U.S. DEPARTMENT OF COMMERCE

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
(NOAA)

HYDROGRAPHIC SERVICES REVIEW PANEL

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PUBLIC MEETING

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WEDNESDAY
AUGUST 28, 2019

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           The Hydrographic Services Review Panel
met at the Hotel Monteleone, 214 Royal Street,
New Orleans, Louisiana, at 8:30 a.m., Ed Saade,
Chair, presiding.

HSRP MEMBERS PRESENT

EDWARD J. SAADE, HSRP Chair
JULIE THOMAS, HSRP Vice Chair
CAPTAIN ANUJ CHOPRA
SEAN M. DUFFY, SR.
KIM HALL
DEANNE HARGRAVE
EDWARD J. KELLY
CAPTAIN ANN KINNER
DR. DAVID MAUNE
CAPTAIN ANNE MCINTYRE
CAPTAIN (ret. USCG) ED PAGE
GARY THOMPSON

NON-VOTING HSRP MEMBERS

CAPTAIN ANDY ARMSTRONG (ret. NOAA Corps),
        Co-Director, NOAA/University of New
        Hampshire Joint Hydrographic Center*
JULIANA BLACKWELL, Director, National
        Geodetic Survey, NOS
RICH EDWING, Director, Center for Operational
        Oceanographic Products and Services, NOS

*Participating by telephone

NOAA LEADERSHIP PRESENT

REAR ADMIRAL TIM GALLAUDET, Ph.D. (ret.
        USN), Assistant Secretary of Commerce
        for Oceans and Atmosphere, NOAA
NICOLE LEBOEUF, Acting Assistant Secretary, NOS
REAR ADMIRAL SHEP SMITH, HSRP Designated
        Federal Official; Acting Deputy Assistant
        Administrator, National Ocean Service,
        National Oceanic and Atmospheric
        Administration; Director, Office of Coast
        Survey, NOS
CAPTAIN ELIZABETH KRETOVIC, HSRP Alternate
        Designated Federal Official; Acting
        Director, Office of Coast Survey, NOS

NOAA STAFF PRESENT

GLENN BOLEDOVICH, Policy Director, NOS PCAD
CAPTAIN RICK BRENNAN, Chief, Hydrographic
        Surveys Division, OCS, NOS
VIRGINIA DENTLER, Center for Operational
        Oceanographic Products and Services
LIEUTENANT DAMIAN MANDA, Chief Hydrographic
        Systems and Technology Programs Branch,
        Coast Survey Development Laboratory, OCS,
        NOS
LYNNE MERSFELDER-LEWIS, HSRP Coordinator
NEERAJ SARAF, Acting Chief, Coast Survey

        Development Laboratory, OCS, NOS, NOAA

**ALSO PRESENT**


THOMAS S. CHANCE, Former CEO, C&C Technologies

     and ASV Global (ret.)

CAPTAIN BRIAN CONNON (U.S. Navy, ret.), Director,

     University of Southern Mississippi's

     Hydrographic Science Research Center

MICHAEL J. STAREK, PhD, Associate Professor

     of Geospatial Engineering, Texas A&M

     University Corpus Christi; Director of the

     Measurement Analytics Lab (MANTIS), Conrad

     Blucher Institute for Surveying and Science

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

2                          8:37 a.m.

3              CHAIR SAADE:  I'm calling the meeting

4      to order.  The first order of business is

5      somebody left their phone in the other meeting

6      room, and it's active, so we can send all kinds

7      of messages and things.  So you want to claim it.

8      Okay, that one's taken care of.  Sorry, we're a

9      few minutes late.  We got all excited about a

10     topic we were talking about.

11              Welcome back to the HSRP meeting, Day

12     2.  We had a great first day of speakers and

13     discussion.  We'll do a quick recap of yesterday

14     from the members.  As we don't have time to do

15     audience introductions during the breaks, at each

16     break I'd like to ask you to introduce yourselves

17     to someone you don't know.

18              Today we're discussing the details of

19     the matrix and continuation of the issue papers.

20     The matrix is an evolving document that helps

21     inform all the HSRP members on what NOS does and

22     where HSRP can be most strategic with

1  recommendations or for issue papers or sessions

2  and speakers.

3  I'm pleased to welcome Captain Liz

4  Kretovic for being our senior member on the NOAA

5  side of the delegation, and I'm going to hand it

6  over to Liz right now.

7  CAPT KRETOVIC:  Thanks, Ed.  Welcome,

8  and here's some housekeeping details.  If you

9  haven't already signed up to make a comment or

10  signed into the meeting, the sign-in sheets for

11  both are coming around the room.  The emergency

12  exits, again there's one, two, three and that one

13  there, and you'll just follow them out to the

14  lobby and then out onto the street.  If we have

15  to evacuate the room for any reason, we'll just

16  meet out in front of the hotel.

17  Bathrooms are out these doors and

18  across the hall, and I look forward to today's

19  sessions and all of the speakers that we have

20  coming up.

21  CHAIR SAADE:  Thank you, Captain.

22  Captain Kretovic and Julie, will you please lead

1      us with your comments from yesterday.  We'll do a

2      recap around the room from the members and what

3      resonated with you and themselves, and to inform

4      the recommendation letter and meeting recap, so

5      you two can take it away.

6      VICE CHAIR THOMAS:  Right.  I did, I

7      did come up with some comments yesterday as we

8      mentioned, things that might be good to include

9      with the letter to the Administrator.  I have

10      been jotting them down.  I did capture Glenn's

11      comments this morning about the meeting at the

12      White House.

13      I will include that, and, yeah, I mean

14      I learned so much yesterday from the

15      presentations.  Aside from that, I think the

16      discussion about these issue papers is really

17      interesting for me, and as we try to get a handle

18      about what is the best process and the best way.

19      And I think it will be great to look

20      at that prioritization menu, also to really go

21      through that and fine tune it for this meeting.

22      That's all.  Gary.

1          MEMBER THOMPSON:  So it was good to

2   hear yesterday cooperation between federal

3   government and local governments and also other

4   federal agencies.

5          As I pointed out yesterday about

6   datums, recognition of datums and how important

7   it is we make it through this transition.  And

8   then from Rich's presentation and then others,

9   the importance of more gages out there and how

10  that data is very critical for public safety.

11          CHAIR SAADE:  Kim.  Sorry, Ann.

12          MEMBER KINNER:  Good morning.  It was

13  my phone that was lost, so my brains too.  The

14  key things I caught yesterday that -- and I said

15  this then too, the key words I got from the

16  Harbor Safety Committee summit in Houston in

17  June, the national, was there were key -- two key

18  words, resilience and relationships, and the

19  ability for all of these agencies to work

20  together, to share information so that problems

21  can get solved in a timely fashion and things can

22  move forward as they're needed to.

1          MEMBER HALL:  I'll just echo what I

2    said at the end of yesterday about efficiency,

3    efficiency, efficiency, especially for our

4    soybean friends.  So I think the key there is

5    infrastructure investment in the marine

6    transportation system is obviously key to

7    economic growth in the region.  It's not just the

8    region, but that's what we really -- I think we

9    got a feel for yesterday.

10          And two, and it's -- Ed'll probably

11    appreciate -- Ed Kelly will probably appreciate

12    this, but it's a team sport for sure when it

13    comes to PORTS and other sensors and things that

14    we're trying to get in, but really who pays and

15    where's the division of labor on that.  So I'm

16    going to take away from this meeting Sean Duffy's

17    boss's comments about customers always want more

18    and are willing to pay less.

19          But sometimes these seem to be truly

20    inherent governmental functions, and so when you

21    decide who pays when it should be a governmental

22    function as well.  So not just the consumer.  So

1    those are kind of my two big takeaways.

2              MEMBER KELLY:  I'm all about the three

3    S's, safety, security and sustainability.  I

4    think by hearing what's going on here locally,

5    just like we know in major ports, all major ports

6    need NOAA services and data to operate safely,

7    efficiently, to protect the environment.  All of

8    that comes together and it creates economic

9    impact, as we've heard very dramatically here.

10             But however, every port is different

11   and that's why I think moving these meetings

12   around is very helpful.  When we talk about

13   precision navigation, it's not a generic term.

14   It means being safer, more secure, and more

15   sustainable.  But what works in LA/Long Beach is

16   useless to me in New York, and what works in New

17   York is probably not going to be much help down

18   here in New Orleans.

19             So although there's an old saying if

20   you've seen one port, you've seen one port,

21   there's a lot of similarities, but there's also

22   very big intrinsic differences.  So I think the

1 ability for NOAA to act in a way to produce a

2 suite of data and services that are uniquely

3 adaptable across the board and are useful with

4 adjustments downstream in individual ports is

5 very important.

6 Again, I think you know New York is a

7 big town, and New Orleans is a little bit

8 smaller. I was impressed by the way the

9 community seems to be very tightly knit down

10 here. We had 9/11 and that pulled our port

11 together, and you've got rain and storms and

12 hurricanes and a hell of a lot of water.

13 So you know I think those driving

14 factors really push the way the ports come

15 together and operate in established

16 relationships. I think those types of

17 relationships are absolutely essential, and I

18 think we have to look to see how NOAA fits into

19 those relationships in every port, and that we

20 can create a broad suite of universally useful

21 data and services, but have the ability to tweak

22 them as necessary to fit those individual pieces.

1       So I'm kind of excited to see the

2   differences in the ports, and again perhaps here

3   in New Orleans we talked about a little bit more

4   than anyplace else, ports and marine

5   transportation equal dollars.  There are huge

6   economic impacts.  The U.S. is a trading country.

7   We aren't an island.  We depend on maritime

8   trade, and I think, you know, we have to make

9   sure that that comes forward also.  Thanks.

10          MEMBER DUFFY:  Good morning.  So I

11  will kind of change my recap notes based on some

12  of the conversations that we had last night, and

13  it was very good to hear that, you know, Mr.

14  Steenhoek from the Soy Transportation Coalition,

15  that, you know, that he showed and demonstrated

16  something that I in some ways take for granted,

17  because I speak about it all the time, is how the

18  American farmers are kept competitive because of

19  the waterborne transportation costs of the

20  Mississippi River, being able to barge commerce

21  down, barge grain cargoes down.

22          There was also a lot of positive

1    reports about the pilot presentations.  You know,

2    each pilot having their own real challenges.  I

3    did a story with a local reporter earlier this

4    year, and when we went down in that first 30

5    miles of river there were seven dredges working.

6    I don't think that happens in very many places,

7    and there were seven dredges working and we were

8    still not able to really keep up.

9         So that the challenges of our country,

10   and I will always look at -- I remember an old

11   saying of what's the competition doing.  Well, we

12   know the country of China is looking to dredge

13   Argentine rivers to increase their soybean

14   markets, as we have challenges here and of course

15   some of the tariffs have had a huge impact on

16   that ability.

17        But I was happy also with the

18   reception of our ports members of Brandy

19   Christian and Paul Aucoin, and the best economic

20   number that's available for the impact of the

21   Mississippi River to the nation is $735 billion

22   on an annual basis.  So it's big money.  It's

1     very important for a variety of reasons, from

2     flood control to drinking water to environmental

3     tours, fishing.

4          So as we are here and I was very proud

5     to hear of some of the high points that those

6     presenters were able to make with you, and I will

7     be proud to tell them that they did a good job.

8     It's all about team work, right?  Thank you.

9          MEMBER McINTYRE:  Good morning.  I was

10    super-happy to see the National Weather Service

11    included in the presentations.  I think that

12    accurate forecasting is a critical component of

13    the precision navigation systems and the

14    effectiveness of that.  And on a broader topic to

15    that, just the partnering.

16          I think that the partnering with the

17    other agencies and the private sector is super-

18    important, and I also like that we touched on

19    agencies not duplicating other people's work with

20    like the ten year cycles on the dredging, where

21    we're able to take advantage of whatever the

22    agency is doing.

1          The other thing that struck me too was

2     with the VDatum presentation, the importance of

3     getting every, all the datums on the same thing

4     so that we can easily share the information kind

5     of between the Army Corps information, the NOAA

6     information, the USGS information so that we can

7     get all across one broad platform I think would

8     make things more efficient.

9          MEMBER MAUNE:  I agree with what all

10    the previous speakers mentioned.  I was really

11    impressed by the soybean presentation.  I think

12    my biggest topic of concern is what we have not

13    talked about so far, and we're doing the -- NOAA

14    is sponsoring a 3D Nation Elevation Requirements

15    and Benefits study, and I commented to several

16    people yesterday that of those that submitted

17    requirements for -- that were concerned about sea

18    level rise and subsidence, the comments came from

19    Florida and the New England states.

20         But who is most heavily impacted by

21    sea level rise and subsidence?  I can't think of

22    any state more impacted than the state of

1    Louisiana, and then North Carolina didn't submit

2    anything and I know it's a big interest to Gary.

3    I'm hearing that well, we're not allowed to talk

4    about those things because we don't want to

5    impact the value of the real estate along the

6    coast and ought to let people know that their

7    land's going to be under water in the near term.

8              So I would like to see what we can do

9    to work on the issue paper that Julie has going

10   there on sea level rise and subsidence this week.

11             VICE CHAIR THOMAS:  Right, and

12   remember there is a panel tomorrow too.  We have

13   a panel on sea level.

14             MEMBER CHOPRA:  Hi, good morning.  I

15   thought yesterday was a lot of good information

16   we got, very valuable, resonate the comments

17   already made.  I just wanted to especially

18   highlight the three pilot association, the

19   economic impact of the river on the economy as a

20   whole, and then the challenges faced by the three

21   pilot -- the presidents of the pilots

22   associations.

1           I thought that that was very relevance

2      for us, especially look at Mississippi River,

3      trying to identify those objects and trying to

4      get that information out, because safety is

5      paramount and that's today rather than a plan

6      time for tomorrow.  So I thought that was

7      critical.  Otherwise, a very informative day and

8      looking forward to today as well.  Thank you.

9           MEMBER PAGE:  I thought yesterday was

10     very informative for me.  I've been to New

11     Orleans several times and ridden vessels down

12     here and what have you, but I've never really

13     fully appreciated the impact and the importance

14     to our nation of this whole river system, so and

15     for that matter, the critical role that the

16     federal government and obviously particularly

17     NOAA and the National Ocean Service has with

18     respect to ensuring that this is a viable

19     transportation mode that impacts our country and

20     the blue economy.

21           So I'm very impressed with NOAA's

22     role, but also Army Corps of Engineers and all

1    the other agencies involved, Weather Service, all

2    pulling together to -- and FEMA for that matter

3    to make this system, the river system and

4    economic engine work efficiently and effectively,

5    and of course the maritime industry itself, the

6    pilot association, et cetera.

7         So it's very, very impressive and I'm

8    overwhelmed as far as the impacts of it, and very

9    much enlightened.  So it was good and I remain

10   very impressed with what NOAA's services does for

11   our country and American industry.

12        MEMBER RASSELLO:  Hi, good morning.

13   What I took from yesterday and I agree with what

14   Ed has said, that the importance of establishing

15   the order in the port who has been hit by a

16   hurricane, all the ports are not the same.

17   Waterways and ports are vital for the economy,

18   are vital for the sustainability of the country.

19        And I think probably ports more than

20   the airports need to be reopened as soon as

21   possible in a timely manner.  What I have

22   experienced with Miami, and I can tell you that

1    without opening the port the city would never

2    recover.  The airport was ready to operate, but

3    the first structure around the airports were shut

4    down.

5              So the only  way to get some support

6    to the people was through the port.  Not all

7    ports are the same, so the resources should be

8    allocated according to where the ports have very

9    certain environmental changes, such as the

10   Mississippi River.

11             We noticed a very dry month at the

12   beginning of the month, and then when the storm

13   came in we had -- floating.  So this contrast of

14   event, you don't have time to act if you're not

15   prepared.  We told the agencies and the National

16   Weather Service to be included in the discussion

17   I think is vital for our program.  Thank you.

18             CHAIR SAADE:  Rich.

19             MR. EDWING:  Morning.  So I thought in

20   keeping with recent meetings, the opening remarks

21   as well as the panels yesterday were excellent,

22   really high quality, informative information, at

1    least up to the directors' panel.  I won't pat

2    ourselves on the back.

3              But I think the thing I really took

4    away was just kind of the stagger -- Ed already

5    used my quote, if you've seen one port you've

6    seen one port.  But I was -- yeah, I think the

7    scale of what we're looking at here is

8    staggering.  We're really focused on Louisiana

9    and kind of the lower Mississippi River, but as

10   the soybean gentleman said what happens down here

11   affects up there.

