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TRANSCRIPT:
[Captioner standing by]
>> We are just going to wait a couple more minutes we have people dialing in remotely so we will wait a couple more minutes.
>> All right, I think we are ready to go. Do I have a Echo?
>> Okay how about this, all right people in the back and hear me? Great, thank you so much everyone, welcome and we just so appreciate you making it. This is our first in-person meeting for HSRP for two years now, and how lucky it is to be in the state of Hawaii.
I would like to welcome the Governor, thank you so much for joining us. I am Julie Thomas, I am the chair of the HSRP, and before further ado, we are very fortunate to have our Hawaiian Representatives here, and they will perform the Hawaiian protocol.
>> Welcome all of you to Hawaii, we will begin with the Hawaiian culture.
[Hawaiian Protocol]
[Singing]
>> Such a pleasure to be here, we started with the Hawaiian cultural protocol, it is a foundational element when ever we begin meetings or events of great significance here in Hawaii. What we do is reset that stage, we set that foundation, where we can't allow the spiritual, and the physical, and the emotional, to come to us as we all work together, to create solution. And whatever our challenges are, by doing protocol, we invite those spiritual things, that sometimes are unseen, and hidden to be a part of this conversation.
So I would like to introduce myself, my name is

Melia Evans, and I am an employee would tran one, and it is a pleasure to be here.
>> My name is Randy no virus.
>> Hello, I am a professor with Arizona State University come up based here in Hawaii. And thank you for having me here.
>> So we are going to do a little introduction for many of you who may not be from Hawaii. So one of the foundations of Hawaiian culture is a practice of Aloha Aina . Which embodies our love, and our stewardship of the lands and waters of Hawaii, and the deep relationships we have maintained with the natural world and each other, through generations. The Aina is the land, and it exemplifies the tangible and intangible values of a white culture, that of developed and evolve, over a millennia of the case -based observations, practice, and knowledge acquisition. Bertha from the oceanic room, the Hawaiian Archipelago has been shaping the wind, rain, waves, and the seasonal changes of the environment. And so too have we native Hawaiians, who are genealogically related to these islands. And in the oceanic pathways that connect us to the wider our name for what is known today as the Pacific Ocean. Through multiple voyaging expeditions, to the most isolated are good people go in the world, our ancestors of living dollars. Our press down through rich repositories of oral traditions and practices. That we continue to perpetuate, and build on today. Our traditional practices, are a reflection, of the intimate knowledge of the natural world, and recognition that the health of our environment, is interconnected to the health of our people, communities, and our culture. Although, we are the most isolated inhabited Archipelago in the world. Our elders, our leaders, our nation, have been receptive and progressive through time. Embracing new ideology and technology, and that will expand our capacity to practice and share Aloha Aina with the rest of the world. We commit with the pepper of Hawaiian culture and we know that the language is culture,

staff develop the Hawaiian language version of our scene here, and it produced a number of Hawaiian language resources to support language revitalization, and normalization, which is proven to be in empowerment tool, for indigenous communities throughout the world. In the 1980s, there were less than 50 children that could speak Hawaiian. And now, there are over 20,000 people in households, that use Hawaiian language as at least one of their primary languages. This is our homeland. Extending over 2400 kilometers, across the vast area. The islands in the northwest lie in the realm of PO, night, or darkness. A place where gods reside and spirits dwell. PO, a source were all life originates, and returns after death. The sacred place, is protected marine national Monument. As we cross, the Tropic of Cancer, we enter AO, though realm of light and mortality and consciousness. Eight Oh, where the younger islands lie and we humans reside. The sovereignty, the life, the responsibility for the entire Hawaiian Archipelago, continues to exist in the hearts in the minds of many native Hawaiians.
>> We are a living and thriving vibrant culture that is continuously growing and evolving. Looking to the past to perpetuate ancestral knowledge, learning to adapt and reconnect to things that we have lost. Hawaiian culture is adaptation. Our knowledge system is a framework for management. Transitioning now to more recent history, our history in Hawaii is complex. Since the overthrow of the Kingdom in 1893, there have been a number of challenges and injustices that native Hawaiians and the people of Hawaii have fought to secure our rights in practices for our culture. From stopping military occupation and bone -- and bombing, and the exportation and development of quiet ancestral lands. To fighting for the restoration of water rights, throughout the Archipelago. Including the responsible and ethical management. Many of which are still being fought for and many elders have passed on it waiting for justice to be served. Throughout this process and

adopting it has a status. In the 1970s the Hawaiian Renaissance gave way to traditional wayfinding. Here is the image in Tahiti in 1976 after their arrival. And this event proved that Hawaiians and islanders possess the knowledge to purposely navigate across the globe to find their homelands.
In 1993 the U.S. apology bill was signed by President Clinton, apologizing for the U.S. involvement in the overthrow of Hawaii. And in 2021, President Biden, and the White House office of science and technology policy, and Council on environmental equality. Release the first of its kind, a memorandum to initiate new federal guidance on indigenous traditional ecological knowledge, and set the indigenous knowledge informs federal decision-making. Indigenous culture is a form of sciences. And today scientists both with and without academic degrees, are perpetuating these ancestral knowledge systems. Growing the inquiry process in leaving other tools and knowledge systems to adapt. Setting an example for research. In closing, as we move forward this week. In the HSRP meeting, we encourage you to consider the need for a Hawaiian and indigenous capacity in these spaces. How will the first people in the Locust communities in the places that your work and informed decision-making and management? Cultural considerations, how will research and management impact this generation and generations to come? Assigning responsibility,, how do we get back to the place that we are doing research and working? Does your work or framework allow for reciprocity? And finally, I want to acknowledge our component and can knock out who have taken charge and have created this path for many of us younger folks today.
>> Thank you very much, what a beginning to our meeting on? That is wonderful.
[APPLAUSE]
It is now my distinct honor to introduce the governor of Hawaii and governor has been leaving Hawaii to its one 100% renewable energy, fostering

environmental stewardship, diversifying the economy, and all of these values that we hold to us. And particularly ones that we have discussed within the HSRP. So we really appreciate you coming this morning and thank you.
[APPLAUSE]
>> Governor: I do not know how I can top that, thank you so much for sharing. I do want to extend a warm welcome to all of the participants and NOAA hydrographic services review panel public meeting. It is great to be back in person. As I know that many of us had to figure out how to do things differently, over the last three years thank you for waiting for the right moment to reconvene in person. I do know that, especially when the focus is on partnership and collaboration. There is nothing that can beat in person interaction. I am just glad that you have that opportunity, as the nation's only island state. Hawaii is pleased that you have chosen to convene this fall meeting here in Honolulu. Of course, I do want to welcome those participating virtually. I think I know that you wish you were here in person. Anyway, while most residents of Hawaii don't think much about high drug or fee, we all depend on the critical mapping were keeps the Maritime transportation system moving safely in efficiently each and every day. Our ports cut over ten commercial harbors on six islands, and are the primary gateways for goods getting to the aloha State. The ports and harbors sustain Hawaii's supply chain. Maritime operations provide most necessities including food, clothing, construction materials few and other essential supplies on the island. Our commercial harbors also cater to non-maritime operations such as fishing passenger and maritime support services all to meet the needs of the State of Hawaii. In addition our Department of land and natural resources division of boating and ocean recreation aims to preserve Hawaii's natural and cultural resources while ensuring public access to state waters, and enhancing the ocean experience. Whether commercial or recreational, we all depend on

data from hydrographic surveys in order to be successful. And as mentioned in the presentation this morning. We are working to incorporate native Hawaiian traditions and cultural knowledge and practices. Into how we can best manage our ocean resources. I was able to participate with the Pacific island conference of leaders last week, in a convening at the east/west center, and clearly, information and data is an important part of their concerns and considerations as moving forward. They do appreciate the efforts of all of you here. In trying to get as much data information as possible. In Hawaii we have formally embraced a subsistence fishing and native Hawaiian practices to manage our nearshore waters. I was proud to sign the very first native Hawaiian subsistence fishing rules for the North Shore of Hawaii. And about a month ago we signed the second for Milo Lee fishing centers and how to best manage the natural waters. It is really important, and one of the questions that continues to come up is about data, and about understanding, the status of the bio and then natural waters. Also informing us about how we should move forward. In the nearly eight years since I have been governor, we have made a concerted effort to put partnerships at all levels of government, federal, state, county, and the private sector. We know that this work is important, and it is too big for any of us independently, I am pleased to see that collaboration is also I think for this meeting. For it is only by working together that we can identify and address issues, that affect people, place, and culture of Hawaii. From disasters such as hurricanes, tropical storms, and flooding. To climate change we are working together to find solutions to the challenges before us. Measuring and mapping the physical features of our oceans, and coastal waters, will play a large part in our success moving forward. I am grateful, that the panel is considering the knowledge of Polynesian voyagers. And the lessons that they have learned. In addition you will learn about the deep

connection, the people of Hawaii have to the ocean, through culture, traditions, practices, sustenance, and the economy. I hope that you see, and incorporate the unique perspective of our people and practices, and to hydrographic initiatives at the local and national scale. And if you really think about it today, I don't think anybody in the world can't operate without Google maps, and clearly I think we have all seen the power of being able to understand where you are at any given time in the landmass. It would be terrific, if we could capture and accommodate that same information that we have for the land, for the big blue continent called the Pacific Ocean. We do know that the old version for Pacific Islanders can access, and keeps us connected to those that came before us. I certainly encourage you during your time together here and in the state of Hawaii, to forge new ponds and strengthen old friendships, I truly appreciate your presence and participation in here and our state. I know that we can achieve shared goals because we have always been better together, then alone. And again once again, my sincerest mahalo, for all of you meeting here in person in Hawaii. Aloha.
>> Thank you very much to the governor for his comments. We do have time for one question, do you have time purchase, does anybody have any remarks? We really appreciate those remarks, we know his efforts towards the environmental stewardship, towards his advocacy for partnerships, I think you know, I would just like to say that, I know that you are connected with NOAA, but I hope you use us as a resource going forward. Yes, if anyone has a comment or a question? Okay, I think we are just starting, so we really appreciated here, and we appreciate your your commitment to all of the values that we have going forward. Thank you.
[APPLAUSE]
All right we have one more, we have a congressional video from Senator then we will continue with our meeting.
>> Is similar: Hello everybody and welcome to

Hawaii, I am so sorry that I kept there in person and speak with you all today. Of a report last year found that 49% of Americans Western Pacific waters were unmapped. Almost 800 and 30,000 square nautical miles. This is the largest geographic gap in any region. At we need to address it promptly, depicts way to do so is adding more NOAA ships and personnel. All private sector partners and technology can help gather the data needed, NOAA's expertise in developing and maintaining nautical charts cannot be replaced. Expanded presence in the Pacific will help the agency fulfill its mission to help our nation to meet us maritime commitments thank you and have a good day. Aloha.
>> Hello everyone and welcome to Hawaii, I'm so sorry I can't be there in person but he appreciate the opportunity to speak to you in person today. The report last year found that 49% of America's Western Pacific waters are unmapped. Almost 800 30,000 square nautical miles. This is the largest geographic gap in any U.S. region. We need to address it promptly. The best way to do so is by adding more NOAA ships and personnel, while private sector partners and unproven technology can help gather the data needed. NOAA's expertise developing and maintaining nautical charts cannot be replaced. And expanded presence in the Pacific will help the agency fulfill its mission, and help our nation meet its maritime priorities. Thank you and have a great meeting.Aloha
>> We will do that for this portion of the meeting, yes we really appreciate I'm sorry Amanda. We are trying to capture the webinar for the remote people that have logged in. So that is why these laptops keep changing around. Yes, so we really appreciate, I know the Senator has been very supportive of NOAA, and the Army Corps of Engineers and many of the federal programs that have helped out. With map, and other environmental considerations. We are very fortunate today, we are going to go around and get to our interjections. I wanted to acknowledge all Scholz is with us, but you want to raise your hands?

He is the deputy director and its sister administrator of the national ocean services. An admiral day from the Coast Guard are you here? I am not sure he is here. How about Mr. Sanchez from the Army Corps? Nothing yet? No okay. We have some distinguished guests coming a little bit later. So, it is great to see Admiral and Evans here to my right. Who is the director of ocean Coast survey, and the designated federal officer. Thanks to those in the room and there webinar for joining our first in-person meeting in decades. We would also like to acknowledge Juliana Blackwell who is with us on the webinar. As a director of NGS. And Rich Edwing, we have two nonvoting members Captain Andy Armstrong, and Dr. Larry Mayer. Thank you for always joining our meetings and permits. We also have with us today NOAA's chief data officer, Tony, right behind me okay we got you. And many there are staff colleagues from other states and other federal agencies and stakeholders and partners and NOAA colleagues. We have many participants on the webinar, and within the room and we would like to give you a warm welcome to all. Please consider making a public comment to the HSRP that we can use in the discussion and recommendations to the NOAA administrator. We look forward to hearing public comments over the next three days. I would also like to warmly welcome I worked three new members for 2022 to their first meeting. And we look forward to their participation and comments. That would be Captain Alex Cruz, raise your hand, thank you Alex, Nathan Wardwell from Alaska, and by the way, we are really happy that both Alex and Nathan could both make it there because we both know that you had extreme weather challenges in your regions, and we really appreciate that you could actually get on a plane and make it here. We have a couple of people who are dialing in, and participate remotely, two or from Oregon doing and, Gary Thompson and Deanna Hargrave are going to be HSRP members that will be remotely dial-in. Okay, we are going to but I'm thinking, I wanted to mention Joyce Miller where

are you Joyce, she is the past chair of the HSRP. It previous well it has been for years, three years, okay. Thank you Joyce, she is from the University of Hawaii and lives here locally, and she has been responsible for organizing much of this meeting. And the maps in the back of the room are actually a synthesis of the Hawaiian Archipelago, and Joyce has managed to share these with us. They are provided by the University of Hawaii Marine Center, which John Smith is the keeper of the synthesis of these matters. At we will air from choice within the next few days so thank you very much. All right, Admiral. Over to you now.

>> Admiral Evans: Thank you and good morning I am grateful to be packed for my second HSRP meeting as it is a federal official in the first in-person. It is great to be here in the room with everyone. I also, want to echo Julie's note about you know concern for our colleagues and friends in Puerto Rico and Alaska. I think the severe flooding in Alaska, and a hurricane in Puerto Rico, are strong reminders of the vulnerability of island and coastal communities. And I think will hear a lot more about that this week. So it is a reminder that hits close to home, and Nathan and Alex I hope your friends and family are doing well. This does promise to be a very productive and exciting week. It got up to a great site yesterday with meetings with local partners including the Hawaii pilots, and the Coast Guard. And we also had the pleasure of a visit to my old ship the rain here, which is on her way back from the Marianas, which he had a successful field season integrating coral reef research by supervisors as well as mapping. And bringing those two missions together all of these activities is set up the stage for a great week. I would also like to extend my severe thanks to the governor and also the center to provide remarks to the L. Our observations navigation products and services and positioning services level data, have a critical role providing the foundational data and operational product which enables responsible economic

development, equitable delivery of service, close to resilience, conservation, infrastructure, and many other critical missions. Nowhere is this more true than Hawaii. And I think that is evidenced by the fact that they chose to spend time with us this morning. Also speaking of dignitaries I think I want to thank the HSRP members who are here. A week in Hawaii it may not sound arduous. But I realize your time is valuable. NOAA values your advice and an engagement and your recommendations have a real impact. And a good example of this is of the value of the HSRP. Is a new co- survey data licensing policy which was released two weeks ago. This policy will result in OCS applying an open data license to all's OCS retreat. Which will make it public domain and additional uses. This aligns with their NOAA data strategy and federal policies that have government data should be free and open and accessible as possible. The policy also requires that licensing be external data contributions from the external mapping committee. This safeguards the interest of the providers and it streamlines data ingestion since the terms of use are already defined by a license. Additionally because the data license is machine-readable, data assimilation into our national source will be no more automated and more scaled. The HSRP engagement on data licensing on our last meeting in the spring, and in other forms was invaluable. I would like to thank Lindsay G and Deanna Hargrave for that leadership on this issue. I appreciate all the members expertise and broad contributions to push us to be better civil servants, and different ideas and help us embrace technology paradigms and striving to meet the needs of the public at large. As I mentioned we have an exciting agenda this week which I think will support that. We have three major technical sessions plan. First he partnerships and priorities, will discuss mapping collaborations of the Pacific region. I think, the governor mentioned this, there is increasing demand for Ocean and coastal mapping data, water level data and positioning data in the

Pacific. Not just to support Marine transportation system, but also the wide range of uses that demands on this geospatial infrastructure and that will give us an opportunity a bit more about those requirements. Second, stakeholder perspectives on opportunities and vulnerabilities, we will discuss the NOAA navigation program. And sustaining a supply chain in Hawaii. Thirdly, the role of the Pacific ohana keeping your feet dry on the shoreline. And it will focus on data products and services, and it will be sea level data products and services. We will also look at one written product and engaging in further discussion, we have a resided paper on coastal resilience. We will be as was mentioned previously, continuing the ongoing discussion and dialogue surrounding private partnerships. NOAA has asked the HSRP to waive any and on public rabbit partnerships and building a paper on this topic was completed in the spring meeting. I appreciate the work in the planet by the HSRP members and NOAA jointly to address the interests of the panel members, and NOAA request for advice. Thank you to the cultures and the working groups. Talk to Abdullah, Captain Chopra, Deanna Hargrave, and Dave Bonnie, and the chair and cochair of the panel, for your ongoing work. And thank you also to Gary Thompson suggesting HSRP focus on public-private partnerships which will be a significant topic. So with that, I think we have some housekeeping items to address. The chair and cochair and I intend to make this meeting is straightforward and as productive as possible. We recognize that for Phil's parts of the statutory requirement for two HSRP meetings a year. It is refreshing to meet in person again. I am glad that many of you are here with us. It is definitely the preferable environment for the dialogue and the creative discussions that leads to a product of outcomes that most benefit tran one. We are already underway and planning the next in-person meeting, for next spring, or late winter in Puerto Rico.
That is of course appropriations permitting. So

please save the date. Julie, Sean, and I hope you can join us virtually or in person. The goal of the HSRP meeting is to discuss the current state of NOAA position and observation services including achievements and challenges. You will hear updates on NOS geospatial data backbones as it applies to trade one navigation products and services, as well as other missions such as coastal resilience. The HSRP members NOAA members and speakers will have a dial on public-private private partnerships. Supply chain, the local flooding, sea level rise, regional mapping efforts and more. I will look forward to discussing regional interests possible considerations, and recommendations for issue papers and the member's thoughts and recommendations to present to the NOAA administration. I encourage all who listen to make public comments to the HSRP to make the public silent. A note on ethics. As you designated federal official, this is an ethics reminder to the HSRP members. When participating in HSRP meetings, you serve as a NOAA special government employee in a special capacity of a subject matter expert. Please remember that you do not represent any group, industry, association, or other entity including businesses you may already be affiliated with. Please remember to take off that regular work out and replace it with your know at as you provide your expertise in Christmas and comments and guidance to NOAA and the administrator. Thank you for the service for strengthening trade one hydrographic and navigation observations and positioning services portfolio. And those I have mentioned we greatly appreciate your vision and your help. On the subject of public comment, I would like to think of participants who already provided, in advance. To the stakeholder staff and others joining the webinar. Encouraging public comment and input. If you have a public comment please type it in the webinar under the questions tab. It will be read into the public record or put on the screen as time permits. All of the comments from the meeting that are on topic will be included in the official

meeting minutes. When comments are listed in advance they will share in the highlighted meeting as well as become part of the public record. I welcome and encourage comments many groups directly where individuals during the public comment. I also a little note about privacy, this session is being recorded, transcribed tribe and posted to the website. They've provided that written permission to do so, the individual permission requires us each a photo, video, voice on audio. The meeting webinar will be retained and disseminated on the public media website and accessible to the public. You can declined by abstaining from speaking or dropping off the webinar. I would like to introduce the NOAA staff here in the meeting. NOS and NOAA have a wide variety of staff to provide subject matter expertise in program and administrative support. There is about 20 NOAA staff who followed the work of the HSRP year-round, and can't assist you with their expertise throughout the year. There is also a number of staff here in the room who help with the meeting. As well as providing ongoing support to the HSRP decent include Richard Detmer, Amanda Phelps, Stephen Scott and Melanie, thank you all were seated behind me so I will to turn around and offer my thanks. Thank you for all of the teamwork. Also in the room and I would ask people to raise your hand as I call your name. Are some of our subject matter experts. From co-ops from the national geometric survey at Carlson, Mike Jackson, and Steven White. And from co- survey, Julia Powell Commander Bree Hills from, Abby Owen, and Paul Turner and Lieutenant Gabby McCann. Thank you for the engagement and the support of the mission and I look forward to learning more from each of you. We have a great meeting planned and I look forward to these discussions. I now have the pleasure to introduce my boss Mr. Paul Scholes for coastal zone management. Paul has served in the NOS for many years, and he brings a strong background in coastal management and resilient. However Paul also has a strong grasp of know what navigation service and we

welcome his remarks are today. Paul hasn't
background materials.
>> I would like to start thanking everybody for the
opening, and Admiral Evans for the welcome
introduction. In addition I think the governor, and
the Senator for their welcome in the comments. And
boy is in a gray, it is really great for me too be
here. This is my first HSRP, it gets to be in
person, and I realize you all have not been able to
be in a few years and I've heard many names. Over
the years, and actually interacted with some of your
organizations and it's great to see you
face-to-face. At this meeting, Dr. SpinRite is in
Asia right now he wishes he could be here. What we
did discuss this and we do share this excitement
free your meeting in person. What I would like to
do, I am going to have a couple of challenges
throughout the course of my remarks and I will start
by, asking you to be forward leaning. In your
recommendations. Thank be on the navigation
observation positioning portfolio to the other
elements of NOAA that may interact and intersect
with her. I believe that they are critical for us
to be address and deal with the issues that we will
discuss in the course. My role here in the meeting
is representing NOAA, and actually the one no
approach to this particular meeting embodies. It is
also personal in the meeting to be back in Hawaii.
I haven't been here in ten years, but I lived here.
And I was involved in starting up many of the things
that NOS has on the ground now before I started back
21 years ago. I was reminded last week when I talk
to Bill Thomas who is in the room and all of the
talking of the work to go. Time just passes really
too fast. And covid-19, two and a half years it
seems like it was a week and it was ten years. For
different reasons. And my wife can probably talk to
you more specifically about that. But anyway, I do
express great excitement to be back in Hawaii.
Learning more about NOAA work in partnership in the
region. In this region nothing happens without
partnership and connections. That is a theme that

you will hear throughout this week. But it is also going to be throughout my remarks. I am going to try to not to thank everyone of the specific individuals that already been thanked because they've been thanked multiple times. I do want to point out Ray Tanabe from the weather services here thank you for that with this. As well as a couple of offices within the National Ocean service the officer coastal management thank you. The office of marine sanctuaries who helped with the logistics associated with these activities that are happening here. I also will thank you all again. For your time and your insights. You have a unique perspective a unique role any unique responsibility in the things that you will be doing throughout this meeting and with the letter that you will be sending to Dr. SpinRite. NOAA was impressed with the outputs from the March meeting, even though it was virtual and you and not able to meet in person. The issue paper that you produce some public/private partnerships on boating and electronic charting are useful. And go into specifics on data licensing, because Admiral Evans already mentioned some of those. But we have also use that information to advance at law. I also want to thank the virtual audience I noted there was about 40 people online when it was bouncing around and I don't know whether there will be more online as we go forward but thank you for your participation. I know from personal experience how challenging it is to be virtual when a lot of things are happening in the room. And I am thankful for the things happening in this room, thank you for participating and hanging in with us. I also want to thank, I will think the NOS directors. Rich, Edwin, and since our very Admiral Evans who was here in person. And others who are hear from the UNH group. And Mike for representing Juliana, who is trying to hang it from the East Coast, but as a guest later in the day that will get more challenging I imagine. The agenda is packed with a lot of sessions, and a lot of very useful information. I think that you will hear a lot about

the work and the effort that is going around climate and coastal resilience. But I want to express a little bit of what happened with us yesterday. We went on site visits and visited with Admiral Evans and I and a number of staff visit with pilots. Here, in Honolulu and with med talk. And we learned some of the things that are delivering that relate to the specific challenges that any one court may have but in Hawaii, it's exacerbated by the fact that I all of their goods have to come in from off alignment. In Honolulu serves as a help for that. And there are critical, you will hear about in the specific tops, but there are critical risk points for that flow. Just in time delivery is a great thing. From the standpoint that you do not have to maintain a lot of storage there's not a lot of storage on the island anyway. But if you have a disruption just-in-time delivery you could run out of fuel and 2-3 days. That is a big deal. Anyway, look forward to the outcomes and outputs from this meeting. And the focus on resilience mapping and public-private partnerships. I do want to remind you of a few things agency priority is set by the new administration as it comes in and the policy teams the political membership of the department and Noah actually have finished the NOAA strategic plans. I have been around for a new one for a while 27 years it happened before but we are probably represented in those documents for the effort in activity that you will be discussing and talking about. As it relates to NOAA there are three primary priorities. One is enhancing NOAA climate authority specifically addressing the fact that NOAA is the primary authoritative provider of climate products and services. Just as NOAA is the provider of weather forecast and navigational charts et cetera. We play and unique role we are not only responsible for collecting data in research, but we also mandated to make it operations. And that's what these programs to that we will talk about as we move forward. Advancing equity is also one for the first time, and I notice is the first time it has

