a single surface. In fact, the data is probably more valuable if we don't do that, so for me, this is a great example to illustrate why it takes some work to establish a simple and functional process for making this complex data widely available. And this is just on the entry. If you are familiar with signs data or you are paying really good attention to the and presentation, you will appreciate the data becoming more complex. Making this even harder. Next slide, please? This area was a representation of how that data coverage was built up over the development of an offshore wind farm. Essentially how we ended up with that spiderweb on the other side. That is very similar to the process you may have seen in Tran 44 presentation. The scope of those earlier surveys were driven by the requirements. This leads to a very wide survey. Before that development envelope is defined in before we really know where the installations are going to impact the sea floor, this leads us to a different approach in the U.S.. The most detailed data is logged near two construction. Right ahead of actual substantial seafloor. Next slide, please. Oh, sorry, next one. So, this really meets us to our open questions of the forum and as an industry, what opportunities do easy to apply NOAA data to this process? To redistribute some of the heaviest data requirements from the very earliest project phases without disrupting the consultation process and without adding an unworkable schedule delays for any of us. Of course, the detailed high spec needs to be logged out of construction. Is there a way could miss him, for all of the input of the consultation and approvals process, so that there is an opportunity to further develop the envelope for these products before sending the vessels out to log the very highest specification data. We see that this was reduced, survey vessel vessel on water, reduce noise output into the water column, minimizing

impacts to protected species, and any other impacts to any other industries. We are really keen to discuss this with you further whether it is in this forum or in Q&A, or if there is any other forum we can facilitate. Thank you so much for your time.

Thank you so much for this fantastic presentation, it is great to see the partnerships that are forming with the developers and NOAA and other users across the board. Really excellent. I think that concludes the panel at this time, and I think we are ready to field questions, is that right?

Yes, that is correct. Our questions are from the panel members, we can open it up for the panel now.

Excellent, Dave, want to kick us off with a question?

Okay, it might be a stupid question, but this is a question on offshore wind energy, I am curious, has a higher average wind speed of anywhere in the U.S., I never hear about wind energy coming from the illusion, we are always talking about the East Coast. Is or something inoperable about Alaska, it is too cold, or too remote to operate out there?

I can take a little stab at that and the other panel members if you would like to jump in, but, Dave, I think one of the challenges is, is bringing the energy to market, we have to be able to tie into the grid where the demand is in order to make it economically feasible for wind to be a perfectible resource. To me that is probably the key, I don't know if Mary, Ruth, or Betsy if you have any thoughts on that.

I think you hit that one, correctly, Deeann. We are looking at state development opportunities in those areas where they would have population centers and we have had conversations. There is also an opportunity that is coming through the RMD development side, we may be able to do different types of technology that can deliver very localized, when it requires the commercial utility scale projects that we are talking about in the East Coast in California in the Gulf of Mexico.

Excellent, I think Ed Kelly, your next up.

Yes, my observation on this is, we have got every panelists saying that they have got very valuable data in there all willing to share in some shape or form, and we have one movement so far with off stead. My comment is not so much to the panelists, because they have indicated they want to share data and they see the proceed value, my comment is really to know what to get this act on the road to set standards and to work this and also the potential tie in for data internationally on this issue to set standards so that it can be done easily, quickly, and painlessly before all of this data that is accumulated that has been mentioned several times, primarily frontloaded is perhaps collected in nontransferable forms or it becomes proprietary my comment is really directed to know on this. To facilitate the collection in the management of this data. Since one of our building pillars in this whole thing since we have opened up with diversity, I am personally, I am an old guy, you can see that, the world is changing on my feet and I am very happy to see that there are six very talented women on this panel and Ed, is only guy so, we are really in a lot of ways on this. It is a new world, there are new opportunities, and NOAA is well positioned. Thanks.

Excellent, we appreciate that comment, Ed, there is a lot of diversity in the industry which is really nice to see and, including age and gender and all kinds of diversity, it is a nice thing, I think it brings a lot of creativity and I think we are in a fortunate time. I appreciate you recognizing that, Ed. You also made a comment about the ease of sharing this information, I don't know, Ashley, if you are on the line still if you wanted to address that at all because I know that you do have certainly some systems in place that are well down the line of making the ease of this transfer easier.