12             If you think about it the Mississippi

13   River and all the tributaries, you know, its

14   reach from north to south, east to west just

15   really staggering just in scale and scope.  Then

16   of course along with that goes the commerce that

17   flows up and down, and Mister is it Aucoin,

18   O'Quinn?

19             Aucoin, okay Aucoin.  Yeah, he talked

20   about how largest seaport in the western

21   hemisphere.  So, you know, those things are

22   always staggering.  So, you know, along that,

1  with that goes all of, you know, all of the

2  organizations, you know, federal, state local

3  entities that are involved and have to work

4  together, and that's kind of good news and bad

5  news.

6           I mean the bad news is there's a lot

7  of people that have to play the team sport.  But

8  the good news is there are a lot of people that

9  if they work together and work together well they

10  can make a lot of difference.  So really I'll sum

11  up by saying how is this really taken, which is

12  kind of the scale of the issue here, you know,

13  even though we're focused on that lower, this

14  lower portion, it really affects almost the whole

15  nation.

16           MEMBER HARGRAVE:  Yeah.  I fully

17  agree.  What I learned yesterday was really eye-

18  opening about the magnitude of the Mississippi

19  River and how it supports the nation.  Pretty

20  much everything has already been said.  The only

21  thing I would add is that I think there's a real

22  opportunity right now.  There's a lot of data

1  that's being acquired, and the data is more

2  resolute and so the data sizes get larger and

3  larger.

4  And so part of the -- what I'm hearing

5  as needs are ways to disseminate that data in a

6  useful way to the users, and that can be all

7  kinds of different ways, and there's an

8  opportunity right now with the advancement of

9  artificial intelligence and machine learning.

10  We're seeing that in industry, and it is making

11  major leaps and bounds.

12  So I think that's something that we

13  should certainly focus on moving forward, to

14  bring this really good quality data to everybody

15  and make it more usable.

16  MS. BLACKWELL: It's Juliana

17  Blackwell. Just to follow on with what's already

18  been said, you know, the complexity of the area,

19  the importance of keeping the channels dredged

20  and keeping the levees high enough and strong

21  enough to prevent any other disasters from

22  happening with those being compromised.

1          I guess one of the things that struck

2    me  is, you know, we heard yesterday about the

3    Missouri River and the things that go that are

4    happening upstream, and I don't know that we've

5    ever considered having a meeting inland anywhere

6    where we can get a different group of

7    stakeholders, but that thought crossed my mind

8    too, and I don't know where that location is and

9    I'm not -- I'm being half serious here, where I

10   think maybe finding out a little bit more about

11   what's happening in other parts of the industry

12   where goods are being grown, and on their way

13   down river maybe there's an opportunity there for

14   us to reach a different group of stakeholders.

15   Thank you.

16          CHAIR SAADE:  I'll go next and then

17   you.  Thanks, everyone.  Just a couple of points

18   to summarize.  Obviously we heard the term

19   teamwork and multiple agencies working together,

20   and a lot of good examples, and that's obviously

21   something we want to keep promoting, and I think

22   we're all completely in agreement on that.

1          Then the only other thing I'd bring up

2     is we're starting to hear the term sustainability

3     and resilience a lot, and we as a group ought to

4     talk about that at some point, if we can squeeze

5     it in.  Maybe not this session but even if we

6     have a discussion on one of our phone calls to

7     talk about what's going on in the world relative

8     to everybody tracking that kind of type of

9     activity and the metrics involved in it.  Captain

10    Kretovic?

11         CAPT KRETOVIC:  Thanks.  Yesterday, I

12    was really impressed with all of the panels, and

13    every time we go to a new location I always learn

14    some different way that our data and information

15    is being used by stakeholders that I hadn't

16    really thought about.  So the presentation from

17    the soybean industry was really eye-opening.

18    It's such an economic driver, and what the Lower

19    Mississippi provides to the rest of the country

20    is really mind blowing.

21         Also just seeing how these federal

22    partnerships are really working here is also

1    really great to know, that we have strong

2    commitments from our federal partners to ensure

3    that the waterway is safe and being navigable.

4    So thank you.

5              CHAIR SAADE:  Thanks, Captain.  Okay.

6    Next item on the agenda is Julie and Dave, for

7    taking the lead on continuing some more

8    discussions on Planning and Engagement Working

9    Groups.  So I'll hand it over to you, Julie.

10             VICE CHAIR THOMAS:  You know, we could

11   take this time to bring up the prioritization

12   list, or we could look at the strategic plan for

13   OCS too.  Do we want to do comments for OCS?  I

14   think that Anne very nicely, succinctly grabbed

15   our comments, and  I think we can do that to get

16   it checked off our list here.

17             How should we do this?  Could we bring

18   up those comments?  We have them in our

19   notebooks.  We're going to bring them up too,

20   flash them up.

21             I think we also have a printout of

22   those -- we also have a printout of those in the

1    notebook, towards the very end.  Lynne did these

2    great notebooks for us, so I know that it's in

3    here too.  Anne, do you want to talk about that?

4              MEMBER McINTYRE:  Yeah, I can start.

5              VICE CHAIR THOMAS:  To bring it up

6    too?

7              MEMBER McINTYRE:  There we go.

8              Yeah.  So basically all I did was

9    collate the written comments that Panel members

10   had forwarded along.  But the big one I think

11   that we should kick off with is that there didn't

12   appear to be any mention of cybersecurity in the

13   draft strategic plan, and with everything, you

14   know, I'm not a tech person so I don't understand

15   how the cloud works and everything like that.

16             But I mean clearly the direction that

17   things are moving is that I think that

18   cybersecurity is going to be an important aspect

19   of implementing most of the programs that are

20   there, and I just felt that there should be a

21   mention of that.

22             MEMBER KINNER:  I just want to echo

1           that because that was something that jumped out

2           at me really quickly.  The Port of San Diego was

3           hacked about a year ago with a malware attack,

4           and rather than paying the malware, they put in

5           an entire new system.  But it meant for several

6           months things were not where they needed to be.

7                     The cloud isn't something ethereal.

8           It's hardware somewhere in somebody's warehouse.

9           I don't know who maintains the various servers or

10          how they're interlinked, but I know that there's

11          vulnerability in any of these online systems.

12          We're seeing it with the GPS systems, with the

13          Coast Guard putting out warnings about hacking

14          and other places where there is known jamming

15          that's going on, which may be somewhat more

16          innocent than you expect, but it's still a

17          significant problem.

18                    When the GPS does not work the way

19          it's supposed to, and you're trying to maneuver a

20          large vessel to a port dock and your GPS is off

21          by 25 feet maybe?  I don't know how much it takes

22          to screw the whole thing up.  But I think

1    cybersecurity is something that needs to be part

2    of an overall plan.

3                    MEMBER HALL:  As somebody who works in

4    this field, specifically maritime cybersecurity,

5    I think the key and the strategy isn't

6    necessarily about the tools and systems for which

7    you can -- the solutions.

8                    The strategy should address governance

9    and strategy.  So I completely agree after

10   reading this last night and this morning, that

11   that is something you have to take into account

12   at the beginning, because if not you're

13   constantly, and this happened to San Diego where

14   they rebuilt their system completely, you're

15   constantly in reactionary mode versus proactive.

16                   The Coast Guard is one of the worst.

17   They have some of the worst cybersecurity

18   internally and they're probably likely to be hit.

19   They like to tell us all about how we should be

20   scared, and there's a plethora of solutions out

21   there and everybody's offering them, but nobody's

22   really concentrating on that like governance and

1   really understanding what you should do before

2   you buy the -- the requirements before the

3   solutions.

4           So I think that a simple mention of

5   that works, yeah.  I don't think you have to

6   decide what your cybersecurity strategy is at

7   this point.

8           CAPT KRETOVIC:  Yeah.  Thank you for

9   those comments.  For the precision -- I can speak

10  to the precision nav program, and I know that as

11  we start this exploratory work in the cloud, we

12  are definitely considering cybersecurity.  I just

13  don't think that we put it in our strategic plan.

14  But it is something that's in the plans as we

15  move forward with building out this program in

16  the cloud, and then turning it operational in the

17  cloud as well.

18          And so the point's well taken and

19  maybe we'll add a bullet in there somewhere to

20  assure ourselves that we're addressing it as we

21  move forward.  So thank you very much.  I

22  appreciate the comment.

1          VICE CHAIR THOMAS:  Kim, do you want

2     to write like a few sentences and send them to

3     Anne, that they might add in there?  It seems

4     like that's your expertise there and --

5          MEMBER HALL:  Are we, are we -- so

6     we're offering actual edits to the strategy?

7          VICE CHAIR THOMAS:  We are.

8          MEMBER HALL:  Happy to do it.

9          VICE CHAIR THOMAS:  Yeah, just to

10     include it.

11          MEMBER HALL:  As long as the Captain

12     is, yeah, would like it.  I don't want to --

13     okay, cool.

14          MEMBER McINTYRE:  Yeah.  I mean I

15     think within the -- a lot of the comments that we

16     had were more kind of editing comments that we

17     could pass along just as far as clarity and

18     consistency throughout the bullet points.

19     Another thing that kind of jumped out at me is

20     how you prioritize the work that's within the

21     plan, and you know, there's a lot of -- you know,

22     when I look at the backlogs that are there that's

1    concerning to me.  But then at the same time I

2    don't know if they are important things that need

3    to be looked at, or if it's just a matter of

4    having looked at and getting them cleared.  I

5    mean after hearing more about the mapping of the

6    EEZ I understand why that's important now.

7              There was one mention in there about

8    getting all the Coast Pilot onto the electronic

9    -- into the ECS.  You know, personally when I've

10   been actively navigating, I have never had reason

11   to look at a Coast Pilot.  That's more of a

12   planning document, and I'm not sure how

13   integrating like a publication like that into the

14   ECS necessarily creates a lot of value.  You

15   know, that's something that you look at before

16   you go in, and it's just when I look at all the

17   other things that are on there, to me that would

18   be a pretty low priority item.  Again, I don't

19   see how things are broken out as to how you

20   prioritize them.

21              CAPT KRETOVIC:  Thank you.

22              VICE CHAIR THOMAS:  Why don't you wait

1      until you get Kim's comment, and then you could

2      send your file again to Lynne.  Any other

3      comments on the strategic plan?  Okay.  So we

4      have three strategic plans, one from each of the

5      offices.  Yes.  Is there consensus on the

6      comments that have been submitted?  Do you think

7      we need to have this for the public record?

8              (Chorus of aye.)

9              VICE CHAIR THOMAS:  Yes.  Any opposed?

10             All right, thank you.  Next, let's

11     see.  How much time do we have?  Twenty-five

12     minutes.  Do we want to bring up the priorities

13     matrix?  So that is in the back of your notebook,

14     because it might be hard to see on the screen.

15             If you bring it up.  So I think we

16     decided at the last meeting that we would

17     categorize our ideas that we wanted to discuss

18     somewhat.  They're color-coded here as far as our

19     different categories we set up, and that this

20     would be a dynamic document.  We would be

21     updating it for each of our meetings.  So maybe

22     we can take a minute and just start at the top.

1    Does everybody have -- I can see Gary's.  Keep

2    going behind that.  I see the color behind that.

3    This is it.  Okay, right.  It's right at the back

4    of your notebook.

5              On the left-hand side, right.  Anybody

6    not find it?  Okay.  So restricted -- I'm just

7    starting at the very top.  We've got restricted

8    visibility, and this is ongoing.  I believe we've

9    already heard it.  My comment on this is it's an

10   ongoing issue.  We've heard it mentioned already

11   at this meeting.  We have it tagged as ongoing.

12   We're going to mention it again in the letter to

13   the Administrator I believe.  Any other comments

14   on that one?

15             Okay.  Relative sea level rise and

16   high tide flooding.  This I believe also is still

17   a continuing, ongoing topic.  We will have a

18   panel tomorrow on this here, and certainly in

19   Hawaii and San Francisco where our next two

20   meetings are, they're both are having,

21   particularly on the Pacific Islands, serious

22   issues with flooding and of course in San

1 Francisco the airport is so vulnerable. So I see

2 this as an ongoing issue. Any comments on that

3 one?

4 MEMBER MAUNE: Julie, was it your

5 desire to have an issue paper published this week

6 on --

7 VICE CHAIR THOMAS: I think that

8 decision will be after we meet and we go through

9 it, and then we'll send it back out to the Panel

10 and that will be a Panel decision.

11 MEMBER MAUNE: Okay, after tomorrow's

12 sessions on --

13 VICE CHAIR THOMAS: Yeah. So well I

14 think maybe we'll have time later today to meet

15 and talk about it in our groups, and then we can

16 decide and it will be a Panel decision whether or

17 not we publish that.

18 MEMBER MAUNE: Okay.

19 VICE CHAIR THOMAS: Okay. National

20 policy issues.

21 MEMBER CHOPRA: Julie, sorry.

22 VICE CHAIR THOMAS: Yes?

1          MEMBER CHOPRA:  One comment on the sea

2    level rise?

3          VICE CHAIR THOMAS:  Yes, of course.

4          MEMBER CHOPRA:  Would it be possible

5    to get some sort of statistics region-wise, to

6    see what sort of trends are happening?  That may

7    help us make that decision and strengthen, put

8    some more material onto that issue paper what

9    we're doing.  Just to see the trend analysis in

10   different regions, and how it's separated from

11   subsidence, subsidence.

12          Because in many of the measurements,

13   both of them are listed together.  So just a

14   request for that.

15          VICE CHAIR THOMAS:  Right.  I think

16   some of that might come out in the panel

17   tomorrow, but I also -- there have been some

18   really good documents published, and Audra has

19   been advising on this somewhat too through CO-

20   OPs.  And I think there's a lot of good

21   statistics out now of coastal cities around the

22   U.S. I was reading before I left for this

1    meeting.  So I'm sure we can get together some

2    more statistics on that.

3                    National policy issues.  I think this

4    was put in here perhaps with Admiral Gallaudet's

5    chair of CMTS.  We wanted to see if there were

6    things that he wanted to bring up.  Is that your

7    recollection, Dave, that that's what the national

8    policy -- okay.

9                    So as you know, Admiral Gallaudet's

10   chair of the CMTS.  It is an excellent

11   opportunity to give him suggestions or ideas

12   about what might be helpful, that this Panel sees

13   helpful going forward.  So we can certainly talk

14   about this one again tomorrow.

15                   Maybe in the recap at the end of the

16   day at the meeting, we might come back to this

17   and see if there is -- what hot issues we want to

18   make sure -- what message we want Admiral

19   Gallaudet to back to the CMTS from us.  Is there

20   something or items that we should put out there

21   for him?

22                   MEMBER MAUNE:  And I think Admiral

1    Smith also listed this as a topic that he was

2    interested in.

3                VICE CHAIR THOMAS:  Oh, for the IHO?

4                MEMBER MAUNE:  Us pursuing the

5    national policies.

6                VICE CHAIR THOMAS:  Yeah, I think

7    you're right.  That's actually where it came from

8    wasn't it?  Okay.  So let's come back to that

9    one, try to take a little bit of time tomorrow

10   and see if we can get together some comments for

11   that one.

12               Okay.  Hardening of offshore

13   observational sites.  This was something that

14   Larry Atkinson had brought up.  I mean coming

15   from the observing world we are always thinking

16   about, and I know Rich does this with his PORTS

17   system, many people around the table.  Any time

18   you put an instrument in the water you think

19   about how to harden it or on the edge of the

20   coast line.

21               What do we want to do with this?  Any

22   thoughts?  I'm not sure we -- do we -- I'm not

1    sure it is one that we want to leave in there as

2    a priority.  I don't know if anybody on the Panel

3    is going to be addressing this.  I don't know if

4    we would have a panel addressing this.

5           It seems like it's an ongoing issue

6    every time in all of our worlds.  Do we remove it

7    from the Panel or from the list?

8           MEMBER MAUNE:  I think we should.  I

9    don't know enough about it to --

10           VICE CHAIR THOMAS:  Okay.

11           MEMBER MAUNE:  To know who to talk to

12    to proceed.

13           VICE CHAIR THOMAS:  Okay.  I'm going

14    to take this one out unless there's any other

15    comment.  Gone.  Artificial intelligence.  Well

16    that one has certainly been coming up, and it

17    says follow up with Lindsay Gee.  I know

18    Lindsay's having a hard time making these

19    meetings due to conflicts.  I know we also have

20    lots of expertise.  I know Neeraj is sitting over

21    there, works with AI, you know.  Yes, Kim.