become a priority for the department and the agency and the line office and the National Ocean service. Which is focused on how we focus on everybody getting access to the products and services in the same way. And to deal with issues that they have to deal with. There are administrator as been mentioned, has equity as essential focus we have been pilot efforts to look at we can do Cron dramatically to make sure the populations can be targeted. But I actually would also say there is an equity issue on what we can learn from some of the native cultures in the native approaches to some of the activities that we talked about. I suspect we will hear about some of that this week. Economic development is not surprising given the Department of Commerce. The frame around the blue economy and the blue economy is a specific effort to focus not just on helping get goods to the coastal zones. That can get to the rest of the islands for the nation. But also importantly trying to set it up so people are getting access to the right kind of data to use it for business development. And that is the thing that you will also be hearing this week. I did want to have two leadership updates forward NOAA, and they been made since last meeting. One is Michael Morgan, the assistant secretary for observations and predictions. He is very interested in these topics and is already been discussing those with Nicole and myself. The other is Sarah Pat Nick who is the knowledge chief scientist. Some of you have participated we have strategic planning process underway from last year. We have had a number of different engagement opportunities for our Keystone partners. In we do have four priorities that will have in the strategic plan. None of them are not new to you. Because they are things that we have worked on together for a while but they remain high priority when his coastal resilience, we will hear a lot about that this week. That is the full spectrum science, service, stewardship, focusing specifically on coastal resilience. New blue economy talked about it already knowledge based economy to use

information that is reusable. Because it is publicly available. Conserving and restore and connect. This is a new way of framing of what we have been doing the natural sanctuary program and the natural estuary reserve system. Both of them are predicated on partnerships to connect on the ground and preserve and protect and restore specific environments. And it makes direct connections to the America the beautiful priority of this administration. And then diversity, equity, inclusion and equity. Where we have done work and equitable use in data services. And how we move forward. We are trying, the whole push within the agency is to not just make this a special project but make it a routine way in business. So as we are thinking about any new effort or activity we are considering the racial or justice related equity that is considered as we move forward in developing new products and surgery it is essential for this portfolio as it much it is for you to consider that. That is another thing I've asked you to think about other areas and communities that we aren't focusing on, or aren't being able to use the product and service because they don't have accessibility or have access to it. The last thing I will mention, relative to the internal NOS things, we do have a new navigation observation positioning deputy administrator that is open right now. It opened on September 12. It will be my counterpart they will focus on the NAFTA ops pollution portfolio. We have this open last year but we were not successful in locating a successful candidate. We did retain an executive search firm to help with recruitment this time around. Hopefully this will help with the difficult decision. We really think the intersection points between in the portfolio are really worth having a high acid to focus on that. I will just briefly talked on budgets. Because I know it is always of interest. And that is because you will will have a meeting over lunch today, or a briefing over lunch today on the details of what is going on with the budget. Regarding 23, the

president's budget in both marks from the house in the Senate are very strong for an OS. We have received great support, significant increases beyond the FY 22 levels, we do expect a continued resolution. You know that is going to likely happen, there is a great debate on when it is going to end? The general feeling is December and there are people trying to push to make it longer than that. Over all the transfer NOS is good. However there is an area that I want to put out there as a challenge for you. We have an easier time making cases for things that are new, or endeavor. And I have purposely been talking about this portfolio as navigation observation and positioning as the foundational infrastructure that we need in NOAA to implement any of the priorities that we define. What we have not been successful in yet, is getting support for those based programs. If you think about it, just as for any business or organization that you are part of cost escalate year in and year out. We have been fortunate in the last two years to get the cost of labor adjustments. And that is a big portion of our budget and big portion of the activity but probably not, it is coming up more than 50% of the cost estimation. And that is not even higher than that in the last quarter or the last year, when you think about energy costs, and impacts it hasn't everything from water, travel costs. That is an area of challenge for us, if you have thoughts on that area, and how we can make that a stronger case for the base programs, I mean think about it I will talk about this when it can't talk about coastal resilience. Without these based programs we don't know what the water level is exactly. You want to talk see overrides from what point? That is a foundational issue that is a base for effort that we need to be able to deal with that. As you are well aware there are two other peaches of appropriations that have been delivered to share what is the bipartisan infrastructure, law. There are specific NOS equities that relate to this portfolio, there is, we are intimately involved in

the flood innovation map forecasting and next-generation model. The activities they are about $95 million as well as the coastal and Ocean Great Lakes observing system. Provisions which is about $94 million. They do, we have other provisions as well but these significant increases, they do represent support for the NOAA priorities on coastal resilience and habitat restoration. Relative to the inflation reduction act, there is a lot of interest in knowing what is happening there. Believe me there is a lot of interest in the political infrastructure that we have as well. It is estimated about $450 billion of spending investment in taxes not to NOS. But we happen to do that. But we don't really have the capacity to do that. However, given the degree and amount of political interest in this, the secretaries made it very clear, that she herself will be making the decisions on anything that is flexible, so we don't even have guidance out in NOAA, on how we move forward on all of the pieces of that, that is still being worked at political levels way above where we all are. As it relates to legislation, and over lunch you'll hear more details. The biggest priority legislation probably relates to the national coastal resilience data and service act. It would provide clear authority and direction for NOAA customer resilience efforts particularly as it relates to data products and services in response to coastal flood risk, including the impacts of seat rising. Rather than creating a new program this still provides NOAA the products to automate capabilities across so we can just make sure some of these alternations are part of that. More relevant to these particular programs, is the national Ocean expiration act which does reauthorize some of the key programs that support these efforts the hydrographic services in the ocean and coastal mapping. We continue to support all of these with our colleagues, and would like to highlight the value of these foundational offices. That we have talked about running navigation. Seabed 23 and

international work. Not only does work on the purview of the navigation observation and positioning portfolio support our domestic mission, but they also meets the international community. We will hear a lot about the challenges we did hear from this morning about the challenges Pacific Rim islands have an doctored SpinRite this summer signed an injunction with that you and Ocean's conference. The MOU does formalize U.S. participation in seabed 2030, and it is intended to facilitate cooperation on the exchange of information and promotion of joint efforts to map the world's oceans by 2030. That is a huge challenge. The acquisition of global water depth supports NOAA many missions areas relying on symmetry as broad a U.S. national interests and global governance. And I know we have folks from the DOT that we met with yesterday and Pat calm, they are very interested in this topic as it relates to national security and deployment of our troops. These goals along with domestic agendas cannot be realized without these foundational programs. In the critical recommendations that you guys provide. So be bold. No macros stated ocean protocol NOAA is developing with partners to established protocol as you are aware. Thanks to the HSRP for prior comments. For the planning documents, and our federal partners look forward to sharing protocols with the implementation plan with you later this fall and a request for public comments. So stay tuned for details. There has been a lot of camps around partnership and I want to rock about partnerships next. I want to thank all of the partners who are attending and we look forward to the session on partners in the Pacific. We will hear from partners on local, state, federal perspectives. Thank you to HSRP members for your conversations that you had to date on advancing public-private partnership and helping NOS to find ways to maximize the use of the nations hydrographic capacity. Welcome to Tony and the boy as trade one chief data officer who will speak on the value of public-private partnership. Along with Commander

Hills from later this week as well. And as mentioned about data licensing thank you for your work and that at that house reciprocate a whole bunch of things on the ground which the admiral is already covered. We do appreciate and value the discussion on mapping partnerships and collaborations that will be held here in the meeting. NOAA has a very successful 30 year public-private partnership model through physical oceanographic real-time systems which relies on industry partners and is some case federal agencies to support the car's chair. The NOAA network is an example of a public-private partnership with multiple partners who contribute data to NGS, and receive highly accurate updated coordinates on stations and benefits. So we might ask how could other aspects or fields contribute to expanding a successful public-private partnership. Are there different ways of thinking about this are there different players to engage are there different fields to engage that we have not engage in? We hope to hear from the HSRP on the thoughts from this matter. As it is particularly important that economy but is also important to be able to deliver on the products and services that we have for the nation. As it relates to resilience in particular, the coastal resilience and sea level rise session that will be held on Thursday it will be a critical opportunity to hear directly for some people that are wrestling with this issue back here on the island and in the island. Thank you for the HSRP on the draft resilience issue paper and we look forward to what we can do to advance that even further. As a relates to NOAA and Hawaii I mentioned that I have been engaged here for over 20 years and I want to mention specifically a Pacific risk management, which is an important regional partnership from the very local level to the federal level and including some nation islands in the outer islands and a partnership in the Pacific panel that we are holding later this week will be emphasizing its critical importance. With that I will handed back to Julie.

>> Julie: Thank you very much Paul, thank you for your candor and your excellent remarks and it helps put things in perspective for the HSRP members to hear about your NOS and administrative interest. We look forward to hear from Chrissy at new time about the budget. And we hope and appreciate the request and the questions that you put out to the HSRP. Hopefully we will have time over the next three days to discuss some of those. And to delve further into what's how the HSRP might respond. I think we are going to move on to the intros, just because we are running behind. But Paul, we will have time for further questions and discussions at a later date and time. So we will jump into formal intros for the HSRP panel now. You will find speaker member bios in the advance materials on the web. And I, we will go three alphabetical order, for these, a few of our Bamber's DNR Hargrave, and others are tuning in remotely. And we hope that they can join us at the next meeting. So, to begin with, would you like to go first please? I am sorry, just because of time, could we just do name, organization, and one line of your interest how about that.
>> Thank you very much Julie my name is Mr. Abdullah, I work chief scientist for a Inc.. Adjunct faculty at Penn State and UM BC. University of Maryland Baltimore County. My interest in the geospatial part on the precision navigation the national specification and public partnership and digital I think we have a discussion set later I am working with others on building that concept it is a great concept thank you that's all I have.
>> Great thank you would you like to annex.
>> Capt. Anuj Chopra, My interests are precision navigation satellite data, especially high raises satellite data related to emissions and greenhouse gas emissions in that space. Focus on ESG and specially diverse equity and inclusion and how we can't improve that. In society. And working towards social license and social equity and social justice. So we provide a level playing field for the small businesses and how we come up promote

small business within NOAA's realm of expertise. Like some of the other agencies. These are the topics that I would like to highlight during this week. Thank you.
>> Thank you. Alex?
>> Yes good morning Captain our screws, I am in Puerto Rico. We work a lot with the transportation and now we work with this economy which is really important now. I am a member of the South Coast safety committee for the Puerto Rico, and also a member of the board of the Caribbean regional observation system. We deal with industry and science besides my regular job.
>> Great thank you Sean?
>> Yes I would say Howdy y'all, Sean Duffy, from Mississippi River New Orleans. I represent the Mississippi River navigation I deal with a lot of work with Noah. Groups. And some other government agencies that keep the river movement, we are very close to the groups on the river as well. Thank you. Nicole?
>> Good morning I am Nicole Elko the Director of American beach and preservation and I am based out of Charleston South Carolina Emma area of expertise is coastal resilience, and I am interested in helping Noah advising them on the community's needs surrounding hydrographic data. Which are coastal imagery and how sediment can be utilized for coastal resilience, and more and more over the last five years in particular the communities great desire for water level data and understanding coastal flooding, and managing resilience as a relates to those challenges related to water and coastal funding.
>> Great Lindsay? Euronext.
>> Hi I am Lindsay G, AMA mapping and science consultant. And you can kinda reflect some of the panels that I am in here that it is the operations and technology, and the mapping and the collaboration in the collaboration that transfers through the public private partnership. Trying to agree with what we are saying is trying to look differently at that. And how we can really leverage

the limited resources that we have out here. I am pleased and I am welcome back to Hawaii. And I kind of feel like I am now connected back to my origins on the other side of the pond kind of thing. Just down the road. It's really nice to be out here. Thank you.
>> Thank you Lindsay Dave money. I am Dave from Dewberry engineers in Virginia. I am on my second 30 year career as my first 30 years was an Army officer in the Corps of Engineers. Where I was chief topographic engineer in the Army. Now add Dewberry I specialize in digital elevation models. And sonar. And I have recent interest in doing geophysical surveys to look for critical minerals and earth elements. Thank you.
>> Great thanks Dave, let's see, and. You are nice.
>> Hi good morning and McIntyre, I am the business director for the San Francisco bar pilots where I oversee their regulatory business. And their legal affairs previously I was a maritime pilot on the Columbia River for 23 years. My interests in the meeting here today, are the public and private partnerships and also the stakeholder panel that I will be chairing. My general interest in the HSRP is the practical navigation and use of the NOAA products in near shore navigation. Thank you ma'am. Ed?
>> Hi, I am Ed Saade, most recently I am retired but I was the president of fugu USA and I've been working for various contractors at work collecting data. I am real happy to be back in Hawaii. I was a grad student here in the late 1970s in physics. So it is good to have this focus on the Pacific and I look forward to the meeting.
>> Great thanks Ed. Nathan.
>> Yes Nathan Wardwell with J OS survey Anchorage Alaska. My area of interest and expertise tied to water levels. In Alaska I do appreciate the comments earlier from the chair in the rear Admiral about the challenges in Alaskan communities that just recently happened.
>> We have two members which are have dialed in

remotely. Sorry Virginia I am no I am going out of line a little bit. Okay, she has got my picture up there Julie Thomas. I am a senior advisor with the California coastal ocean observing system. At Scripps institution of oceanography. And also with the program director for the coastal data information program which was an operational way program and we work very closely with Noah, and I am semi retired. And, we have two of our members which are online and Skinner? Can you hear us?
>> Okay I think I can now. Great. D
>> You want to introduce yourself.
>> I am Captain Ann Skinner. I've had four day grades of direct work with the boating community. Also with the small commercial craft community. There are thousands of those as well. I am currently chair of the San Diego Arbor safety committee. And I own Seabreeze books and charts in San Diego. And I spent all day every day sometimes seven days a week working with charts.
>> Great thank you. Two but can you hear us.
>> As I can can you hear me? Hi I am to but I am a faculty member here in the College of Aspen atmospheric sciences at Morgan State University. My area expertise is predictions of waves in circulation in the coastal region in general including navigational inlets. I am a big proponent of engaged research in this room so the products of the research can benefit stakeholders. As a second piece has a second hat I've done a lot of work around the inclusivity in academic and other settings. So that is a another thing I bring to these discussions. Unfortunately I cannot be there with you this week. Currently I am serving as interim dean of our college. I in fact I have to log out run quickly across campus to do our convocation today. Our students are marching across campus for convocation classes start tomorrow. I am hoping to join you in the spring meeting thank you.
>> Great thank you tuba wheat note you are a busy lady these days. So we appreciate your introduction though. And thank you. I would like to just remind

people we do have someone interpreting for sign language. So if you could make sure your particular names and any names throughout the session over the next few days to just say them clearly. That will give the sign language person enough time to capture them. Okay, we will move on to our nonvoting members. Andy you are next.
>> Are we going to do yes? Okay. Andy is not here. Where are you over there? I was looking next to Larry.
>> We don't always sit side-by-side.
>> I got the two of you right there okay go.
>> Thank you Julie I am Andy Armstrong and I am the NOAA hydrographic center based at the University of New Hampshire. Our role is research and development in the ocean mapping and hydrographic services. In education in the so to feels as well so thank you.
>> All right, the next one will be Juliana Blackwell is Julianna online? Great. Are you there Julianna?
>> I am can you hear me? Hello, I am Julianna Blackwell, the director of NOAA survey. We have Mike who will be the eyes and is there an will be the presenter for NGS. Thank you all very much hope to see you next time.
>> Great thank you Julianna and Mike, since you have your picture update you when introduce himself to.
>> I am my chief of mode since it NGS
>> Great thank you rich.
>> Good morning everyone Rich Edwing, we take information and turn into meaningful information and we like to hear about the local issues here with a particular emphasis on how do we make that data available to be more equity available to underserved communities. That's what I'm looking forward to hear more about that thank you.
>> Great thank you Richard, all right Larry you're up next.
>> I am Larry Meyer, director of joint hydrographic center and it is another part of the mission to go it is the next generation of hydrographic mappers and we are proud of that included one of our people right here. My interests are I guess in ocean

mapping at large the seafloor underwater column and individualization of 3D data. 225
>> All right appreciated Larry. Let's see, all, you have already spoken, do you have anything else that you would like to say here?
>> No I think I probably spoke enough for now.
>> Okay all right. And Chrissy, where are you sitting.
[Indiscernible by Captioner]
>> Okay will be hearing from Chrissy at noontime, and we appreciate you coming Chrissy. Antoni? Do you want to go and introduce yourself again?
>> No wait sorry.
>> Is probably not going to be worth it. My name is Tony the boy, I am the chief data officer. I am basically the NOAA senior executive responsible for data governance and major planning and I have already heard the word data so many times just in the opening session. It makes me really happy to hear that. I am looking forward to your discussions over the course of the series thank you.
>> Thanks Tony and this is Galen who is holding the microphone we should introduce him here. He's one of our trustee tran one employees, and we have so many of the NOAA employees sitting behind me and out in the audience. Let's see Amanda do you want to raise your hand? Back there okay and John Nyberg is here, John is you don't have a microphone so I would just say you have been very helpful to the HSRP and serving as a deputy here. And let's see Virginia, you have already met who is running here. And then Lynn of course, we owe tons of gratitude for. Okay, we will take a quick break, because we are a few minutes behind not too badly. And let's convene back here, let's go for 10:30 a.m. That's when the next session is supposed to start. So if we can do that and we can plow through thank you.
[Captioner standing by]
>> I have a couple of logistics announcements, if you need parking, we have a parking discount sticker is at the front table. If you have not signed in sign in, for the meeting so we can capture that you

are attending, also Nicole Echo will make an announcement about a it invitation for Thursday night. Nicole?
>> Nicole: Thank you Lynn, we have a couple of formal invitations here. But the whole group is welcome to join us after the meeting concludes on Thursday September 19, at 5:30 p.m., at the Hawaii yacht club. They are hosting a happy hour, and we will love you all to join us. To celebrate the conclusion of this first in person meeting of the HSRP of this decade. And enjoyed some drinks and appetizers in low because demonstration so we hope to see you there.
>> Thank you Nicole, so it is my pleasure now, we have a very distinguished panel. They will talk about partnerships for the Pacific, local, and state perspectives. I will introduce each one as they go in the very first one is Admiral Michael Day of the Coast Guard.
>> Admiral Day: Thinking broadly of tran one I will talk about consumer product perspective, and will be happy to have the Q&A go on in-depth on the other issues of health. In my perspective it is shaped by two very different contrasting experiences. One being the Port of New York and one being district commander out here in Hawaii. Two different areas of operation. But there is one common denominator. That being the professionalism of the NOAA, and how they do their jobs. I've been in the shop for a short time but they are unique and without legal and I've heard that term you need to use it several times and that's just a word that captures it. As a maritime service that operates throughout the blue Pacific's we see the challenges of remoteness, the tyranny of distance, difficulties in the challenges of a changing environment. Our code is routinely utilized NOAA products to navigate across the Pacific. Most of the sheet fleet has shifted so late to navigation relying on accuracy of data provided as well as sensory inputs. Tran one is it instrumental partner for us so we may execute our things effectively. We also use NOAA

documentary data to operate our search battery. Our success of search and rescue is directly correlated to the accuracy of NOAA data. Good data enables us to target our limited resources to where we have the highest probability of success in the search and rescue case. Be on the Coast Guard's and here in the states, I will look to our partners across the blue Pacific. How they are navigating the waterways and using waterways. We as a Coast Guard's and training teams to our partners, to provide our best practices to them across of Mary admissions test. We also learn from our partners, with the Center for disaster management Joe over to my left. We sent a team to the Falkland Islands to train on disaster management response. Tr NOAA was the master science and how we trained with the partners. I also want to mention the office of NOAA we just want to acknowledge the role in natural disasters. Our being exasperated by the changing climate, and I think we have to be mindful that we have to adapt our methods and models to meet those new demands for assistance. About a month ago they were in a severe drought and they want one of water for the island. Another natural event that is coming out to Concord without hesitation the Coast Guard Cutter Juniper went to the islands along with USAID. The point I want to make blue Pacific is truly a village they must work collectively to thrive in these ever-changing times. The Coast Guard strives to be a trusted partner to provide needed support and collaboration. The sea level continues to rise, we battle challenges of accurate charting. Some of the areas in the Pacific that operate are not was surveyed. Whether it's due to infrastructure, capacity, remoteness of the Pacific on the countries, charting can be unreliable. Too often we find ourselves relying on information that is outdated, yet continues to try to navigate safely using our seamanship skills in order to work with partners. One of our national security cutters while operating in South America near the Galapagos chasing drug smugglers. Just last month struck an

uncharted seamount of the Galapagos Island. Taking that ship out of commission for a number of months. This example could be replicated in the blue Pacific. Collaboration of entities to revisit some old areas in the blue Pacific would buy down risk and execution remission in the region. Not only for navigation, but navigation by the nation's maritime fleet. A key and perhaps most important take away I would like to leave you with his regard to the fragility of the Marine transportation system here in Hawaii. With one major deepwater port for shipping the harbor in Honolulu is the main artery which the rest of the island relies on. A straight container, some special, or natural disaster could severely crippled the Hawaiian maritime sector. With NOAA alongside us we must position ourselves to be ready to respond in any such case that presents itself. NOAA with capabilities will be one of my first calls for the systems in a number of scenarios. The Coast Guard has always recognized value NOAA as a key partner in the maritime domain and I look forward to our continued work. I believe is a lot of work to be done in the Pacific given the current climate situation and together we will be best positioned to meet the task at hand.
>> Thank you very much, I love the Pacific has a comment. It is great. Pose a Sanchez UI next? Army Corps of Engineers want you to do so.
>> José Sanchez: My name is José Sanchez I am the regional director for the U.S. Army Corps of Engineers Pacific ocean division wrote located right here in Honolulu. We oversee for district that are residing in Alaska, Hawaii, Japan, and Korea. Our mission is diverse, we have a team work as well as a military program solution that executes projects for the Army, Air Force and Navy and for many other federal agencies. The Army Corps of Engineers has been for a long term partnered with NOAA from scientific components to the application component as well. The data that we utilize from NOAA is vital. We cannot do our work without your assistance just the Honolulu district they oversee

projects in Honolulu and other Pacific islands. We have 27 maintained deep draft and boat harbors in the Hawaiian territories. Like the Admiral just mentioned, that number is heavily on the small boat Harborside. On the deep draft there is few of them. There is importance to economic viability and security for the nation. We have a number of federal control products as Well in the area. But then we cannot forget Alaska. Those two districts of the main districts that perform civil works mission for the Corps of Engineers in this region. It is advanced we also mentioned the vastness of the expanse and the time and some of the areas that were remote and without data right? In Alaska alone there is 53 deep draft harbors in small boat harbors that we have authority over. That is a vast number of small and that 53 number. We actually also working on some projects that recently have been identified. It is in the port of Nome, we are working on the initial stages of that expansion and deep draft. Modifications. So that is just a little bit of the projects in the area. In reality the court right cooks we have this mission given to us by Congress provided that a system for waterborne transportation that provides commerce and national security and recreation for our citizens. So that is just you know, depending upon the great projects and great projects require great data. In order to have that emphasis on quality. The Corps of Engineers just recently rolled out a strategy on, we have been focused on, time and cost for a long time. And that is interesting. The pendulum has been swung too far to that site. We understand this is a three legates tool for quality, cost, and time. That is what keeps the project. We need to make sure the quality is not forgotten. The core's reputation is based on quality. So we have to get back to his dissent that we can leverage those three parts of the stool. I know we have several members here on this board. That actually are part of a board that advises chief engineers on coastal engineering and research matters right? I know Dr.

tuba is part of those sets. We can't learn what is happening here as well as what happens in that side with great information here. We are very proud of that. And we use the data for a number of things. But, I will touch upon a little of a it's close to my cell. Because we recently embarked on developing a strategy to expand our coastal hazards system to the Pacific Rim. We are talking from Alaska to Korea. It is a massive effort. We have done it for the northeast coast after Sandy. We have now included the South Atlantic including Puerto Rico. And working in the Texas coastal city as well. But we literally haven't had the effort focused on the Pacific and the West Coast. That is going to be, being a five-year 20 million-dollar program. That will get all of the information for the parameters required to develop the economic duty. The feature in the coastal area in that entire coast. It is a measure, for we know it is ambitious. But we also have seen a lot of interest from academia and members as well on this matter. We need something that does not require weeks, and many hours of computing time to be able to build up the parameters for the structures. That is, that is again, it order to do those models we need to know the data. And I will briefly talk about some projects that are coming up that we do need some data on. Alaska, we are doing a national study, we have no metric data for that project. St. George and sample island in Alaska, for wave models and improvements. And just one of the projects that we are on now heavily involved in one of the eight holes of the Marshall Islands the Republic of Marshall Islands. It is modeling for in addition for improvements. We have a major construction projects for military construction and sustained restoration modernization and that a toll and that is a great importance of national security. We share the joint airborne lighter imagery center of expertise. I should get a medal for that.