Yes, thank you, and Ed, thank you for your comments. I do think that we are doing, making improvements on our and to facilitate the transfer of data into NOAA's data centers from tools at the archives themselves and ironing out the kinks so that the next agreement, we are helpful for is going

even more smoothly. So, point taken, Ed, we are looking at all of these issues, I think the standard ocean mapping call, while we aren't creating anything new, we are simply collecting best practices in making our recommendations for different data standards and specifications. I think that will help the same situations that you have described. Help everyone be on the same page. Something that we can each point to and say, do it this way and it will go more smoothly. So, thanks for your comments. Hopefully in a few months, we can say, we have the tools all ironed out with Betsy and others to share that data.

She's very quickly, in our conversations, the data that they have a net Betsy described, the high standards of collection are very exciting to hear about. I think the exchange will actually be quite easy once we get those logistics ironed out. Getting a thumbs up from Betsy which is good.

Folks, I would also say, that there is a lot of activity going on in academia and other private enterprise I think creating a mechanism in a structure to receive, process, standardize data and make it available to better usage. Certainly, the time is now to do it. That is my comment. My story, I am sticking with it, that is it.

Thanks much, Ed.

Yeah, I was going to ask the same question from Ed. I want to spin it in a different way, I want to ask the panelists from their experience so far, where do they see no was roll in coordinating this data collection? I totally agree with Ed, NOAA has a great opportunity to serve the community by at least coordinating, maybe we can have it a part of the digital cause for example. We need that for a lot of this a data. Like Elizabeth pointed out, you use the activity and protect the species and use it multiple times. So, that is my comment. For Mary, I have a question, can you give us an idea about this negotiation, is it different from location, from one company, it is hard to see them negotiating lease of land on the ocean. I just wondered if you can just give us an idea, what type of negotiation? Thank you.

I'm not the expert in the office about the leasing, but we have lease sales, we go through that process of identifying the area and then we offer it for lease, companies come in and bid on that area, somebody is the highest bidder so they win, what they have is the right to do site assessment and site evaluation, but they don't have the right to build a project at that point in time. They do have the right to go out and look at it. It is an instrument. If you go on our website, you can look at the leases. You can also negotiate terms in there that you have to follow. We have stipulations with respect to environment and other types of stipulations and essentially, they negotiate and execute a lease. This is been done to decades. There is oil gas leasing. It is not that different, except that in this case it is for a fairly large chunk of area, and then there will be the eventual submission of a construction operation plan for the review and approval to actually build. It is an agreement between the government and that company. You have to remember that, we do it for the American people. You charge rent for it. We are going to collect some royalties, the American people should get something back for allowing these activities to occur in that area. We have that right because of the exclusive economic zone to do that off the coast of the United States. I hope that helps. There is a lot more complications to it. If you're really interested, you can go to the website and actually go and look at one of the lease agreement if you really want to see what is in it.

Thank you.

To the first question that you had, one of the challenges I think, depending on the datatype, what a part of NOAA that you are working with, I know the focus here has been a lot of the mapping data , standardization has been mentioned a few times, the importance of metadata, we also know that there is a resourcing challenges, the data management doesn't come for free, data storage doesn't come for free. We're talking, I think this is something that is being addressed in the 2030 initiative. We were spending all of the money to collect this information, very high resolutions as you heard from

Tran 46 and Betsy. How do you work through standardization through storage and integrity as well? I know that there all of those different facets. I agree with the comment that was made. There are other opportunities, this is a unique necessarily to offshore wind to. This is been addressed in the mapping community, I work mostly on the biological data. We have been trying to address this through office of protected resources, endangered species, how can we share our marine mammal data, how can that be useful to managers, a lot of the same issues. Metadata, standards, storage, responsibility, integrity, all of those pieces have to be addressed. I think there are ways that we can learn from doing this. The Gulf of Mexico is a great example and private industry partnerships in terms of all of the mapping data that is collected by the oil and gas industry, being able to have this in high resolution. There are instances where this is been done. I think really trying to get the right minds together to figure out how we do this at the scale is what is needed.

Great points, Ruth.

I will just pick up on a couple of things that Ruth mentioned, absolutely, the scale of the farm, these were very small data sets, it would be easy to hand everything over, these are terabytes of data. And that definitely makes this a challenge to make sure that that data doesn't just sit somewhere on very expensive cloud storage but really gets used and is accessible to graduate students, to individuals, academic scientists who are trying to activate this for other scientists. At some level, I think that offshore wind developers are always going to log some of the data themselves. There are going to always want to add in the final engineering data themselves and have control of that, we are really excited to work with NOAA especially in areas where there is already a lot of data coverage, there is already a lot of material to pull from. To see how we can use that data more intelligently.