22           MEMBER HALL:  I think this was a very

1    specific.  So I know that it says just artificial

2    intelligence.  But I think that's why we wanted

3    to talk to Lindsay because there was something

4    very specific that he was talking about, kind of

5    like specific to what Gary is talking about in

6    his paper.

7              So I don't think it was a writ large

8    -- if we want to do that, I think we should cut

9    out, put in several different areas we're looking

10   at.  Specifically, this one was related to

11   disaster recovery.  But I think we shouldn't --

12   AI is not just one large thing.  There's a couple

13   of things that we think it applies to.

14             VICE CHAIR THOMAS:  Very specific.

15             MEMBER HALL:  Yeah.

16             VICE CHAIR THOMAS:  Okay.  So I'm

17   going to take out the comment "follow up with

18   Lindsay," and do we want to tie this directly

19   into emergency response?

20             MEMBER HALL:  That's what it says

21   currently, but I don't know if there's other

22   things that we wanted to look at.

1       CHAIR SAADE:  I'll jump in.  I think

2   it's a lot bigger than all that.

3       MEMBER HALL:  Yeah, but I think we

4   should list --

5       (Simultaneous speaking.)

6       CHAIR SAADE:  Everything that has to

7   do with data processing and you're going to see

8   later on it has to do with unmanned vehicles and

9   the like, it's all about artificial intelligence.

10      VICE CHAIR THOMAS:  Maybe we should

11  have a panel session next -- in Honolulu that

12  specifically is on AI.

13      MEMBER HALL:  In all the different

14  ways.

15      VICE CHAIR THOMAS:  Right.

16      MEMBER HALL:  So I mean I think that's

17  what it is.

18      VICE CHAIR THOMAS:  All the ways --

19      (Simultaneous speaking.)

20      MEMBER HALL:  -- but we were dealing

21  with it in small ways.

22      VICE CHAIR THOMAS:  Back to these

1     three offices.

2            MEMBER HALL: Yeah.

3            VICE CHAIR THOMAS: Okay. Well let's

4     leave it in, and I think we will change the

5     comments here. We'll definitely take out

6     Lindsay's comment, related -- should we just say

7     and how it relates to the three offices right now

8     or something like that in the second column? I

9     mean we need to --

10           MEMBER HALL: And suggest that either

11     at Hawaii or San Francisco that you have a panel

12     --

13           VICE CHAIR THOMAS: Okay. I'm going

14     to put Hawaii next to this one. We're going to

15     move this down to the Hawaii section.

16           MEMBER KELLY: Yeah, Ed Kelly. I

17     think this -- as we've just said, this is a very

18     broad topic and it's a very important emerging

19     technology that has to really find its home and

20     proper place in the strategic platform of NOAA.

21     I don't think we want to address this in little

22     pieces or chunks. It's going to be -- it has to

1    be overall, yeah.

2               VICE CHAIR THOMAS:  All right.  Do we

3    think it's an appropriate subject to maybe think

4    about getting a panel for Hawaii? Or San

5    Francisco.

6               CHAIR SAADE:  And I'll say we should

7    -- we'll try and do something with the Technology

8    Working Group in between then and now, just to

9    get a good briefing on it.

10              VICE CHAIR THOMAS:  Yes, Liz.

11              CAPT KRETOVIC:  I was just going to

12   say, you have a great opportunity being in San

13   Francisco, which is such a hub for technology,

14   that it might be worth pushing it to San

15   Francisco just because of the location and the --

16              VICE CHAIR THOMAS:  Expertise that

17   will be available.

18              CAPT KRETOVIC:  That will be available

19   to you there.  It seems like it would be more

20   appropriate, and then that would also give

21   everyone a year's time to really plan for it and

22   hone in on exactly what you want to see in this

1      realm.

2                    VICE CHAIR THOMAS:  Any comments on

3      that?  Can I move it from Hawaii to San

4      Francisco? All right. Public-private

5      partnerships.  This actually came up when in

6      discussion with -- way back from with Russell in

7      Miami, but we have some people on the Panel like

8      Deanne who are really connected with public-

9      private partnerships. And  I think that's a

10     really, a really good topic because we see it in

11     everything.

12                    I mean we've seen a lot of the

13     industry partners, a lot -- through shipping

14     there's a lot of industry partners, through the

15     pilots association.  Yeah, Ann, so the pilots

16     association, that's private also, right?  Or is

17     that --

18                    MEMBER McINTYRE:  It's kind of a

19     hybrid.

20                    VICE CHAIR THOMAS:  It's quasi --

21                    MEMBER McINTYRE:  It's private.  Most

22     pilot organizations are privately held but

1    they're publicly regulated.

2              VICE CHAIR THOMAS:  Right, okay.  So

3    what do we want to do with this one?  Comments?

4              MEMBER CHOPRA:  I was going to say I

5    think it's time to expand this as individual

6    states are getting into it.  Just to give you an

7    example, state of Washington, the governor has

8    started a blue economy initiative, which is now

9    scheduled to meet again in October.  And it's a

10   regular cycle where all the players in the field,

11   all the stakeholders are got together to look at

12   holistically rather than create bottlenecks.

13             So maybe as HSRP we want to reach out

14   to these folks and see how we can be of

15   assistance and even participate in that.

16   Personally, I do participate in part of that

17   group but it's just to -- put it that states are

18   getting involved.  They're looking, they are

19   realizing the advantages and the holistic nature

20   of trade for their state, the economic well-

21   being.

22             VICE CHAIR THOMAS:  All right.  Gary.

1              MEMBER THOMPSON:  I serve on another

2     federal advisory committee and we currently are

3     doing a public-private partnership study.  So I

4     don't know if two -- I don't know if we can, I

5     don't know if that's allowed or not.  There's

6     already an ongoing effort with the National

7     Geospatial Advisory Committee on public-private

8     partnerships.

9              VICE CHAIR THOMAS:  I imagine it's

10    allowed.  What would be interesting is to either

11    collaborate or complement what's being done.

12             I definitely see public-private

13    partnerships happening all over the place within

14    these -- yeah, Rich.  Through PORTS, I know you

15    have public-private partnerships, right?

16    Partnerships.

17             MR. EDWING:  Yes, we call it a public-

18    private partnership, yes.  It's one type, one

19    type of a --

20             VICE CHAIR THOMAS:  Okay.  Yeah right,

21    and I think there are several of those that we

22    could actually go through the three offices, and

1    maybe what -- yeah, Ed.

2              MR. EDWING:  I was going to say, I'm

3    trying to figure what the goal would be.  I mean

4    what I do see is a lot of examples of public-

5    private partnerships with these meetings.  So I

6    think they're already up and running.  I guess,

7    as Gary mentioned, they're looking into it.  So

8    maybe there's some areas where there's some

9    obstacles that prevent from further going on

10   public-private partnerships.

11             I see that on occasion, where we can't

12   interact with you because you're a private entity

13   and we're a government type of thing.  But so I'm

14   thinking what we're trying to fix.  Is there a

15   problem we're trying to fix?  I mean right now

16   public-private partnerships are well underway in

17   many different areas.

18             VICE CHAIR THOMAS:  Right.

19             MEMBER PAGE:  I like to use that term

20   a lot myself, but I guess if we can -- if we get

21   smart and maybe look at some other study in a

22   public-private partnership to identify some

1    issues that need to be fixed or addressed or

2    refined, then maybe that would be something to

3    sink our teeth into.  But otherwise, all we can

4    do is endorse, which is a good thing.  We can

5    endorse public-private partnerships as a way of

6    being more efficient in government and more agile

7    and what have you.

8              Just, I'd just encourage continued

9    public-private partnerships, because that is

10   probably a more cost-effective way of getting

11   things done.  But I see a lot of this happening.

12   So I'm just trying to figure out what do we

13   accomplish when we do a position paper and then

14   they go yeah, well we already do public-private

15   partnerships.  What are we adding value here?

16              VICE CHAIR THOMAS:  Anne.

17              MEMBER McINTYRE:  Yeah.  You know, so

18   much of that I think relates back to the funding

19   issues, because I mean really there's two things.

20   There's funding and then what Ed said.  A port

21   is, you know, there's only one port.  So you have

22   to have to public-private partnerships in order

1     to meet the unique needs of all the different

2     stakeholders.

3              But at the same time a lot of it

4     really just goes back to the funding issues, and

5     what we're hearing is that it is, you know, it's

6     possible on the federal side right now to kind of

7     support the establishment of the infrastructure

8     but not to maintain it, and that's why

9     maintaining the public-private partnerships are

10    so important, is because if you put a system in

11    and you can't maintain it, then it's a problem.

12             So I mean I think it's something that

13    needs to stay on the radar, but I think the

14    funding is a big part of it.

15             VICE CHAIR THOMAS:  Okay.  For right

16    now, I'm just going to capture some of those

17    comments, and we'll just continue to endorse and

18    encourage and leave it in our priorities matrix,

19    and then we can think about what we want to do

20    with it later.

21             Let's see.  NOAA's application of IoT,

22    AI, and M2M, enhance the process of receiving and

1    disseminating navigational data.  Do you want to

2    talk about this one, is that something that --

3                MEMBER THOMPSON:  It's Ed Page.

4                VICE CHAIR THOMAS:  Oh, it's Ed Page

5    who did this.  I-O-T.  Thank you.  Do you want to

6    talk about this Gary?

7                MEMBER THOMPSON:  Well so, it falls

8    into the AI we've already talked about.  So we've

9    kind of talked --

10               MEMBER HALL:  We've been dealing with

11   it as kind of separate issues, which is why I

12   want to make sure that that one was specifically

13   for something.  But if we decide we want a bigger

14   issue, that's great.  But I think we can merge

15   them now.

16               VICE CHAIR THOMAS:  Okay, merging.

17   Okay.  Moving on to the orange-colored section,

18   incorporating non-authoritative sources into

19   hydrographic products. So this is the citizen

20   science product, projects that come out,

21   products.  Crowdsourcing, satellite-derived

22   bathymetry.  We're still -- improve access issue

1   paper.  Finalize to May 2018.

2               So there was an issue paper that was

3   submitted for this and it's being tracked, okay.

4   Any other comments on this?

5               MEMBER HALL:  I don't know who's

6   tracking it.  I think that's -- we have to track,

7   we should be tracking it and asking the question,

8   and if there are any updates at each meeting from

9   NOAA.  That's what that means or was meant to

10  mean.

11              VICE CHAIR THOMAS:  Right.

12              CHAIR SAADE:  So this is a big part of

13  Seabed 2030 as well, as a means to start to fill

14  that bucket up with data, both from satellite-

15  derived bathymetry and crowdsourcing.  So maybe

16  as we track it, it's a good extension to re-look

17  at it and see how it fits into Seabed 2030.

18              VICE CHAIR THOMAS:  Ed, do you think

19  that in Honolulu we could just have an update on

20  that?

21              CHAIR SAADE:  I think Seabed 2030 is

22  a great topic for Hawaii.

1      VICE CHAIR THOMAS:  Okay, yeah.

2 Thanks.  All right.  Arctic Charting Plan.  I'm

3 not so sure we didn't replace this one, Ed, with

4 the Arctic issue paper.  Is that what happened?

5      MEMBER PAGE:  I think so, yes.

6      VICE CHAIR THOMAS:  Okay.  I will

7 delete it from here then?

8      MEMBER HALL:  Wait.  Do we remove it

9 or we leave it there because we'll be continuing

10 to track it, because we're still working on the

11 issue paper.

12      VICE CHAIR THOMAS:  Right.  I almost

13 feel like all of these issue paper ones we'll put

14 in one and call them issue paper track or

15 something like that.

16      MEMBER HALL:  Okay.  I just saw you

17 cross it out, so I want to make sure you don't

18 delete --

19      VICE CHAIR THOMAS:  I crossed out the

20 charting plan.

21      MEMBER HALL:  Gotcha, okay.

22      VICE CHAIR THOMAS:  But I was actually

1          going to suggest just listing all of our issue

2          papers at the bottom, all of our issue paper

3          things that we've submitted and just put tracking

4          on there.  Yes. We're okay?  Everybody okay?

5                    All right.  I think -- yeah, is Rick

6          here?  Where is Rick?  He's behind me.  Lynne is

7          asking whether or not this is anything to do with

8          the OCS charting plan here, but I think that was

9          specifically Ed Page's Arctic plan.  Are you --

10         do you have the priority matrix?  Okay.  We can

11         touch base afterwards, just so that we're not

12         eliminating something that should be included.

13         No.  All right, okay.

14                   The Army Corps-NOAA partnership,

15         track.  This was an issue paper, wasn't it,

16         before my time?

17                   Two minutes?  That's okay.  If we

18         don't finish it, that's fine, you know.  We'll

19         have more time to come back to this.  Yes.

20                   MEMBER HALL:  Sorry.  As the

21         originator of all of this, that one was we

22         decided that, and we were kind of waved off by

1    Shep for a while as he is trying to actually

2    improve the relationship.  So it wasn't just

3    about the paper that, we gave that as fodder for

4    him as he took over from Gerd Glang, and so

5    that's really what that is.

6              I think it's something that we're

7    still very interested in and want to keep track

8    of.  So I wouldn't necessarily put it into the

9    issue paper section because it's more, it's

10   bigger than the issue paper.

11             VICE CHAIR THOMAS: Right.

12             MEMBER HALL: But we'll hold off until

13   Shep or anybody in OCS says okay, now we need a

14   little bit more, more from the agency.  But I

15   think it's always going to be something this

16   committee looks at.

17             VICE CHAIR THOMAS:  So it kind of

18   falls into that continue to endorse and encourage

19   area?

20             MEMBER HALL:  Exactly, absolutely,

21   yes, yes.  But we didn't want to lose track of

22   it, because this is also kind of our corporate

1  knowledge in one place, so we didn't really want

2  to lose track of it.

3        VICE CHAIR THOMAS:  Okay, yes.

4        MEMBER HALL:  And so the other thing

5  about that is if you're going to start deleting

6  things, I might put that into a separate page,

7  just so we know what we have worked on in the

8  past.  So take that column and put it into a

9  separate sheet, and that way again, when we're

10  all dead and gone, somebody's got an idea of what

11  we worked on.

12        VICE CHAIR THOMAS:  Yes.  Well I

13  definitely -- that's why I think it would be good

14  to also list -- I mean this can be listed twice.

15  It can be listed as an issue paper to track, but

16  it can be kept up here as a priority too, to

17  endorse and encourage.

18        MEMBER HALL:  Right, but those ones

19  that we're kind of shuffling away, that we're

20  kind of -- where it's no longer a priority, I

21  think it should still go --

22        VICE CHAIR THOMAS:  Put them down in

1    the archive?

2              MEMBER HALL:  Yes, exactly.

3              VICE CHAIR THOMAS:  Thanks.

4              MEMBER DUFFY:  So I appreciate those

5    comments.  I'm  going to come back to some of the

6    discussions that we've had yesterday, and I will

7    say this is a top priority for the folks along

8    the Mississippi River, and that it ties into a

9    bunch of things.

10              I'm happy to report that Shep has

11    indeed made a lot of progress.  Being a member of

12    the Mississippi River Commission is very

13    important, and you know, I refer to my team sport

14    approach is sometimes we all, like, may wear

15    different jersey, but underneath them we're all

16    red, white and blue, and that we need to work on

17    continuing that and I think some of the

18    discussions about datums.

19              I mean I'm telling you right now

20    there's a lot of smart people in the room that

21    I'm counting on to figure out some of the

22    problems we have.  But it is very complicated.

1    It's comforting to know that we have the Corps

2    and NOAA engaged at a very high level working on

3    those improvements.

4            So continuing to track it and I'll

5    defer to the issue paper.  But this is very, very

6    important to the folks along the Mississippi

7    River.

8            VICE CHAIR THOMAS:  Okay.  Well you

9    know, I just wanted to say it's really good to

10   have the feedback on this, because it helps with

11   the tracking notes.  So I did make a note of

12   that.

13           CAPT KRETOVIC:  And I'll just say that

14   the relationship that NOAA has with the Army

15   Corps is important no matter what district we're

16   in or where we're located.  And so I see this as

17   a topic that should be --

18           VICE CHAIR THOMAS:  Ongoing.

19           CAPT KRETOVIC:  --ongoing through the

20   whole time that this body exists.

21           VICE CHAIR THOMAS:  Okay, all right.

22   Do we want to stop here Ed, and then we'll just

1       pick it up.  Thank you.  That was a great

2       discussion.

3                  CHAIR SAADE:  Okay, thanks everyone.

4       We're going to take a 15 minute break and we'll

5       get into the next panel discussion on autonomous

6       systems.  See you in 15 minutes.  Thanks.