[LAUGHTER]

Did not used to be, they used to work for me when I

was director of the laboratory but I have to say that. That center has been too reliable for all of us. And I am told that they are already planning for a fly over here in Hawaii. Which has been needed. I think the last one was 2013 if I am not mistaken. We need that they should be in the five-year cycle and we are waiting on commercial funding for that to happen. Again NOAA has been a great partner and we look forward to sharing more data thank you.
>> Thank you very much José, I know the court -- the corps has been a part of that and we rely on your expertise so thank you.
All right, the next one is Joseph Martin sorry. And he is with the center of excellence and disaster management humanitarian assistance thank you for coming.
>> Joseph Martin: Thank you for taking the picture down. So first of all this is a new group for me. I appreciate the opportunity to be here. I hope you have the same thoughts when I am done speaking this is a some value to you. And then, I was caught earlier but I did this is sort of a two artisan -- audience event. It's a public event we try to share with the community of things like going on. Those of you who are listening in that I give that is value on the Pacific command is contemplating climate change specifically, and have been successful. As well as being a NOAA event, we are very interested, the consumer data and then really after discussions yesterday hopefully today looking at additional partnership opportunities. My intent is to share with you the point of view with respect to how this command this headquarters is looking at climate change and its impact. And then if nothing else, what you would at least want a little bit about a new organization or an organization you may not have heard of. And I will talk about that in a second period I will answer question as these things go along or we get to the end. I will tell you this I have a pretty good representation of the regional impact of climate change with respect to what five

cares about. I can't make things up if that is easy to you. So just let me know. I will start very briefly with the center itself. The Center for disaster management and humanitarian assistance has been around for 30 as per the mission is to provide training and education research, information sharing with respect to natural primarily natural disasters. We are stationed here in Hawaii, and we have a global mandate so we do operations and events all across of the planet. With respect to Lord of those lines in every. And in the last year, a matter of fact July 15 specifically of last year. The Admiral who is the four-star in the Pacific Commander tasked me too look at the impact of climate change, for the Pacific command. So this is a chart that we put together to help folks understand how we got to where we are. This should be entry-level information for most of you so I apologize for boring you but maybe there is somebody online who has never heard this before so they will at least be entertained for the next few minutes. I am a math and statistics undergrad. So I like numbers, I am really not into business of arguing anybody about climate facts. The data that is gathered at the measurements that are out there are accurate as near as I can tell and indicative of a passionate friend so I will not fight with people on those things. I am very interested on the way they express themselves and the impact of climate and we can talk all we see in this crowd sea level rise will be sorted out one of the greater focus areas but hopefully not exclusive focus area. What happens when sea level rise more flooding in more droughts and sometimes in the same place. Eroding rose in extreme temperatures et cetera. As I have a conversation with folks and even in my head sometimes. None of that really matters unless there is people there right? It is really the human security impact. It impacts fresh water and food insecurity and these things migration patterns driven by climate change itself when people move from place to place. And then on the NOAA side

there is fisheries impact and what happens to breeding grounds and fishing grounds and the rest of that. All the way up to island features disappearing and stop losing economic zones. All of those things affect people and most of those people, live in some version of state and within those states that there is security issues tied to that. So if you are going to become a victim of frequent disasters and storms that can have a significant impact on the security and stability of the country itself. All the way down to the bottom where we look at existential threat to cities. In places like here in the Maldives were literally the entire nation may cease to exist based on these factors. It puts an increased stress on fragile governments and that is a significant event in many places across based on some of us some small island developing states and geopolitical things particularly in South Asia as well as Southeast Asia and others. The good news is I have done my exploratory work this far since last July. I found that there are thousands of people literally looking at those first four boxes. So I do not have to do it. So if you want to talk about those I can into to those folks as a matter of fact you probably are some of those vultures talk to yourselves. But what I want to do is talk about the impact of war fighting and national security of these things. The next line will elaborate but you can see on the far right-hand side where it talks about what happens when we start to respond to more disasters. Not just us, that his allies and partners doing more things. A quick study, quick anecdote on that. Is the Australian military Australian Defense force, as I have food serious readiness issues because ADF has a significant role in internal disaster responses with fires in particular in Australia. Less ready as the military force today because they are responding to so many internal disasters. The same is almost certainly true like Indonesia, if you are familiar with Bangladesh and the train wreck. That is the collection of every disaster imaginable

there. There is the Bangladesh Armed Forces actually is the lead agent for disaster response in the country. So you have to manage security issues with internal safety and security issues as well.
If we could go to the next slide. So, I know we have two slides because we only have a 45 minute presentation I was speeded up a little bit. We will look at it from a dispense -- from a dispense perspective left inside looks at readiness.
Right-hand side is where could climate change actually generate the potential for conflict?
Readiness side, focus down on the top box where it talks about the condition and challenges associated with operating locations most used military applications operations don't occur within the United States and they operate from some of the location, and as he climate change is those places become less and less successful, perhaps have issues with future, and they could not usable for national security purposes. Extreme weather patterns, RC changes can't affect the flight operations and ground operations and see operations. And there is some significant we skip straight to the bottom one right now in Alaska for example permafrost significant issues for Army training. Because now the vehicles that used to be able to operate over that train cannot do that. And his puts them at risk. The one that talks about increase of network complexity is really relevant as I alluded to other Armed Forces but as well as the U.S. Because every natural disaster that U.S. military response to it so you think about what's going on in Puerto Rico I think the Navy sent four or five vessels in the last 48 hours to go help out. Those vessels were not bought and paid for to be disaster response. They are to defend national security interest. Now reduce the capacity of that force to go do that national security effort. Indications are, that is going to start happening more right? And it is not because places are less resilient, because countries actually are more resilient today at least in the Indo Pacific. That's because the frequency and

intensity of those things will take them beyond the ability to respond. Right-hand side I don't want to talk about this too much, clearly it has potential for conflict when you start to talk about sea level rise and as well as upstream restriction or water flow. What we like to tell people is 17 million people live in that region in Vietnam. 80% rely on rice cultivation. What happens when you have 14 and a half million people that will have internal strife and regional strife, and I was actually asked by a senior member of the military do you think this could generate conflict? And the answer is if you are asking that question then you arty or know the answer to that question. So climate migration is a real thing, multiple examples of that. Clearly indicates that you are looking at Afghanistan and other places. The increase in natural disaster events climate induced changes take a country that already has emotional events and put them and keep them in a desperate state for a long time. And of course there is ways to weaponize climate change. We already alluded to damning rivers upstream and engineering and then on the political side you can actually provide assistance to the country who is suffering from climate change and use that to your economic or deployed in Iraq or whatever to prevent his. These are all super cheerful thoughts and I appreciate to bring this to bear. If nothing else it'll give a slight twist on how I was thinking about this. How does climate impact readiness of the U.S. military and then working it and generate more conflict in the future thank you.
>> Well thank you very much and thanks for bringing that perspective. When we think about climate change and the defense. Okay, the next speaker is going to be Bill Thomas. Bill is a senior advisor for Islands indigenous in international issues for NOAA coastal management.
>> Bill Thomas: Invited me too speak about this. Everybody has talked about the physical aspects that happen and the needs and data and everything is what I will do is actually go through what we have done

and develop partnerships and things and things you might not know. These you might know a little bit about, so I would like to sort of use that as baseline and maybe get a more cheery message that my partner here. The pictures you see here [Indiscernible by Captioner] for the voyage around the world. Hawaiians are always concerned about what the place in the world was. There is work, and that required a lot of work and a lot of partnerships and collaborations which I will get into those later too. But I think, it is sort of in our DNA built in the DNA. To look for these real deep partnerships and allow us to move forward and understand things on how the world works. Just to give you a little perspective, the zenith of Polynesian voyaging which is the 16th century. Sixteenth An early 17th century. In Europe, Galileo was imprisoned, for his his eccentric theory about going against the Catholic Church. A physician and theologian and cartographer in Spain he was hunted down for some Copernicus also came up with the theory independently from Galileo. But he was not persecuted by the Catholic Church. But they hunted down Michael Servetus, and they burned him at the stake for describing accurately the first description of the human pulmonary system? Hawaiians have been Polynesians across the board have been interested in exploration. They have always had a good grasp of science and understanding of the processes. And then if you go on the flipside, being a child of the 60s. I was also taught that public service was a good noble profession to be in. And as a public servant I always understand the best way to understand the public is to better understand those that you serve. So that is what the partnership is about and that's what I am about to get into. My grandmother is Hawaiian. She taught me too be careful about the words that you use because they can have different meaning depending on the context. You could have an accent and a different syllable, you can't have a diacritical mark over a letter it so be careful

about words. So anytime I am asked to do something I look at something like partners and collaborations what do they mean. You know I am not going to read through these, you can see what they say, you know they are sort of obvious I think for all of us that do this. But there are shortcomings to the definitions and by definition of a definition, it does not address how it describes things in detail but it puts them in a box and put limits on it. Like my grandmother said, the words, if you don't have limits is a conflict in which you use them. So the context really matters in which way we use partners and collaborations. Sometimes I use them interchangeably but they are not the same. So, you know trust trustworthiness and co- governance. When Paul mentioned this it was over 20 years ago and being the new office on the block is what do we do in this big Pacific and all of the things that we have to do? Not just climate or disasters, and coastal management it is everything. And partnerships are really important. So one of the things that we need a definition whose characteristics that we are looking for. You can see these sharing common goals and priorities. Sharing of knowledge, and expertise and experience is really important for this. You cannot have any hidden agendas. What you see is what you get you have to be up front. And probably distribute those obligations in those responsibilities which is the word governance. When you share governance everybody has an equal part but also a coequal responsibility. Now, a little perspective you guys know some of these. But I will focus on the last three. The real challenges we have in the Pacific. That we got the only state that is not connected to the continent. And we got three island territories. But the last three, 15 island nations across the Pacific, 50% of the U.S. that are either easy and 25% is outside of it. So is economics important? In a different language on 130, that is over hundred 38 that is spoken at home every day. English and Hawaiian of the two official languages it is not

always the one that is spoken. So you have to understand how to connect with these people. American Samoa, over seven some are English of course Samoa is the one is most probably spoken. Then you have Philip to an Korean and Japanese and Chinese. That are spoken there. Guam is the same thing ten plus and Marianne is ten plus. So understanding the place and those people, and the way they communicate, is extremely important and helping to advance public service with them as well. Foundational pieces for us it understanding is understanding and acknowledge the diversity of indigenous cultures that exist in the Pacific. Polynesia, Micronesia, Melanesia, it is not the U.S. position but it is all of them. Picture yourself in the ocean we have always seen the ocean that we are connected and divides us. So what of those things that we need to do to connect us? Across of the ocean? Understanding people and places Polynesia Micronesia everyplace is different. When you go from island to island a village to village and town to town, those protocols and ceremonies that they engage in, and their adaptations of places is different. You need to understand all of these things and nuance is always a big one. That nature culture nexus, it is the environment when do we become Hawaiian is the question we always ask. We did not always owe right here and say we are in Hawaii. Hawaiians adapted to the place like everybody else. The adaptation depends on your understanding the meteorology zoology, the hydrology, everything about that place. So you can understand what you need to do to survive. I talked about ceremony protocol this morning. The importance of that is not just recognizing your place. An understanding those things that affect how you feel about the place. But for something like this, that started 20 plus years ago using the meetings is when you command, how many of you thought while you listen to when they were doing the song, how many of you thought the things that you bonded with at home or at work? Or as you focus in

on what they were saying and what they bring to this. That is part of the ceremony protocol. Protocol is sort of how you behave. But the ceremony I think is the thing that brings your mind to the place. The focus on the important work at hand. And that's why we begin all of those things were protocol and ceremony. Because it is important. The issues that we have are important to everybody. Everybody needs to bring their best to it and that helps focus on that. Communication, it is an iterative process. It will not work overnight. Trust trustworthiness and before this, you can be a trusted person, because of who you are and what you do. But the trustworthiness is not just you going to follow through is how long you going to be there either for the long haul for you In-and-Out? So that, that it reprocess iterative means you be there all of the time. But in doing this, especially those who are not from places like even me going to different places in Hawaii and Samoa I've seen plenty of places around the Pacific I do not know everybody. I do not know the protocol and the ceremonies of this place. But I sure know how to find someone who knows it and who do not just help me and teach me, but to bring me along and be that person that does. Because you don't go any place without asking permission. With the people you asked permission of? That is so fundamental. And then, the last piece that I had, is probably the most important piece. It is free, prior, and informed consent. You go in and ask questions you say that we get data in obtained data. Actually we need to ask for permission first. Even to be granted that opportunity with that data. Free, prior art, in a form consent means that you asked. Also they have the authority in the ability and responsibility sometimes to say no. You have to respect that. In my family, I have a couple of differences were family that I have traditions that are part of the family and genealogy. They cannot tell us about it because it is so sacred, it is their responsibility to not give it to us so you

have to understand that. I have a bunch of R's, I don't expect you to know everything I will refer to my notes to see which ones I am referring to. I can probably look at it right from here actually. But respect of course the first one. It is what we often hear with elders whether they are for the first nation or from us or from the Pacific. It means they will give you what they can. They will tell you what they are allowed to tell you. And you have to understand, you may be asking the questions but asking the wrong questions. To get the answers that you need. Reasoning, we do think differently because of the way which we are brought up in how we live. We talked about the adaptations of place. It really is sometimes it is really hard to articulate. You have that feeling. But in reality, it is knowing all of these systems, that actually surround us, so we often try to come up with a definition for resilience. In rather than thinking of resilience in our perspective, it is really broad. But I think it is something that is very unique something that can happen anywhere. Understanding the system which you live and living within the systems. [Indiscernible by Captioner] the deep understanding and the places that you are the places. The responsibilities a good friend of mine is a member of that nation's University last week [Indiscernible by Captioner] he said that always talk about inalienable rights. We do have a few of them in fact we have many inalienable responsibilities that's the way we look at it we are responsible for the places that we are in. And resilience, I have heard this one as a kid. The Hawaiians were vanishing and the travel partners we are vanishing people and we are not. We are here. We are actually robust, and we are building even more resilience over here it says people living inheritance. We also want to talk about things like science and publications. And they need to publish dinners I am not a biologist. But we say that our journals, publications, or us. We are the ones with proof of practices successful practice that allows

us to be us -- might be here today and to speak to this. And then at the end, this represents how to treat people as other human beings. In understanding what it takes to be a good human. In the terms of you know my grandmother. And many of my other relatives is we are all related, and certainly in the Pacific the degree of separation between you and highest levels of government, the highest leaders across the Pacific is like this. It is really small. So you have to be nice to everyone because you never know who's going to be a cousin or your relatively my mom is one of 22 kids. I have over 151st cousins. And I have no idea who their kids are. So you run into people that related to, so you need to be nice and respectful to everyone. That is fundamentals of being a good human being. Paul mentioned the Pacific risk management. We started that 20 years ago and Paul was like what? I have pictures to prove it. Yeah, I had here at that time. But we started with 45, and we did it on a wing in a prayer. We need help frequently. Now we have over 100 organizations that we deal with regularly. We have reached out the picture of the of the sailing ships. The first one you know we reach out beyond the Pacific. Be on states across the Pacific. That also are federal partners across the U.S. Alaska, West Coast, the Gulf, even the Caribbean also across other parts. I just had a meeting last week with a bunch of them. Because it really encourages to understand who is in this what are the issues if you are dealing with it what do we have in common? It is not just the ocean that unites us, but it is the water that falls, that starts in the Pacific that unites us so water is the one uniting thing. So getting a lesson from others and being partners with others, that are not necessarily on the coast but on the coast. It gives us a better understanding of who is doing what? One of the lessons that we learn from others and perspectives that we have that with they don't have. We always say more heads are better than one that is true especially when it comes to my head. And I

mentioned leadership, that last word treat each other as relatives. Because we truly do believe we are all related. [Indiscernible by Captioner] the Nobel Peace Prize is come to the meeting for times and I was taken to the airport. One evening I asked them I know that you have a lot of demands and you have really highly placed organizations that want you to be a part of whatever it is. But you turned them down to come to ours. Why did you do that? You know I go to some places and I just sit there and they raise money and I shake hands. But it does not do anything for my people. I do that because the word and that's my responsibility. So I come to you because you treat me as family. We hope to do things with our partners that allow us to have a solution that is being worked on and not presented in a given to them. So that is the point of starting Primo, is work with those were looking for solutions and the challenges and work with those who have solutions to bring them together. Twenty years later, we did this on a wing and a prayer, and not a whole lot of you know funding for NOAA, it's enough to keep it going but is spent enough of the partners that value this in so much higher than the money with that we put into it. It's what we put in ourselves that provides the big value. We have work with them in the past. And we hope to continue work with them. We are fortunate enough to have the Pacific command sitting with us. Actually, working with them started in 2011. It started in Honolulu. Where we were talking about what other things that we can do across the Pacific and other waters. He was talking to us and he said I think they responded to an event on average every six or eight weeks in the Pacific. And then they will be there a year from now and they said no that is not the mission. But maybe we are partners that can. That is where the beginning of a group called Asia-Pacific disaster resilience commission. Along with FEMA, and other institutes in EPA. And [Indiscernible by Captioner] that was actually designed after Primo, Rich Perry I saw him sitting in a bar. He literally

drew it up on a napkin. So we have had that connection with them. And they have been great when you work with them. Because they actually have been to fun things that we don't have and they are good partner doing that. And they see having good leadership that comes across the Pacific region to meet with them as well. So we have an intersection of national security, and we work in that intersection that something is done as well over the last 20 plus years. Part of this is with the Yukon and Wilson Center in D.C. And we work with a bunch of other partners to improve our capabilities in those Association states. Because, if it is not just they have been neglected, but the compact of courses coming up, or renegotiation again, and to get a handle on what their needs are, but this is something that will help us to bring to other areas in the Pacific as well as across the Caribbean and even continental U.S. if we can understand how to improve the capabilities to include especially the last bullet interaction across scales. Because transnational it is intergovernmental intergovernmental, as well as something that is a global impact. So this is something that we have been working on and part of Primo, part of NOAA, and it might have several here that have been to these meetings. But it is something that we are continuing to do. And for us, it is Primo is a foundational for us in this. We often talk about the work on intersections of water food and injury. The global breakthrough heritage counsel that started with six or eight years ago now. It brings all of those things together but also commerce. And health, water, food, energy, and health. Those are the biggest things, that impacts resilience. Across the Pacific and elsewhere that is something that is really is growing. And we work with epidemiologists, physicians, scientists, as well as farming organizations. To bring a lot of these things to bear to create a much more creative market. And much more healthy and resilience society I could get into this a lot more there's a

lot more behind us. We have the next meeting next month. And we will talk about that. There is a group called rising voices it is a center for indigenous and science. In adjusting climate issues and we work with them for ten years, and this is a reflection last week. And this brings, it brings Earth science together with communities and their indigenous knowledge elders. To look at perspectives of the science that is held within and chants and songs and dances. Because there are bits and pieces of data in there that can tell you about what is happening at certain periods of time. So it brings those together to come up with ways that you can better help address climate issues within these indigenous communities for research. In the University Corporation research can do to help. Many universities and probably some of you out there are partners with members of this. Be on the Pacific so what we have done, is part of Primo, part of NOAA, and part of you CAR, and in CAR, and more indigenous and tribal colleges. And the University of north Kansas on issues of coastal resilience. In Kansas might sound like what are you doing in the middle of you the U.S. working on coastal issues. It is a national University that has four or 500 different tribes. And they regularly have three or 400 of those representative students and also student faculty. It is also a place where everybody gathers. They are working on developing a proposal to help address some of these issues. And through NSF, and after submitting it and 18 months at looking at the same question. [Indiscernible by Captioner] the grant recycle fun is awarded and there are two NOAA partners on that. And the others as well, ones are highlighted that are P there I and go P there I. The recipient of the funds, [Indiscernible by Captioner] is an API of it. How we converge all these viewpoints and information together to come up that will be beneficial for everybody. But also understandable there will be postdocs and undergrad in all kinds of things. But we are quite excited about this. And we think that

this will be something that will not just help us in meeting our mission, but us collectively being able to understand and we are bringing science to something a to a place that's understandable and useful in both directions. Now to book and what I said, and end on. They had mentioned this earlier, is PILINA. This is one of the words that my grandmother said you have to understand the deep meaning of this thing. So it means to get Inc. to be a part of relationships. But we have this other phrase which means [Indiscernible by Captioner] inseparable bond on separable bond it is incorporated into this love for the land, it is something that no matter what happens if they take away from you you have a connection. That is because our legends is what you saw in the first slide, the guy holding [Indiscernible by Captioner] we are connected to the land. So we are connected to this land, and from this land and all of those things part of the land are relatives. And that is something that is at the root of our perspective. Because we are related to everything. It is not just dirt on the land and things that grow but as the water that comes from the ocean. Understand those relationships, and the relationships [Indiscernible by Captioner] so in actuality the relationship moves at a speed of what ever given to it, it is not the amount of time it is what you give to it. And when you give into it and trustworthy relationships, you can look back and see on this. But it is going to vary depending on what you get to.

>> Bill one more minute. That is it okay good job. Thank you. Thank you very much Bill, much to absorb their regarding knowing your partner. Okay the last speaker we have for the spaniel is Matthew Gonser, the executive director of climate change in resiliency and the city and County of all the loot thank you Matt for joining us.

>> Matthew Gosner: Those are at minimum some of the resources that I tap into on a daily and weekly and monthly basis. And I would be remiss if I did say

Sea Grant. Frankly I did not know how or where they land in NOAA, I was trying to navigate from the main tran one page last night on how and where I fit in the NOAA family and frankly I could not find it. Because what matters is we know these kinds of tools and resources are available to us. And we know that the partnerships as Bill alluded to are increasingly important moving forward. Really, out here in the Pacific tran one does lead and certainly that means a lot of things. They actually fill gaps at other federal agencies would traditionally serve in a different geographical setting. For example a lot of the land-based data also comes from NOAA out here. If you think about the sea cap data and change data over time. The collection that is currently underway. But they certainly also do it in partnership with federal agencies like USGS, a local university and community-based organizations as well. And I heard the word consumer, I consider myself a user of information, as well, but really it is about partnerships that we are talking about here. From the Sea Grant model science serving VC or community. Forgive me it is been five years since I was a Sea Grant Extension agent. In essence, that concept of connecting people with information or outreach, really helping to make research applicable or in reach as we used to call it. We have a lot of smart people doing amazing things here. But is it even answering the questions that community members have? At the end of the day just frankly connecting people with people, to take a step back and or if you are in the environmental review site. The no action alternative is not a choice anymore when change is coming to your short. The increasing observational experiential financial changes that we have here, are really concerning. I know that is equal for communities all around the nation and all around the globe. The future is uncertain. Climate change blinks that uncertainty and certainty is rest, to people in place, the environment of those places and the economies of those communities. And whether we think about those

climate changes in terms of shocks from a hazard event right? Like a storm, a punch to the gut, or the long-term changing baseline around the stress of something [Indiscernible by Captioner] and is a challenge for generations to come. For us tran one does support our adaptation efforts in the critical science and also the communication skills. I find myself almost every other year going back to the NOAA digital coast and trying to find some risk communication document that has been updated but if it hasn't, these foundational things that allow us to help extend the information and lead people where they're at. Help resonate in whatever setting that they are responsible for. Because it helps understand we have been and where we are, and how we may navigate this changing future. Just to reinforce NOAA's importance, and presents out here. Really the foundation for a lot of community awareness on coastal hazards ends sea level rise in particular is built on NOAA produced resources. Such as gait data [Indiscernible by Captioner]. Or NOAA funded resources such as Hawaii sea level rise exposure area. Which was from a one million-dollar grant several years ago, which really built up the data tool but also the communications and outreach resources to accompany the science. And as I allude to the NOAA partnership for community science and engagement lead locally by the U.S. Sea Grant College program. I see a good partner and friend the director Melissa in the back. Also reminded on walking out during the break my good friend Steve, who do these roadshows. We were doing these digital coast trainings all around this island, and helping people maybe remember science 101 and remember where they are in space and time. Because local governments truly depend on readily accessible information and communicable information in support of coastal economies and resilience. These tools and resources certainly they allow us to think about coastal management and hopefully make resilience more possible but frankly they do not guarantee it. And that's where I will try to wrap up comments here

especially from the local perspective and local government with the city and County of Honolulu. There is no data without a story and no story it without data. But I think you all recognize that there is potentially a gap in what you can deliver and what is expected from us in terms of really tackling climate change or some of the humanitarian challenges that Joe alluded to. As someone who used to work at university I would roll my eyes when they need more specific and accurate information and blah blah blah. And I was thinking when José was talking about this very specific data information so it is a good reminder not to be flippant in terms of that. We have seen a lot of Navy whites out there. My brother out there a former commanding officer of the USS Cheyenne. They need a different level of accuracy and precision to carry out the mission and operation. There is a big gap in terms of TMI versus data for motivation and action. Really, thinking about how we are grounded from what Bill was sharing. Grounded in science and people, and those relationships over time. We do need to continue to be acutely local, and hyper focused on our contacts, but we cannot recite the challenges and the potential lessons and connections with people globally. As all of this increase in the urgent and concerning an alarmingly expensive. Right, we as a nation are good at cleanup, we average dollars during events, and you know all of the federal agencies are trying to do right and do different moving forward, but we know it is a long road to thinking about how these systems support local governments and local communities. Because also local communities are just people, people at the end of the day, whether you elected them or not, they are people in positions that maybe they were equipped for not a quick forte wrong Tom Wright play situations. But they are people making decisions and data is not always what motivates them. People need courage, they need coalitions, they need community members to stand up, so that really obligates us more to think about how we can connect