Yeah, excellent, thanks.

Thank you, thank you so much, great information about datasharing. I'm sure it will happen sooner or later. Specific to the U.S. offshore. We have got these highly specialized vessels which are doing the installation and North Stead is a leader in that space. But, also, the requirement that we are going to use, local resources under the Jones act side of it, and that way, the question is specifically to Mary, we developed a very good operational and safety standard there where it was meshing well with the operations. What is your plan for offshore wind? There's a slight disconnect between these highly specialized vessels and the local, how do you plan, you don't reinvent the wheel, we sort of learn what we haven't take this forward, that was the thought, thank you.

For small, I want to say that we recognize that there is this whole vessel issue and takes it very seriously in vessels, as you know, there is the wind farm which is five turbines off of Rhode Island, they brought the vessel over from Europe. They put it down right by the thing and then they went back and never touched, that is a very big challenge. They, for those two turbines, they are staged out of Halifax. To me, energy is right now building their own vessel. We really would be looking to, we don't really control this. We really aren't able to do a whole lot about it, we will do what we can to not keep it from happening, but not be a hindrance for it happening. I think also, the private sector has to step up and think about building vessels in the United States and the energy is doing that right now and Virginia has one specialty vehicle, we can also look to oil and gas. That is another opportunity that people are looking into. So, there is a lot of opportunities here, but it really falls more on the private sector than on the government.

Thank you, completely agree on that, I know that that is a transfer of technology happening which will make it improve with time. Questions specific to operation, we have seen some challenges come up in the field between these highly specialized vessels and the local fleets because of lack of standards of operation, I would likely develop that for the offshore field for petroleum development, are there any plans to develop something similar for the vessels and the monitoring vessels which will be taken locally to do something in that space. Because, he to see a bunch of accidents, and then be learning from it rather than what we have learned from offshore and incorporates all of that.

Mary, I am happy to jump in.

Absolutely, I will just say that Tran 43 has extremely high standards in their mission to avoid any type of accident. I personally witnessed where they had vehicles get the fishermen away from the wind turbines as we were still trying to do things. The industry already has, this is also the Coast Guard engaged with this as well. I will turn it over to Ruth to answer some more.

Those are great examples. From the shell perspective, we have the same standards as oil and gas. I spent a lot of our time working with our contractors, or new companies are coming into the market. Provide that training and other opportunities to assist with that, we see that growing. There is also a couple of efforts for Department of Energy and offshore operators committee on developing standards and I forgot the Coast Guard, Mary reminded, the Coast Guard part of this to look at those vessel types in the processes and procedures and requirements of that we can utilize what is already in the oil and gas industry in the U.S. framework and cater that to the nuances with offshore wind and keep the same level of standards across the offshore industry. I think that is underway. It is probably not as physical, it is more in the background. There is a lot of investment and workforce training by all of the offshore wind programs pack. That includes fishing communities or other mariner groups that want to participate in have an opportunity doing that training, helping to get vessels and equipment up to standards and working through our very robust contracting processes so that they can participate at of course, that is something that the industry that has a lot of these workforce efforts growing. Also bringing complementary acts from the Gulf of Mexico that can help the communities of the Northeast to be able to participate in the industry as well.

Thank you so much.

Did you have a question or follow-up to that one?

That is all, thank you.

The Coast Guard is very actively involved in this. They are the lead agency. There has been extensive governmental agency meetings that have addressed commercial operation and navigation on an outreach to a commercial fisherman. There has been a very active betting and planning from the commercial part. Overseeing with the navigation aspect by Coast Guard. So, and prior to each Tran 45 being done. The Coast Guard requires a review of navigation safety review plan that has actually put it out for public comment. I know myself and many other commercial navigation people have been deeply involved in these. I think the safety issue is certainly paramount as well as development in compliance. I believe these should be Jones act compliant vessels. Europe is ahead of us, but there is expiration and are looking at how to develop a Jones act to handle this, and very much on the formats and plants that have existed with oil and gas exploration. There are still several years lead up on this, and I think there are people who are actively looking at the financing and I don't think there is a problem. I think safety is being addressed as well. I'm just looking forward to what happens.