7                  (Whereupon, the above-entitled matter

8       went off the record at 9:33 a.m. and resumed at

9       9:49 a.m.)

10                 CAPT KRETOVIC:  Welcome back

11      everybody.  I'm thrilled to have HSRP members Ed

12      Saade and Deanne Hargrave, along with OCS staff

13      member Neeraj Saraf as the chairs of the

14      Technology Working Group session.  Speaker and

15      HSRP member bios are in your materials and posted

16      publicly.  We'll only do very short intros.  Ed,

17      Deanne and Neeraj, I'm going to turn it over to

18      you.

19                 CHAIR SAADE:  Thank you, Captain.

20      We're going to get going here.  We have a lot of

21      material and a lot of really smart people.

22      They're going to be talking about it, so it's

1     going to be -- I probably you a really exciting

2     session.  So Neeraj, if you want to take it away

3     and get us all introduced.

4              MR. SARAF:  Okay, thank you Ed and

5     welcome back.  So this is going to be a very

6     interesting and diverse panel.  We're going to

7     talk about unmanned systems for hydrography.  Now

8     there's -- in the last couple of years, there's

9     been a lot of movement towards of course the

10    marine side, but also now the aerial side.  So

11    drones and things like that, and we're going to

12    hear from an academic partner from Texas A&M on

13    that, and then kind of a survey of various

14    projects and efforts going on across government

15    and industry as well.

16              So we're going to kick it off, we're

17    going to do some introductions here with Admiral

18    Gallaudet, U.S. Navy, retired, and current

19    Assistant Secretary of Commerce for Oceans and

20    Atmosphere and Deputy NOAA Administrator.  We

21    have Dr. Michael Starek, Associate Professor of

22    Geospatial Engineering from Texas A&M Corpus

1    Christi.  You've got some fans in the back.

2                   (Laughter.)

3                   MR. SARAF:  I spent a couple of years

4    at UT Austin so I don't know.  But I have no

5    allegiance, no allegiance to that.

6                   Captain Brian Connon from the

7    University of Southern Mississippi, U.S. Navy

8    Retired, currently director of the University of

9    Southern Mississippi's Hydrographic Science

10   Research Center.  Welcome.  Mr. Thomas Chance,

11   former CEO of C&C Technologies and ASV Global,

12   and Lieutenant Damian Manda from NOAA, from

13   Office of Coast Survey, Coast Survey Development

14   Lab, Hydrographic Systems and Technology Programs

15   Branch.

16                  So we're going to kick it off with

17   Admiral Gallaudet, who's going to talk to us

18   about the NOAA strategy and we're going to take

19   it from there.

20                  RDML GALLAUDET:  Thanks Neeraj.  All

21   right.  So this is a great, great topic that I'm

22   excited to speak on.  I have a little bit of

1    history here.  In the Navy, I worked and oversaw

2    a pretty large increase in our unmanned systems

3    development and operations, and then before that

4    I had experience working with the Naval Special

5    Warfare Command, the Navy SEALs, and stood up

6    their small drone program, both underwater and

7    aerial.

8              And so this is just sort of doing the

9    same now, but at a larger scale for all of NOAA.

10   So let's see here.  I will drive, and thank you.

11   All right.  So why are we here?  Why are we

12   talking about this?  Well, you know, if you look

13   at the capabilities as they've advanced, the

14   unmanned systems and autonomous systems are going

15   to transform how we do business, and the bottom

16   line is it's not just because it's neat and cool

17   and technology; it's really because they will

18   allow us to make major improvements in our

19   coverage, our accuracy and how we do our

20   business.

21              So that's what's really important

22   here.  So for us it's about predicting the

1  environment, observing it and all the decision

2  support we provide.  These systems are going to

3  help us end to end.  Now the kind of high level

4  motivator comes from the White House.  The White

5  House released an executive order on artificial

6  intelligence and autonomous systems are part of

7  that, and at the same time we have the new White

8  House Science Advisor, Dr. Kelvin Droegemeier.

9          He's a Ph.D. severe storm

10  meteorologist, great guy, and he loves us and so

11  that's why he's great.  But he is -- at his first

12  kind of public speaking event, he called for a

13  second bold era in American innovation.  Some of

14  you have heard me talk about this, and what he

15  was referring to was the first bold era which

16  immediately followed World War I.

17          You had technologies like those

18  depicted here being developed, nuclear power,

19  super computers, space exploration.  And those

20  major advances were funded by and large by the

21  government, ONR, NSF and that.  Nowadays the

22  landscape has changed and actually it's sort of

1    flipped.  The major R&D investors are in the

2    private sector.

3              Now look at SpaceX, and so this is

4    where we need to turn, and we really need to up

5    our game in ocean partnerships, ocean science

6    partnerships.  We're doing it already in a great

7    way and I think Damian will talk a little bit

8    about that.  We contract a large amount of our

9    hydrographic surveys out to really solid private

10   sector firms, and that's only going to continue

11   and most likely advance. So that's the motivating

12   piece here.

13             Next, I wanted to talk about what

14   we're doing today, and interestingly we have

15   about 100 of our own drones of all types,

16   surface, underwater as well as aerial, and

17   they're helping us do every aspect of our mission

18   as in fact, we leverage a lot more of those from

19   our partners like in IOOS and elsewhere in the

20   research community.

21             And so you have for our fisheries

22   we're right now prototyping the use of a

1     Saildrone with acoustic sensors to do fish stock

2     surveys, and we're calibrating the data against

3     known survey methods using ships, and that's a

4     really exciting area right now, and we're going

5     to expand that dramatically.  We also use aerial

6     drones to survey marine mammals and meet our

7     Marine Mammal Protection Act mandates, and then

8     that's actually quite exciting.

9             And then of course we've actually

10    flown aerial drones from P3s, and meanwhile

11    gliders collecting underneath hurricanes, and in

12    fact that has allowed us to improve our intensity

13    forecast, as well as just the nature of the track

14    with respect to the small drones from the P3.

15            We have done different types of

16    ecosystem assessments. One of the most

17    interesting projects was using a long-range AUV

18    that was doing sampling for harmful algal blooms

19    and actually doing DNA and environmental DNA

20    collection.  That was in the Great Lakes, and we

21    partnered with MBARI on that one.

22            And then all sorts of mapping, and

1        that's the reason we're all here is all the

2        mapping applications, both the hydrography using

3        AUVs and USVs, as well as some of the important

4        feature identification using aerial drones that

5        we're actively doing today.  So it's been really

6        exciting to watch us move forward in this area.

7                    Now some of the motivation behind this

8        program.  We have an active UAS Research Program,

9        and in FY '20 we are standing up an operational

10       program in the Office of Marine and Aviation

11       Operations, and this program is actually directed

12       in the FY 20 budget.  So we have a moderate

13       increase of $4 million and the House looks like

14       they want to mark it up by potentially $14

15       million.

16                   We'll see what the Senate does but

17       that's -- they've indicated that they want us to

18       pursue this path.  Additionally, Senator Wicker

19       has drafted the CENOTE bill and the President

20       signed it, and it stands for Commercial

21       Exploitation of, I think, Ocean Technology.  But

22       basically it directs us to partner with the Navy

1     down in the Mississippi area to grow our unmanned

2     maritime systems, and so we're doing just that.

3                    And then also you know I've talked

4     about our blue economy priority, and actually

5     both our weather and water priority and blue

6     economy priority are going to advance and be

7     really further enabled by unmanned systems.

8     Lastly, I have to acknowledge that this isn't

9     like a new game.  Our researchers have been doing

10    fantastic things with UASs and UVs and USBs, and

11    so that's just, we're just building upon that.

12                   Now the difference, the thing that's

13    different is that we're making the program more

14    operationally focused, and that's why it's an

15    OMAO, and the idea is right now all that unmanned

16    systems work I talked about was basically smart

17    scientists, you know, doing a pickup game.

18                   I had really, you know, great, bright

19    microbiologists and biologists basically

20    acquiring their own UAVs and doing these marine

21    mammal surveys, and then trying to do some of the

22    AI data processing all on their own.  You know,

1    biologists should be doing biology, I think, or

2    maybe a little bit of other things, but

3    centralizing the functions with professionals

4    like those at OMAO and the NOAA Corps Officers

5    really makes a ton of sense.

6              Have them do the certification

7    acquisition training and standards development,

8    and that's what we're going to be doing.  We'll

9    have a major hub at Lakeland for UASs, where our

10   AOC is, and then we'll have one in the Stennis

11   area or the Gulfport area for the maritime

12   systems being surface and underwater.

13             This is our strategy, five main goals.

14   You can read them.  They're all fairly

15   straightforward, and we're in the process of

16   finalizing the strategy which will have a number

17   of supporting objectives for each one of these.

18   So you can see the idea is advanced research,

19   advance the transitioning of research, and

20   strengthen our partnerships and our workforce to

21   do it.  So we're going to be putting this out

22   sometime in the fall.

1          So this is it.  This is why we're

2     doing it.  It's part of three main technology

3     focus areas, the other being AI and the other

4     being omics or basically microbiological big

5     data, and these three together under my position

6     as chief scientist, we're rapidly advancing again

7     to transform the way we do our business in ways

8     that are smarter and improve our skill, and at

9     reduced cost.  Thanks for letting me be on this

10    panel, and I will take questions at the end.

11               MR. SARAF:  We have Dr. Starek next.

12               DR. STAREK:  Oh, very sorry.  Thank

13    you.  So, hello, everybody.  Mike Starek.  I'm

14    out of Texas A&M University-Corpus Christi.

15    Thank you very much for having me here.  I'm a

16    professor in the geospatial engineering program

17    there, and also affiliated with the Conrad

18    Blucher Institute.

19               So, today I just want to give a little

20    overview on -- I'm going to talk about small UAS.

21    At the end, time permitting, I'll show a big

22    small UAS for lidar, but really just the small

1    UAS and the standard kind of commercial grade

2    drones like the TGIs or the senseFlys or those

3    kind of things that we're using to map.

4              But briefly about our institute, so,

5    we had one of our directors, Gary Jeffress, serve

6    on the HSRP Committee.  If you're not familiar

7    with it, CBI's an endowed surveying institute.

8    It was actually endowed at our university before

9    it was part of Texas A&M, and it supports -- the

10   main primary objective is to support our

11   surveying and geomatics program.  We have a

12   bachelor's, a master's and then we now have a

13   Ph.D. in geospatial computing, which is heavily

14   AI-focused.

15             So, we're well-known for our work in

16   coastal observations and modeling and the Texas

17   Coastal Observation Network, those kind of

18   things.  We do a lot of GIS, et cetera.  In terms

19   of our use of NOAA products, NOAA Tides and

20   Currents is a huge value product that we use.

21   Elevation research.  Myself and my students are

22   huge fans of the NOAA Digital Coast, especially

1  lidar data.  We use VDatum all the time.  It's

2  actually one of our integral products in our UAS

3  workflow, OPUS, et cetera.   So, thank you to

4  NOAA for all the products that you provide.  We

5  really appreciate it.

6         So, just quickly, I know the folks

7  here know about this, so I'm going to go through

8  this very quickly.  But some advantages of why I

9  might want a small UAS for coastal mapping.

10  Again, I'm just going to talk about mapping.  We

11  do other things with it.  But, again, the ability

12  of rapid deployment so we can target events.

13         I think the biggest value is temporal

14  repeatability, but we're really at local scales.

15  Technology's evolving, et cetera, but we're

16  talking about local areas.  When you scale up to

17  regional areas, the price difference or cost

18  effectiveness changes a lot.  So if I want to do

19  all of Mustang Island, for example, in Texas, I

20  would say it's not conducive for small UAS.  If I

21  want monitor a beach nourishment project, it's

22  excellent.  Or, you know, we can do long linear

1      stretches of coastline, but there's different

2      issues there with it.

3               The other advantage, I think, is what

4      we call hyperspatial, or yesterday I heard high

5      definition.  It just means we're using pretty

6      cheap cameras.  The technology's evolving so it's

7      getting better and better. But we're flying so

8      low.  We're talking about if you want centimeter

9      to subcentimeter resolution, if you want that.

10     So, very detailed imagery using full cost

11     consumer-grade cameras, but at the altitudes

12     we're flying.

13               Limitations.  The number one

14     limitation where we're at using electrically-

15     powered small UAS is endurance.  So that's one of

16     the biggest things with high winds in that area.

17     Now there are platforms that can go a long ways.

18     They're gas-powered, all different kinds.  But

19     even if you can, regulations, again, if you don't

20     have a waiver and you're in line of sight and you

21     want to abide by the rules, you have to march

22     along.

1           And then there are also challenges in

2    terms of accuracy where we have lay out these

3    long control networks, or we can equip a better,

4    you know, a differential GPS on the platform to

5    improve that.  But those are some of the biggest

6    challenges.  And weather.  And, again, the number

7    one thing where we're at, we have one of the

8    highest average wind speeds in the country, is,

9    again, endurance issues with the wind.

10           Briefly, the main advantage of a fixed

11   wing in terms of mapping is, all things being

12   equal, you cover more area more efficient.

13   Rotary vertical takeoff and landing.  You can

14   better control your flight.  You can, you know,

15   zoom in/zoom out.  So those are kind of

16   advantages, but the technology's changing.

17           As an example, at the bottom here we

18   have a hybrid platform that's a vertical takeoff

19   and then it goes to fixed wing.  So a lot of

20   options out there in terms of these platforms.

21           So, very quickly, what we're doing

22   with this, at least in the mapping sense, it's

1  called Structure from Motion.  It's just

2  photogrammetry.  So we're trying to map with

3  cameras.  But the basic way it works is, a lot of

4  different software out there to do this, but

5  you're essentially overlapping a bunch of images.

6  These software go in and automate how it matches

7  features between images, and then it can

8  basically -- when it does that it can reconstruct

9  the camera position orientation.  You get kind of

10  a point cloud and then it can densify that.

11  Really the end product you get out of

12  this is kind of like the lidar survey.  You get a

13  dense, what we call a 3D point cloud or a

14  textured point cloud.  But it has different

15  behavior than the lidar point cloud.  We'll talk

16  about that in a little bit.

17  Then what we do with this, or the

18  software, the main products we get out of it are

19  a digital surface model that's tied to vertical

20  data and a digital elevation model.  You can

21  correct the imagery, you can drape on top of it,

22  and you get these nice GIS products, very low

1    cost.  I mean, this is incredible.  You know,

2    when I was in grad school it was kind of unheard-

3    of, so it's pretty amazing.  And lot of this has

4    been pushed by the algorithms from computer

5    vision robotics and stuff.

6          It's a culmination of inertial

7    measurement units, GPS, autonomous systems,

8    algorithms to create these things and classic

9    photogrammetry in one.  I will mention that one

10    thing about this, this Structure from Motion is

11    very powerful.  Anybody can pump in data, but to

12    get consistent, good data, accurate data is

13    challenging, especially along coastlines.  We

14    still it.  There's a lot of uncertainty in SfM.

15    But it's incredible what you can get, but you

16    have to be careful.

17          So, quickly, I just want to show some

18    examples of what we're using it for, for one of

19    our projects called Regional Geospatial Modeling

20    Project.  That's with NOAA NGS and our partners

21    at the University of Southern Mississippi.

22          One thing we're using is wetland

1      monitoring.  So at Mission-Aransas NERR, we have

2      a bunch of different surface elevation table

3      study sets or wetland sites.  And so we're flying

4      these routinely quarterly, yearly, et cetera, at

5      different sites along the NERR.  As an example of

6      what we're doing with it, we've been using

7      terrestrial laser scanning quite a lot.  It's a

8      $100,000 scanner.  We've started integrating

9      small UAS.  Here's the same port cloud.  We can

10     fuse the two together, and if we do it right we

11     can get very similar accuracies, but we're

12     getting the aerial perspective, and we can take

13     that data and do stuff with it.

14               So, for the sake of time, I won't

15     cover this very much.  But one thing we're doing

16     is this Hurricane Harvey.  We had a before survey

17     and we went quickly after, and this is one of our

18     wetland sites and we're able to basically

19     quantify how much erosion, et cetera, that

20     happened in that wetland site.

21               AI.  We're doing more than just the

22     point clouds.  We have algorithms that actually

1  work on the point clouds to separate. But this

2  is an example of using the imagery, which is

3  another valuable product in just doing land cover

4  mapping. But in this case, we're using a

5  technique called deep learning, which is a type

6  of machinery learning AI well-suited for RGB

7  imagery. Very powerful, everybody's going to it.