with people and information and connect people with people. Maybe my last reflection just because I was on the phone before I came in today. Today is my mom's birthday I will save you how old she is. She is a former educator actually both my parents were educators. My dad was my middle school assistant principal. My mom taught kindergarten and first grade. She would always at the end of the school year, in June just be beaming because how far these kids have come they are just tremendous. And then after the first week in September she would come home and say these kids don't know a damn thing. And I don't need to share that with you all.
Opening this morning from Paul reminding us the new administration new priorities how do you repackage the same types of things that you know and need to do anyway. And we have the same struggles of re-introducing ourselves, Welp coming new city council members and state representatives et cetera. It can be challenging to deliver the same message time and time again while you are still trying to make it resonate. What it comes down to is the partnerships, relationships, come coalitions to have more people help you to say the things that are important. Because we know there is a lot of important work to be done so thank you Julie.
>> Thank you for your important message there. We are running behind time, I will turn it over to Paul, who is going to go ahead and wrap up the session.
>> Paul: Yes you be glad to know I will not say a lot but I do want to thank the panel. I could not have asked for a better first panel to conduct this meeting. You brought an incredible wealth of knowledge, information, and perspective. Through these conversations and into the issue. I would take that, and thank you very much. I think we should thank them as a group.
[APPLAUSE]
We are honored for you to share that with us and my challenge to the panel is how do you take these perspectives, some of which are wildly different

than the way you have been thinking about some of the challenges. They are supposed to provide recommendations to know what on and integrate them into your thinking so we could advance his whole ball that we are trying to advance with a big piece of the puzzle. Thank you.
>> Yes thank you so much
[APPLAUSE]
All right, Ray, I would like to introduce Ray Tanabe, he's the director for the Pacific region for the National Weather Service. We are really pleased to have right here. He is going to be joining us also on Thursday for the resilience session. Yes? And then you are. Ray, I will let you introduce him.
>> Ray: Thank you very much again welcome everyone my name is Ray Tanabe on the director for the National Weather Service Pacific region. Just a real quick description the National Weather Service Pacific region is the largest of six regions nationwide, we stretch all the way from Puerto Rico to the ease into the Republic of Palau and the West. A little over 10,000 miles and roughly 11 time zones. So we cover a lot of territory. It is great to see all of you here in person, welcome, for those of you who have not the good news last week. This city went into the low covert community level. That is a good thing.
[APPLAUSE]
And for all of the NOAA employees who worked on Ford Island it is a significant milestone so we stayed in the low category for two weeks in the cafeteria will finally reopen. I cannot wait for that. Real quick. My journey with the Polynesian society started off in the mid to thousands. As a forecaster at the University of Hawaii forecast office is located. I was asked by Hawaiian Airlines to provide weather training for dispatchers and pilots. At about the fourth or fifth class, I was approached by one of the dispatchers at the end she introduced herself and said would you mind talking to my brother, he's got this crazy canoe trip that

is trying to plan. I said sure why not I can help them out. Little did I know the president of the Polynesian society. In a crazy canoe trip is the worldwide voice. After our first meeting I remember asking him, where you really planning to go to circumnavigate the earth? In a canoe? This is the tropics. Hurricanes, typhoons, all kinds of different weather events. He looked at me straight in the eye and said yes, we are absolutely going to do this it is a big canoe. So what I did not realize at the time was it was not a literal translation right? By canoe he was talking about a huge community that was going to make this a successful voyage. So over time, real soon we started looking at weather maps, we started looking at seasonal weather patterns. Tropical cyclone, hurricane typhoon climatology from around the earth. We charted a course that would provide the least amount of risk for the canoes and the crew. Along the way, I met a lot of amazing people. Voyageurs, students, scientists, planners, people, and one of the most amazing people that I met. Is standing right here in the room. And I would like to read a part of her bio to get it across. She is a scientist, surfer, and Voyager on the Windward side of the island. As you mentioned assistant professor at the Arizona State University. Her life is guided by the values in the storied history of ancestors. Her research combines coastal geomorphology, Helio environmental reconstructions, spatial analysis, and their perspective of a native Islander to investigate how islands and reefs and island people are impacted by changes in climate.
While I thought forecasting weather was difficult. Ladies and gentlemen is my pleasure to introduce [Indiscernible by Captioner].
>> Aloha, Thank you guys for having me today. I wanted to share just a little bit about some of the ways that we navigate on our canoes. I will share a little bit about some of the experiences that we have had while out at sea. And then share kind of close it with, how we try to rip -- replicate that

in the classroom for our students. And the next slide is a video so fingers crossed that it works. Perfect [Indiscernible by Captioner] we come from Hawaii a place where we can still recall the voyages of the first people. Who navigated thousands of miles across the Pacific, to find the most isolated islands in the world. [Indiscernible by Captioner] we come from a place where oceans are so highly revered, that our creation story tells us that the coral polyp was the first organism created. [Indiscernible by Captioner] we come from a place where we are taught that our coral reefs turn into islands. And we are reminded that the health of our islands, is intimately connected to the health of our race. We come from Hawaii therefore we are Hawaii. We come from a place where love for home is so great, that people cannot be separated. We come from a place with the science tells us, that our oldest and most isolated islands, will be uninhabitable in the next 30 years. And potentially removed by sea level rise in the next 80 years. I am an Islander from Hawaii that relies upon ancestral knowledge. In modern technologies to adapt to climate change as a means of survival because we have nowhere else. So, a lot of the video and the images that you just saw here, were taken while navigating across the world as Ray mentioned. For those of you who might not be familiar with this we spoke a little about it today. But it was a replica canoe that was built in the 1970s. As a part of our Hawaiian Renaissance. It was built by a group of amazing men and women who had this vision who knew the stories of our people, of how we navigated and we found Hawaii without using GPS, tense, during a time when many Europeans were not making these long voyages across the ocean. And it was a time when there were also theories of how we got there. Did we draft? Did we drift from South America? No. But so this is also a science experiment, this was done to not only revitalize our people in our pride of being islanders. But it was also to prove that our people had the knowledge and

the skills to purposely find their homes. So this is they both made the journey again and then the ancestral pathway to and from Tahiti. Or our homeland this past summer. And I was fortunate enough to be a part of that trip, it took us about 18 days, and that is actually really fast. We were making about 8-10 knots most of the time. And yes, it is just it is just a really great experience.
But, like most Hawaiians my age, and the generations before me, we did not always know the stories. We did not always know the names of our navigators, of Hawaii, Palais, and it is really been the revitalization of not only voyaging, but all of the academics that come along with it. This is a picture in 1976 when they made that first maiden voyage to Tahiti. They were greeted by 20,000 Tahitian's by islanders. They said that there was so many people there in the harbor, and the water that, they describe having to climb into trees, in order to see the canoe. The folks that were on the canoe on the first voyage said that Tahitian's there were so excited they started to jump up on the canoe, and wanted to just touch the canoe that the canoe was on the sinking. In the water. And in high school, for the first time I got to meet my heroes. And many of these aunties and uncles that are in the photo, were a part of that 1976 crew, that first voyage to Tahiti and the voyage back home. So if you could imagine being this young high school student who is trying to figure out what is going on with their life, they are kind of dirty and want to do science. But nobody in science looks like them, and then they learned that we have a history of being scientists, using science and observing the world as a means of survival, like this is really I awakened for not only myself but a lot of the young people in the photo. So I wanted to share with you folks, a journal entry from my first trip down to Tahiti. When you are in your 20s maybe, and you are studying navigation, you have a series of test. The first test we talked about that space the place of pole. That's where

the small islands are in the Hawaii. Your second test is to sail, over 2000 miles to Tahiti. And really what you are aiming for it is not is self. You're aiming for the islands, the largest Island archipelago in the world. You're aiming for all of the small islands, archipelago itself is so big that it actually blocks a lot of the swells that is the first group is you stop to fill you stop feeling like wage then you start to see birds. These tiny birds. If you live here in Honolulu you probably see these white little birds, they are like fairies when they fly. That live in a lot of the buildings in the trees. And then, you will see what the island looks like as we get there. But I am going to start to read. My journal entry. Okay, so this is from June 16, 2014, this is day 15. And we are searching for the island. Have you ever tried to look for something, something you have no idea what it looks like? Sometimes it's even harder when someone tries to explain it from their perspective. I know I said the island will look like a faint irritation of the iron. Fuzzy uneven surface on the horizon. A way that does not move. Look for the island reaches the top of the swell not when you were at the trough. Don't stare too long or you will lose focus. I never knew how time research would be we started searching and looking for the glow of the island. We were blessed with a large mood, so when we saw a pile of boards in the darkness we continued the journey south. By sunrise the hunt was intensified. Jason and I spent all morning to see if the birds would show us the path from their home. No such luck, they were all fishing by early morning which must mean that island is fairly far away. Standing on the railings bending my knees, and observing the lift of the canoe as the swells passed underneath. I can only stand for 20 minutes at a time. My eyes we get weary and my mind was such a wonder, our whole voyage was constantly honest about our east link. Making sure we hold tight to the winds we did not miss the island. It is mid afternoon, Southeast

well, we saw yesterday is entirely gone. We are getting close on the a chain of islands could block a large swell. On the horizon we see a patch of haze, but is that my mind playing tricks on me? Our goal right now is to be. Covers many miles as we can't before we lose the light. A sunset approaches and we call another meeting. With no sight of land he tells us to spread out along the rails, and look for it. We are looking for the birds that are flying home after they finish fishing. Jenna spots land we see clumps of trees on the horizon, the island looks just as described. A faint irritation of the eye of fuzzy uneven surface on the horizon, a way that does not move. Though for many of you you have been out at sea this may come as no surprise. What an island without my mounds looks like. But for many of us here in Hawaii that are used to seeing high peaks in mountains. We were really surprised that this is what we were looking for. We had spotted the tallest part of the island by the tips of the coconut trees. To experiences like this have inspired many of us from Hawaii to pursue careers to better Hawaii. On the canoe you learn the profound impact a teacher in experience can have on your life. Our teachers encourage us as young navigators to be confident in our choices. And to trust the teachings of our ancestors. They create a space for us to grow and gave us the freedom to lead and succeed and even fail. And as voyaging has evolved, it has been really great to also see the evolution of how we do science in a canoe. To have our crewmembers become the scientist. For example, we did a series of projects on the canoe, we do water quality monitoring, we will look at the gut contents of all of the fish that we were eating. And we started to find more and more plastic in their stomachs. We will do a lot of outreach with students both on the canoe, on the satellite that we have. We will get to do hangouts over video as well as share our experiences similar to this while we are important. So, how do these experiences help us navigate life back on? The answer has been to

create similar learning experiences for young people. Last year, with support of the office of foreign affairs, friends and family were able to organize a unique research exposition to study how are islands are responding to change into climate. The trip is unique in many ways. First, rather than going on a large research special, we decided to sell. Each of our students, were required to hold watch. They were required to learn how to sail, and they were required to help with cooking, and cleaning of the vessel. Here of a couple students Brad Wong is the cultural liaison as we make our way up. And secondly, [Indiscernible by Captioner] we spoke earlier about this place in Hawaiian culture. I want to talk about this a little bit more on the science on Thursday. But I just wanted to go briefly over the purpose of us going up there was also to assess how hurricane Malacca impacted the low-lying islands out there. There was a low hurricane that had on 2013 and there is a direct hit on one of the Atoll Islands and is obliterated the reef. You can see it in the top left-hand corner. As well as removed an entire island. I'm sorry I have those two pictures messed up the bottom one is on the right is after the hurricane. So what we did, is we organized a research crew that was comprised entirely of native Hawaiian students. We wanted to see what is it like to do science with a bunch of Hawaiians? This is the first time that we were able to do something like this. Here is a picture of students as well as research staff, from the University of Hawaii. And when you ask why Hawaiian, why is it important for diversity in science? If you take a look at the statistics. If you look at the National Science Foundation. You will see that there is 26,250 PhD's. Geoscience atmospheric science Ocean science. However less than .09% of them are American Indian or native Alaskan. And 1.5% are classified as other race. So, native Hawaiians get grouped together, and that 2.5%. So we are largely overestimated. And this is our crew, while we were there, we did a series of

things. We did entry title surveys. We looked at how our intertidal organisms if you have ever been to a Hawaiian luau you sure had this acquired delicacy? It is really delicious. So we did a series of surveys because we wanted to understand how these organisms are living up in this remote island area as well as how they could potentially be impacted by sea level rise. Each of the places that we visited each of the islands we greeted them as if they were [Indiscernible by Captioner]? What does that mean when you greet a place as an ancestor? What we did we had all of the students line up along the railings of the boat. And one by one each of these students offered water from where they're from, and they also offered similar to what we did this morning. They offered the only, or a prayer, or a song, and each person brought one of those from where they are from. So we add students from Hawaii Island, from Maui, and from Kawai. And at the end of the day we offer thanks. So we think the place for providing us with insight, guidance, and safety. And then once we were on island, we conducted a series of surveys as well. Many of these islands, don't have the best coverage when it comes to availability of data, whether or not it is elevation data imagery, et cetera so we conducted a series of GPS surveys. We also collected sediment, so in some places islands were lost, and in other paces they were built up islands, so we wanted to know is the composition of the and in the same before and after this event? And then, we came back to the bone every night, we work for the samples we cleaned them up we had dinner and then we held watch so a lot of work. I was really surprised that nobody quit during the trip or after. Yes, where are they going to go. And yeah, and this is the place that we were working in, it is beautiful, okay now I got lost I started to go off topic. Yes, I want to share some of the reflections of some of my students. So, I want to share two reflections, from my students, and the first one is from a student. He asked what does it mean to be resilient in times or of change?

Although I have dabbled In-and-Out of a handful of science conferences and had amazing research and internship experiences to undergrad. I never really felt like a scientist but rather a minority that struggled to carry out the work. But it is because of so many supportive mentors and peers over the years that I am grateful to have that pushed me to be steadfast in exploring the field of science.
This past year, I have been reminded that we are the product of resilient ancestors. Who continue to guide and inspire this collective work. And that we can exist as Hawaiians in this field. From experience Sandy islands and seeing abundance of life like the fish that Rome the shores to huge sea turtles and mud seals. That basket and every other corner, the gazing of the sheer cliffs with birds and intertidal zone region play. It is resiliency and is profound and inspires us in so many ways to prefer severe in these times of change. So it is crazy, we went up there to look at the devastation, and the recovery, this really detrimental event, and our students were talking about the abundance about the growth, about the health of this place. And in the second reflection is a conversation with the head with another student. And she is working with community members to better understand intertidal fisheries state on the deck of a sailboat with Laura and we finally got a moment to take it all in. She shared, it is easy to get caught up in the Magic, the all of the ancestral islands. I knew exactly what she meant. These islands, although they are old and small and by some standards may appear frail a week. These islands give so much life. They provide a safety for unborn, a home to raise young, and when storms come through they take the brunt of the worst impact. They break so everything else has a chance to survive. They build themselves back out, because they are the strength that so many others rely on. She continued like all living breathing thing's time with us is not forever. The couple who not islands will continue to evolve, and in 100,000 or 10,000 years they may be appear as a

reef, but continues to protect, fee, and nourished.
So reflecting back of the trip to ancestral lands.
I am thankful for the foresight of my teachers, and
an valued importance of teaching. How to navigate
by doing. If we are to move forward and adapt to
climate change, you must learn and be accepting of
diversifying the sources of knowledge and the values
that we used to inform decision-making. We need to
first start with our students in the local
communities, and acknowledge and foster connections
in place. We must rely upon and learn from the
past, and be open to allowing that to inform our
future.
[APPLAUSE]
>> Thank you so much, that was great, and I think we
have time, does anybody on the panel, do you have
any further questions? How many trips have you
taken? Are you still there? Three? Okay, and it
sounds like a wonderful program working with the
students. Ben do you have any closing remarks?
Before lunch?
>> Nothing other than to say the really inspiring
nature of the connection with the students and
having spent a few research cruises in the monument.
I have some recognition of the magic of that place.
But nothing like what your students experience
again, very inspiring thank you for sharing.
>> That was great, okay, so I think we are actually
at our lunch break now. So for the HSRP members we
have lunch right here. We will reconvene at
1:30 p.m. Thank you all very much.
[Captioner standing by]
>> Could everybody please be seated, this is the
start of the afternoon session, thanks very much.
>> While we are convening for the afternoon session
I want to take a minute and introduce she is the
pack Pacific Islands Director, she is in the back
she's attending, and I think the executive deputy
director is Jordan sitting next to her. So Melissa,
helped put together a session with resilience for me
on Thursday and she is a former colleague of mine
when I was with iOS, and we are pleased that you

could make the meeting Melissa thank you. Okay, so we are let's see, this is it I will switch over to my other mic. Alright I think everybody is here on the panel this is an afternoon session is on opportunities and challenges for the NOS snag a vacation observation and positioning portfolio. And we are very pleased that we have representation from our different divisions up here, and we will be starting with Admiral Evans. You are on.
>> Admiral Evans: Thank you Julie, okay, it is great to have the opportunity to just be here and speak to you all about the and provide a program of the office Company survey. It is also a challenging time in hydrographic's. I have talked about this before, I see us in the midst of a transformation, to meet the world's growing demand for database products and services while continuing to honor our core mission, to support safe navigation. Looking forward to sharing more ideas through initiatives that we are pursuing with the non- survey to lead the transformation. And we will also acknowledge the challenges that are present. Fundamentally wisdom must not only collect more ocean mapping data we must provide the data in a form that is fit for purpose. Whether that is NPC for a mariner, imagery for Marine protection managers, more high resolution imagery. We can do that in a timely fashion. Frankly, it is that that keeps me up at night. That piece right there. Hiding data products and services in a timely fashion from the data that we have already. So what have we been up to since March? So, mapping this is our field season, it is in probably winding down at this point. We are experiencing increasing demand for high resolution mapping data across all depths. This requires and all of the above to acquire editing data acquisition. We tried to make maximum use of in our services in collaboration with partners. I am looking forward to the standard ocean mapping protocol released to the public later this fall. Via the Federal Register notice and you will hear more about this from Paul Turner later in the

meeting. Paul also mentions the MOU with seabed 2030. I want to reiterate this supports many of the NOAA mission areas as well well as broader U.S. interests. And corporate relations. So, field season, so in addition to expanding sources of data and approving distribution. We are also transforming our field units. Hydrographic survey sheets and RT's are spread all over this year. It went in the Gulf of Mexico one on the East Coast, as we heard about last name, rain a year just returned. And Fairweather is underway on the West Coast of Alaska. We are in the Pacific I recognize that but I would be remiss if I did not talk about our work in the Great Lakes this year. Which is the first significant deployment of a NOAA ship in 30 years. We have Thomas Jefferson along with our code serving navigation response team for New London, and contract partners have been conducting high-resolution documents or surveys in the Great Lakes again the first time since the early 1990s. So this work included testing operational testing, and operation really of the IX blue surface vehicle to augment and amplify the capabilities of Thomas Jefferson crew survey launches. As was mentioned at the opposite end of the U.S. X spectrum, as a receipt in the middle picture. The unproved system and navigation response team deployed to the Chesapeake Bay to complete four weeks of near short shadow all are surveyed using an Eco boat 2040. This is required by a storm surge spot program. In both cases U.S. X increasing efficiency and safety and quality and cost-effectiveness in the field of work. I would love to go into more detail about our field operations this year. But in the interest of time there is a QR code and the reference material in the webpage, so you can follow that to learn more about our field season. I do want to spend some time talking about the Pacific Bell. That is why we are here. It is to focus on the Pacific. And in addition to our traditional route supporting navigation in U.S. waters, there is growing U.S. interests and this reason. And the role that

mapping can play as a part of U.S. government satiety scientific diplomacy. This study of the effort necessary to finish mapping the Pacific U.S. easy in 2020. Most of the Pacific can be mapped with lidar and 1000 days of shit time. Unfortunately there is not necessary the resources associated with that requirement. But at least now we know what that requirement is. We surveyed parts of the Hawaiian Islands in 2019, the first high-resolution survey in over 40 is accomplished by a dedicated NOAA hydrographic platform. All eight of the NOAA 2001 surveys are available that an CAI and are being processed into the charge. Two of the service have made it to the [Indiscernible by Captioner]. So this year the ship reindeer as you know, was embarked upon the collaborative mission to Guam and the Commonwealth of Northern Mariana silence to deliver high quality data and products and tools in the seamless map linking the hilltops to the underwater depths. With lidar and sonar data. Integrated data surrounding the court ecosystems. The crew was dedicated to the late admirable Brandon, who many of you know. Who is a champion of this collaborative work between the National Ocean service in the fishery service. I think it is important to know the lidar data which made this possible made the ship work that much more efficient. And RSD has issued a contract to in advance of Riner's work in the American Samoa next year. And similar circumstances. So I mentioned that there is increasing government interest and engagement in the Pacific. We heard some of that this morning from the panel. Particularly for the island nations. So as some of you are aware I served as a member of the Mississippi service commission -- Mississippi River commission. With the Army Corps of acting engineers, academia, and the private sector. While that commission is focused on flood control and navigation in the Mississippi River basin. It also has an important international role in the Sister River partnership with the Mekong River partnership. The Mekong River

commission as a similar provision with the added challenge of international coordination among four nations Cambodia, Laos, Thailand, and Guam. And the Mississippi River commission visited Laos and Cambodia this past July to refresh that partnership, but we also saw firsthand how critical U.S. scientific and technical engagement is to our diplomatic efforts in that region. That includes mapping. And another kind of a punch point for NOAA in the Pacific's participation in the cell West Pacific hydrographic commission. That is charting and capacity developments across the region. We need to make sure that our developing countries are not left behind, as we move towards making Digital Products of the global standard. There ship transiting from Hawaii to Australia will benefit from modern navigation services but it will trained on data from countries like Fiji, Carol Bosse and others. Not necessarily the United States. Speaking of Fiji, survey Dr. John Nyberg participated in the state department front science Fellowship through the U.S. Embassy. He spent a month working at the secretary of the Pacific community during the time John established relationship with many members of the Pacific community and environmental organizations. He concentrated much of his effort working with Carol Bosse, it is one of the world's smallest countries by land area. But it has a large easy half the size of the continental United States the result there was this importantly threatened by pollution, illegal fishing, and sea level rise. John has been working to strengthen their geospatial program using the United Nations integrated spatial integrated management framework and is specifically concentrating helping them establish hydrographic programs and Marine spatial planning post practices. He was also able to work with Indo pay, thanks to Captain Ben Simon who is with us to bring two members from the team of the UN Global geospatial meeting in New York. Setting up to set a geospatial workshop later this year. Pacific bathymetry is

vital for marine modeling branches it uses to develop Hydro models and tied operational forecast systems. It uses the global search and tied model and the modeling blanch plans to include surface currents in the Pacific region scheduled to be operational in FY 24 or 25. These technical innovations are not possible without expanding and transforming our workforce. They contributed to the International hydrographic organization empowering women in projects by hosting free women aboard NOAA ships for a hand on experience during the 2022 season. One of the candidates went to reindeer in the Marianas, surveying Guam. To meet these growing needs recapitalizing enhancing ships in the region. Coming online at 24 and 25 should be two new ships Richard -- referred to class a vessels oceanographer Discover. They will have a full suite of ocean mapping systems, that can cover the shallowest and deepest open waters. In the oceanographer will be based here in Hawaii. Plans call for the replacement of NOAA old is hydrographic shipped this decade reindeer and fair weather. These will no be be the new class B ships focus on deploying and recovering a variety of small craft for mapping and charting. We expect the ships will focus in the Pacific and Alaska. Another area of focus in public-private partnership that will be the area for this meeting. Public-private partnerships were discussed at the joint hydrographic Center and I look forward to hearing more about this in the meeting. I do want to know a few things. First USAF University of South Florida Center for ocean mapping and innovative technology is supported by a grant. The COM ID permit review is coming up this fall and I am certain Leigh looking forward to participating. The Brennan matching funds through this day invite nonfederal entities to partner with National Ocean service is an ocean and coastal mapping programs on jointly funded projects of mutual interest. Subject to appropriations NOAA will provide up to 70% of the total project cost. With the selected partner providing the rest.