I agree. It is fun to be in the front row, front row seat watching was all advancing and happening. We have time for a few more questions from the panel. Are there any questions for the rest of the team while you are thinking about that, I guess I have one. For Mary, and also for some of the NOAA folks. I am curious to know, where do you see that the interagency coordination between NOAA is going well and also where do you see that there could be potential opportunity for improvement and is there something that they could help with in an issue paper or some discussion to help address any possible improvements with interagency coordination. I know it is a tough one.

Yes, I was going to say I appreciate the question, we have worked with NOAA for decades . And like any relationship, there is always a really good aspect to it. There is also challenges. The biggest

challenge is where our mandates intersect or get crossed, cross each other and sometimes but obviously, with the these Band-Aids with executive order with all of this work, everything is working towards constantly improving how we work together and we all want to see all of this be successful and responsible towards the environment and responsible to all of the ocean users, but recognizing the choices have to be made and it is not me. So yes, we are working to have better relationships all of the time to work out some of the kinks, and especially now that we have nine Tran 45s under environmental review. There is a tremendous amount of effort to make all of this happen. It is happening, it is definitely has everybody's attention indefinitely everyone wants it to be successful.

Thanks, I appreciate that. Did you have a comment for that?

I would like to jump in on that. So, as one example of where I think we have worked really well together, the development and ongoing maintenance of ocean reports as I mentioned earlier, that has really set the stage for us to understand one another, not just the data that we have our responsibilities and the responsibilities in the interest of our state holders, we ask really good questions about one another, what do your data you to wants. It offers that opportunity. I think it has been a wonderful success and as the potential for co-uses of ocean and potential conflicts rise in the ocean, we are really leaning into finding new ways to ramp up ocean reports and to bring it to the next level so that we can still be a scoping tool and still be an early use tool for robust conversation, in ways that more users can make the most benefit of, we really do really do want to enable good use of our ocean spaces. That is a good opportunity, that is a great out opportunity of how we are really working well together, we have some opportunities to better understand one another's interest, and really quite frankly, we have got our processes in our interest, we all want to get to the same goal. It is sort of, we are on tight timelines. There's a lot going on, we are moving very quickly. I wouldn't say that we are running with scissors. We really are trying to listen to one another and say well, wait, how does that affect you and your stakeholders, and there's going to be bumps in the road, but I am looking forward to being driven ahead by this 30 gigawatt goal and it's really getting to know the processes and the folks even more as we do it.

If I could just add something. Another area where we are collaborating is actually on data acquisition on the front end. Those tools bringing information together. We have been very innovative in working with us two fund data acquisition, getting to what Betsy was saying at the end of her talk, having the federal government sort of collects this high level preliminary information so that developers can use it to assess and make decisions about more refined study needs. NOAA, we already have one an existing agreement. Is actually off the coast, off the coast of California to support some renewable energy work there. We are doing another one shortly that will sort of go anywhere type of agreement. Funding can support projects or through contracts paired with the NOAA in-kind effort to arrive at data that supports both agency requirements. It is great to see the collaboration from the developers perspective. It is really impressive, the work has been done by the agencies. It is going quite well for the huge task that is at hand for an industry that is growing and it is so quickly changing so rapidly.

You have a question from Lindsey G. Okay, Lindsay, you are up.

Thanks, sorry, I'm going to circle back to the data management that earlier on, I'm sorry can get on earlier on. We don't underestimate that on the approach that we should take for the future, I admire the optimism. You kind of make it, we are still struggling. I think it is not through one of trying, I think it is a matter of the resources and the approach, and the data, the data back and is sometimes forgotten I think we forget the member. I really appreciate the panel discussion. I think Ruth was one of the ones that mentioned about this. Getting it done both with the supplier. It is something that NOAA is going to have to make sure that those resources are available both internally and externally to make sure that they really are ready for this. Think we see that now, it is not just in this wind area. I think we need to make sure that it is done. Secondly, it was mentioned. It is simple. Used once. You don't often go through the details. That was something that needs a lot. You kind of mentioned some of that in it, but I just see sometimes that getting it done is kind of, the guys in the back office will get

that done. We will really be dedicated through it. To get it done properly. That was my comment, more of a comment than a question.

If I could just follow up on that a little bit, I think it is a really relevant point. It is why we have been working so hard with Ashley to not just hand over the terabytes of data and say have of data and say have fun . Butts, to really be an active part of that, to engage in the metadata that we have available to start small with a really defined data sets that we are handing over we are handing over in to see how that sets a pathway that we can expand to the different types of sensors. So, starting with the dosimetry, it is not easy. They have been really great at trying to hone down. Where can we go from that, how do we map the process? I absolutely agree, if you just hand over a hard drive, there are 30 hard drives with this data, it probably goes nowhere. It takes so much to digest that, to package that in a way that is at all accessible to someone else.