8  But this is showing land cover

9  segmentation. We built an architecture, my

10  student, for wetlands specifically, and it's

11  breaking up into tidal flat, vegetation water, et

12  cetera. But we're at three centimeter

13  resolution, so very detailed. So, the kind of

14  things you can do with this data.

15  Hurricane Harvey, another example. So

16  we're not just mapping natural environments,

17  built environments. So we went with a team of

18  structural engineers from Notre Dame. We flew to

19  an area in Rockport that had some of the highest

20  average wind speeds in the region, hit really

21  hard for wind damage, called Salt Lake

22  neighborhood, and this is just an example.

1           We were able to use Google Earth

2  products before when it was out there.  We flew

3  the small UAS and we were able to quantify, for

4  example, roof damage, how much percent loss, and

5  then we had the three dimensional information as

6  well to help with these engineers to quantify and

7  look at building codes, why did this structure

8  perform better than another, very cost

9  effectively.

10          Another example, this is a Port

11  Aransas jetty where we're doing -- it's a 3D

12  point cloud where we image structural damage you

13  can see coming up here.  We're looking at some of

14  that damage on the jetty.  So this is very

15  detailed information that we can get with it.

16          I think this next example's pretty

17  interesting.  This is actually in Florida.  We go

18  out to Apalachicola NERR at Little St. George

19  Island, if you're familiar with it, and do a lot

20  of surveys on wetlands along the shoreline.  In

21  this case, we used a small UAS equipped with what

22  we call an RTK GPS onboard, which greatly speeds

1    up our workload because we don't have to lay out

2    dense control networks.  We still need control

3    for QA/QC, but we can lay out.  But we were able

4    to map out nine miles of linear coastline in two

5    days with it.

6              It just so happens that we went -- in

7    this case we mapped out the whole beach basically

8    two months before Hurricane Michael came through.

9    And what we're able to do, then, is take that and

10   then the USACE JALBTCX group flew their survey

11   post-Michael and were able to couple a digital

12   elevation model from our small UAS before the

13   storm and then the airborne lidar, traditional

14   airborne lidar after, and we can take that and

15   quantify damage.  And it's just an example of

16   looking at fording loss, et cetera.

17             I have a student looking at this right

18   now.  One interesting thing is JALBTCX just

19   released a paper on their assessment of change

20   out there using a prior airborne lidar survey

21   three to four years ago.  So it will be

22   interesting to see the difference in their

1  results versus what we've got with basically a

2  two-month before-storm assessment.  So it's a

3  fusion of the two different data products.

4          Well, what about mapping below water,

5  since this is a bathymetric group, a hydrographic

6  group?  So, we term that UAS photobathymetry, and

7  there are ways to do it.  In terms of Structure

8  for Motion, it's very challenging because of the

9  algorithms rely on this feature matching.

10          So what you want with Structure for

11  Motion is you want basically all the motion from

12  the platform, absolutely no motion from things on

13  the ground.  So, in water it's dynamic, because

14  you're flying back and forth and you rely on this

15  overlap.  Things change, you get glint, et

16  cetera, so it confuses these algorithms greatly.

17          Of course, it relies on, you know, if

18  it's clear and you can see through the water, how

19  much clarity you have.  These software have

20  issues with texture sometimes.  You have

21  refraction and other things.  But in certain

22  cases you can actually do pretty well with this.

1    There's a lot of research in this.

2         I know NGS and NOAA's Remote Sensing

3    Division, Mike Aslaksen's group, is doing some

4    neat work in this.  So, early on, we started

5    exploring this.  Just as an example very quickly,

6    this is a campus beach we have.  This is the

7    aerial image.  It looks very clear.  It should

8    have done really well in Structure for Motion,

9    but this is what we got.

10        So this is only about a meter deep,

11    very shallow area.  We got no returns under the

12    water, for whatever reason, on that flight.  So

13    similar to when y'all mentioned satellite-derived

14    bathymetry, we took the Structure for Motion data

15    and then did a technique called optical

16    inversion.  We were able to get depths, and we

17    confused to two, but the bottom line is what we

18    get out is a topobathy DEM off the shallow area,

19    small area.  But we have a RMSE or an error of

20    about eight centimeters.  So it's an example of

21    what you can do.

22        Another example that's kind of

1  interesting, particle image velocimetry.  So this

2  is a group of students as part of an NSFS

3  project, so they're undergraduates that come to

4  do research.  This is in Corpus Christi at Bob

5  Hall Pier on our island, and this is a little

6  different approach, and we're not the only ones

7  doing this, Corps of Engineers does a lot of it

8  with static cameras.

9       But basically we're just hovering and

10  recording video.  And then in the air what we can

11  do is, if we can track the particles of the wave

12  velocities, we can get wave velocities values and

13  we can stabilize the image.  Then, from that,

14  there's a relationship to the depth.  So we can

15  basically invert the water depth.

16       So here's an example of just showing

17  the wave velocities.  So we're hovering and we

18  can use the pier to kind of stabilize the

19  imagery.  But the nice thing about this is you

20  don't rely on water clarity.  Accuracies we're

21  still working on.  It's challenging, but what

22  happens is here's an example of looking at

1  different video speed rates between -- we're

2  getting basically point clouds underwater.

3          So these are the kind of things that

4  folks are working on and different ways you can

5  go about it.  It's an interesting problem.

6          Finally, lidar.  So the technology's

7  rapidly expanding.  Just to give you an idea,

8  this is what we would call a survey grade UAS

9  lidar.  So this is still a small UAS, but it's

10  pretty big platform.  So our operations with this

11  are quite different than with the ones you saw

12  before.   We have a very strict protocol on how

13  we fly.

14          This is an example of a 2006 airborne

15  lidar survey at an airport in Sinton, Texas.

16  It's the only one we had available.  So it's a

17  little bit outdated, but still you can see the

18  structure and what it would look like with a

19  point density.  Here's the UAS lidar example of

20  how detailed the data you get.

21          We have very strict flight limitations

22  with it.  We actually took this system, as an

1 example here, and went out to the Apalachicola

2 NERR and flew some of our wetland sites.  You

3 might say, well, we both get point clouds from

4 this technology.  What's the advantage of lidar

5 to Structure for Motion?

6 One thing, I think it's much more

7 well-behaved, at least from a surveying

8 perspective.  The other thing is you get what's

9 called multi-return detection.  So you don't need

10 to get multi points that can -- basically, you

11 can penetrate better through canopy and different

12 things like that, where Structure for Motion is

13 photogrammetry.  It's what we'd call a single

14 return-type point cloud.  So if you have

15 vegetation cover, this is where you have a big

16 advantage with lidar.

17 So I'll stop there.  Thank you again

18 to NOAA for being here.  I'll just mention a few

19 things.  There's still a lot of work on best

20 practices, especially in coastal surveying.

21 You'd be surprised just with good flight design

22 how much better data you can get.  UAS is big

1     data.  It's ripe for cloud processing and it's

2     ripe for machine learning.  Thank you.

3                    (Applause.)

4                    MR. SARAF:  Thank you, Dr. Starek.  I

5     think next is actually me.  But I'm not me today;

6     I'm actually going to be Andy Armstrong, director

7     of the University of New Hampshire Joint

8     Hydrographic Center, unfortunately unable to join

9     us this week.  But he might actually be on the

10    webinar, so if you notice any comments or you

11    guys have anything to add, I'd be happy to add

12    those in.

13                    But just about me, I'm the acting

14    chief of the Office of Coast Survey, Coast Survey

15    Development Lab.  So, there's many parts of NOAA

16    that have grants with the UNH Joint Hydrographic

17    Center and all other parts of UNH, as well as us.

18    So I'm happy to represent this work this week.

19                    So, I'm going to run through a bunch

20    of scenarios that the Center has as examples of

21    their work with autonomous systems, and I'm going

22    to touch a bit on the artificial intelligence as

1      well.

2                So, one of the main things, you know,

3      beyond prototypes and testing things out, I mean

4      the Center really intends and strives to further,

5      you know, the actual mission of Coast Survey in

6      terms of some of the mapping, the hydrography

7      that we do, and they're taking the scenario-based

8      approach with that.

9                So, here's a couple of examples to

10     start with, ways you can do that.  So, you can

11     increase productivity by adding platforms.  So,

12     adding an unmanned system to the larger NOAA

13     vessels can expand your capabilities and tools

14     onboard.  You can also operate, you know, these

15     vessels which are smaller in areas of higher risk

16     to either humans or equipment, such as even the

17     photo on your right there.

18                Closer to shore, you know.  We talked

19     about this last year in Juneau as well about, you

20     know, areas of heavy ice and other geography that

21     makes it harder for the larger ships to get to.

22     So that's one example there.

1              All right.  So this, as they say, is

2    one not drawn to scale and is not a final design.

3    But I wanted to give you an idea, kind of

4    notional idea that the Center developed in terms

5    of what a future NOAA ship could look like.  So,

6    imagine the Fairweather and its next generation,

7    or even now we're doing projects to outfit

8    existing ships with launches that could have this

9    capability.

10             But imagine, you know, this variety of

11   devices or configurations here, including like

12   the C-Worker.  So, the ASV C-Worker IV, as you

13   can see, has been a key part of that portfolio.

14   The iXblue DriX is kind of a newer one in the

15   last couple of years that the Center's also

16   tested and we'll talk about.  And, of course,

17   Seafloor Systems EchoBoats.

18             But, as you can see, there's various

19   ways to imagine these ships being able to have

20   this capability and being able to drop them in

21   the water in an optionally unmanned fashion and

22   what have you.  So, while this is not a final

1      NOAA design, I think this is something that we're

2      definitely keen on looking at developing and

3      pushing forward, and Damian will be talking a lot

4      more about that in his talk as well.

5                Okay.  So here's another example of a

6      project in the Great Lakes.  So, Thunder Bay.

7      This was a collaboration between the Office of

8      Coast Survey and Office of National Marine

9      Sanctuaries in NOS, as well as the Center at UNH.

10     So, this was very interesting.  So, a small team.

11     This was what we called more of a Navigation

12     Response Team scenario.  So, trying to figure how

13     this technology could be used in a response

14     operational capacity.  So, fairly limited.  It

15     was about a ten-day mission mostly sent out of

16     the harbor and brought back.

17                So not really a concept of a chase

18     boat here, but it actually allowed us to, and UNH

19     to, you know, test out a lot of the technologies

20     listed there.  So there were a lot of new

21     technologies kind of folded in there.

22                And also the last bullet I wanted to

1  highlight is a bit of a start of some AI sort of

2  research.  So, here's one idea of a type of

3  application for artificial intelligence.  It's

4  object detection, classification.  The  Office of

5  Coast Survey, you know, will also probably talk

6  more, and especially probably in San Francisco,

7  about some projects and ways that we could use

8  that in mainstream processing.  And we're also in

9  line and kind of coordinated with Admiral

10  Gallaudet's committee in NOAA, so we're happy to

11  help there.

12              So, Andy is on the phone and he would

13  like to give a comment and probably correct

14  something I said, I'm sure.

15              (Laughter.)

16              MR. SARAF:  These are big shoes to

17  fill, I'll tell you, literally big.  I mean, his

18  shoes are really big.

19              (Laughter.)

20              MR. SARAF:  All right.  So, next

21  example here, and you see ASV Global there.  This

22  was a really neat one.  This was actually a

1  collaboration with National Geographic on

2  attempts to find wreckage of Amelia Earhart's

3  plane.  I'm sure many of you probably know more

4  about this than I do.  I learned a lot about it

5  in researching this.  So, of course, Robert

6  Ballard, who's famously known for discovery of

7  the Titanic, was involved with this.

8         So, the ASV shown here, or one like

9  this, was sent out at various parts of the

10  mission when they may have something to dig

11  deeper into.  So if you don't already know, I

12  don't want to spoil it too much.  But I think

13  they found some wreckage.  It wasn't Amelia

14  Earhart's airplane, it was something else.  But

15  that still was a pretty neat kind of process they

16  went through to go through that and see what this

17  could do.  So there's links there with a lot more

18  details on that.  It's really cool.

19         All right.  So one of the latest

20  collaborations has been with iXblue, a French

21  company.  It is a diesel powered vessel but, you

22  know, UNH has done a couple of things with it.

1  So initially they trialed it up in New England

2  last December, and then some operational trials

3  on the NOAA ship Thomas Jefferson, this in the

4  last year.

5      So this again, they had another tool

6  and another platform that we're looking at, and

7  we're going to hear more about -- with USM, we're

8  going to hear another type of technology with

9  that in the same vein.

10      Okay, and so this is an example of --

11  there's Larry there and who actually -- this is a

12  previous mission in Greenland, and ironically

13  enough that is where he is this week as well,

14  probably on a Swedish icebreaker at this moment

15  is what I understand.

16      But this was with the EchoBoat.   So

17  this is another icebreaker and, you know,

18  basically a scenario in terms of surveying ahead

19  to find out what's coming and how to plan for

20  that and avoid mishaps.  So that's another type

21  of application there.  So that's just, you know,

22  kind of a general survey of various projects

1    they've been working on, you know.

2            The Center has been there, as you

3    know, about 20 years.  We have a few of the

4    graduates from the graduate school in the room in

5    fact, and so it's been a very important pipeline

6    for Coast Survey and NOAA in terms of, you know,

7    kind of resources for continuing this kind of

8    effort.  So to tie it all up, I was going to talk

9    a bit about the Coast Survey Ocean Mapping Plan.

10           So we talked a bit about the Coast

11   Survey strategic plan earlier, and so as you read

12   these bullets, you'll notice that there are

13   definite overlaps there.  So mapping the entire

14   EEZ.  So that's definitely a major goal here.

15   That's also tied in here.  So this plan goes into

16   a lot more detail of how we're going to plan to

17   accomplish a lot of these things.

18           Definitely there's a focus on unmanned

19   systems and other automated processes, and I

20   think as you'll see as this goes forward,

21   definitely a lot more artificial intelligence,

22   machine learning applications to that.

1    Specifically, Coast Survey.  You know, we've done

2    a couple of projects over the last couple of

3    years just to kick the tires on machine learning,

4    and so more to come on that as time goes on.

5    But you know, with that, of course

6    you'll have access to all of the information and

7    Andy's on the line as well.  So I understand he

8    would like to make a comment.

9    CAPT ARMSTRONG:  Hi everybody, and

10    Neeraj, thanks for doing this presentation for

11    me.  I'm really disappointed I couldn't be in New

12    Orleans.  But anyway, I'm happy to have an

13    opportunity to participate here.  So I think

14    Neeraj did a great job.  I just want to make a

15    couple of other comments, particularly about the

16    DriX trials.

17    Those are actually coming up in

18    October, and in those trials what we're doing is

19    trialing the sort of -- the wing man approach and

20    we're doing so by making some adaptions to the

21    Thomas Jefferson's davits, and we'll be able to

22    pick up and retrieve the DriX in the davits much

1    the way we do with survey launches.

2              But the DriX is particularly

3    seaworthy, a high speed and long endurance ASV.

4    So we'll be able to operate that around the clock

5    in tandem with the TJ, and only bringing it

6    aboard every couple of days to refuel and then

7    send it back out.  So we view this as an

8    opportunity to -- with one DriX double the ship

9    mapping capability of the TJ in a rather

10   straightforward and efficient way.

11             So that, that's the -- I think that's

12   the main point I want to make.  Those trials are

13   coming up in October and we're really looking

14   forward to that.  So thanks for the opportunity

15   to add in here.

16             MR. SARAF:  Okay.  Thank you Andy, and

17   so with that thank you very much.  I'm going to

18   pass it next to Captain Brian Connon from the

19   University of Southern Mississippi.

20             CAPT CONNON:  Good morning everyone.

21   Thanks again to HSRP for having us, allowing us

22   to talk.  First up, I think hopefully what you're

1    gaining from this session as well is the

2    importance of your academic partners.  So between

3    University of New Hampshire, who has a position

4    on HSRP, universities like Texas A&M and Southern

5    Miss, we provide I think a vital role to what

6    you're trying to accomplish from both the

7    academic of training the next generation of

8    hydrographers, as well as on the research side,

9    of trying these new technologies and pushing the

10    envelope and helping us get to where we need to

11    be faster, to accomplish things like Seabed 2030

12    and getting these technologies quicker to the

13    agencies and to the industry partners.

14              So I'm from Southern Miss, but the

15    campus I work at is actually Stennis Space

16    Center, which is only two miles across the border

17    from Louisiana.  So we are close.  We are, you

18    know, I live in Louisiana.  So this is a great

19    opportunity for us to be able to talk to you, but

20    to talk a little bit about Southern Miss' hydro

21    program started back in 1999 by a guy you all

22    know well, Rear Admiral Ken Barbour.