Proposals for this year award is due September 30. This seascape Alaska campaign was established in 2021. In the last year the campaign has published a story map and deemed the first ocean mapping summit. Building from an Alaskan coastal and spatial study that concluded in April of 22, the group is now partnering with the Alaska coasting mapping initiative to develop a common operating picture. Both groups work towards multiyear coastal and ocean mapping plan of action. We are also planning a follow-up summit for later this fall. So, most of what I have discussed so far is focusing on fieldwork and data acquisition, and as I mentioned at the beginning these activities are critically required simply acquiring more data is not enough. We need to develop more efficient automated and seamless means of ingesting and assessing and building products and disseminating the data to deliver our next-generation products and services. Frankly I think this connection between data and delivery is where we face our most significant challenge right now it is what keeps me up at night. Our resources are frontloaded to a data acquisition. Without commensurate investment and development and dissemination data products and services. Some of this is due to factors the rot beyond our direct control. But I also think there is engineering and organizational improvement that we can make to improve this. Of course, not on the charge for being central to the mission, our transition to EMC, is continuing. Paper chart cancellations are proceeding per plan, and we are now decommissioned an average of 30 charts per month on track for completion by 2025. We have also canceled 180 and we have 168 more in last condition status. Which amounts to over one third of our original charts. We have accelerated the pace of NC regrading in the Northeast and we expect completion of that region in six months. Following that we will move on to Mexico. We have also focused and will focus on scheme efforts in Alaska, West Coast, and Florida and lower Mississippi River. We are working on

drafting an updated nautical charting plan to refresh the last one published in 2017. The updated plan will combine contents of chart cancellation plans, ENC transition plan, and the nautical charting plan, into a single document. We hope to have that published by the end of the year. We value the HSRP input on the transition away from traditional paper chart. Partly as a result the agency recommends at the last meeting, we have worked with the Coast Guard to revise our disclaimer language on the NOAA custom chart tool output which will allow the use of vanilla car chart to products to meet Carrie's requirements in some cases where the Coast Guard finds it to be appropriate. There is a session on resilience activity later in the HSRP meeting and I would like to up to date the group on you topo with -- blue topo. We are building out the source, which creates an maintains high seminary tree to the best available data. We need to do this faster. Two blue topo is the forward fate public facing realization of the NBS, it provides high quality data in a consistent format, a means for us to deliver coastal intelligence required for National Ocean service strategic roles and coastal resilience of coastal resilience and conservation. This work is important, and the team has the New England and Gulf of Mexico data built and is working on posting and Caribbean and South East to website. The blue topo website it has a presentation that describes the data, and a link to example code that enables a user to more easily access data for the interest. Another transformative NOAA initiative that the panel is zero where is pristine merriment mean navigation program. Precision bear marine navigation is the newly released NOAA plan as Paul discussed earlier. It is a great example of how our focus on data and enables us to serve a wider range of users with timely fit for purpose products. We are continuing to work on developing additional partners for dissemination. A prototype as 102 high-resolution layer it was developed since the

last meeting and we are beginning development on S104 water level information. This is something HSR P follows closely and it is a high priority from us we will hear more from Julia Powell later in the week. Wrap up, it is definitely been a busy and productive few months, working on multiple fronts to increase efficiencies and impacts across the full range of our workload. Data acquisition, data and product development and dissemination, at the same time continuing inter- agency and leadership in mapping charts. Give to further detail on many topics in the coming days. I look forward to those discussions and the HSRP input thank you for your time.
>> Thank you very much.
[APPLAUSE]
Rich you are up next..
>> Richard Edwing: We are going to focus on the good things that we dud at the last HSRP meeting in March. And just a quick outline here, we are going to talk a little bit and what we do with the supplemental funding that we got and 22, we will talk a little bit about what is going on with the ports program and a lot of things going on the title current program. Some of the things that we have been doing and have done in the coastal resilience. In a couple of reports in things that we will be doing mainly and 23. So, we did get a small amount of funds in the disaster supplemental bill. And actually the good news is we did not get that much money because our repairs were relatively minor. You know, the 2021 season in the Atlantic was the third most active season on record. Twenty-one named storms. We only lost one station the freshwater canal. We think that is because a ship tied up to it and yanked it over when it got rough. It has been rebuilt and we've had some other minor damage, I will say the two stones just happen in Alaska and Puerto Rico. All of those stations stopped operating -- they will operate fine continuing data coming out. It is possible there are some things we are not aware of but things are

pretty good. In other East disaster supplemental as you get money for damages and repairs will you get money to make enhancements. And all East Coast surveys and some others we are part of a collaborative Everett. Two small pieces one is to work on data simulation techniques, to improve hurricane forecasting. As well as to work with the water center to get some model coupling for flood activity. And then the I IJ eight is a number of provision subsections. And there is one that was $100 billion over five years to enhance and improve coastal ocean and Great Lakes observing systems. And it was fortunate for NOAA this money came because the observing sessions were in need of recapitalization. The dark buoys and tower raise and getting fundies that is a lot of good things that are being dealt with this finding. I would like to think that the development and publications on capitalization plans, to make sure we are ready to use this money very well helped us you know compete for some of this money. So the funds will be getting here and that we will do three main things with her. The biggest chunk goes to recapitalizing and rebuilding stations. Right now that they are entire need of that. It is also going to allow us to transition into operations microwave level sensors complete that transition incentive in five years instead of ten. Also we were allowed to update some of our legacy code in our data management system which is really critical. Because that can bite you at some point. And by modernizing it we do security ways and things are operating more efficiently. It helps us improve continuity operations. That was very important for us. That was provisional. And the other bigger provision is provision number three, which is coastal and inland flooding mapping. And forecasting. And there is a bunch of subsections that none of these sections we are alone in. Throughout the whole build there is a lot of cross office and crossline office collaboration. So under the subsection called coastal in land flooding and initiative mapping, --

inundation mapping, they are modeling activities. We are excited to get funding and accelerate the development and tradition operations are operational focused systems on this. We have been working slowly chipping away incrementally getting the coast covered. This is meant to accelerate that. Also building on the disaster supplemental funding we are also going to be working on 3D models within the center. And then the other section seasonal annual predictions. And I will make the simple at the first section, it will allow us to better depict you know months to eight year out what is going on with the level. Right now we can fork asked Eric really no more than a week after it caps off. This is going to allow us to improve that. That accuracy, and in the second bullet is about taking that information and working with it, and bringing it into different types of products and services. For the applications. All right ports program. Since the last HSRP, we did enhancements at four ports we had done three ports before that. And by enhancements it's really having one or more sensors. Because they identified new requirements for that sensor. Current meters are the more popular ones with sensors as well. And then in terms of new ports, in June, we commissioned a new port and kill Sapp Washington, with the U.S. Navy. The Navy has been partnering with us a lot lately for new ports. And that makes 38 capital ports around the country. Covering about 84 of the major seaports. Soap making a lock up our progress and getting to the top 175. Then once in the queue here, Freeport Texas, I think what it will miss being wants to share in this fiscal year. Early in FY 23, but right here in a while who, we have been funded by the Navy to establish a new course at Pearl Harbor. It looks like we will get that done in FY 23 but it could potentially go to 24. Brownsville Texas is a another port where we establish new ports. As well, and 23. And we just got a letter of intent from the Port of Seattle to start working on their. So it just keeps on rolling here. Title current surveys I

think at the last HSRP we talked about the conclusion of the two-year Delaware Bay project. And now we have already started, the new project up in the Columbia River. And that was resuscitated by the deep digging Channel. Which always causes changes in title and tide predictions. And it is a new project for us. It is a long River. And I mean commerce goes up to Portland and Vancouver up the river. Is that right? I know I have somebody to check me. And they will do deployments at 28 locations, we have already done 50. Actually I think we are getting ready to pull those 15 out and we are leaving two of those into run simultaneously with this first appointment in the second deployment. And we have been kinda doing some different things at the survey, the longer the deployment we use more of these side looker meters which we did through the port system. We had to use here. So Kirby is a real-time buoy, it's a quickly deployed buoy [Indiscernible by Captioner] a small group that does R&D and test evaluation. And it is really for two reasons one is to help support observation programs, and we can sometimes use them for recon on current surveys to make sure what is going on and an area. Help us to determine where to put the longer-term buoys. It is also for our office of response and restoration. Because they often need real-time data when some sort of event happens and you start getting data from trajectory models. And all things that go into water, so they funded either to construction of the couple of these. So we have actually kind of forward deployed to some of these buoys on the different coast. We use them for regular surveys, but they are always flown back and redeployed for emergencies should one happen. In May I believe, we launched our or issued our annual state of high tide flooding and 2022 Outlook. Again this report, the new industry report is three or four years now, it looks back at the past year end what is going on and it updates the statistics with high tide flooding and ports in the U.S. and also makes a projection out not just a year

out but also decades-old. Because of the sea level rise. Besides this issue it shows and we continue to work on some of the underlying support products we have a website dedicated to this. And it will be enhanced and we will move it over to a more interactive platform. And you can click on each one of the stations, and bring up a lot of different information about that station, not just about high tide footings but seeking trends and other things. And you did see the slide in my last patient was such a good deal I would show it again because, even though this was an iteration report a lot of work on the data, that they collect is really core to this report, and an update it'll updates and Old Republic. A prison projections from the IPCC, it is an satellite data and brings that altogether. And there has been a lot of great feedback on this and how useful it has been. Also behind the scenes, we created a number of eight offers that allow people to get the data that the report talks about so they can bring it directly into products or one analysis or it just makes it easier for them to use it. In conjunction with both of these reports, you know about this event was held where media can come in and ask questions and so forth and in both cases, there is over 70 of media outlets, participating in these work major media outlets, you know CNN, New York Times. There was a range of media. There was a lot of good articles generated afterwards, and not so much in the more important thing can help provide a focus on the issues that these things are helping. External valuation, the things, and 2023, we are going to be doing a annual review and external review I should say. Maybe every five years, and is something that we have all the courage to do by Nicole Lampe. And most not I will say, I think we owe one of the first ones I involved, I've been in my entire career. I was an external review for, and they asked me too do a presentation. Some may remember the old 60s they printed that on over the objective. That's how I gave the patient that gives you an idea that was state-of-the-art technology at

the time it gives you an idea how long ago. So, anyways we are going to actually this has been set up now, we have got up and set up, everybody is invited and agreed and there is going to be three meetings in October and it is a panel that looks like this one, we have a diverse range of folks it is not focusing on everything that we do this one is going to focus on observing systems and maritime products and services and where we should take that in the future., we hope to finish up with the report by the end of the calendar year, and certainly we will be able to share that with you at the next meeting and probably send it to you before that and then the other thing is we have a contractor to waive assessment. Kind of two different things, one is Telesis size of the bread box, we are putting out the system without a clear idea of where the end is what we really want to get out there and do an assessment and or understand if there is a fully nonsystem at what does it look like? Where are the two that might benefit new boards that don't have them where objects is that don't have them them, what happened and don't need one. Or how much more expansion that they may need this will help us to plan and other things. Along with that, we want to get some feedback on the government model, if you will. We obviously have a lot of needs with the car share model. You know, there is an argument out there for a full federal funding the government's model will look like after that? We have ideas about that but we want to see what other people think then take a look at all that information and we want to understand equity and access. Considerations for the underserved communities and I think the last thing I will mention the other thing that we will do, is will we develop a new strategic plan, a five-year strategic plan. Because the one we have now comes at the end of fiscal 23. And also an external review will help before that. I am handing the baton.

>> Great thank you so much rage, that is helpful, and I think our next speaker is actually, and he is

going to talk for a minute and he will introduce Larry
>> Andy Armstrong: I will introduce my partner. Joint graphics presentation, Larry is going to report on the unproved surface special technology developments at the joint hydrographic center. That pair as well on ocean mapping and the Pacific, and in particular the Marine National Monument. So Larry's presentation will describe last months combined joint hydrographic center and ocean and explanation multi- beam mapping projects and around the area. Most southeasterly island in the Monument. And in that regard we are extremely grateful to the monument for approving our apartment to work them so, the project name, which is [Indiscernible by Captioner] which roughly means divan rise until reaching the echoing sound of blowup it sperm use -- sperm whales use this sound to locate the goal of the project is to refine and demonstrate the operational procedures to carry out simultaneous deep water and sallow water and sea pet mapping from a ship and in a park on the surface special. Each using multibeam systems in an area with depths ranging from about 20 meters thousand meters and so the fact that the exploration vessel Nautilus, from ocean expiration trust, was going to put in the monument, in an area with this wide range of death, and with a USB equipped with the shallow water multi beam whole mounted deepwater multiparty was a great opportunity for this effort. We think this is a great example of multiplayer cooperation between the office of the Coast survey, OA are ocean expiration, University of New Hampshire, and the ocean expiration trust. To accomplish our joint goal of mapping, exploring, and characterizing U.S. waters. On top of that the national survey remote-sensing division had recently complete lidar mapping of the nearshore waters around the island. Through that contract. Making this actually a six effort. We think that is not only a great example of the Pacific ocean mapping, but of a private partnership, and I will let Larry explain what we

did it and how it turned out
>> Larry Mayer:Okay, whoa it is still going. Okay, and eat that was just a fantastic introduction. And it saves me some time in explaining which I really appreciate. This was a really wonderful example of cooperation between multiple partners. And the monument folks too. We added a cultural liaison and we spoke about it earlier this morning and they acted as both a culturally age on any scientist. It really was a great example of cooperation. I have talked in the past of HRP, I am getting back to the beginning of the slide, about ASV activities. We have a whole range of activities at the lab small vehicles and medium-size vehicles, and most recently, and this is something that Admiral Smith started with us to look at this vessel which is called the tricks. Mostly because is capably it's in a plea to go very fast. And it can be very stable. So we had a loaner from the eye expert with the manufacture of it starting about two years ago or so. That we started to run through the paces, and learn how it operated, and we advanced really through another ship with OTR acquired and purchased they go in numbers, so we acquired our own vehicle DRI acts eight. This is the one that Andy mentioned, mostly for ocean exploration. We took advantage of it being there to do this combined activity with OCS activities two. Finally this most the this most recently led to a purchase of Drix 12 and it came to our lab for objective testing and now it is in the Great Lakes. We've seen several initiatives. We see our role in this as the academic partners, the one who take the bruises of the systems them when they are not ready for prime time at all. They are all prototype systems, and we go and suffer the law of the items so when it was turned over to NOAA or industrial partners we learned a lot of lessons. We are always writing lesson learned reports and things like that. It is a very good thing for us to wash the manufacturer to see if they do make the changes that we suggest. When DRIX12 comes up with the same columns as DRI

X8, we will see if that happened we did have through this place is just to give them an idea. While they were so interesting to us, with winds up to 35 knots it stays very, very stable with speeds up to 12 knots really high quality hydrographic data. With density that was suitable for OCS purposes. So we had uncertainties that were all acceptable we were happy with those early testing results. We went through its first installation on the naughty list on the DRIX eight, we had a ten day dedicated shakedown this was necessary we had to do production work at that time nothing would've happened it was a disaster after a disaster and that's what the shakedown this is all about, we were desperately work out a lot of the issues and problems. Installing a new crane and is something called the UDS. It will give you an idea of what this looks like. It is a four and a half ton package with the Yupik acts, it is not a trivial thing to launch or recover. It has a gondola that comes down, it extends down to meters. Which allows for that really high quality data at high speed. And let's see what comes next, you see the launch, it is a very simple manually controlled things once it is over the side the people it releases it and it swims back and then we will see in a minute you will get a nice view of the DRI X coming out. There is a little shark fin that latches onto it and it is actually driven out of the launch recovery system. This is underway, we do not stop this is done. And I think the next thing that will show us is kind of the real capability of this which is the high speed that it can maintain a can go up to 40 knots it was surfing at 16 knots. With the vehicle, the most playing you can keep up with the mothership and that is the advantage and I will talk about that in a moment and I think I will probably stop the video here. I do want to show you the watch shot. It shows you it swayed some capability here it is. This wave purchasing capability which makes it so nice and stable to object. So, once it is in the water, it is great as you'll see when you launch and

recover. That is a lot of the lessons learned. It has an automatic recovery system, in theory it can auto dog. It has a laser radar and GPS capabilities. And when it all comes together it is a thing of beauty to work -- watch. When it auto docs it does not always auto dog we had another leg were did every single time and another leg where it didn't everything the time. That is part of the lesson still to be learned and things to be worked out. I want to talk about the second leg we went on publicly. Which is now an ocean exploration leg. This was a different use of the vehicle not much for mapping purposes. Although we did map with a much more focused on the idea of expanding the ocean exploration footprint, and developing and demonstrating collaborative behaviors between multiple vehicles. We had to admit what a vehicle, a deep dark hybrid vehicle, and we had the DRI X out there. And we operated them at the same time and let the Nautilus go off into its own thing. We were successful in doing that we develop behaviors and follow the new one around. Well if either of the vehicles around. Relay information to the underwater vehicles Endo. Information from the underwater vehicles back to the satellite back to shore partnership, and then again the other ship going off and doing his own operation. It is situational awareness to is that we developed a look at all of the different features of all of the different systems. To me one of the most exciting things is they have deep DNA samplers. It has no idea where it is. We were able to follow it given its position to the ship. It had no idea what is going on in the water Carolyn. We had EK 80s. So this opens up the whole new world to what I call verified directive sampling. Which will have many more applications. We can also transmit CTV or anything that the vehicle is collecting. That information back up to the ship and defeated too short in real time. So it was very successful we also did a lot of mapping. All shallow water mapping. Let me get to the lake that we just get it

and ENI. This was again this beautiful intra-agency collaboration it is really a nice example. It is mostly funded O AR with supplemental funding through OCS. The goal is to understand the capabilities and limits of it DRI X. It is a tool for charting purposes [Indiscernible by Captioner] as Andy had mentioned. Road sensing division collects online our data around that, and then elect some gaps in the shallow water. And we look to see how we can fill those gaps? We had a good contingent of people. Don Jones and Lieutenant Mary head. And we had the whole DRI X team. We had 12 people from UNH on board, mostly working for OHC. Daniel, where is Daniel Daniel we will talk about the OA team mission later I think tomorrow or so. So here is the people, that is the lie.measure information. It is the lidar data. We can we develop sites for dual operations. Independently we wanted a junction with the lidar data are too. And we wanted to go out and see if we could fill gaps where the lidar went to extinction. The gaps that had been some multi data collected and we want to see in conjunction with that and redo some of that. And we also had the situation with the mothership was there, with its 30 kilohertz echo sounder. And we did shallow water mapping. I'm curious whether that data will be used for charting purposes? So we had a number of purposes out there, spectacular. Learned a lot, because the weather was much rougher than any cruise that we had been on about operating in rough seas. We are 20 or 31 knots all the time, and 1-2 Peter swells almost all the type once it is in the water it's not an issue. We actually get out there never once we not comfortable in those conditions. They would not have launched a man watching those conditions either. They were quite rough. But, what we did though, was recognized that we had this capability to go very fast with that vehicle. It has quite endurance, they advertise seven days is seven knots in six days is more realistic time, and so what we did, just to be safe, we ran back 120 miles to get near Hawaii. We launch the vehicle

and turned around and ran back another 120 miles. And we still had enough you will in the vehicle. We could do this at 12 knots, we spent ten hours or so doing that run each way. And we still at enough food and desperate fuel for three more days of serving. So we took advantage of that capability the endurance and speed of the vehicle to get us into a place where we can watch the vehicle, and then go back and collect data. And it turns out we did not have to do that again for the rest of the time. But we found enough lead to launch and recover from there. As I said the joint survey at high speed no problem. A little degradation. We had no problem with the dual operations. We operated both vessels independently. You see the Nautilus on top and the DRI X doing it survey. And we can do that up to a range of 20 kilometers, with full transfer of information full data coming back at the end of each line processing in real-time. As long as we are in the range of 20 kilometers data was excellent 95% of the data collected no specs for those water debts. They will work on this but the thesis. They will work in us all up in cap the data very nicely just to give you an example of some of the data sets and what they look like. And a lot of junctions with the lidar data and a lot of junctions with the old multiple data. Although those goals were achieved. The lidar data we got was collected. We did not have a transformation model, so we are working on this I will turn it back to Mike and Nicole and her crowd and get some input there and think all then all we were very happy with what we demonstrated that we want to show you the DRI X coverage, the Nautilus coverage, and then if we look at the existing multibeam we didn't accomplish in only eight days of work. We were only allowed to work in daylight hours. So it was only eight daylight hours that we were able to fill the gap. That we came out to try to do the next time we will focus on trying to do this all much further than 20 kilometers away from the open nature we have full over the horizon capability using low elevation

satellites I don't know how far we would get with that. We can all do from right here. Thank you
>> Thanks very much Larry
[APPLAUSE]
>> Mike you are filling in for Juliana.
>> Mike Aslaksen: There we go, hey, there we go. Thank you and thank you for the opportunity to brief on the survey progress. Updated the NRC IRS. The national recognition system. Coastal mapping program specific focus on the Pacific. It really highlights have been this year I think all of us as the infrastructure bill as well as supplemental funding to hurricane Ida. We look at the coastal mapping program. And this I cannot understate how huge this is at least in my career. The infrastructure bill and what we are directed to do to support a totally different customer base. We always talked about in addition support, and that direction we got coastal and Midland indication for the national water center. And for the service, to start taking high-resolution data. 1 meter data, from a sub kilometers scale data down to 1 meter. But more to me as an opportunity for all of us, as they want in the telemetry. That is the big missing holy Grail for them. And the topics of the models like I said last week. They assuming flat plains. I just don't understand what data is and how they can prove that. That is the data that they want and the officer survey. Again, funded around $100 million to do this over the next four years. There's a real opportunity for growth and doing not only in parallel with navigation. Now we are getting into [Indiscernible by Captioner]. Under that, we are re- tasked with the letter surveyed shoreline imagery. In 22 this program, we put 14 task orders. A little over $26 million. There is a lot of work to. We also got support for GR a V-D. We need to build models because they are important first surveys so we can get information relative to that. An additional funding look at [Indiscernible by Captioner]. We understand what the plan is doing to understand there is funding for that as well.

Again an update on an SRS modernization. We need to re- stack the priorities for an SRS. Their decisions were for public release. Again to get to the end of it we look at mid 2025 release of national space and reference system data and tools. But we are not going to wait to both of those tools. We are going to release it in alpha and beta versions, and work through it as we go. So we can get this thing in place. We will focus on like open opus S and opus projects that the online we take the data from users and petitions. We will make sure that works 1st and foremost. And then also look at across the motion. This will work in places like the West Coast where we have crystal motion that impacts the reference system. So we want to get those up and out and we will have an additional model into an updated model as it comes available. Again for more background in detail on an SRS. We did a webinar and the link is down there for the reference. [Indiscernible by Captioner]. Foundation course, this is the critical part of establishing and maintaining the an SRS. These are reference stations we've heard a lot about that a great example. In this case we are looking at having established about 200 of these stations for the federal framework in which it is a lot of partners. Thirty-six will be federal, as you can see the new sites that we will be establishing over the next couple of years. Cold Bay Alaska, Maryland, Virginia, two in Guam, and one in Fairbanks. Again great nurse like NASA and the forest service. GR a V-D update we are at 95 to 70% of collection. And very active year for them. Using a contract in assets for Guam. You can see there we have 82% being collected. We are out here this summer. There are 12 lines remaining to the self. We do need to collect those, and we are going to come back and also highlight within the Pacific excuse me, what our plans are in the oceans. We are looking to go there in April of 23. And then we are in talks with NASA to get access to a NASA Gulfstream to do the work in Hawaii in the summer of

23 or fall of 24. And then go back out to American soil which is about 40% complete, at the same time. So a lot of plans to establish in the Pacific my group, this past year we delivered 7% of the national shoreline. That is 11,600 miles. We were able to update the shoreline in the features and 58 ports. In addition we did a change analysis on 50 of those ports. So in one year we looked over 100 ports updating as well as evaluating any changes that may be updated in the following year. We have a mandate to report out on how much shoreline we did. In Alaska which is 554 miles. Also this year we delivered 6500 square miles of topographic data to the office of coastal management in digital coast. We updated 3% of the continually updated shoreline project. That is providing the GIS level water shoreline [Indiscernible by Captioner]. Again FY 2223 coastal mapping operations. This is primarily for entry missions. You can see a lot of activity plan for 23. Especially the Louisiana work that is supplemental. Again the model work that has gone on this past year. As well as plans for the next year. With contract and in-house resources. And plans for Alaska, we just did a ward contract and you can see that collection there. That is important data. There is a storm there [Indiscernible by Captioner]. You can talk to Nathan about some of the impacts they are severe this should be a baseline data set post and we will get out there next spring. Topo pathway operations, again the black lines infrastructure and projects. So we have awarded all of these contracts for the entire state of Maine. You see the mid Chesapeake there. The tent area there. You see the arrow pointing at Louisiana. As well as self Central Texas are all part of the structure. We will continue the work in the Hawaiian Islands here. Again and the monument and we did award the contract for American Samoa, which probably will not start happening -- will which probably will start happening in the fall. On the right is Saipan, and just highlighting ongoing activities in the Pacific

we have completed CMI jointly with lots of other partners at the USGS and coastal management. It gives you an indication of the quality data we are getting. 50 meters 64 feet. It is data that we have not seen before. There are a lot of different opportunities that we have heard. With no one impacts and sea level rise. And shallow water archaeology there is a lot of different articulations here for the service. Again image on the left, [Indiscernible by Captioner] and the image on the right is Alaska. You can highlight the blue line and look on the left image on the right. This is what we call the lighter line. This is by coastal rate of competence and water depths. So they can match it with hydrographic assets. Especially in the upper right here image on the rocks. What this does it greatly enhances efficiency and most importantly the safety of the vessels. They can stay offshore they are more efficient, and we get this work done we show huge savings. I know in Alaska there is always 30 of CD saved [Indiscernible by Captioner]. Estimates in the Pacific plant which you will hear later. Satellite Bath imagery, we continue to develop this too. We have uses in the contracts as well as new operations in Alaska. Again it is a great reconnaissance two. As you might know the satellite systems that we use in the sentinels are giving two images a day of Alaska Peninsula is a high up opportunity and a potential to get satellite imagery of some point. The datum update. Again a lot of this is the opportunity so we want to get the do's and the symmetry. We want to have it at a common reference. And found that they enable all of these capabilities and the needs that we have. I want to move to this fast I want to update where we are. You guys can look through this. In the interest of time. But I will highlight 4.5 is coming here next year. We will balloon in the Columbia River data in order which [Indiscernible by Captioner]. Also going to a regional development and you will see the Puerto Rico USVI 24, Texas and Louisiana 24, it is

pretty huge as well. The Alaska State lots -- my statewide model in four. We are working with the state and others to fund these gaps to get the work going. The Pacific model is at 27 that is tied to the genetics that we need to establish. [Indiscernible by Captioner] it'll allow us to update data as new data is available. Just a great shot at the same time Rainier was surveying and Guam. We had an opening three to an airborne gravity. To give us an opportunity for a nice shot of working at the same day in the same function. That's all I have.