I don't think handing it over is along to staying. It doesn't even need to be it. It is maybe unnecessary, we need to look at other approaches.

Excellent session, one minute left.

I would imagine that Ed has a few things to say, we have been working to kind of cut the barriers out going through the operator and then going through the government agency to work with the agency directly with our information. We also have it just to use another example, I know that Goldman is on the phone with some of our crew data. We have this issue, it was originally set up to go through the national Center. They didn't have the resources to do the quality control and the processing and the archive being of that data. It actually, we worked with because it made more sense to have them off the platforms to go through. We actually worked with them to give the notice regulation for that change. We can have the appropriate data going into the right sidethe right side that didn't have the resources that can manage that. Is not the right place for the information to go in terms of the right resources. It takes a lot of work to get through that effort, but I think if we can get through the perception as well as the data, who is providing the data, that would be a big barrier when we are trying to advocate the data management storage. It tends to be, why do you want private industry data, is private industry collecting it, it is not good data. We have been able to break that down and communicate the value of the information of the data that is being collected regardless of who is collecting it. The efforts with the ocean exploration plays really well. We are not talking about one industry against the other or who is collecting the data. Why it is important to integrated into the missions to map the U.S. easy. I just wanted to throw that one in there to your comments too. I feel with the perception bias, that is still a very real thing with public private collaborations that is another barrier in addition to the back end data.

Guys, I'm so sorry, we have to end this session. We so appreciate your comments, it was excellent. I think there is a lot of ongoing and additional discussion, but we are late to start the public comments. Thank you all very much, I'm sorry to interrupt you.

Thank you everyone, I appreciate you doing this.

Okay, thank you all very much and sorry about the quick ending there. I really appreciated hearing the presentations and the discussion and wanted to note that we are still taking public comments as the meeting progresses. If you wish to make one, please post in the questions section of the webinar. I'm going to make an attempt to summarize --

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Hey John, the public comments are directed to the HSRP members, it is not really about the sessions.

Yes, okay thank you. I would like to summarize the advanced comments, I think it will be shared on the screen as well. I'm not going to read each one as I go through the summary. So I will just get

started. A number of the comments were related to the management software. The integration for the diverse range of applications. That was beyond operational risks in navigation. Data application comments included search and rescue, and facility resilience. There is one comment regarding the installation. There was a comment regarding Native American tribes in our government to government interactions. It does include them during our hydrographic survey contract. Project managers, local Native American tribes as a part of the environmental compliance process, that was true for both in-house projects. We also do so through our navigation managers and in other areas. I can't speak for co-ops, but their requirements for tribal consultation. We received comments requesting the increased use of surface vessels. And lastly, we received very thorough letters from someone in Alaska concerning survey and other work that is being done in Alaska. These projects, Alaska coastal mapping strategies, Alaska agencies in requirement contributions in additional topics. I won't read the entire comment due to its length, but if particular interest stages for Alaska, personal mapping programs are in their infancy. One of the first steps is the transformation tool. Beyond, emerging, data sets for a sustainable resilience. She also thanked Paige for his service on the HSRP representing Alaska in the U.S. Arctic, I wholeheartedly are there any other comments that you would like read in?

John, thanks, we have a bunch of people who have provided comments, Denny Haynes provided a number of comments which were excellent and we will put those in, we will put all of the comments in the public comments. There is also an additional comment asking more about the intersection about how the overlapping mandates and how private sector can be more involved and then, the executive organization asks some questions dealing with the services improvement act and some of the reports to Congress which are really questions to co-survey rather than to the HS RP. He wants to know if HSRP is aware of these provisions and if they comment on those kinds of reports. Butts, we will include that entire comment into the public record. And then, Chantel Johnson asked if questions about the survey backlog and the hydrographic survey contract would be reopened, contracting questions, we will refer that over there. And then there were a lot of comments about the wind energy, people were very excited about that, about how what happens with all of the the data and how that happened. Has answered a lot of those questions already. I'm sure more will come up. Jason Creech also asked a question about the wind energy, he wanted to know if there were already partnerships that would allow installation of scientific censorship's, Isaac a lot of people are excited about that opportunity for all of that wind platforms to be all the scientific incubators. And then, we ask you about contacts and streamlining, and that is it for now.