1          So unfortunately with Ken's passing

2     last year, we're all missing him.  But that gave

3     me an opportunity to come down and assume the

4     role here at Southern Miss.  But we are one of

5     the two Category A programs in the U.S. with

6     University of New Hampshire.  But we also have an

7     undergraduate program now in Marine Science, with

8     an emphasis on hydrography that is the only

9     undergraduate Cat B program in the U.S. for

10    hydrography.

11          We graduated our first graduate this

12    past summer and where's John?  And David Evans

13    snatched her up and he's put her to work.  So

14    we're trying to hit both the undergraduate and

15    the graduate level folks.  Most of our graduate

16    students are either from NOAA, Navy, NGA and

17    others or international.

18          So but in the 20 years we've been

19    going, we've graduated over 200 graduate students

20    out into the hydrographic industry.  So really

21    something for us I think to be proud of as a

22    group, that we have these two institutions in the

1   U.S. who could provide that level of hydrographic

2   expertise out to both government and our industry

3   partners.

4           I'm going to kick it off with a video

5   we did for the U.S. Hydro Conference that was

6   held this year, so you'll get to see me again in

7   the video.  But it tells our story and then I'll

8   go into more after that.

9           [VIDEO PLAYS.]

10          CAPT CONNON:  So the Center that I

11  lead, the Hydrographic Science Research Center

12  was established a couple of years after the

13  academic side, and again in partnership with the

14  Navy, to try and support the Navy's efforts to

15  advance their hydrographic efforts through the

16  Naval Oceanographic Office and the Fleet Survey

17  Team.

18          You can see some of the previous work

19  that we've done there.  A lot of work on the

20  multibeam side for the NAVO survey ships.  For a

21  long time we had an ECDIS lab when S-57 was first

22  coming online, and also the digital nautical

1  chart that the DoD uses.  One might look at that

2  and go it might be time for another ECDIS lab

3  adventure as we go into the S-100 and all of the

4  overlays that we've talked about yesterday on

5  who's going to be looking at those, producing

6  those and coming up with how we're going to use

7  those new overlays.

8  Then the big one was CZMIL, which is

9  the Coastal Zoning Mapping and Imaging Lidar that

10  was mentioned by Mike that JALBTCX uses.  Naval

11  Oceanographic Office also uses that.  So we were

12  a big player in the development of that system.

13  Right now, we're working with them on how to help

14  them better process through automation machine

15  learning that lidar data, and we're working on

16  some potential projects with the Army Corps

17  there.

18  But how we're supporting NOAA

19  specifically with our unmanned systems projects,

20  I'm going to talk about these things.  So first

21  one there, upper right, you see an L-3 ASV Global

22  C-Worker 5 we've called the Sea Eagle.  We're the

1  Golden Eagles at Southern Miss if you didn't know

2  that.  So everything's got to have an eagle

3  something in there.

4          Saildrone project, I will go into

5  that, and then we're going to be procuring an

6  unmanned aerial vehicle this year under our NOAA

7  grant.  So I'm going to be talking to Mike a lot

8  to get all of his lessons learned so we don't

9  have to relearn them.  Then under OER, we have

10 our two AUVs, the Eagle Ray and the Mola Mola.

11         So the Sea Eagle, again built up in

12 Lafayette by our good friend Thomas Chance before

13 he retired.  He made sure we got a good one, so

14 thanks for that.  Five meter diesel powered.  UNH

15 runs the C-Worker 4, so a little bit smaller

16 version but again very similar.  We do have an A

17 frame and a wind sonar so we can tow either

18 sidescan or do other operations, drop a CTD with

19 that.

20         The goals of the project for NOAA

21 really isn't about the sensors.  We know how the

22 sensors can work.  It's more about how do we use

1    them, developing standard operating procedures,

2    looking at the training and certification of

3    operators and how do we integrate some of these

4    COTS sensors that are out there and make them

5    work on board platforms such as the C-Worker.

6              We'll be taking it aboard our research

7    vessel the Point Sur in the spring to start

8    looking at using it from a ship at sea as well.

9              Saildrone.  So we have a rep from

10   Saildrone here, Matt Paulson in the back, a

11   former Navy guy as well, Fleet survey team.  So

12   this is an exciting project.  We're using a wind-

13   propelled solar-powered drone to do surveys in

14   remote areas, and we wondered could we do this.

15   Saildrone is a service, so you do not buy the

16   vehicle, you buy the service from them.

17             So we have been working very closely

18   with them.  They've been a great partner along

19   with Norbit, who's our multibeam manufacturer, to

20   install a high end multibeam sonar in the bulb

21   keel of one of these Saildrones, and then take it

22   out on the Gulf and say could we actually survey

1   to the standards that we're looking for with

2   this.

3              So you can kind of see our first lines

4   there.  You can see, I think we got a laser here.

5   You can see here it was tacking a lot, all right.

6   So a lot about this is understanding your wind

7   and adjusting your survey plan accordingly.  But

8   as you can see for the most part, these things

9   can hold a survey line really, really well.

10             So we were very impressed with how

11  well it can hold it.  But it doesn't have -- as

12  long as you have some wind you can hold a line.

13  If you have no wind, well then it's a buoy.  But

14  it's still collecting data, so that's a good

15  thing.

16             Just to kind of some examples, so

17  here's an area we were looking at.  You see those

18  two charted wreck positions that were there.

19  Here's where we ran over those with the

20  Saildrone, and then you'll notice the wrecks were

21  exactly where they were charted, well done NOAA.

22  But this is the definition we're seeing from the

1    sonar, and I've got to point out this is not

2    corrected for anything.  This is just the raw

3    sonar.

4            So we didn't have sound velocity

5    collection available to us there.  We also

6    haven't corrected for tides.  But this as you can

7    see, these systems can collect good hydrographic

8    data.  So we're very excited about where this

9    might go, where this could be used, places like

10    the Arctic or the Western Pacific, you know, in

11    our EEZ where it's either hard to get to or it's

12    only accessible certain times of the year.

13            So you've heard NOAA's using Saildrone

14    for many things, you know, fisheries, survey,

15    those types of things.  This is the next step.

16    So we've got some lessons learned from it and

17    from our ASV work.  Autonomy?  We're getting

18    there, but it's not there yet.  These things can

19    go do some things on their own, but as you

20    increase the technology of these sensors on board

21    and the amount of data they're collecting, the

22    interaction with the human operator has to be

1    there and that's where that kind of quotes of

2    unmanned.

3            So these are not unmanned.  There's no

4    one riding them, but you still have to monitor

5    them and be looking at the data, and the

6    communications are really key.  So one of the

7    problems we have with the Saildrone that we're

8    working through is how do we get some indication

9    that the sonar is actually working back from the

10   Saildrone during its mission.

11           There's got to be a way for that

12   software to talk to the command and control

13   software on board the drone to be able to come

14   back, similar onto the ASV as well.  These

15   sensors weren't built to work on their own in the

16   hydrographic sense.  So we've got to work with

17   industry on how do we integrate those better, how

18   do we make those connections between the command

19   and control and the survey software work for us,

20   so that we can understand how well our systems

21   are working without having to go out and check

22   them physically.

1           The data quality, we're impressed with

2      data quality, but again we want to be able to see

3      that in near real-time, so that we can make

4      adjustments if we need to.  And then maintenance.

5      Upper right there, as you can kind of see, this

6      was -- we had it in the water for what, Matt,

7      about a month, and during nice algal bloom, very

8      nutrient-rich waters in the Mississippi Sound.

9      So there's a lot of growth on there.

10          So if you think about our survey boats

11     now, we pull them out of the water at night

12     pretty much, put them on board.  You can clean

13     things off.  These things are going to be out

14     there hopefully for 30 days at a time.  So we had

15     to start thinking about how do we protect those

16     hulls and sensors.

17          So actually we've got a project with

18     our Polymer Institute at Southern Miss, looking

19     at some new coatings for these types of things,

20     to reduce the amount of marine growth.

21          That last piece I'm going through very

22     quick is we are now part of the Ocean Exploration

1  Cooperative Institute with URI, UNH, Woods Hole

2  and Ocean Exploration Trust.  So we're part of

3  the team that will be doing exploration type

4  surveys here in the Gulf of Mexico.

5           We're scheduled to go out to Flower

6  Garden Banks National Marine Sanctuary.  That's

7  where we'll be using our AUVs to go down and do

8  some mapping efforts for a potential extension of

9  the marine sanctuary, and using our imagery AUV

10  to look at what's growing in those areas.  And

11  that's it for me.  Thank you very much.

12           (Applause.)

13           MR. SARAF:  Thank you Brian, and just

14  to add one note, that getting that Saildrone from

15  USM to the port there was quite an engineering

16  feat.  I'm very impressed with that.  It was a

17  nice hot day, and we pushed that thing to the

18  water and that was neat to see as well.  Thanks.

19  Next is Thomas Chance.

20           MR. CHANCE:  Okay.  I'm going to be

21  radical.  I'm going to stand up.  I was one of

22  the people in the back, so I can appreciate

1    somebody getting closer.  Okay.  So I'm Thomas

2    Chance.  I had a company called C & C

3    Technologies.  We did hydrographic surveying.  We

4    did hydrographic surveying for NOAA Coast Survey

5    for many years, and ended up selling that company

6    about five years ago.

7              But we had like 600 people and we did

8    hydrographic survey and other maritime type

9    survey all over the world, and we did a lot of

10   UUV stuff, AUV, autonomous underwater vehicle

11   stuff.  We also started doing unmanned surface

12   vehicles stuff back in the 90's.  Ended up

13   starting another company called ASV Global, and

14   we sold that last year, about a year ago now.

15             So got lots of experience in the

16   hydrographic area, hydrographic survey area.

17   Lots of experience with unmanned boat and

18   unmanned underwater vehicles.  So it's -- and

19   have had the opportunity to work with NOAA.  So

20   it's my honor to be here and share.  I'm

21   completely retired now.  I want to tell you a

22   year ago when I was working for ASV, I would have

1  told you the same thing today, you know, last

2  year that I will tell you today.

3  So I just lay it out on the line,

4  good, bad or ugly, so that's what I'm going to do

5  here today again.

6  All right.  So the content, we're

7  going to talk about unmanned, optionally manned

8  or optionally unmanned, minimally manned

9  conversion to optionally unmanned, converting an

10  existing boat to unmanned, force multiplier

11  examples and how they, how that works, line of

12  sight versus beyond line of sight on unmanned

13  boat stuff.  Everything here is really about

14  unmanned boats.

15  Examples of USVs that NOAA could

16  consider for unmanned plus, and then unmanned

17  lessons learned, and I'll talk about that.  So

18  from an unmanned boat perspective, here's some

19  examples and if I find the right button here.

20  Let's see, right there.

21  Okay.  So you can see in the top left

22  we have this is the Ocean Alpha.  This is a

1    Chinese boat and here's a sea hydrographic.  So

2    these guys, these are small battery-powered

3    systems.  The one beneath it here too, Martec,

4    these are battery-operated systems.

5              The most you're going to get are about

6    four hours really, and if you get bad sea

7    conditions you're going to have a challenge,

8    especially if it's -- if it's a monohull unless

9    you're in a flat glass, where you get some

10   aeration problems that you sometimes have to deal

11   with.

12             If NOAA Coast Survey's in a very

13   protected area, then something like that would

14   work if they know, hey look, we've got a survey

15   that's going to take us three hours, then that

16   would work.  But for by and large, what you

17   really want to do for NOAA Coast Survey is do

18   like diesel or, you know, something not

19   batteries.

20             Here's some other examples here.  This

21   is like the C-Worker 4 and C-Worker 5.  This is,

22   those are diesel-powered.  This is electric.  So

1    you have those constraints on them.  Maritime

2    Robotics out of Norway makes a jet drive one.

3    Here's the AutoNaut, used like the wave glider,

4    used as a wave to propel itself forward.

5              They have been, like the Saildrone,

6    has been able to run lines, you know, to a pretty

7    good degree.  But when you don't have any real

8    power, then you have to really limit the payload

9    that you have on there, right.  So you have to --

10    and then you have to worry about Mother Nature

11    cooperating.  You know, I need waves to run or I

12    need wind to run and that kind of stuff.

13              So Sea Robotics, that's another --

14    oops, sorry.  Pushed the wrong button here.  Sea

15    robotics is an electric system.  This is another

16    diesel powered.  Kongsberg has a system, I just

17    sold one of their systems.  Kongsberg makes good

18    stuff, you know, and it's expensive but it's

19    good.  And there's iXblue DriX, which was talked

20    about earlier, unique as a survey rental house

21    and they make --

22              So a lot of people will start off with

1    a system like this, right?  They do a catamaran,

2    they put some publications on it.  What the first

3    thing you'll find out is it works great if you're

4    in Scandinavia, but if you come to the Gulf of

5    Mexico, the heat kills it real quick.  You almost

6    have to have an air conditioner in an unmanned

7    boat.  I mean you really need an air conditioner

8    in an unmanned to keep the electronics cool,

9    unless you're going to work in Alaska all the

10   time, huh?

11            Optionally unmanned means that in

12   general you're taking an existing manned boat and

13   you're adding software to it to make it work

14   unmanned, which is really a very valuable thing

15   because now you can work either way.  If you

16   want, hey I've got somebody.  I need to get them

17   off this big boat.  I'm in anchorage and I need

18   to run them to the dock.  I need to go pick up

19   something.

20            Well, if it's a totally unmanned boat,

21   you can't do that, right?  So there's -- and of

22   course if you've got existing assets and I know

1      NOAA is converting some of their launches, manned

2      survey launches to have that optionally unmanned

3      capability, and that is certainly the right step

4      forward.

5              This is a conversion of a Canadian

6      Hydrographic Service boat.  You can see a sea

7      robotics system.  Dynautics, they did -- that

8      used to be H Scientific over in the UK.  They've

9      done a lot of systems.  There's some other

10     vessels that you see here.  This vessel here,

11     this is an ASV vessel.  It's working in the Gulf

12     right now doing hydrography.

13             Minimally manned.  So the concept of

14     minimally manned.  Like one person told me, he

15     said Thomas I do these ROV operations.  I need

16     130 foot boat to do ROV operations.  Usually it

17     takes me 25 people.  Really what I want to do is

18     make a minimally manned boat, and I want to run,

19     I want to monitor that boat over the satellite

20     link and control the boat over the satellite

21     link.

22             I want the ROV operations to be done

1    over the satellite link, but I want to have six

2    people on that boat, three for the day shift,

3    three for the night shift.  Their job is to just

4    fix stuff that breaks, you know.  I mean it's

5    part of the reality guys, and the payload can be

6    more complex and have more issues than an

7    unmanned system.

8              So you've got -- you know, when we

9    talk hydrography, that's kind of like the open

10   court lay up on unmanned boat, right?  It's like

11   a sensor.  It's pretty passive.  It's not like

12   you're towing a bunch of stuff.  So it's a lot

13   less stuff to break.

14             So here's -- in this example here, you

15   can see this Kongsberg is working with a company

16   called Yara on this 260 foot boat they're

17   building now, and that will be an all-electric

18   boat, and then in a couple of years they'll have

19   that running back and forth the exact same track

20   in Norway to carry stuff.

21             So it kind of shows some of the way

22   forward.  M Subs, which is now Automated Ships,

1     they're attempting to do this.  I haven't heard

2     that they've made a lot of progress.  Ocean

3     Alpha, a Chinese company and then ASV came up

4     with this hydrographic solution, where you have

5     an AM-124 in the bottom and a 712 multibeam with

6     two C-Worker 5's in the back.

7            And so it's a picture, right.  When I

8     was at ASV, we pushed that to help get it funded

9     by Congress, but haven't heard anything on that.

10     Conversion to optionally unmanned.  There's a lot

11     of companies here that do conversion.  Sea

12     Machines has a system, Sea Robotics has a system,

13     Dynautics.

14            Kongsberg has K-MATE, and actually in

15     this picture you see this vehicle which is --

16     their news release, press release just came out

17     the other day.  They're going to try to cross the

18     Atlantic next year with the SEA-KIT, unmanned,

19     while monitored over the satellite link, and ASV

20     has a system.

21            As a force multiplier, this is a

22     TerraSond boat working in Alaska.  This is an ASV

1    unmanned boat working the adjacent survey line.

2    You can't really see this chart, this bar graph.

3    It shows for the last five years the production.

4    So the first year there wasn't much, but after

5    that you're looking at one manned boat, one

6    unmanned boat and they're both doing about the

7    same.