>> Great thank you Mike. Thank you to everybody. Nice for the panel to receive all of the updates we really appreciate it thank you so much. I think we are on break time now, we are running behind let's at least take a ten minute break and then we will convene back here thank you.

[Captioner standing by]

>> Welcome back everybody I will introduce one of the moderators for the next panel on partnerships and priorities. Mapping collaborations in Pacific region. With co- moderators Joyce Miller and Breanna Helstrom

>> We have five presenters that will do this, there are two moderators actually come up welcome back to Joyce, I already said that earlier, I am game for Joyce, and Alex. Chair of the HSR P. And the other moderator, we also added three commenters. They won't be giving a full presentation but will be commenting at the end of the presentation, and then we hope to go to questions after that. I think some of this just a collaborative mapping in the Pacific relates to what we have seen already so hopefully the questions were and we can cover that as well. First up I would just like to introduce Joyce to do a quick intro to the session thank you.

>> I guess you know I am. I have been mapping out here in the Pacific for well over 20 years. And I want to say that in 2002, 20 -- one of our presenters John Smith, then Lieutenant now Admiral, Ben Evans, Jeremy Warnick is head of ocean

explanation -- exploration to define the boundaries of the sanctuaries. So, it is old home week here. As you see on this map up here. The Pacific is big. And it is mostly remote as we have heard before. And most of what is left to map is either very shallow or very deep. The U.S. territory includes 50 islands in of course Hawaii, [Indiscernible by Captioner] Guam, American Samoa, and then the spots in the middle are the smaller islands of what we call the Pacific rim Island areas. Mapping with smaller -- modern multi- beam began in the 1990s. With significant mapping resources from NOAA coral reef conservation program from 2002-2010. In the mapping has continue with support from a number of other NOAA programs and federal agency academic groups. But there are a lot of challenges, these include availability of limited resources particularly ships. The diverse needs of the various stakeholders, the remoteness of many of these areas, and finally, some think that is probably not thought of into much detail usually, but the coordination of the mapping plans, our data collection, and our data synthesis effort, present additional severe challenges. With that I will introduce Bree, and she will talk about tran one.
>> Yes this light up here is a teaser for the NOAA technical memorandum. It was published as a technical memo, but it was written back in 2020. I think covid-19 stalled it out a little bit. But it was a bunch of things associated with rainier, RST and fair weather they were going to be test with moving down the Pacific and doing a lot of the mapping work. So it is definitely from a tree and one perspective, it takes into account the resources that NOAA has it looks at him tran one ships only. As Joyce pointed out it is really shallow or really deep. When you do the map, lidar really shines. The Pacific is an amazing place to showcase what lidar can do by keeping a ship say. And keeping well, getting the work done right? And so, you know whether you agree or disagree or you know, have a different approach or whatever, it is something to

go off of here. We want to set the stage we have a great panel that can talk about all of the different reasons they want to map, and what gives me hope is that it can be done. That is exciting. Once you start there, you can't expand even more, I will leave it there and I am looking forward to hearing all of these different perspectives on mapping, because my job is to make sure we are putting resources where they need to be, and they are quite limited. It is quite a big area so I am excited to hear what you guys have to say.
>> Okay over to you John thank you.
>> John Smith: Thank you for having me here today. Okay there we go. Yes thank you for having me here today, as advertised in the program I am giving you an overview and more detail to what Joyce just mentions about the history of our combined partnership between the University of Hawaii and other groups mapping and projects that we have done as partnering efforts. And some observations out there doing mapping cleaning this area and these other monuments. And that EEC and some examples and recommendations. Upon you know what we can provide. Given resources. So this before I go off of this banner map. This is a combined multi- beam synthesis of the main Hawaiian Islands, and a separate synthesis of the Northwest Hawaiian Islands. The main ridge is kind of rotated so it is looking sideways. And it is the same map product as the big model that is printed out in the back of the room just with the multibeam I don't want to give you the wrong idea. It is all merged with the satellite imagery in the background. All right, so kind of going back decades. The Hawaii Institute of geophysics was instrumental in a lot of Pacific wide research. Not so much soft mapping, but from the 1960s on, there were a lot of cruises funded we believe by DOD sources. Which is lidar and crust and nodule research. And the management service which I believe is the predecessor to owe Emma. A lot of that occurred in the heyday of the 70s. These were they did all kinds of geophysics and

single beam bottom seismic reflection. They dredged lots of rocks. We have an archive would like 5000 buckets of rocks in it. And a lot of the research now, and then as far as swath mapping goes. The entered side scan and the sonar were developed there. In the 1980s and that spun off and became a commercial dill -- like a commercial entity seafloor international. Mapping was the reboot of the university, it came out of the version of that see Mark too. Which is a digitized version of Hawaii MR one. They also developed a 30 kilohertz which is operating and property for a cruise. They also has 8120 system from Woods Hole which is re-fabricated and rebranded. They also HM RG hosted the main Hawaiian iron multibeam synthesis. Including Joyce and myself work on that. And then they also develop real-time software and processing development software and provided support for a variety of missions. Unfortunately, they are kind of they have one person left us. In a couple of retired people that come In-and-Out of that mode as necessary. So moving on, I was involved with the excuse me though Hawaii undersea research lab. I trade one funder group, and we had a ship that was converted to SIA [Indiscernible by Captioner]. It had a 12 kilohertz CB monitor on it. It was the first vessel based in Hawaii around that system around 1995. And the program was defunded in 2013 our last dive was 2017 and the ship was sold after that. We did a lot of kind of first of the surveys in the Northwest Islands as far as dedicated service not just transit passes. Surveyed a lot of route Islands. And then NOAA came in and added to it. Mainly the ship and the survey was used for HOV support. And ROV, and I mentioned it was funded by the NTR program my colleagues Christopher Kelly and I developed this technique to merge multibeam backscatter from various systems in ships and frequencies. We partnered with a local NOAA office and for history there. Benjamin Richards and his group funded us to kind of develop a higher resolution version that can be used for bottom

fishing in a study that I have listed at the bottom. So moving on from that, the current vessel RV Kevo Mo Anna. It is a swath ship it is 100 kilowatts sonar on it. That was a second multibeam vessel in 2002. And did the first extensive multibeam survey and what would be the Marine National Monument. That is the one you mentioned Admiral Evan's joys and a number of us are involved in it. So we also did Central Fish habitat studies. Doing studies around all the main islands. And those are funded by a local NOAA office and local state funding as well. We did seven surveys and extended continent to show program throughout the Pacific about 1 million square kilometers if you add it all up. A lot of kind of applied research to foreign entities doing manganese nodules. In the clearing clipper zone. It supports all of our Ovi, and the unique whole design has a deep draft like 24 feet. And very little pitch allows us to pretty much a survey at will in any kind of reasonable or separate large see stole. So these vessels are the ones that Joyce mentioned they were in the habitat mapping center. They are decommissioned or no more here. The one on the left and the launch on the right did a lot of the surveying throughout the Pacific. And then some that are not based here, several NOAA ships, they were already mentioned the reindeer and also the Brown, as far as I note there is some limited in the recent survey. And please correct me if I'm wrong. The Explorer has done quite a bit of work in this specific just like in the Pacific Monument and the EV we have the foul core on the main islands. And then now the nautilus has moved into that mode. Those three that have been there the most, all 30 kilohertz systems. So I am kind of this is just locating. I will just talk about the main Hawaiian Islands Northwest and the Johnson atoll which are these two they are the most recent that I have worked in, and then I have a little experience from just last week returning from one cruise. So when some of the observations being out there mapping for the last number of years. Is that most of these

observations kind of follow a theme many of the sea mountains and other major features in these areas, have been mapped with the 30 or 12 kilohertz system. The 30 kilohertz is great to have on the seamount. Now we are starting to get into the deeper areas. That is not the prime zone for the 302 type system. You can't reach it, but you have a narrow swath and you have more trouble with the range. Because of their frequency. So, that is the idea 12 kilohertz system in this area would be very useful. Also, just to highlight at the bottom, one effort is spent getting a ship, and getting it with proper sonar and getting it on the schedule and getting it in the area. We also have to think about having the property that is trained and has all the right equipment. So that is quite important for getting the job done. One of the examples in the Johnson atoll area, the gold circle around it is the 200 Mino easy center around the island. These are the comp -- like a combination of the multi- data that has been synthesized and top of that local photography. You might be able to tell there are still seamounts to map, but a lot of areas in between that are all the major features. And then on the left side there is the main ships and groups funding agencies that have been involved in recent years working there. Plus a lot of transit passes. Just to kind of point outcome what you see some of the Navarrette lines. Those are from the tube type systems and the wide ones are from the EM 128/122 systems. And then examples from recent mapping, these are in the northwestern portion of the monument boundary. The area in the middle, these are all from three Nautilus cruises. The polygon in the middle is the one we return from last week. Of those three cruises. Just to show you a little bit, this is the zooming end of that area. This is what the assignment was to work in. The green and the purple our previous cruises. So they map the seamounts and they go on with additional mapping. And then the great lines are the data from the archive and the National archives. Those are

12 kilohertz. Again you can see the difference in about three times the difference from 12 kilohertz are on full speed transit rims. So just to quickly some of the views of the data sets. The seamounts in the middle of the dock area at those already mapped by the other surveys. We were filling in the flatter areas in the small bunk areas with the 302 system. This just zooms in on some features that we did map. These are all like in the 48300 or 48 or 4900 meters depth range at the pea. The surrounding sea floor you cannot see the scale, it is in the range between 5000-55,100 meters. These only are aside to qualify as a seamount. We are mapping a lot of features in the sea area. Recommendations, these are our core questions we were asked to speak to. What is working and what we would like from NOAA is providing programs like deep ocean exploration Explorer to come out here. And do a lot of the mapping, also providing external funds to the Nautilus to do mapping as well. Again, providing the funds to have the processing groups and the antsy people to support them in both cases. They go a little bit differently but basically you're still there. In the final recommendation was what else would you like to see? Again, these recommendations basically all say the similar thing. We would like to see some deep water systems out here, I know who the new ship coming out but until then the one out there is quite capable. I hear it is available cap, that would be something that you could look at. That would provide three or four times the efficiency to do some of the surveys. I saw in that paper that was magic, I believe there is something they estimated 900 days of 12 kilohertz time is required to do all of the EEC. And to get a team they don't really have a mapping team to support these things in full mode. What you need that would have to be considered. And I think I will leave it at that. The last slide I will leave there. We had done this analysis, of the area that is mapped and unmapped, we had of this is prior to our cruise. We added this little bit up in the area here. I think

about the size of Maryland close to 40,000 square kilometers of transit, and these other areas on the right so it is about half-and-half right now with the unmapped areas are pretty wide open and big polygons in a flat seafloor they are not the main ridge of the C mountains. Thank you.
>> Thanks John.
[APPLAUSE]
>> Hello my name is Dr. Jennifer Sansone and I am with the Pacific island science center. And we will focus on the focus of high-quality mapping products to the Pacific island mission. Which is screw to conduct research and monitoring programs that support domestic and international conservation and management of living resources in the Pacific region. Today I will show you how they use high-resolution symmetry to inform our fish and coral reef survey. Create predicted models of fish biomass and other indicators and identify essential fish habitats and critical fish habitats under the Endangered Species Act. I was stuck with the recently completed reindeer integrates charter charting i.e. geography and demographic for the Richard mission that wrapped up in the Mariana While the ship's hydrographic team and use the two remaining HSL's to collect high resolution imagery to close out 13 surveys for a total of 7981 linear nautical miles. The FIA ole included scientists. From the team. Many months the two science team spent together provided excellent opportunities to get to know our respected missions and identify ways our different projects could be mutually supportive. The up's component of Richard can focus on the Pacific execution of the natural core reef monitoring program. It is a long-term monitoring program. Designed to track the status and trends of U.S. coral ecosystems. Our survey domain spans the Hawaiian Archipelago, the Mariana Archipelago, and Pacific remote island areas. The components of the survey has a student survey design stratified across three definitions spanning 0-38 meters of all bottom habitat. As a survey is geographically

comprehensive across all U.S. Pacific island territories from 0-30 meters. It is a big job to get statistically robust estimates, and any improvement in survey efficiency are a major benefit. There are at least two paths to more efficient surveys. Approximately having better maps will help prevent mismatches. Ole miss allocated survey sites that require reallocation in real-time, often scrubbing scuba dives in the process. This slide shows the results of two of our most common graded data sets. Along with diver observation. Here we show two common types of data widely available across the survey domain. The continental relief model volume number ten, with the spatial resolution three seconds, or CRM. As why -- as well as lidar products. For the CRM we can show that the diagrams found different conditions than those mapped that mismatch areas in red. And they are 26% rate per site. Of all of the sites, and where there is missing data, they are 9.3% of the survey sites and gray. The lidar product is somewhat better , with the mismatch and missing's up 11% and 7% respectively. However, on the Big Island, CRM gets much worse come up with mismatch rates up to 66%, and over 20% missing data. Lidar district lidar answers better areas roughly matching. Lidar coverage is variable, for some islands it only provides partial coverage or is absent altogether. We are aware there are better lidar products currently available to the main Hawaiian Islands which will be utilized when planning our 2024 project in the Hawaiian Archipelago. But in many of the other regions that we are working that is simply for not the case. And we are focused to and we are forced to work with these products with better coverage. You can see with better symmetry and hard soft maps we can improve the efficiency. Move into the second path ultimately what would be better would be more robust habitat maps. Which we can't re- stratify our surveys as has already been done in Florida and the Caribbean. Unfortunately, and sunny areas we work the Marie national Monument. The only

shallow habitat currently available for re-stratifying our surveys, are from 2003, and have holes in them. We do not use a and they do not use a consistent habitat classification scheme. With the main Hawaiian island maps. The best coverage is in the Hawaiian Archipelago. Meaning only the name Shoals. Those products are 17 and 15-years-old respectively. With that a robust domain scale habitat map, where surveys are unlikely to benefit. With that being said, there are some new lidar data available or soon to be available at this part of the region, that will allow us to reevaluate our current stratification in approve our precision and efficiency. Moving on to bottom fish survey. These represent another high priority tips effort that relies on high quality map products to increase our precision efficiency and reduce survey costs. Having both symmetry and clean backscatter are equally important as displayed here in the expanded window, which shows stratified color coded 500 by 500-meter grades. Use for the main Hawaiian. Surveys. Defined habitat strata meaningful to the design species. This example uses hard bargaining fact scattered data inquiries with less than 1% almost never hold fish. So it can't be excluded from any survey domain. That is reducing sampling effort and cost. Moving from a nine to a 24 level stratification based on depth, hardness, and complexity. We read result in 34-57% reduction effort to achieve the coefficient of variation in statistical target. You can see the Nieman curve on the right, the blue line shows theoretical numbers of samples needed to achieve the desired CV on the Y axis. In this age of limited ship time this is really important deficiencies. Prior to the recent rainier mapping were conducted as part of the Richard project, the Marianas had imagery but much of two low resolution and did not extend deep enough for the fish domain of 75-400 meters. In addition there was little usable backscatter. Here we see an example from the islands showing overlap between the symmetry red and blue and the backscatter yellow and

brown come up with her 500-meter sampling grades. Good bathymetric coverage is provided here but little backscatter. And we have these brown zebra lines and the backscatter or artifacts that reduce these abilities. As stated previously recently completed Richard Mission, will fill many of these gaps including bathymetry coverage from 2-15 meeting -- 1500 meters with a 5-meter resolution for 95% of these depth ranges. Which will allow for the derivation of slope and complexity. In addition, rainier collected backscatter data in the same ranges. To allow for the determination of seafloor hardness. Which is a critical component of fish survey design. In addition to reading the foundation there are a high priority for service. U.S. Pacific region is so vast, and identifying and describing and protecting this essential fish habitat for federally managed and endangered species with our limited resources can be a major challenge. Excuses available maps of the seamounts and rip his own rage is located in the northern half of the Marie national Monument. The model likely locations of deep-sea coral habitats. Then design targeted on crude surveys in these remote areas to confirm and improve the model predictions and accurately identify primary high density coral and sponge bed habitats. We were also able to use distinct features such as the southern ripped zone ridge of Pioneer Bank to direct the unmanned submersible for sampling a video that reveals this area contains some of the richest deep core features in the area. Also utilize available multi- synthesis combined with biological observations to propose of fish habitat revision where precious corals in the main Hawaiian Islands. Finally, to take it back to the beginning the Richard Cruz and the Mariana Archipelago, not only provided much-needed high-resolution mapping products. To improve pick surveys or models. It also created an unprecedented opportunity for OCS and scientist to collaborate to identify specific ways that different data products mutually support each other. For example team set

down each night with the mapping team, to review the newly generated maps and refined the next day's bottom fish surveys. Team, also worked the OCS team too register that collected 3D structure read through, and the multibeam hydrographic surveys. Our SFM reef models are extremely high-resolution. 1 millimeter scale, and provide enough detail to fully document area that are spatially limited. Rainier's multibeam survey data however, covers an entire survey domain with high-resolution. By walking these products into the same scale geo-referenced, and then correlating data among the products. We can generate novel habitat maps. Maybe find other novel applications. While this is still a private scale efforts, we have successfully co- registered this data and hope to expand the effort moving forward. On the left you can see the slightly digital elevation model. Superimposed by the SFM product. Digital elevation models, in the center you see a ship DEM, SFM TEM and the final photo mosaic. The bottom line, Mike stole my money shot. The bottom line is that pips is that pips needs high quality mapping products. And this leads to increased precision and efficiency in the reduce survey cost. It also lets pick scientist to develop better and more predictive models for federally managed marine resources in the Pacific region.
[APPLAUSE]
>> Just to repeat we will have all of the questions at the end of the presentation thank you.
>> Good afternoon everyone I am Daniel Waggoner, I work for the ocean exploration trust and today I will provide an update of some of our recent accomplishments with the ship back here in the Pacific. And also provide a preview of where we are going next. So for those of you that are not familiar with our mission. So, we own and operate the exploration vessel at Nautilus. In our mission is to explore and seek out new discoveries and all kinds of different fields. And push the boundaries of technological innovation in stem education. Our pillars are exploration and go to places that we

have not been before. Scientific excellence. New emerging technologies and integrating them into a traditional approach and's see if they stand the test of time. And then training and expounding the next generation of marine scientists explorers, and other stakeholders. In terms of our priorities, they are varied, but they are broadly defined, most of them are tied to those of our sponsors. We are grateful to the sponsorship of NOAA, and various offices within NOAA. Also the no
>> strategy, seabed 2030, and decorative ocean science. Stem education and building workforce and a major pillar of what we do. And then collaboration, this is really what I want to highlight in this session. Everything that we do is in partnership with the government, academia, as well as the private sector. In the last we also have a firm commitment to diversity, equity, and inclusion. In terms of what we do, for those of you who might be familiar with us what we are most known for is our presence. So we provide live stream 24 hours a day and seven days a week. We can always go online and see exactly what is happening on the ship. Seeing exactly where it is, if we are doing a remotely operated vehicle dive, you can see the images on the seafloor. So, those images, and the deep-sea habitats is really what captivates most people. But really, foundational to all of that, is the mapping. That obviously does not get as much traction or as much, but it is really pivotal, and it is important to everything that we do. So these three components are a part of what we do and most of our missions. In terms of our mapping capability. We have two mapping systems on bird. DEM 302 is mostly a deepwater system 200 meters and deeper. We also have a some bottom profiler that is able to map the features 30 meters below C4. And next season we will also integrate meltwater at sonar fishery sonar. Now these are the standard technologies that are part of every one of our missions. But we are also integrating progressively a conditional mapping and this is happening in

collaboration with our partners that NOAA Ocean expiration Cooperative Institute. We heard this morning from Andy and Larry about bricks. And we been -- DRI X, and we collaborate with Woods Hole, and a newly operated vehicle. We are also working with fine scale so not so they can be put on remotely operated vehicles. In a series of other technologies, and I think the really important point here is that, you know we sought the maps, and if we want to map the entire Pacific not just the U.S. We will need more than just ships to do it. But we are stilling a lot of these technologies and they're still in the testing phase. To borrow Larry's words, we still need to go through some bruising and learning, we have a firm commitment in helping and test and integrate this new technology into some more traditional approaches. Now, in terms of our accomplishments, so we have been in existence for a little bit over a decade, and the first part of our history was focused on working the Mediterranean and the Atlantic. And since 2016, what we bought the ship into the Pacific, with that we have done quite a bit of work off of the West Coast and the U.S. and Canada, and then the last three years really focused on the Central Pacific, and map close to seven hundred thousand square-foot Columbus. If we zoom in on the area, we will really showcase our most of our priorities. So the biggest part of our work has been with in the national Marine monuments. It is a big remote island but also done quite a bit of transit mapping and the time between that. And I think this is a really important, you know this is an opportunity to do work and not just to rent out the systems, but they use this time and we have to go in between the adjacent waters and use it in a thoughtful way. One thing I did want to highlight, and we have heard from several speakers this morning. It is really of the importance of what we do and how we do it, and here in the Pacific is a perfect state for that. This is something that we are firmly committed to. It is that in the Pacific, this is really, really important. So, in the last

few years we are thankful to several of our partners. The office of the wine affairs, and many other partners, that have help with this, we have worked with community to develop Hawaiian names for the expeditions. We are also involved staff of the monuments, and students and all of our expeditions. And then also, we integrated cultural liaisons, that help us not during the expedition but also in the planning. So that we appropriately include the protocols and the language and the values into our missions. And also develop educational resources not just in English but also in the Hawaiian language. This is a really important. Pillar of our work. I didn't want to just highlight the plans for next year, we are currently finishing the field season. We are pretty busy in the field season. And then we are starting to plan for next year, and then next year, it will be heavily focused once again on that U.S. economic zone in the Central Pacific. In particular again the marine national monuments. So we will have several expeditions here in the main Hawaiian Islands and the Northwestern Hawaiian Islands. And I know this will work in Johnston in in Palmyra. And we will work with additional partners that will bring the ship into non-US waters. We are starting a new partnership with National Geographic that will bring the ship out to the Marshall Islands, and then continue our long-standing collaborations with oceans network Canada to support service of British Columbia. And one thing I do want to point out, which finalizes the schedule here probably next month or so. There will be putting out a call for input, this is a really important part. The map here that you see is large and easy, they are large maps, we try as much as possible and use the call that we received from both the resource management scientific community in terms of creating the finer detail plans of our expeditions. In terms of where exactly two? Will we conduct our remotely operated vehicles. What kind of samples that we collect. Because we really want to help the product scientific and research

management community. And I would just like to finalize here, a couple of things, in terms of some high level thoughts and reflections that will emerge from all of this. In particular in terms of partnerships, I think we won important thing we have to remind ourselves is we all know this but partnerships take time. They take planning, they take effort. That is why forms like this are so important to get together people from different backgrounds and different offices. And it is not enough to do that every four or five years. That is something that has to be maintained with partnership. They take a lot of time, and the importance of co- designing Inco delivery, so really working with stakeholders from the beginning and designing these surveys, and alas, the importance of doing some work and the focus of this form is on the U.S. exclusive economic zone, but as we have heard from several speakers this morning, the species don't care where the boundaries are, in Polynesia. Many people do not care, we have more connected than we are separate. And so there is also a commitment and in importance to do work as well. So thank you so much, and I will pass the baton.
[APPLAUSE]
>> Good afternoon Stephen White with the national Geo data survey condition. We will talk about the coastal mapping program. So, our ST we fall within GS and we have mapping programs and the one we are focusing on today's the coastal mapping program, the CNP. -- this C and D, we have a mandate, to doing the cosine. It provides up-to-date accurate shoreline as applying elevation data. In this tons of sources on the lighter side of things. These are just examples of the data that we have been collecting in recent years in Buzzards Bay Massachusetts. And there is a lot of information as you go into the Pope at the side you see the palm trees and in the bottom right you see oyster Bay Virginia. There is a lot of details in this data.
But one of the real case is trying to support hydrographic surveys. The whole business is that we

come in beforehand we provide shoreline with imagery. With the real hope of providing this data so they can plan operations. And have overall situational awareness. But the real priority of increasing efficiencies in the safety of these operations. Again, one of the things is the shoreline. All of our shore lanes a high base, medium high low water. Running this data and pushing out shortly and Cali control future attributes. Most of our work in the last few years has been centered in the Gulf of Mexico. On the East Coast in Puerto Rico and the U.S. Virgin Islands and some of the Finger Lakes in upstate New York. Again, what we are really talking about is the Pacific. The sensor package is mostly being used is the the four acts. This is the shallow Channel very high density. Generally going 0-2025 maybe 30 meters with some of the new systems coming out. When you were in Clearwater, you can utilize the archive which is more laser power is able to go deeper. We are getting to around 40 or 50 meters deeper in certain areas. So again, Mike steals my slides as well. You not the only one. But again, this is actually something in conjunction with the USGS office of coastal management and we were able to go to Marianas and collect quite a bit of data. You've already seen the item it marries up to the light. Also, you know it is terrible. The USGS takes the Guam data and reprocess it further for some of the deliverables that they need. So we are going to go through and show some of the data. Where we had the lidar on one side and then the light plus the multi- being. There is a few tours, once we get be on 40 meters going down to 40 to about 160 meters here. You can actually see this is probably hard to see the yellow lines and this is where the actual multibeam is actually being acquired. So they are able to stay far enough offshore. I am just jumping through her these. There is Saipan, and just kind of zooming in, and you're able to see where they're actually just a offshore and not go on shore where it becomes

inefficient. And dangerous. Tinian, and to resume serious so I think one of the things is we all talk about it, but actually having people use the data and kinda getting their feedback. I think one of the things here is is kind of halfway through this. It can be anything around 20 minutes is D. With a large buffer they feel comfortable being on board, and having high quality data is different and improved from how they use operate. They just have a little awareness of what they're actually going into. And the bottom is just a huge in terms of time savings and safety. So they were happy to have more data to share. Then again there has been a lot of talk about what we are doing, and the monument, so I would you show you some of the QuickBooks from that. This is actually really beautiful data that we are seeing come off here. And we actually come up we still have some data left to acquire. So hopefully in the next year we will get that completed. Not only the specific, going up into Southeast Alaska, we were acquiring data to help support the Rainier operations, this data has been delivered to them. Actually I will jump back there is a hold of his data. We only are collecting up to about the 40 or 50-meter contour. There are gaps, we had some of that USGS data and we could fill that in and make these visualizations really cool. I am kind of zooming in on the bottom right there, just some really high detail data in these areas. So this is a little bit different. Usually we talked about going in beforehand and collecting data. This was kind of the opposite way. So we put together some of the slides and it talks about we wish we would've had to slide up you'll see the gaps here. If we had that lidar and it would be able to go in and clean up all of its gaps. It just shows the importance of getting data beforehand. And then again we talk about acquired the information hear from American Samoa. So other things that we have been working on or with Oregon State University is coming up uncertainties associated with the data. We are working on getting a lot of the sensors that

are currently in the market to have this TPU calculation. And then there is other things, they have no belies intensity more consistent. So this will help when they are utilizing for the habitat classification. So I also wanted to talk about the technical Center for expertise. They have been doing a lot of hard work to be getting funds in the last few years to get worked up in Alaska. So we are begin priorities from a lot of different organizations and partners. They have been posters around the state. Trying to see where they have been acquired and there is a lot left. To be required. And then actually moving out into with they have been doing in this specific. They have been spending the last few years on the West Coast. But they do have two possible wake Island is going to be acquired this year so they have funding for that contract. And they are tentatively planning to get that acquired as well. We make all of this data all available in digital codes whether slider imagery or shoreline data Explorer. Again we want to use this many times. That is the whole IOC perspective. We have been taking a lot of this data, using a lot of it for metrics. To try to help the classification mapping. And they have actually had some good books using this metric to assist in that. With the Pacific logistics are a big thing.
We were initially planning the monument. You see here we have different colored circles. What you get into the red it gets to be difficult due to the aircraft platforms that they are using. We are looking to use other platforms. And then act get access to Midway as well. There is certain things like terrain. This is in American Samoa. We can't acquire we usually acquire around 1200-1500 feet. And there are certain areas we cannot get into due to safety issues. That is the yellow circle in the middle. And then there is areas where it is just not safe for people to go to. There are defense operations where it is just not say. Unless they stop that at one point time we can get in there. There is an area that we did not think we could get.