Thanks, I appreciate that.

Everything will be put into the public comments document.

Great, thank you. I think at this point, we will turn it over to Sean for the wrap up when Sean is ready.

I am ready. I will do the best I can. I have been working storm stuff. So, I will start off, I can't help but again come in on the great work NOAA is doing coordinating with government agencies since we have been online today , the Mississippi River has been reopened to commerce, bunch of different limitations, no getting around the power line, NOAA has been involved with that. Overflights, and good coordination on surveys, we still have a bunch of different challenges for the right people. I really appreciate it. The doctors discussion in terms of blue clothes reminded me of blue Roush, so I wanted to pull out an application to get a blue roof on my home. Nicole, again, great comments. I know she understands the situation there and John, when you mentioned precision navigation, sorry, John, the discussions on precision. The focus on the wind farm issue was very good and with that, I am going to kind of admit to having being a little preoccupied, working on some work and personal things during some of this and, I know that others are better plugged in and I will just go down the line, I am assuming someone else is in control of that. Thank you, excellent panels, I appreciate everybody's time in understanding and support. Thanks.

I will start, great presentation, very interesting, especially North Carolina. The need for accurate and precise data. More possibilities of private partnership. And also, what our state will have to do to support that infrastructure as it comes in within our jurisdictional boundaries.

Thank you, Gary, I am not sure who is controlling it. Go ahead Julie, please do.

Ed, are you online? Ed had to step out for a little bit. Ed, are you here? Nope. Okay, how about Sal?

I can take it over, I see it now, but Sal, go ahead.

I see a lot of progress, we did all of the project we were taking. I think we did very well. I love the comments.

Think you sell. Okay, Captain page, I believe you are still there and I would like to personally say thank you for your time, I'm going to miss having you.

How come I don't get my visual thing going here?

Can you hear me?

We can hear you.

Nonetheless, I am very interested in some of these new projects. We think in the wind situation, it is kind of intriguing. It is a dynamic situation. They have been very responsive. And they will make these new trade developments if you want. That is all I really have to say at this time.

All right thank you, Ed. Captain McIntyre.

I just wanted to thank all of the presenters for the information today. A lot of it is outside of my area of expertise. I recognize that the resiliency and climate change, they are just huge challenges and it is really heartening to see how much work and how much expertise is being put forward towards the issues, and also the wind farm stuff is super exciting as well. It is something that I don't know anything about and I left today knowing more. Thank you very much.

Thank you. Okay, Dave is next.

I thought that was really wonderful. It seems as though he read it from notes. He did a very good job. It came from the heart, and I appreciated that. I also enjoyed learning more about the offshore wind energy. I thought that the high winds would have a benefit there. If it is too far away, it is too far away.

Thanks, Dave. One of the things that came to me as he said that, I will be entered on day one. Knowing my way around the Swiss Army knife and having great respect. Kenner, it is yours.

Is obviously out of my area of expertise, I am focused on navigation in particular, but I am curious to see going forward how wind farms are going to be approached on the West Coast giving the depth of water and the transmission issues I'm sure are going to come up with getting the power to the market wherever it happens to be and where it is going to start. In particular, dealing with the basically very deep water out here, a whole different environment.

Excellent point. I think it is challenging in the Gulf of Mexico too, I would imagine. Ed Kelly, I see you next, I want to thank you again, it is been a great pleasure to meet you, although we have worked through that for many years.

Thank you, Sean. As some may recall, I made a premature exit speech last time, I'm going to wait until tomorrow to get my final comments but based on today's meeting, kudos to everybody at NOAA for getting as much done and for keeping the momentum going despite all the COVID restrictions. The whole world is how to deal with a new way and by hearing from the leadership, all of the advances that have been made, I think you certainly have to be congratulated for the progress. Glad to see Dr. SpinRite back. The operation will be in good hands under his management. I was very encouraged to hear his comments about the economy and very happy to hear that there is a recognition that NOAA exists within the Department of Commerce and I think that as we move forward, they should reinforce how NOAA creates conditions and operational expertise to increase the commerce and the benefit to the United States. Great comments. She mentioned the increase, I know Nicole likes to work in a team environment. I hold a good portion of the increase budget that will be put into expanding public private cooperation so that it can be used as a force multiplier to bring the whole organization forward. Hats off to all of those folks. Their excellent programs that save lives in the property. There all promoting commerce. Remember, commerce now. Once again, I have to say, they are excellent programs. They should be expanded and they should be federally funded so that there is equal application and said that it is well done. Use some of that extra money you have got to there, Rich. Offshore wind, tremendous opportunity. If no acts quickly to assume the leadership position to govern acquisition standardization and availability of data by reaching out and coordinating, they could use a great help to the regional associations here on New York, Merrick loose is very active with a lot of this and NOAA has to have the best way to leverage private industry, academia, and government to pull this information together for the maximum use. Looking forward, I think we had a great day today. I think we have a few very actionable things we want the administrator to know and we would like NOAA to pursue. I am anxiously looking forward to tomorrow's meeting, over.