8            Actually the last three years here,

9    the unmanned vessel is doing more survey work

10   than the manned vessel.  So that's one unmanned

11   boat.  So if you get a big vessel like the Thomas

12   Jefferson, you know, and you put two or three, I

13   mean you're going to double or triple at a

14   fraction of the cost of the big ship, right?

15           So that's really the big advantage of

16   unmanned is that for a fraction of the cost, you

17   can dramatically increase your production.

18           Line of sight versus beyond line of

19   sight.  Most of everything has been done so far

20   using line of sight.  Radio links to a mother

21   ship, radio links to shore.  But now you're

22   getting more and more where you can do it over

1    the horizon, and when you're doing it over the

2    horizon over a satellite link then boy, that's

3    when the dam bursts, right?

4              I mean that's when you can do all kind

5    of things.  When you leave the dock, you can go

6    out for long periods of time.  You can get data

7    and you can monitor it.  You don't have to worry

8    about crashing.  I mean we're getting there,

9    right, and in some cases you can.  Examples that

10   can be used for NOAA, the Kongsberg system that's

11   come out.

12             I mean Kongsberg has done some good

13   stuff over the years.  The DriX is still a little

14   young, needs to be flogged.  You know, work with

15   them.  I mean hey, they're a good company and of

16   anybody that NOAA works with, they just need to

17   work with.  I mean it's not like you're going to

18   go Walgreens to buy a calculator and it's going

19   to work, right?

20             You need to iterate, and then these

21   three systems are all ASV systems.  Fugro system

22   just being delivered now.  Two systems is really

1    the latest ASV system.  It's a high productive, a

2    high productive system.

3              So lessons learned.  For real-time

4    survey production a cheap USV can be very

5    expensive, right?  When you start to, you know.

6    Oh yeah, we got, we really saved some money on a

7    USV.  So we got cheap radios that we're going to

8    find out we're going to have to change.  We have

9    cheap connectors and anybody who's been in the

10   commercial survey world or the hydrographic

11   survey world or any of that, connector is like

12   30-40 percent of your problems.

13             Don't get cheap connectors, don't get

14   cheap radios, you know.  Have good network

15   switches.  All of these things will kill you and

16   from a cost standpoint.  So you might as well do

17   it right, as opposed to trying to save money and

18   costing yourself a fortune.  Don't go with

19   batteries, they just don't cut it.  Go with

20   diesel.

21             Smaller monohulls can have variation

22   problems like I mentioned.  One good strategy for

1 NOAA going forward, get an unmanned boat, just

2 one. Don't order five, order one. Work with the

3 contractor to debug it, then order four more. So

4 that, that's what my recommendation would be.

5 Beware of heat as I mentioned, all right?

6 You've got heat on your electronics,

7 you've got heat on your -- maybe you have keel

8 coolers, keel coolers. I mean hey, look. If

9 this thing is built in Europe, they've got cold

10 water, it works great. You know, maybe in Alaska

11 it works great. You get it down to the Gulf of

12 Mexico, a keel cooler it's like man, we need

13 twice as big a keel cooler.

14 So I mean you really have to watch

15 that. Beware of water. It's hard to keep the

16 water out and especially in electronics. Beware

17 of connectors as I mentioned. Launch and

18 retrieval system is obviously very critical. If

19 you can't launch and retrieve it, then it doesn't

20 help if you're trying to use it off of a mother

21 ship.

22 As I mentioned, don't expect that it

1    will work like a calculator from Walgreens.

2    You'll get there, but it's -- you're going to

3    have to work on it a little bit and at least

4    recognize that.  Hydrography is one of the

5    easiest applications of unmanned boats.  Don't

6    get confused between good USV graphics and pretty

7    paint versus lots of years of experience, because

8    you have to have all those years of experience to

9    really learn your lessons.

10            Make sure your USV manufacturer has

11   extensive maritime experience.  If you go hey,

12   look.  Here's an unmanned boat company and

13   they're all from MIT.  Nobody's been on a boat,

14   but they're all smart as heck but they've never

15   been on a boat.  That's a problem.  COLREG

16   autonomy has not been perfected and you must

17   supervise them.  You really need to be

18   supervising them, or else you've got to expect

19   that you're going to have an issue there.

20            The last thing is check with other USV

21   users before you buy.  If you want to buy a USV

22   from these people say hey, tell me all your

1    customers and then go talk to customers.  Hey,

2    does this really work, right?  That's all I've

3    got.  I'm out of time and that's my contact

4    information.

5              (Applause.)

6              MR. SARAF:  All right, thank you.

7    Last presenter is Lieutenant Damian Manda from

8    Coast Survey.

9              LT MANDA:  All right.  I was also

10   sitting in the back so -- is this one on?  Yeah.

11   So I'm Lieutenant Damian Manda.  I am the chief

12   right now of the Hydrographic Systems and

13   Technologies Branch under the Office of Coast

14   Survey.  Just to give a little bit of context of

15   where that is, we're responsible for development

16   and testing of new ocean mapping technologies and

17   supporting existing ones.

18             We're part of the Coast Survey

19   Development Lab within the larger Office of Coast

20   Survey.  Our main customers are within that, so

21   the Hydrographic Surveys Division, the Nav

22   Services Division and to some extent the Marine

1  Chart Division.  But we also support a lot of

2  other NOAA entities that are outside of that and

3  also use their data and their expertise to

4  support our operations.

5  But here I'm focusing primarily on our

6  autonomous systems and a strategy that we have

7  for Office of Coast Survey in using unmanned

8  systems.  So overall on the strategic plan that

9  was discussed a little bit earlier, there's a

10  bullet point for integrating new and innovative

11  technologies into our mission priorities.  So

12  that's where we're focusing in this UxS vision,

13  to develop and utilize unmanned systems for more

14  efficient and effective acquisition of data to

15  support NOAA's navigation products and services.

16  That comes from another kind of white

17  paper that I believe the HSRP has seen in its

18  iterations.  So kind of going through some of the

19  use cases that Mr. Chance touched on as well,

20  there's a number of different types of vessels

21  that have different applications for which

22  they're best suited.

1          So for unmanned surface vessels, the

2     small platforms are good for shallow water

3     mapping, putting them into dangerous or unknown

4     situations, and then for the bigger diesel

5     powered platforms for the long duration missions,

6     on really augmenting a ship.  For unmanned

7     underwater vessels, we've kind of shifted that to

8     more of a small response scenarios, for the man-

9     carried versions, and then for deepwater high

10    resolution mapping for the larger systems.

11          The conversion type that we're doing

12    with our launches, those are great for

13    utilization of existing platforms and a lower

14    cost conversion to be able to start integrating

15    autonomous technology, as well as preparing the

16    workforce that's on our ships for these next

17    generation technologies, and knowing how to

18    handle those systems.

19          We're also working on unmanned aerial

20    systems.  That goes towards better shoreline

21    acquisition and some of the stuff that was talked

22    about by Mr. Starek.  The strategy is kind of

1    broken down into four main points on where we're

2    focusing, so the first being developing enabling

3    technologies.  I'll go into each of these a

4    little bit more in detail.

5              There's a lot of points on the slides

6    as well that are kind of left just for reading,

7    but I'll touch on the main points.  Building and

8    maintaining operational expertise.  So this is

9    the personnel development.  Operational

10   innovation.  So this is the actual new platforms

11   and sensors and the integration of them, and then

12   collaboration.

13             A lot of the work that we've done has

14   already been presented by the other partners, and

15   they feed a lot into what we're able to do as a

16   whole for Coast Survey.  We have a lot of

17   different steps in our data collection process.

18   So this is kind of what goes on in some of our

19   field platforms.

20             I'm not going to go into every single

21   section, but the idea behind this is we're really

22   trying to enable automation in processing,

1    because if you start getting an increased volume

2    of data from unmanned systems and you have a

3    force multiplier with more data coming in than

4    you have people to process it, that's not going

5    to work.  It's going to slow down our bandwidth.

6              So we've kind of innovated all up and

7    down the pipeline, from initial raw data

8    collection to the delivery of reports where we

9    can speed up that process, with our eventual goal

10   of reducing that very significantly.  Another

11   enabling technology is the wireless data

12   transfer.  Our optionally manned launches have

13   one system for this, and we also have procured

14   another system that's been installed on the

15   Thomas Jefferson and is getting rolled out to the

16   other ships in the hydrofleet for monitoring and

17   some low level control of the launches.

18             For the optional platform, operational

19   platform expertise, we've stood up the Navigation

20   Response Team in Stennis, Mississippi as a Center

21   of Expertise for Unmanned Systems.  The Admiral

22   touched on that, and we also have a platform, the

1     Bay Hydrographer that does a lot of system

2     testing and has helped with qualification of some

3     of these systems.

4            So this year we've officially

5     transitioned all of the unmanned assets that are

6     owned by Coast Survey over to that NRT, as well

7     as done some training activities on board the

8     NOAA ship Okeanos Explorer to help facilitate the

9     operational expertise.

10           For the optionally unmanned launch,

11    this has been a big focus of my office through

12    the last couple of years, and this year was the

13    first year of field testing for the launches.

14    The NOAA ship Rainier has two that have been

15    retrofitted right now.  We have a contract for

16    one more on the Thomas Jefferson, and plans for

17    up to three more that will be converted

18    throughout the fleet.

19           So this really allows us to start

20    building up that expertise like I said within the

21    personnel, and develop the CONOPS that are

22    necessary for running unmanned systems.  As Mr.

1    Chance talked about, kind of deployment and

2    recovery is a large part of this as well, so

3    we're trying to figure out some of those systems

4    and how they can work with vessels that were

5    originally designed to be manned operation.

6              Right now on that -- right now we

7    actually have our second round of testing going

8    on in Hawaii between two of the launches being

9    able to operate, one from the other and from

10   shore, for some of the first true unmanned

11   operations with those platforms.  For the other

12   innovation that we've been pursuing, we have

13   shoreline via unmanned aerial systems.

14             We were able to do field operations

15   this year in Michigan to support NRT acquisition,

16   which also fed into the Coast Pilot, as well as

17   some of the structure for motion processing

18   that's been discussed.  We're working on being

19   able to train people.  We have in a couple of

20   weeks the first full class of training going for

21   personnel to be able to certify in the operation

22   of these types of UAS.

1               We have collaboration partnerships

2     that are able to facilitate a lot of more rapid

3     development.  The Navy, as was mentioned, the

4     CENOTE legislation directs us to leverage their

5     expertise in development and transition of

6     unmanned systems.  We also have a memorandum of

7     agreement that facilitates coordination and

8     collaboration on both hydrographic survey

9     initiatives overall, as well as specifically

10    targets unmanned systems.

11              Right now, the Navy is undergoing a

12    very similar autonomous launch conversion and

13    actually using the same vendor, so we're hoping

14    to leverage that directly for improvements to our

15    systems through the additional parts of their

16    contract.  With the University of New Hampshire,

17    some of this has already been discussed in that

18    presentation.  We had the first deployment of an

19    ASV off of a NOAA ship for specific survey work.

20              They've also been advancing the DriX

21    and this year, as was mentioned coming up very

22    soon some tests on the Thomas Jefferson doing

1 that. Also the C-Worker operations in Thunder

2 Bay earlier this year, as well as the Pacific

3 Islands. In addition to the Earhart project,

4 they've done some mapping in the marine sanctuary

5 out in the American Samoas and for the DriX, just

6 the retrofit with the Thomas Jefferson.

7 UNH also has a separate, slightly

8 separate effort for Saildrones for integrating a

9 deepwater sonar system into a large Saildrone, a

10 72 foot model that would be able to map deeper

11 water than kind of what's the application for the

12 USM investigation, which was already discussed

13 pretty much in detail so I won't go into that too

14 much. But that was tested in the Gulf of Mexico

15 this year, as well as the continued development

16 with the C-Worker 5 at the University of Southern

17 Mississippi.

18 So kind of in summary for all of

19 these, we have a lot of things that are going on

20 within Coast Survey and among our partnerships.

21 We've been working on these towards -- the goals

22 that are on here are the ones that come from that

1    strategic plan.  We've met almost all of them for

2    2019 that were designated.  We've reduced our

3    shipboard data processing efforts significantly.

4    We don't have any exact metrics on that, so that

5    might be kind of a fuzzy checkmark but we're

6    definitely close to that.

7              We've staffed our NRT.  We will have

8    the OCS training coming up very soon for UAS.

9    We've got the operational use of our launches and

10   shoreline field acquisition with the UAS, and we

11   have the DriX testing as well as the integration

12   of the mapping sonar on the Saildrone through USM

13   and UNH.  So we've made a lot of progress on all

14   of these initiatives.

15             So going -- where does that go to

16   bring us forward with the strategy.  2019

17   activities is what I've summarized.  In 2020,

18   we're looking forward to having additional

19   optionally manned launches.  Continuing our

20   reduction in data processing, we have some

21   initiatives to continue innovating on the

22   reporting side, and we keep refining kind of our

1       data processing pipeline.  Some of that also is

2       getting the shoreline data acquisition through

3       the UAS dialed in and getting that pipeline

4       developed.

5                   I had an intern this summer working on

6       some of the initial development for that, and we

7       were fairly successful in starting that model.

8       And then also testing kind of navigation and

9       situational improvements for USVs.  This will

10      hopefully also leverage some of the development

11      that the Navy's doing, which requires a level of

12      COLREGS autonomy in their unmanned conversion.

13                  And then rolling out the shoreline UAS

14      to the fleet.  So getting that training in place,

15      but also procuring the UAS themselves and getting

16      operational expertise with those.  Then moving

17      into the years beyond that, kind of the bigger

18      goals to start supporting multiple deployments

19      from the UxS team, different types of deployments

20      and different missions, and then testing kind of

21      the more advanced mission behaviors, where you

22      have multiple autonomous vessels deployed at the

1    same time from a field platform, as well as

2    expanding the use in more complex environments

3    with more traffic, more obstacles to navigation,

4    as well as kind of the persistent deployments

5    that might be good in the river-type scenarios or

6    ports where you have a vessel that will go out

7    and routinely resurvey an area automatically.

8            And that's what I have.  So we have a

9    lot to look forward to.

10           (Applause.)

11           CHAIR SAADE:  Thanks.  Thanks

12   everyone.  That was a great amount of diversity

13   and a real wide spread of how far we've come.

14   We've been seeing a few of these presentations at

15   the HSRP over the last several years, and we just

16   keep moving forward.  Okay questions.  There have

17   got to be some questions.  Okay, I'll start.

18           So I see -- we at Fugro, I'm going to

19   take my HSRP hat off, talk about as an operator

20   and a contractor.  We see the biggest problem at

21   Fugro is the inability of the global Coast Guards

22   or marine operators throughout the world to be

1     able to set a standard for being able to operate

2     these things over the horizon.

3                 We feel that until you can operate

4     them over the horizon and set them free and go do

5     massive amounts of collection for days on end,

6     we're never really going to see the benefit of

7     the fact that we have an autonomous vehicle.  So

8     I don't know what anybody can do about that,

9     except we can keep complaining.

10                 But it doesn't seem that the U.S.

11     Coast Guard's getting anywhere, the UK

12     authorities or the Canadians or the Australians,

13     or anyplace else that we operate that anybody's

14     making any progress on this.  So I don't know if

15     anybody's going to comment to that.

16                 RDML GALLAUDET:  Those things operate

17     over the horizon, gliders.  So I think hybrids

18     are something we should be looking at.  So I know

19     there's these authorities and concerns, but you

20     know if you can -- maybe part of the mission

21     involves something where C2 and data

22     dissemination and download is done on the

1   surface, and then there's a near surface type of

2   hydrographic mission.

3           I certainly think the technology is

4   moving in that direction.  But before you --

5   anyone else answers, I do want to point out that

6   the good work the Thomas Jefferson did in

7   demonstrating some of the unmanned systems, that

8   was done through the leadership of a NOAA captain

9   in the room, Chris Van Westendorp, who commanded

10  the ship at the time.  So I just wanted to

11  acknowledge that and thank you Chris.

12          (Applause.)

13          CHAIR SAADE:  Okay.  And then along

14  those lines, I'll give a shout out to the state

15  of Louisiana, because as Thomas' old company and

16  the Fugro Company, between the two offices that

17  are based in Louisiana and the AUVs that they've

18  been operating, we're probably close to a million

19  line kilometers of collection since the inception

20  of using these things.

21          All of that is driven from the

22  headquarters in Louisiana, the technical people

1    and the staff that do those things.  Yes Thomas.

2              MR. CHANCE:  Let me comment about

3    running over the horizon and legal aspects of

4    that, because when I was with ASV, we talked to

5    the Coast Guard and different groups about that,

6    and we couldn't get a square answer, you know.