But there was a short window and we were able to go in and get data acquire. There were several other areas that we would get like high resolution mutual for the Pacific. In the end.
>> So I think might be one of the last presentation. And I hope you do not mind I am a geophysicist I felt naked without my laptop so I had to bring it up. But thank you for the opportunity to talk today. Today I will provide an overview of USGS partnerships in the Pacific. Opportunities for future collaboration and some USGS priority areas for new mapping in the Pacific. All of these will focus on mapping data. The majority also have a need for it C-4, water column and biological characterization. I will not get in the Pacific point but that is some to keep in mind. I did not put together all of the size they would through a consortium of USGS scientist. I will admit some of the slides are a bit text dance. But my hope is they will make a useful starting resource and anyone reads interested in partnership project. At the bottom of each slide I put the relevant USGS contact information is full so feel free to reach out directly to those people for partnership. So the first one you probably might be familiar with is expressed or expanding Pacific resource and exploration of some resistance. Multiyear multi-institution cooperative and D.C. areas of the West Coast. Including the shelf and slope express is intended to guide wide use of resources and habitats inform ocean energy and mineral research decisions. Improve offshore assessments. The image on the left shows areas that have been mapped through express with partners including NOAA USGS, and the U.S. CC grant. Collaborative mapping to date was over 11,000 miles of shit -based NDS. And 150 square miles of activity that is including multi- beam.
The contact is at the bottom of the slide. Then as this one is Seascape Alaska I did not know if Alaska was in the scope of the panel. I love to plug seascape Alaska whenever I can. It is a NOAA Legion with a diverse range of federal state and private

partners working towards a common goal to fully map the U.S. waters of Alaska. The figure on the right is a gap analysis of the Alaskan zone. Showing that as of January this year 69% of the electorate Scott EEC is unmet. Seascape Alaska role is to cut that number down by tracking down existing and contributed data and giving that data into CEI. two encouraging collaboration for mapping unexplored areas. And to encourage motive to the sorority plans and technology to match my data collection. Lots of interest but no money. I participate in seascape L Alaska data management working group I also want to plug that. And so if you know or have access to data and Alaskan waters that has not been contributed and you are willing to share. Please let me or the NOAA lead no. In tracking down existing data is one of the ways we can increase the percentage of mapped areas in Alaska without the need of additional resources. It is a high priority for seascape Alaska. An example data management working group just a couple weeks ago [Indiscernible by Captioner] which is making its way through the pipeline. The West Coast Alaska as the project. It is a USGS project that is based on the Pacific coastal and marine science Center. It is been working with NOAA every year since 2016. The image on the right shows information connected with low NOAA and is used to collectively assign potential. You can see landslide debris on the right line area. And from the collapse of the Delta fund great Alaskan earthquake in 1964. Which devastated the town of Seaward which is on the top left in the white. This partnership includes data with USGS and NOAA collected in Alaska and California. I won't go into any super dead on ECS but the USGS is a member of the task force. It is a lead for geological and geophysical information. The image on the left shows three of the regions that are in the Pacific as well as other regions that were the extent to be evaluated. There are still existing mapping as well as characterization means particular for hazards and resources in a range of other scientific priorities

that are related to delineating that boundary. In some of those specific ones we will get into in the future site. I think we heard a lot about three damp earlier except to highlight NOAA partnerships that have happened in our ongoing. For example, between fiscal year in 2019 and 2022. [Indiscernible by Captioner] in fiscal year 20 week collective data for all of Guam and USGS will bring that data in as a continuing project. And NOAA also provided significant questions for the island of Hawaii. The USGS global marine project is another project on the Pacific coast of Marine science and it focused on deep ocean minerals. The project aims to provide stakeholders with the best available science regarding potential resources and environmental impacts associated with accessing those resources. The map on the left shows crust and purple. So you can see the outline of Hawaii there. And regions of interest. The symmetry in scatter are required to plan examples. The end goal is geological sampling but we need mapping data in order to successfully plan the sampling mission. Currently for the Marine mineral resource project a priority areas are south of Hawaii. While many of the areas are already met. Most of the surrounding regions are unmet. And those of the high priority regions for the mineral resource group. This is what I am interested in the Pacific island climate adaptation science center. This is a collaborative partnership between the USGS and the University consortium hosted by the University of Hawaii. It includes the University of Hawaii, Hilo, and the University of Guam. The task is designed to support sustainability and climate adaptation in communities across Pacific Islands. Current priority area is the Pacific remote island areas. The Republic of the Marshall Islands, and that was interesting to hear that you are going to be there next year. I will pass that up the chain. And the Federated States of Micronesia. American Samoa is a high priority, but we hear it is already planned by NOAA. We would live full topographic leverage, but they

are very steep islands understand that. So, those are high-priority not just for 43 damp and volcano science centers. So anecdotally over the last month the Hawaiian Volcano where I am at is been responding to earthquake unrest. On top of that it will be critical information and data product going forward over the next two years in terms of mapping the island geologically in assessing volcanic hazards. The working group on ocean exploration and characterization convene somatic working groups to a dressing geographic priority areas. All of which identified the need for additional mapping data. The USGS contributed input on their needs for most of these areas and all of it makes up the water column group. The map on the right shows Calico to priority areas in the Pacific. We see a lot of those areas that already previously been discussed. Remote Pacific island areas, Alaska, not so much in Hawaii. the epicenter for the 1946 magnitude 7.4 earthquake was caused a tsunami which killed 157 people in Hawaii. I live in a small town about 20 minutes self wear 25 schoolchildren and teachers were killed in the tsunami. So, I cannot overstate the need for mapping data in the Aleutians but it is important to the hazards in Hawaii. So the last three slides identify USGS downstream products. And products that use trade one mapping data but have no currently identify priority areas but I would like to mention. These are potential future project for collaboration with these increase in turn on investment with NOAA data. The first of the projects is the habitat project which collaborative rates with government agencies to produce habitat classification maps such as the map on the left, a lot of people are doing classification including USGS. Cosmos for the modeling system project provides modeling and detail predictions of coastal flooding and storm scenarios to help coastal planters in emergency responders understand and visualize and anticipate local impacts from sea level rise and storms flooding during crying chains. The map of the righteous modeling of the sea level

rise in flooding from a 20 year storm in the San Francisco Bay region. Projection for cosmos are currently available for a number of areas along the California coast. But with more increasing data that can be expanded in other regions. And the last slide I promise, the last project I will mention his chips coastal habitat in Puget Sound project. Which evaluates changes and goes a chance to inform concerns of habitat loss associated with land use and sediment disturbance. So in the image you see there you see about 750 hectares loss of grass in the Delta. Which is a concern for recovery targets and Delta stability with sea level rise. I think we are done.
>> We are done.
[APPLAUSE]
>> Thank you to all the presenters and we want to start up for questions I think we have commenters we are going to ask for about 10 minutes behind but I think we still have time for the questions I would like to ask the commenters briefly comment now. Melia if you want to.
>> Thank you so much, hello my name is Melia child I am with the national Marine Pacific regional office as part of the conservation division. The mission is to protect and conserve habitats across eras jurisdictions in the Pacific. My portfolio is managing the fort Marine national monuments along with several other management agencies. So excited to hear the good work happening and monuments. I also help manage essential fish habitats with talk about scale right? Cheney's team asked to find resolution mapping of nearshore environments. But then we also protect large areas of the Pacific Ocean. I guess my comment is really glad first of all I want to thank HSRP committee for including a management perspective. As a end user of a lot of this data. I was glad I sat in on the previous session I heard that one of the targets is to create usable maps right? To disseminate information and quality products. And I just want to emphasize that. We are in the middle of developing management

plans for the Island National Monument. There is a lot of mapping that is going on there. And we have to use the best information available in developing this plan. One of our targets continues to be characterization in exploration of these large unknown areas. Because we don't have the information available to us. I just want to think people like Daniel Wegner. Prior to going up to primp they reached out for Monument managers and they said what is your priority mapping it? Anyway thank you for including us and glad to be here. I learned a lot from some old friends in some new friends thank you.
[APPLAUSE]
>> Sarah from USGS thank you.
>> Thank you. Hello, I am from Honolulu but I am with the U.S. Army Corps of engineers. USGS is not a bad association I'll take it. Yes, thank you for having us, this is wonderful showing the collaboration amongst all of our organizations here. The Army Corps of Engineers engine -- the Army Corps of Engineers has been mentioned about the work that we do and I will add a few more already items. The area of responsibility is the entire Pacific. Just similar to many of your folks. And it has been mentioned a few times, they are going to be collecting data the next fiscal year coming up very soon. So we are looking forward to that, it will be made available in the digital coast as it always is. And then, I also wanted to mention that we do maintain the federal channels for all of the ports deep draft harbors in small boat harbors across the Pacific. We make that data available on the Hydro. That is a navigation for the Army. We are maintaining those federal channels we are dredging them. We also maintaining the breakwaters that protect all of those harbors and we are collecting this data and sharing it. And that locally I wanted to add that we have just added a drone program. So we are using these to collect data on harbors, to get kind of if there is a natural disaster it takes the breakwaters they will have the before pictures

and we will also use it for some of the inspections. And then if you are familiar with the Army court we had a whole military mission. So we are using our drones to help with a large of those -- a lot of those projects as well. Thank you for let me speak, and thank you.
[APPLAUSE]
>> Finally I think we have heard about the great project out there in Guam. So we have [Indiscernible by Captioner] just to give us comments from his perspective.
>> Yes thank you I just wanted to pass along during the 6-7 month appointment, during this time in the Marianas, actually to summarize into a great job. From combining the structure for motion, to grab a treat and symmetry to produce the 3D models of corals. To assessing the potential early effects on coral. To updating the nautical chart. Products including maritime safety. This synergy, between these programs and the local scientists was in short and amazing collaboration. And, all of this hard data, was not his only success. So right now it was depressing to be there. During the imports and there are events, the local communities asked everybody as used to say in the area. Oversee you are from the big white bow. But they were very thankful for all of this data and all of the mapping that we accomplish there. And I hope we will be able to do the same in the previous in the American Samoa's next year thank you.
[APPLAUSE]
>> Thank you we have just under 15 minutes for questions. Will bring the panel up first proceed.
>> Thank you very much this is very impressive definitely. It breaks my heart so big when I see the scalability and energy to map the Pacific. And then it is giving me the thought, I believe and technical confidence. We did meet with the idea to call the technical conference. Where we name it mapping [Indiscernible by Captioner]. Because gathering scientists to see that cooperation in the Pacific and the priorities. So I see a lot going on

it. It is beautiful in one place where we have all of the heads together, and we talk about a solution. In how we cooperate. How we set our goals for example. They are just suggestions thank you.
>> First of all thank you that was great to see how much is been done and how much more there is. So this question is sort of for all of you. But particularly you Dr. flinders and Admiral. When I look at it from my perspective, and I see the maps that you showed in the things you need off of California and Alaska. It is deep water mapping. And of course, Admiral, you made a presentation about all of the different things that you want to be able to do. Is it real easy for the two agencies to share? Is it real easy to share vessels? Is it real easy to have a vessel go out, even is waving eight USGS five. In collect data that will really help tran one? At the same time when we stop talk about public and private partnerships and working together and all that, how easy is it to get another vessel in there and then finally Dr. flinders. The whole area of California do you know how shallow they shall was part has been? Because there is going to be a whole bunch of activity out there with the offshore wind farm. It sure likes it will overlap a bunch of your polygons and how to get everybody aware of that. So there is a couple questions in there.
>> Yes, I will speak to what I know and not say anything about what I do not know. As I said, I don't work on any of these specific projects. Think of me as a mouthpiece. So, for express in the California work it was done in partnership with NOAA for their specific we didn't -- reasons. He was offshore capabilities. But much more than that I do not know. In terms of USGS interest it spans the full range in terms of water depth. The water is amount round monk leaving in the Aleutians. And it is very shallow. And dozens of meters. You're talking areas that have fast currents. Areas that were AV out there as part of a project this summer. But we were able to map some of the areas but not

others just because of the currents. But it is also difficult to get a vessel through there because of how shallow it is in terms of mapping capability. That is on the but then you also have areas in the trench. So, in this adduction area so it is the full range. The USGS does not have deep water capability without partnerships. We have shallow water capabilities to the marine science center for the Pacific. But in terms of deep capabilities without NOAA or their partners we do not have those resources.
>> Thanks I can echo the doctor and say that the with respect to the express project that was and remains first successful collaboration between the USGS in NOAA. We have been able to leverage the capabilities of the NOAA fleet, to meet the more specific requirements of USGS in deeper waters. Where we don't explicitly add a safety navigation mission. We are interested in the data for the charge of course. But it is deep and up where it is not our primary coastal navigation charting navigation area. But we have capacity in the fleet. And we are able to partner I think very effectively with USGS to utilize the capabilities of the ships in the area. I don't know, if I am looking at Bree, I don't know if we have executed any of the express projects via the contracting vehicle. I am not aware that we have. But it does not seemed like we have.
>> I don't think we have. I think to speak more broadly about utilizing vessels, we get an allocation. We are going out there with partners and say we have opportunities. I think where Paul's group knowing what people want to do. Up front, to try to you know find those entities. I am in trouble. Do I have to say that all again? Are not considered elegant. Okay, I will leave it there. But I guess I have a follow-up question which is is there a better way to coordinate then in these random meetings? Maybe if they are not so random, but sometimes it feels unsatisfied to me to hear about things like meetings and sometimes being

reacting and not being so strategic about our resources. I think it's about a question for the group.
>> Do you want to comment on that?
>> Great presentation and from different viewpoints. We know the Pacific issues. And there is a lot of work to be done. Is there a way we can come up with a risk-based prioritization where all we were together once the prioritization is done. So we are not beating it and not grabbing one to feed the other? There has to be a better way, because all of the stakeholders are here. And all of your work is valuable. So is there a way to prioritize and then use the resources in the best way possible? To bring them on a common matrix or a common table rather than different rather your thoughts on it but thank you.
>> Further to that about bringing people together to find what those priorities are. I think one of the things that we looked at which is looking at the connotation strategy. We said not only does it need to prioritization it needs someone to actively manage. We kinda need someone at a higher level above this. It is actually coordinating across agencies. So it needs to be charted whether is to directly by Dr. spinner. They need to actively do this so they know where the projects are and know the priority is not just regular meetings. Because you cannot passively do it. I think they would still say the recommendation about that it was still stand. In a coordinated. It is a big Pacific. And what we have not talked about there is resources to train one ships. Optimizing the resources and having the right ones, I think John started talking about 30 kilohertz. The difference of one ship going out there three times or twice, and then you get the same amount of data that you get one ship going out there. This is across a very big Pacific and trying to optimize what you are trying to do you have to got to coordinate that act. And I think from the somehow coordinated act nurtures their priorities out and leave the agencies to try to work

out how they do it. I will pass it back over.
>> I mentioned I work for the University of Hawaii as to John. We have a 12 kilohertz ship that is capable. It is the same one that NOAA used in 2002 to map the boundaries. The last time it at a dedicated mapping crew, was 2018. That was funded by the law and see project out of Alaska. I was the chief scientist. There are issues with how to contract academic vessels out of NOAA. -- NOAA there isn't much sense in having three kilohertz ships coming In-and-Out of here all of the time. When one let's say 130-45 day cruise and it is capable of 45 day cruises could wipe out a really significant amount of deep data. And I think it is not cost-effective for NOAA to keep funding 30 kilohertz ships. They have great capabilities with ROP and everything. But, you know, let's talk cost. If you were told you could save half of the budget. By using one vessel versus the other. That only makes sense to me. And I know that the marine superintendent who is retired rear Admiral. I need a Lopez, who is that head of the marine center is very interested in hearing from NOAA.
>> Yes getting back to the comment on terms of priority. At least in my mind that prioritization has already partially been done. At least through no
>> and the recently published of March this year to draft strategic priority for the interagency working group on ocean exploration and characterization. That was a large consortium of five working groups. I helped run one of those working groups that was made up of 12 different federal agencies. And each one recommended by geographic priorities. There is take it or leave it, some type of priority list. I do not know what the interagency working group coastal mapping as in terms of drafting strategic priority plans. There is something there that has a larger market amount of mapping that needs to be identified.
>> I think just one comment on that. Sorry.
>> I would like to add on a little bit. We do have

the seat sketch program, which manages and accepts both work that is being done, and work that is to be done that is a common platform among the agencies for laying out mapping plans and there is also been a mapping priority exercise done it run by the IO CM program. It incorporates input from academia and the other agencies. So I think there is going. I is a good idea to use these opportunities to advertise that in those kind of programs. It make sure that everyone is aware and using those tools.
>> I would just say it with those plans and the pins that people put their priorities in. They often come with no funding, and I think this is coming back we bring it to the RP. And I work with OCS and new vessels and all those things. How does that come? Across agencies can't have request, but they cannot just come along to OCS and say we would like to stunt without bringing something along to the party that is some of the issues. I received lots of requests and collaborations. Like how do we manage and coordinate across the department to get the right funding. But then to have having to write contract vehicles even to do that. For the way that the ships are there. I think just a comment on the Pacific is that it is something that I was hoping to hear from the original panel this morning. It was about collaboration that was beyond just the EC. It is the Pacific these days. And outside the PC we have to build relationships. Because we are providing science to everyone, and having to ships. I think it is a combination and we could use contract vehicles and contract shift. We really need to see replacement for rainier so we have the right and better sensors on them and also they are out there doing other things. Having a wide ship and you are from the white ship and we appreciate you being out there. We said at the earlier conference you got to build the relationships. There is a wholesale of becoming unstable geopolitical situation. Where it seems like the NOAA white ship waiting a flag in addition to the map. It comes down into having the higher level

coordination that addresses that as well. I think that is something that is really important to support sorry.
>> So completely agree with that. You know I think what Dr. Joy said. The optimization point, to that is the use of resources that put you in a better spot. The other place I feel is commercial leads. When you are talking within the different departments of the government you are looking at commercial work. Commercial work lease the regulation. That needs to be some input there to see where those needs are getting identified. And worked in. So just a thought on that spot.
>> Yes, I am almost hesitant to raise this point. This is been a wonderful conversation, to me is a beautiful example a true friend one approach to the need for mapping. But, I also notice that there is a group not here who is not associated with the HSRP. It is a different mind who has taken some responsibility for the Deepwater mapping component too. And so, I just think as we have this really important discussion about how we address this problem but of mapping the Pacific we need to remember I personally think are artificial barriers in place on the distribution mapping that I think need to be resolved.
>> So I would just throw this out to you all. At least for the Pacific coast of the mainland. Over the next 10-20 years, there is more and more depending on how crazy everybody gets with offshore wind farms. There is going to be a whole bunch of vessels coming from other places because there is virtually no deepwater vessels available or shallow water vessels available on the West Coast. A lost -- a lot of vessels will come in with multibeam Deepwater EV's and all kinds of things. With clients that want to donate data, to state and federal agencies, and for all of the good causes of donating data. So, there has got to be a way to get those people connected with all of your needs, and really enhance all the way back to the tendering process of the appliance. To say let's get together

with some of these agencies and share data or share assets. And it is, if it is anything it is getting people aware. I just became aware watching all of this. And it is not going to start tomorrow, it will take a couple years to ramp up. But is also a means to donate a lot of data to seabed 2030. Because as all these vessels transit over here they can turn on their multibeam's and get another strip here and another strip there and it all adds up.
>> Okay, I Julie do you want to Representative the session? Okay Sean.
>> I really don't have see my chair Admiral Evans?
>> Thank you, I think we can at this point we will shift to public comment. So we can release and think our panelist.
[APPLAUSE]
>> Thank you to the pins and thank you to Joyce in our commenters, it was a very robust. Office he reset up a robust discussion there is a lot more here to delve into. And so with that, we are going to pivot now to the public comment section of the meeting. And I will assist in this by Lynn, who is behind me. So you are encouraged to the audience you are encouraged to submit comments to the question box. Please focus on what tran one can improve on optic observation in positioning in services. You should not be addressing comments or questions to the panelist. This panel or others.
So I will ask at this point I will ask Lynn to read and summarize the comments you should see them on the screen. There will be correlated in a document share with the members in the panel and NOAA and posted at the HSRP website.
>> Okay there are already for public comments. Joyce Miller gave us one but she also just set it.
So we will not repeat that one. From assistant professor she would like folks who have anything to share. They are doing research, on disaster relief supply chain. And please consider participating through a short interview. Pamela says, on the NOAA custom chart as a recreational boater, I am hoping for a more complete paper product regarding the

following. Display of controlling death's prominent in the plot over there in the supplemental she's. Characteristics, disappearing quicker than they do on the online chart display. In if not on the plot, at least include supplemental she's. And NOAA weekly chart updates. I am hoping for a version that can span a number of weeks at one time, I had heard this was being considered but have not seen it. From Guy Noel, I am interested in how the ports requirements become federated in standardized? Across the implementation spectrum as a quote unquote system. Could NOAA create a systematic approach to navigating to encourage maritime ports to have a minimum digital content signature that re-creates opportunities for crowd support collaboration. Next page from starlet Robinson. It sounds like bringing up the bran and matching fund program may be worth mentioning right now. They are looking for funding projects I think someone mentioned that. And if there are people in the room who would like to make a comment we would ask you to come up to the front and we will hand you the mic.
>> Currently we don't have more comments in the webinar box yet. But we may. So if any of the members or directors want to make a comment about any of the comments are welcome to but you do not have to.
>> I can make a comment on Pam's comment. Which is to say, we are actively working to further develop the NOAA custom chart two. In incorporate any additional capabilities. We are moving that as quickly as resources allow. But we certainly appreciate the specific recommendations and request that we can incorporate into our prioritization of additional features of that product.
>> This is Rich I will respond to the Board's comment. Simply to say I am not quite sure what he is saying. I will have a follow-up discussion with Guy to better understand what he is asking.
>> 'S rich it sounds a little bit like what you presented when you want one system, like what would a buildout system be? You'll have to clarify it.