Thank you Mr. Kelly, very good comments. 46, the floor is yours.

I won't say too much more on that today other then to really think Nicole for your leadership on the panel for helping guide us to share the information that was important to the group. Also, Ashley, thanks a lot for coordinating the effort and for your tireless work in working on those data sharing opportunities between public and private sector. Also, I want to think the panel members for your presentation, it is really well done. Mary, Ruth, and Betsy. I appreciate your insights and your input. Thank you very much for those. That is all I have at this point, Sean.

Dr. Nicole, you are next.

You are muted.

As I was saying, like in North Carolina, here in South Carolina, I come in with that being ahead of these topics, we talked about coastal resilience last time and here we are with this exciting information about coastal resilience today. Like Betsy, I am embarrassingly passionate about coastal resilience as you all already know. And we are really excited about the remarks from Nicole about all of the funding in the interagency working groups that NOAA is representing , well represented on. So, kudos to you. This is the first and we have talked about coastal resilience. Is just thrilling that we have this opportunity ahead of us. We have been making investigations and mapping. We have been investigating in beachfront engineers. Now you have this opportunity, maybe it is the climate change, increased storm Enis, the premonition that today's flood will become tomorrow's high tide. Here we are in this opportunity to advise NOAA on this coastal resilience topic and I hope that we can do that through our issued paper that I would be delighted to help lead and edit on perhaps the flooding issue paper, we talked about that last time, morphing that into a recommendation on coastal resilience. When we hear from our members, they are still concerned about beachfront are still concerned about beachfront challenges, those water related challenges are really what they think of when they think of coastal resilience today. I agree with they think of when they think of coastal resilience today. I agree

with Ed. The collaboration is going to be a great way for NOAA to get ahead of this and really make some strides. Thank you. to get ahead of this and really make some strides. Thank you.

Thank you Nicole, the coastal resilience is a very big issue to us in Louisiana too. Very much appreciate that, I look forward to catching up with you more on that. Okay, next up, Lindsay, are you ready to go?

I would just like to think everybody involved in the wind energy panel. The other panel members I think was a great and very timely briefing. I think we need, it is kind of a cross everyone, it is industry academia and government in sharing that data. We need to be aware of how much it is going to take to do that officially. I was interested to hear about the co-ops. I think that sounds like a really interesting move, a positive move for them in working together. I was very pleased to hear a couple of comments and in particular, the focus on the research to operation. I think that is a really key area that is sometimes tough to do it well. To get in the real operations and support that. That is a key thing, he raise that as one of his closing points.

I just want to say farewell and best wishes to the panel members that are leaving. It is kind of tough.

I think we are losing a couple of ads and gaining a couple of and cream or two. I look forward to hearing your comments.

Thank you so much. I agree with all the comments. I especially like the comments. The precision navigation and the website I think they're going in the right place, I think wishes are coming true which NOAA has been helping for some time. Great leadership there. On the wind energy side, that was a great learning session. Thank you to all of the presenters. I really appreciate that. I think NOAA needs to maintain leadership in that space , they are ahead of the curb and keep that in their domain. That will be amazing. I completely agree on the coastal resilience, that is the larger picture as we would call it, thank you and a very fruitful day, thank you so much.

Trend 47, you are next, my friend. I think you are on mute. You are muted.

You are muted.

I am so sorry. What I mentioned like everybody said what I wanted to say, it doesn't have the great comments. My highlight of the day, everything went there today. Ending by the the wind energy, that is a great set up definitely, thank you all, the speaker. Very delighting. But, I am really impressed that the new director, Dr., he is ready for the job. His support, his vision for mission diagnostic, equitable distribution, those are just great concepts. I am glad we found the right person to run with it. His focus on the importance of the precision navigation and John, you will find another member. And, what Nicole said, Giuliana briefing about the great report. I am glad you formed these two branches. The stakeholder services is really important for NOAA. This is just improved , improved the public and private partnership. That is a place we can go to. Thank you very much. Definitely. And, that is really all I will say. That is all, thank you very much.