>> I would like to say something on the guys question. So I would just be specific to the Mississippi River and our ports program. The navigation industry has worked and we have things that are of interest to us, we have seven bridges across the ship channels so a gap sensors are critical. Additional current meters are some of the other things that we look at and we have them placed on bridge appears in looking at proper placement of the system. One of the things that was briefly mentioned earlier is the continued request for a full federal funding of the ports program. We are, requesting sensors that we don't necessarily have a cost share unit 40 and M, which continues to be a challenge, and just trying to maintain the standards. There is a lot of different braces for a gap sensors to go. And I know we are working on one right now. Some of the challenges we see our costs related to shutting down a bridge, nighttime traffic management to allow installation below it, so there is a lot to it, I think a standardize the ports is hard. Because each system is different, and has different needs.

>> I will just follow up as a standardize from the aspect all the senses follow the same sense of requirement. Whether it is a current meter or whatever. It is displayed the same way around the country is gone all going to look the same no matter where you go. You're right every seaport has a unique set of port requirements. And what sensors they use. But they all put them into documentary requirements in terms of accuracy and off often they take samples and things.

>> So specific regarding ports, funding and the way ports are set up. It produces a challenge or a sense of equality within ports because you are looking at stakeholders for funding some of them. So, as we know just as an example the Houston Galveston ship Channel is the largest port in the United States today right? The last two years it has been the number one port as tonnage and container traffic is go around 22% this year. We

know we are going to enter the fall season restricted visibility coming up in another month or so. I am on ports at this time. In that area does not even have one visibility sensor at this time. There are other ports of smaller significance where they have two or three or five centers. Because those entities there were willing to pay for it. Because it is a private public partnership. Can know what consider a program based on national economic need, because all said and done. In 2021 figures, the Port of Houston had an 800 billion-dollar impact on the U.S. economy. So we are talking close to two and a half billion dollars a day. And even shut for one day because of a few hours in addition to jobs it has a huge economic impact on the country. I'm sorry I'm bringing this up a second time, but I feel it is a need an economic need, and we don't have it so maybe there is another way to look at this process. And how we designate these visibility sensors. As to make it objective in getting an answer rather than subjected and causing those issues related to it thank you.

>> Can I say something here? I totally understand and get we are coming from. What the one challenge we are talking about equality and equity for underserved committees. Because we base it on the economy Alaska would never get any coastal monitoring that we would need.

>> It is to be complicated.

>> Capturing the Port assessment what other things that we need to look at. It is a fairly funded system to equitably address the needs.

>> Because it is economic, and it is a safety really you know about the ports I think our next session we have it whole another choice that we have got to talk about this. But there is a lot of interest among the HSRP members around the boys. In his bendable ongoing talk as long as I been involved. So we could think about how to deal with it for the future. Because I think we can spend a lot of time talking about this. And the different variables.

>> Or we could have an innate an engagement meeting also. Dedicated to that and we could think about that. Okay, did you want to say anything else on this? Right now?
>> Note that I am happy to engage with the panel.
>> Let's talk about it and see what makes sense in the region. And are you all right? We are good? Okay that we are going to switch into our round robin. So, what we are going to do here is go around to all of the panel members, we have about 25 minutes. To give our wrap up oppressions or any comments or any questions that have emerged from the day. And we will adjourn the meeting. I think we will start with those that are online. Is Mary Thompson still online?
>> Okay Gary, I know you've had a busy day too. But if you were able to sit down on any of it or have any comments or questions?
>> Sure, great session today especially about partnerships. I think what we just heard about the ports I think that would be a good topic for our next session. So a great presentation today.
>> Thank you, and we will be hearing more from you went we are session too. Let's see are you still there?
>> I am definitely still here, I have had a couple of notes that I made in listening to all of this.
>> We cannot hear you and are you talking? Are you muted? We lost you completely. Okay, and we will come back to you. I'll come back to you after we go through the others and will see if we can you at that time. Okay, let's move on, we will start at the end of the alphabet Nathan. It is up to you.
>> The honor of going first. Okay, let me see if I can read my writing. Let's see, I mean, I have obviously have a slight bias towards Alaska here. So I was pleasantly encouraged a number of times I heard Alaska referenced in the Hawaii in about the Pacific. This morning when Paul shows were talking about NOAA climate authority in advancing equity you know Alaska really plays right in there. You can see climate change firsthand in Alaska with

permafrost melting and the remnants of a typhoon a great example of that I don't expect reduce storm challenges in the future it'll probably just increase. I think the last time that I talked maybe went a little bit long. In the last meeting in March. So I'm go too much longer. I was also encouraged to hear about the potential coverage in the Alaska in the NGS net why 24. Speeding that up in any way it would be beneficial again. I know the response were a lot of the storm surge damage that was caused recently in Norton sound would benefit and be expedited with models. I think those I will keep my comments to that for today.
>> All right thank you very much Nathan. Ed.
>> Thanks Julie. First of all thanks to you and the whole team for setting us up for such a heavy dose of Hawaiian input in Hawaiian culture and Hawaiian themes. I think it was really well done and oversee really appropriate, it was great that the governor showing up, that is a first for me being at one of these things and having the governor of the state show up. That was great I think. All of the topics associated with the various aspects of incorporating the types of things that are important to the Hawaiian culture and all of the reasons of subsistence fishing and Polynesian voyagers. As a means of why we do this. I think that was an important point. Paul's comments are great. It was a great start to what we would talk about on Thursday. And listing out priorities of climate authority in advancing equity. Everybody gets access to the products in the services in the same way at the same level. And the economic development and the new blue economy. I am encouraged to keep hearing that and where we are going with all of that. A couple of other points. This session that included Bill Thomas and the gang was great. My only complaint is we did not to ask the questions I was dying to ask them questions. Specifically, the comment about an example of you know and alienable responsibilities. I think it is a great term I would love to get an example of it so I can get in

sync with it because it is a really powerful statement. It would be nice if he could send us a couple examples of that. Great to see going forward with seabed 2030 and the commitment from Noah on all of that. And the other comments on the the matching funds. That leads to what we want to talk about in terms of public and private partnerships. And then wrapping up with the last discussion I think it is always amazing the things that I personally learned when I come to one of these especially when we do it in the public venue like this. And it was amazing to see how much mapping is going on. And how much more needs to go on that happened here in the Pacific. Hopefully this can stimulate a lot of that thanks Julie.
>> Thank you.
>> I thought it was a great day. I have two notes for today. First of all, I want to thank Rich for talking about the current work that was done on the Columbia River and also on the Columbia data. I think John would hit me in the head if I did not say something to acknowledge that. I know it is much appreciated up there. And the second thing I wanted to say is I really appreciate the discussion on cultural resources. I found it edifying. Just having a new perspective and how you view culture in just in the process of policy and priorities, and I think it is in an important perspective to consider across all decision-making and policy.
>> Dave?
>> I thought all of the sessions were really excellent. I am going to give you your briefing several of us on Thursday about public and private partnership. And I was taken by the statement given by Bill Thomas. He said relationships move at the speed of trust. And I thought about that and said zero my gosh. This whole public/private partnership thing is based on how the public and private trust each other to work together. To get results of common benefit. Relations -- relationships move at the speed of trust. So anything that we can do to promote trust between private and public sectors is

going to make all of us who lock happier in pursuit
of the goals that we seek coming thank you.
>> Okay Dave Lindsay?
>> Hi yeah I had a number of notes some of them yes,
I also really appreciated the work that he has done
to set the stage chair in the discussion about the
cultural relationships and the things that we have
an is an important part of not just the Pacific.
But wherever we are. I mentioned just in the last
session, I was really pleased in that initial one
where they said the Admiral's work. It was a
discussion I did not expect to hear about that. It
was all Pacific it wasn't the U.S. easy. And see
that it was being addressed that way, I thought we
might discuss something more as I mentioned about
the geopolitical situation, and how the importance
of the NOAA ship's being out there. It matters
represent the U.S. of the work is a big Pacific and
there was no one out there. We spent a bunch of
time out there this year. You all mention the
Johnson atoll, three and a half weeks almost four
weeks. There was one vessel I saw in the Johnson
atoll, it was a Chinese fishing vessel. And when I
was out there is like this is weird why are we out
there doing other stuff? The I really appreciate
Encina and go to back that again. It is like about
observing. I think we get so wrapped up in the
technology and how we do things better and I'll
assume things is about observing and what we have
always done it is still the same I'm trying to pass
that one. That was really important. There was one
I think Admiral mentioned, just in passing, I
mentioned something about data we concentrate on
data acquisition is a lot about that. It is got to
get to products. It is not about the data all the
time. I think they mentioned the products. And
what you do, from the point of view we do have on
the priority matrix. I think it is something I
would hope to address sometimes about how we get the
data that comes in the door, that gets to the
products out the end. And I think that is really
important and if you struggle and you mentioned

that. I think that keeps you awake. I think you should address that future meetings. In the comments about the Pacific. Making sure we optimize the resources we have out there to do that and the importance of coordinating and actively having someone as a priority matrix. So I think we still need I personally think we still need someone out there is an active coordinator for the mapping. And that may be outside OCS. But Paul did mention this morning we should think about that and go beyond ICS. I think that is important thank you.
>> Thank you Lindsay. Nicole?
>> Thank you, so I will start out by thanking Lynn great day. From logistics thank you for making it all happened it was wonderful. Also thank you to all of the panel organizes in moderation speakers really good information today. I love starting out with that indigenous perspective, overall, and then hearing a little bit about their perspectives on that effect of climate change, and you know getting into their shoes and their heads in terms of the perspective of the underserved communities that we are charged with supporting very much right now. A couple of things specifically that were said, I agree with Ed. I would've love the opportunity to ask a few more questions earlier. Bill Thomas' comment regarding resilience, he said he is always been tough. We are not vanishing people. And that is a really powerful statement when you are thinking about coastal resilience and how we are going to respond to climate change over the next decades. I also really appreciated Matthew from the office of climate change city and county. Saying that they really required their data and products to be acutely local. So I think that is one thing for an organization to get down to that level. So great morning session. Or opening session. The conversation that we are starting to have about economic benefit. That would you know, prioritizing project based on something. And if it is economics, then that is something that we actually discussed at length last week with the Army Corps of Engineers

advisory panel in Anchorage. Because the court has use that benefit cross ratio. It has served them pretty well for the last 50 plus years. But now, to serve the underserved communities, it is failing miserably right? It is this system was not built to do that you know? Especially if you are looking at that economic. So, I think one of the questions I would have like to ask a little bit maybe we can get into this tomorrow or at another time. Where are we kind of, so I guess the core is looking at adding other things in the way they prioritize projects rather than just national economic benefits right? They look at other social effects in particular. How to quantify that is a huge challenge. So what my question for this group is has have you been given guidance or developed a definition of underserved communities? And kind of where are we in terms of quantifying what that means? And then finally great idea about Lindsay on dissemination right? It is part of our charge gathering data we talk mostly about but dissemination of data is also something that trade to overseas and that's that you challenge for coastal resiliency as well. There is lots of tools out there, so getting appropriate authoritative information into the hands of coastal managers for decision support and that dissemination piece is usually important thank you.
>> Thanks the call. Sean?
>> Thank you Julie, so Dave mentioned the comment that caught me today. About relationships moving at the speed of trust. Another thing that was said by José Sanchez of the Corps of Engineers. It goes back to enter agency coordination. And it talks about the culture based on quality. And as we looked at a lot of challenges I will come back to the Mississippi River. After being in the Pacific all day. We see some of the same challenges data alignment. We have disagreements, as and said, I have to mention John dancer and I'm sure is happy that the Columbia is done. But he himself knows that is easier than the Mississippi. And the Mississippi has not been done. But I will stop

there. I think at some point trying to nuance between role with NOAA and private industry I continue to see challenges, related on understanding of budget. I will see more and more missions being taken on, and I wonder if the budgetary staples are there to continue to serve needed navigation services. And maybe would request either through Glen or Christie a little more information on that budget so maybe we can see where some of the shortfalls are. May be creatively think of ways to help in that pursuit. There is a lot of challenges that I have seen going back to sensors that NTSB report on the sunshine bridge mentioned a bunch of different data challenges. Made some recommendations to NOAA on proper charting. I would like to come back to that so we can respond and make sure that at least four that portion we are helping NOAA obtain what they need to solve some of those challenges thank you.
>> Thanks Sean. Alex?
>> Great section today. It was very interesting. And different. Overwhelming difficult and complex is the Pacific ocean region compared to the Caribbean region or Atlantic base. It is really overwhelming the work that has to be done. Going to the ports. It is my opinion and I agree with Nathan about the economy of scale of the area. The ports are owned by the state or they are private in some cases. They can actually pay for their needs. They do not have to be done everything just like the Coast Guard does. You have a federal Channel okay they do federal bullies. Private Channel going to facility for port you have to put your own voice. They can apply the same principle like fourfold signals or other things or electronic tags that we have got today. So and another thing is we are looking into what NOAA is running kind of short on moving platforms over the sea to do research and investigation and so on. But we talked about a lot of public-private why don't we also talk about public and public. For example the United States is building five new multipurpose service multi-

mission training shifts for the academies. Those ships most likely will see that the dock for seven months a year. They can't actually put the equipment needed to be used for science and no one can use them they are training for cadets. Because at the very end, not only it is science but we are going to run short of seamen, and we are looking at that right now all of the new things are coming. That we have here in the U.S. those are my comments for today.
>> All right thank you had news?
>> First shout out to Lynn and the team, and the amazing speakers and the arrangements here. I talked to today's morning session it was amazing. It gave us a view which was outside of our way of looking at it I thought it showed us different aspects of society members of society playing that out. It was eye opening for lack of a better term. I really like it. And I thought that was a great perspective the way we go about things. From Bill Travis I think of law I took away the partnerships are about trust and trustworthiness and core governments. So I think that is where our key factors go. Coming back to Paul, I really like the aspect about the blue economy and looking outside the box to come up looking at optimization and looking at collaborations. Those are key factors that we are looking at. I agree with prior to Dziedzic and we spoke about that there has to be something bigger. Looking at the holistic picture for optimization of resources. The $340 million each for those training shifts, it is a huge chunk of money. And if they are sitting for several months at the dock I'm sure we could find a better use and it is part an interagency discussion to put their $2 billion on the table. And I am sure the students would learn and you would get one of the things that we raise today is shortage of personnel who understand surveying and biometrics. So that could be an advantage and learning in that space. Thank you I learned a lot. Completely agree with the comments and I still feel the economy is what is

driving and that is where the money is coming to NOAA. So we owe something that to grow that. Thank you so much look forward to tomorrow.
>> Thank you
>> Yes thank you very much Julie, and Len, and all of the people it was a great meeting and a great start. I love the morning session and the afternoon session. Just bringing focus to the community. That was amazing. It was nice to give them that. And understand where they're coming and when they are concerned about the nature and the environment definitely. And the morning session on the private local and federal governments. That was a great session definitely. And I really like to thank Paul for her indication for us to be bold. I just think what we think and what NOAA needs to do and thank you for that we definitely will. This afternoon session was great. It is very impressive it will make you proud and the agencies and NOAA especially. And now we learn about the ocean exploration. They have a nice shift in shallow water mapping. Maybe we need to do formal Corporation. I mean, focusing therefore divide and conquer. Because when you talk about mapping. The Pacific it is a huge task. It does not mean is not doable. We need to organize it in no way will we have all of the energy. We divide the task. For me as a private industry when I want to take over job. The first thing I deal with with a certain index. Mapping tiles. Who is going to donate and corporate with partnerships. So that's how we tackle it, divided into smaller pieces not by geographic location. But we really need a very organized way with tiling of things. But it can be done. So the one thing that I noticed really we focused on data collection. Not as much mansion on the role of the AI. Artificial intelligence. When you collect that much multibeam it is going to file, you don't want to just you know interpretation manually by humans. You got to go and focus on the machine and deep learning for exploration they are talking about mineral exploration, but you want to do it manually. You need to on leash that power of

the computer definitely. As for the concern. They brought up about the sensor and distribution around the nation. How that is and the lack of it or the of it in some areas. I really wish NOAA would take leadership and performing assessment analysis. You know economic value for these ports, versus during restrictive things. And based on that, we can determine the need. This five or six and fog and wind. But that does not mean NOAA would be responsible about doing it. But we have a scientific way of saying this port is missing five sensors or three sentences. So you are putting just the foundation for people and then the pressure on the state or the port management. To abide by that they have at least good guidelines. That is really all I have a thank you very much everybody I think it's a great day actually thank you Julie.
>> Thank you, are you back on?
>> I think I am back on
>> We can hear you.
>> A couple of things it has spent a lot of stuff for my brain to absorb. Some things that I have written down collaboration to solve beta gaps. Collaborate. That is important. I really believe that. And would like to, I like the thought of one point of the technical working group. Outside of what this is doing. But to bring all of the other imports, and all the other sources of data. And coordinate and collaborate and read eliminate redundancy. Where it is not necessary. And make more adequate use of limited resources. Just going to this morning, I spent some time in Hawaii. I read interesting books about the whole Polynesian navigation systems. There have been a couple written in the last year. That I find really intriguing one is called the way of the birds, which I don't know how to say it. When she touched on following the path of birds flying home. Which is definitely something that this book talks about. There is another one that have not gotten into it. The title is C people. It talks about basically the population of the Pacific by the Polynesians from

west to east. Which was for such a long time not an accepted thought. It is definitely open up a lot of minds of what the real possibilities are. Too that extent the things that she said about observing the physical environment around you. And understanding what is creating the changes. And what I wrote down and this goes to another comment that was made about vanishing people. They're not vanishing by any means they have been overlooked for a while. It is start to pay attention again. Old ways does not mean irrelevant. If you don't know what physically the charts and maps are shown you, how do you really understand that digital postage stamp image? If you have a physical sense of what the changes are that are creating a difference in movement on a boat, or the difference in a way the air feels around you, or end the way that the wildlife is operating. And doing whatever it is doing to whether to go fishing or to go home or whatever. I think all of that is still incredibly relevant, and I hope we never lose that sense of physical connection to this globe, to this motion that we all spend so much time on. I'm looking forward to tomorrow too. To talk about data collection and all of the things that are going to get put into creating safe navigations materials and what I wrote down on data collection it is not useful if it cannot be translated, into useful products. It's nice to have numbers is nice to know how deep it is, but can the mariner use that to get safely from port a two port queue. Or is there some missing piece that would connect that mariner with that self information. My final comment is basically looking at data for safe navigation and I am still primarily focused on the nearshore environment, because that is where they have missed. That's what I do not want to run into things I want to know how deep it is? The rocks were are they, what are the things that I have to be aware of. Because they will have an impact on my tricycle really look forward to tomorrow. I think that will be in his presentation tomorrow morning, but I have to tell you, today it is kind of like the last

couple of weeks. My brain is full it will take me a little while to digest a lot of the stuff but I appreciate all of the efforts of all four of their survey transiting, trying to turn all of this into useful information, contributions
>> Thank you. All right, Rich got over our own time. I want to make sure.
>> I will keep it brief like everyone else I found this morning to be really great. Just a cultural immersion. As well as the panel of people from the area talking about the priorities and challenges of the missions. I just is really set up the whole rest of the successful giving kind of basic level of understanding, and I also even though my program is involved with emotion. I found that interesting as well. I think the two yes it is a very at a very large challenge and I also thought a lot was interesting and good. There is also a lot of commonalities between the two areas in terms of size and those sorts of things. I will stop there.
>> Okay thank you Rich. Mike? Do you want to say a few words?
>> No. Yeah, I think all is been said and probably one of the best sessions that I've ever been to as far as presentation of what we are to where we are the presentations. One thing we talked about coordination, and sometimes it gets on the hair of my neck stands up. We spent an inordinate amount of time on the operational contract awarded. Three years over out here, we went out here and organizing to try to build a coalition of the willing to do specific mapping in conjunction with Marine fisheries in the time we have on the ship. Everybody was safe yet that's great, but at the end of the day it was the resources and navigation services that came to the table. That made a lot of this happened. I am not hearing his comedy time people using know what data collected by map services. As we go forward who are these uses. So I put out the challenge to chase users of data or it may be resources. Because again we for the next thing that I picked up. And again there are some

successes coordination ration more recently within the GS, we've had successful collaboration and funding from the state before. More recently the USDA. The CS is going to be funding us to join projects for their requirements received earmarks in Long Island sound throughout Florida. It is a lot of work we actually try to pull [Indiscernible by Captioner]. Chase these things in the way it happens as agreements. Just for her awareness on the part of it. Your comments still go unheard but some of us if you have attended you need to look at the users of the data.
>> Great thank you Andy T want to say something?
>> Sure all the panels and presentations were really excellent today. I think I would like to say I thought the cultural protocol this morning was beautiful and inspiring. And I think it really did, as other people have said, get us in the right mindset for everything that we did today. So I would like to thank them for that. And again express my appreciation thanks.
>> Clarity want to.
>> I am the very last there is nothing left to say. That has never stopped me before. I think we have heard from everybody. It really was a wonderful wedding day. Thanks and expressed to Lynn and Vanessa and all of the people was really quite a success. I think we saw the power and value for ships. Expressed in real terms, I think that will inform our discussions later this week. With examples that appear to be working. And some other issues too. And that is important to keep that in mind too. We also again as everybody said the protocol and all of the input from the local communities. It really helps us understand why we are doing it but it also reminds us of the importance of incorporating traditional knowledge and community involvement. And like everybody I have been doing this long enough, I was absolutely impressed by the breadth and range of activities that are going on in the Pacific. Even on the agency and also intimidated by how much more there

is to do. And I think I was very flat at the end of the last discussion that we did come back with this overarching concern. It is really important that everybody knows what's going on. As best we can, and terms of both need with respect to mapping. And the activities. Because it is just a sin to duplicate these kinds of efforts at this kind of expense. And so I would just leave it there again just a great day. Thank you all of who organized it and I look forward to the rest.
>> Okay thank you Larry. Paul?
>> I was quite impressed. I will simply say I was quite impressed with what you all adjusted. You all just showed that you were listening, that you heard a lot of the information and that you all have great ideas. That is great. That's what we need. Thank you. I will leave it at that.
>> Thanks Paul.
>> Thanks Julie at this point basically everything has been said. That will not stop me from talking. So I think that you know I have been thinking a lot about the panel that we had in the morning. With looking at the requirements in this specific basing starting at a global level basically. In trailing gradually down to the local requirements. I appreciate the comment about hearing more about the U.S. government diplomatic requirements. That is something that we hear strongly about and my position and I know our DOD partners very strongly about that. I did hear it but maybe only because I was really listening forward. But I think that is a a powerful driver that we are going to have to figure out. Me in my office are going to have to to figure out how to navigate. I will echo the governments, and he presentation on community engagement, and I did want to make one note on that. Because it struck me last week I was as I mentioned I was in St. John's Newfoundland for the Arctic regional commission meeting. You would not think a meeting in St. John's in a meeting in Hawaii where they have that much in common. But on this particular point there was tremendous commonality

and how we engage with indigenous communities. It turns out, the comments that were made today were in many cases Word for Word the same comments on best practice and strategy for engaging in indigenous communities in the Arctic. That resonated with me and the requirement that we listen intentionally for community requirements, and that when we come into a community we not only focus on building capacity but also building ownership. Ownership of the process, should ownership of the data. We saw examples of how lack of work. And there is an example that we heard last week in St. John's. Shifting to the afternoon, I think the one thing that struck me there is the one of many things that struck me is a comment that Dan Rather made. Partnerships take time. And the further comment that relationships move at the speed of trust. I think I mentioned or we mentioned yesterday that the Richard project the campaign in the Marianas was scheduled for 2020. And we were very frustrated at the time as Mike pointed out we were here what three years ago to plan that campaign and to build and map out how the two projects how the two missions the coral reef mission and the mapping mission would integrate and we thought we had it figured out we felt we were ready to go in 2020 and I think covid-19 did us a favor. Because it's not like we put that plan on the show for three years and just dusted off, no they kept working that, and what you saw, which I think was phenomenally successful, what you saw is truly the result of two to three years of planning, not you note the two days that we spent locked in a room, figuring this out. So if we had executed this in 2020 I don't know the thing -- Mike I don't think we saw the same degree of success. I want to thank the members of the panel who picked up on my comments about the challenges that we face producing products from data. I do want to emphasize that sometimes the product is not necessarily talking about making a nautical chart. Or making an S100 product. Really we want to get the data in whatever form is necessary. Whatever form is fit for purpose

into the hands of the users. And at all levels of that that is a challenge. And then I think the last point I was going to make. I kept coming back to the panel in the morning or the discussion that we had this afternoon. I think there was some comment on this. How do we, as a navigation service community within NOAA, how do we balance our domestic mandates, and our forward leaning requirements. Whether that is deep basin to expertise to bear on mapping the deep basin in Pacific. Or being forward leaning to support U.S. government priorities in the Western Pacific to support our partner our national partners. Again that is a challenge that we feel that we feel the tension on that on a daily basis. And so we look forward to forward conversation on that. Thank you.
>> Thank you very much, okay we are going to, I am go to hold my comments until tomorrow or the next day. Because I feel like beer is on everybody's mind. And I was going to turn it over to Len.
>> Anybody would like to Join us we are going to the Waikiki brewery for an informal join up. If you don't know where it is tell me your e-mail send it to you. And we will start at 8:30 a.m. tomorrow, for the members and the staff who have a working breakfast that is at 7:30 a.m. same room, same time, same place.
>> Thank you so much and thank you to all of our NOAA partners.
[APPLAUSE]