Thank you, Trent 47.

Sean? Thank you so much for doing that round Robin. I think we are going to move on because we only have about 10 minutes left or so to go through. We really want to hear from the directors. We will start out with Richard Edwin. Richard, are you there?

I am here. Okay, I agree with everyone. It was a great day. My three main takeaways, first of all, I very much enjoyed listening to Dr., I have seen his priorities put out. It is always best to hear it from the person you learn a lot more, that was good. I certainly really enjoyed the wind panel. I learned a lot. I had a general idea of what was going on. That really helped to fill in all of the background. That

was great. It also took me back. I wanted to take more of that and never could, just never had the time. And last but not least, I just point out, the timing of the meeting with hurricane Trent 48.

Great, thank you, Rich, let's move on to Julianna.

Thank you, thank you for the opportunity to do updates. If anybody has any specific questions about anything technical that they are working on, you're welcome to send me an email and I will follow-up with you. I know we don't have a lot of time, but I appreciate having that on the agenda, each of these meetings. I also appreciated these presenters from the offshore wind energy. I just wanted to say I thought it was a good afternoon.

Thanks, Juliana, I thought these director updates are really valuable. It sets the stage for me. Okay, and Andy.

Thank you Julie, I just want to add one more time, I thought the wind panel, I thought it was, the presentations were a great demonstration of the complexity involved in ocean mapping and the complexity involved in the management of that data, that gives us all a really good basis to go forward.

I couldn't agree more about the integrity, it just goes on and on. I know it is a big challenge for NOAA , but I think it is so important. Nicole, you're going to be on it. Nicole, you are next. I think Mark is not online, is that true? I think he already had to leave. Okay, Nicole.

I want to say, what a great first day. The level of excellence in professional caliber of the Tran HSRP members. Is more than just themes. These are core proposition. Equitable delivery, and even, I will say some of the software thinks the generosity of spirit. Gratitude and acknowledgment of the hard work of others. I have heard of many HSRP members that are passionate. I heard Margaret Davidson's name twice. This group is so special, and I am grateful for you as I am for the prospect of new funds coming in. I want to just thank you all for this experience. I want to say something to Ed Kelly, I want to say thank you for supporting and for pushing NOAA. We do need the private industry. We are enhancing our relationships meaningfully. Yes, Ed Kelly, I took to heart your comments made during the wind panel. You were spot on, sir, there were a lot of women on the panel, there are many brilliant women here today and although, the observations are gender-neutral. Whatever your ident identity -- including on really big topics like coastal resilience were we can all contribute, where we will all benefit from working together. I am very excited. I want to think the team for pulling this together so seamlessly. Thank you all.

Thanks Nicole. Glenn, would you like to say something in closing?

All of those comments, I will just add again, the program office updates provides me in my policy bubble with a chance to try and get reacquainted with the stuff on the ground, and really kind of reminds me of the details of the work that we do and how important it is. It gives me some tools to move forward. In the day today, there are things that I would rather not hear about, frankly. I frankly. I really appreciate that very much.

Great, thank you, glad you could join us today, Glenn. John, I think we are getting John back up around here someplace. We are getting close to the end the end of this meeting. Do you want to say some some closing comments?

Sure, I have tons of notes. Thanks to everybody. I couldn't help but think about the hurricane Trent 48 response. That is the perfect example of where it all comes together. The research that goes in to doing their jobs better. Just these few short hours, we have covered everything from education to data to response when all that goes into that effort just to make sure that we are ready and able to respond, I thought it was an excellent discussion on wind energy. I was extremely impressed by the

integrative approach. All the different datatypes, the size of the projects. The integrative approach used in meeting to plan these projects. It was really exciting to hear about the opportunities regarding data sharing. I think that has been definitely right for expansion. I look forward to that. I really also wanted to note that I was happy to hear the reference in significant tied to the decade of ocean science. Just last quick comment, thank you to the whole panel today. Julie, you have done a terrific job. I really appreciate it. I want to especially thank Sean Duffy for hanging in with us today. We really appreciate it. Thank you very much.

Thanks, John, and thanks to you and the directors and the panel, all of the people that made this behind the scenes. It was a really great meeting. We will see you tomorrow at 1 p.m.. I look forward to tomorrow's conversation. Thank you all, bye-bye.

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