7    We've had Coast Guard headquarters people say

8    hey, after 12 mile limit we don't care what you

9    do, and we have other Coast Guard people say oh

10   no, you can't do that.

11             And it's like -- and I would say that

12   for the over the horizon stuff, which you've got

13   to really make sure for unmanned boats, is to

14   have, you know, that remote VHF capability,

15   because when the Coast Guard pulls up and starts

16   talking to you on a radio and you don't answer

17   back, they don't like that, right?  So you know,

18   I know there's being efforts on that, you know,

19   to have.

20             So somebody back at shore has got that

21   satellite lady at the radio linked to a local VHF

22   on an unmanned boat, so that if they call you on

1      16 or whatever, you can answer them and say yeah,

2      there's nobody on the boat.  That's why you don't

3      see anybody.  But it's still -- you're right.  I

4      mean it's unresolved to a large degree, but

5      there's -- you know, from my ASV days we never

6      had seen it.

7                 You know, it's not like you can't do

8      that.  There's nobody ever really stood up and

9      said don't do that.  No, you don't -- you get in

10     a wreck and it might be different, right?

11                CHAIR SAADE:  Yes.

12                CAPT CONNON:  So I think going back to

13     what Admiral Gallaudet said about kind of having

14     these underwater systems that can go out, if you

15     look at companies like Ocean Infinity, Fugro's

16     doing some of the same, of being out to do these

17     huge ocean searches using multiple AUVs with

18     potentially an ASV as a calm relay in an updating

19     position and getting health status of the vehicle

20     themselves.

21                That's a very expensive proposition.

22     The vehicles that are being used out there are

1      three to five million dollars apiece, and the

2      longer that they can stay down and thankfully

3      guys like Elon Musk are making our batteries much

4      better.  So now we can get underwater vehicles

5      going for tens of hours, approaching hundreds of

6      hours underwater.

7                Well then you've got to worry about

8      well what's their positioning like?  Is the data

9      going to be good enough?  You know, for a search

10     it's probably okay.  But when you start looking

11     at ocean mapping requirements, you know, are you

12     going to be able to maintain that navigation

13     quality of data for that length of time?

14                And for the companies, now your data

15     risk increases every hour you're under water.  So

16     if at Hour 99 of an 100 hour mission you lose

17     that vehicle for some reason, well you've also

18     lost 99 hours of data and how much is that worth

19     to you?

20                So I think that's an interesting thing

21     to look at as well, is how do we improve the

22     ability to retrieve data or at least, you know,

1　processing on board as you're collecting, so that

2　you can offload data to reduce your risk from an

3　industry standpoint while you're getting these

4　longer-lived missions out of the AUVs?

5　　　　　　CHAIR SAADE:  Thanks.  Thanks Brian.

6　　　　　　MEMBER HARGRAVE:  So there are a lot

7　of ancillary data sets which you can acquire with

8　these autonomous systems, and for an example

9　would be if you have a camera on a system then

10　you probably have a turbidity meter.  But are you

11　recording that data and are you doing something

12　with that?

13　　　　　　Another example would be using the

14　Doppler velocity to record the currents near the

15　sea floor.  Are those data sets being looked at,

16　and would some recommendations of what those

17　could be or how they could be used, would that be

18　helpful from the HSRP?

19　　　　　　CAPT CONNON:  So I will say yes, we've

20　looked at other things with our ASV other than

21　mapping, and one we've looked at is with the

22　winch and the A frame that we have, we could do

1   oceanographic stations, if you will, to map

2   hypoxia in the Mississippi Sound by using a CTD

3   with an altimeter so we can get down.  We've used

4   gliders for that, but we tend not to be able to

5   get the vertical structure that we really want.

6           We are looking to get some microscale

7   turbidity as well.  It really depends on what

8   your customer wants and the specific missions.

9   So I think from the academic research side, we're

10  willing to try anything as long as someone's

11  coming to us to ask us.  But to get to your other

12  question of where does that data go, that's a

13  great question and I think you've got NOAA data

14  centers where that information should be going.

15          But a lot of it again is how is the

16  research funded?  Is it a standard requirement in

17  the collection?  You know, when I was in the Navy

18  and we did mine warfare surveys, we didn't

19  collect -- we were collecting bathymetry and side

20  scan and those kind of things.

21          But we weren't collecting the water

22  level information or the positioning well enough

1  to be able to then use that as a, you know, part

2  of the hydrography mission that we should have

3  been doing.

4         So yes, I think that is something to

5  think about.  There are a lot of things like on

6  the Saildrone mission they were out mapping for

7  us.  But they also have an anemometer, a sea

8  surface temperature and all those things.  So

9  they are able to contribute to that, you know,

10  global modeling effort, that in situ data.

11        With the number of them out there,

12  well that's a lot more data and especially if

13  we're going to remote areas where you don't have

14  anything else.

15        MEMBER DUFFY:  Ed?  So it's a little

16  outside of the topic of discussion, but if you

17  were here yesterday, you heard a lot of comments

18  about multibeam surveys.  You know, what I take

19  from this is that the new technology coming out

20  may see us with options on how the lower river is

21  surveyed, you know, whether through better

22  technology, unmanned vessels.

1          The challenge -- I mean one of the

2    improvements to the single beam data the Corps

3    has done over the last couple of years was

4    related to the fact that they -- there were gaps

5    between their lines, their survey lines, the

6    single beam data, five to seven hundred feet.  So

7    they do a center line survey which -- I mean the

8    truth of it is you have a survey vessel in the

9    middle of the channel with vessel traffic

10   altering, because they want that center line

11   done.

12          So as these topics come up, I'll

13   always bring it back to the local application.

14   So looking at that in a different realm, and of

15   course Mississippi River currents are a little

16   different, turbidity, visibility, all those kind

17   of things.  But hopefully there's a business set

18   and idea for looking at that application, which

19   would be huge for at least this river system, and

20   I imagine it would carry over to many others.

21          CHAIR SAADE:  I mean I could answer.

22   I can say yes to that, but it's -- the newer

1    generation that Thomas showed, they're starting

2    to get up to the eight, capable of achieving

3    eight knots.  So the faster they can go, the more

4    they might be able to withstand the challenges of

5    the currents in the Mississippi.

6              MEMBER DUFFY:  I remember the Jetsons.

7    I'm ready.

8              (Laughter.)

9              CAPT CONNON:  Yes.  I think Thomas'

10   point of, you know, battery versus diesel, you

11   know, that's a big part of it.  But you know,

12   with the multibeams that we have now, you can

13   angle the sonar head and account for that.

14             So you don't have to run center lines;

15   you can still get the center line measurements

16   there.  So but being able to do it faster, being

17   able to process data as it's being collected so

18   that there's very minimal cleaning to be done

19   once it comes back in.

20             But how do you make that something

21   that either it becomes an organic asset to the

22   pilots or to the port, or is it a contract out to

1     one of the companies who can do that for you.  I

2     think there's that scenario to look at as well,

3     and then getting that into the concept operations

4     that you have for that vessel traffic.

5             How do you integrate hey the survey

6     that's coming through, and it's going to be at a

7     set time or whatever.  Because I can tell you,

8     yes they run a center line of that single beam

9     and that's great.  But they still have that 600

10    feet separation on either side.  Nothing ever

11    falls off a ship, right, never have a container

12    go down or anything like that.

13            So yeah.  You're not going to see

14    that.  So that was, you know, for the Navy we

15    used jet skis with single beam and side scans for

16    beach surveys, because we were running single

17    beam but we would miss the big rock that's going

18    to punch a hole in the bottom of the landing

19    craft, right?  So similar kind of idea.  You need

20    to see everything down there.  For you, it's not

21    about seeing an object necessarily; it's about

22    are you getting buildup of that sediment and

1    reducing your draft?

2              MEMBER DUFFY:  So and I agree.  I want

3    to be careful and just that I am not complaining

4    about what we have.  It's the best we have, but

5    knowing that there are advancements that we can.

6    Some of the things that will drive the government

7    agencies there are having the private industry

8    show what is possible, you know.

9              When we prove what's possible and, you

10   know, it's also wonderful if what's possible can

11   be done better and cheaper, that's a big sell.

12   So you know, I don't understand all of the

13   technology, but I know what the applications

14   we're looking for are.  As we move forward, it

15   would be great to keep in touch and thank you.

16             MR. CHANCE:  So I would just tell you

17   that look, the multibeam stuff came in like 25

18   years ago.  Whoever's doing single beam, like

19   bless their heart, right?  I mean -- and the

20   processing improvements have come along so far

21   that it's not like -- it used to be really a

22   challenge to process the multibeam data, and

1 that's gotten a lot easier.

2     So and then so unmanned boats and, you

3 know, you've got to be careful of hot traffic

4 area.  You got ropes, you've got garbage bags,

5 you've got -- I mean that's a reality, right?

6 Trees, stuff floating all over the place.  But at

7 the same time and look, regardless if it's manned

8 or unmanned, the cost of multibeam over single

9 beam is going to be, you know, it's going to be

10 nil, right?

11     So you might as well go with multibeam

12 and you might as well -- in the unmanned stuff it

13 should be less expensive, you know.  You'd

14 probably want like a Zodiac or something that,

15 you know, if you hit something it's not going to

16 be a mess, right?

17     CAPT CONNON:  And I would say that the

18 nice thing about the multibeam is you start

19 building up a knowledge that you have never had

20 before, and then you start tying in events of

21 well we know when this happens, we are going to

22 start seeing buildups, you know, this many days

1  later.  You can start modeling when you will need

2  to go and dredge or when you need to go check to

3  see if you've got sediment building up.

4              Without having that kind of, you know.

5  So maybe you don't have to survey every day, you

6  know.  Maybe you have to survey every week and

7  then as needed based on the flow of the river and

8  what might be coming that way.  So but that's

9  going to take some time and effort and study to

10  kind of come up with what's that going to take.

11              MEMBER DUFFY:  Didn't mean to

12  sidetrack the panel, but it's very relevant here

13  and I'd like to continue that discussion.  Thank

14  you.

15              CHAIR SAADE:  Admiral.

16              RDML GALLAUDET:  So a little bit

17  different topic, but I neglected to mention two

18  important developments that are relevant to this

19  board.  The first is we are with the White House

20  hosting a Ocean Science Partnership Summit in the

21  fall, and this is focused around all sorts of

22  ocean technologies.

1           So mapping is -- there will be a

2     session, one of probably eight, that are

3     dedicated to developing and advancing

4     partnerships with the private sector, and that

5     one will be on mapping and there will be some on

6     some other areas too.

7           But that's going to be pretty

8     exciting, and we expect to make some big

9     announcements when we have that summit.

10          The second is the White House has also

11    asked us to develop a National Strategy for Ocean

12    Exploration that will involve mapping,

13    characterizing and exploring.  So that's going to

14    be a major interagency effort.  We'll lead it,

15    and this strategy we hope will be the sort of

16    foundation to grow our NOAA program as the lead

17    program for all the interagency.  So more to

18    follow.  Thanks.

19          CHAIR SAADE:  Thank you. Did you want

20    to ask a question?

21          CAPT KRETOVIC:  Okay.  Thank you for

22    a very engaging panel.  At this time, we're going

1    to open it up for public comment.  So those of

2    you on the phone or in the room, if there are any

3    public comments, we'll be taking them at this

4    time.

5            MS. MERSFELDER-LEWIS:  If anybody in

6    the audience would like to ask or make a comment,

7    we would welcome that.

8            MS. LUSCHER:  Thank you very much for

9    your presentations today.  My name is Audra

10   Luscher.  I'm hosting a session tomorrow that's

11   focusing more on taking a look at the

12   hydrographic services related to sea level.  But

13   I think we see a very interesting application

14   related to coastal mapping and to what seems more

15   of a sea level perspective for communities from

16   Brian talking about your program, you're

17   communicated that and the need for that.

18            But I definitely see our unmanned

19   systems are focused on more of our navigation

20   portfolio.  Do you see any disconnects that we

21   need to be kind of looking across, outside of the

22   navigation spanning into the studies around

1    coastal risk, and how these unmanned systems

2    could be -- are being used so they can meet both

3    missions?  I just wonder if you have any thoughts

4    or suggestions.

5            CAPT CONNON:  So I would say yes.  Due

6    to time, I wasn't able to go through all the

7    things that we're attempting.  So NOAA has also

8    funded us to look at some VDatum and subsidence

9    work that we've done off -- in the Mississippi

10   Sound tied into this as well, you know.  Using

11   multi-GNSS constellation type work to try and get

12   better measurements is part of that

13   understanding, you know.  Is it subsidence or is

14   it sea level rise?  That's always a good

15   question, so we're trying to help answer that.

16           So I won't say there's a disconnect.

17   There always can be better collaboration, but I

18   think forums like this and our conferences.

19   We're seeing -- in the hydrographic side we're

20   seeing more of the coastal resilience and those

21   types of issues coming up.  So that's all tied to

22   that.  So yes, I think from the Southern Miss

1     side, we are seeing that in Mississippi, that

2     especially.

3               MS. LUSCHER:  Thank you.

4               CAPT KRETOVIC:  We have one public

5     comment from the webinar, and so we'll be reading

6     that here momentarily.

7               MS. MERSFELDER-LEWIS:  Okay.  We have

8     -- we actually have two.  We have -- or this is

9     all from the same person.  It's all from Vitad

10    Pradith, who by the way used to work for us.

11    He's an awesome guy by the way.

12              Okay.  He asked if -- is there a

13    current strategy for shallow water areas, 60 feet

14    or shallower for USVs?  What are the needs for

15    NOAA from this perspective?  Then he asks is

16    there a current strategy -- it's the same.  Some

17    of these platforms are too large for these really

18    shallow areas.  So if you want to comment on

19    that.

20              LT MANDA:  I think we kind of

21    mentioned that a little bit.  If you're talking

22    about like near coastal areas that are really

1   shallow water, that's kind of the realm of the

2   Navigation Response Team.  So that's where having

3   the unmanned, the small unmanned assets tied to

4   the Navigation Response Team out of Stennis is

5   the intention for those assets.

6          So those are the -- they have Z-Boats

7   and EchoBoats, kind of two meter long vessels

8   that are capable of going in less than a meter of

9   water, up to -- and the EchoBoats are equipped

10  with multibeam EchoSounders that should be

11  capable of going beyond 60 feet as well.  So as

12  long as the operational parameters are there, so

13  not too many waves or current or that kind of

14  thing.

15          Those solutions are intended for that.

16  Also for shallow water up to the shoreline type

17  mapping, certainly to some extent the Structure

18  for Motion from UAS.  As has been mentioned,

19  there are some challenges with getting bathymetry

20  out of that.  But it is possible in some regions

21  for shallow water as well as the lidar systems

22  that can be mounted on UAS.

1          We don't have any trials of that right

2     now, but it certainly shows promise for near-

3     shore mapping.  Then for kind of ship-supported

4     activities, certainly some of the -- like the C-

5     Worker has been used in very shallow water, I

6     believe both by kind of our contractors,

7     TerraSond and the like, as well as the UNH

8     operations in the Channel Islands.

9          I think there was a picture shown in

10    one of the presentations where it was right up

11    against one of the rockfaces basically.  So

12    that's kind of where it might be dangerous for a

13    manned vessel to go in there, but we can use some

14    of the smaller to mid-size unmanned vessels that

15    are ship launched for that as well.

16         CAPT CONNON:  Yeah.  I would just add

17    to that that, you know, surveying -- we've said

18    team effort I think a couple of times here.  But

19    you know, using all of your assets available.  I

20    think the use of airborne lidar is probably an

21    under-utilized asset to do a lot of that shallow

22    water work, because there are areas where the

1   water is clear enough, where the lidar can get in

2   and do that close-in work very, very quickly.

3           So then you would only have to then

4   manage your assets to determine what's the best

5   available asset to go back in.  Small USVs like

6   the EchoBoat I think are also useful from the

7   Corps perspective in their canals and locks.

8           I got a call a couple of weeks ago

9   from the New Orleans Sewage and Water Board

10  asking if I, we had any students who wanted to

11  come down and survey some canals, and a couple of

12  days later they found a car shoved in underneath

13  of one full of beads, of course.

14          But when you start thinking about the

15  canal system and those type things, these small

16  USVs are great assets for that, because you can

17  stand on the bank and you can just remote control

18  and run them around.  But that, someone's got to

19  put that into place.  So I really think the

20  answer to that is it depends on the situation for

21  which asset you want to use to tackle the

22  problem.

1          DR. STAREK:  I'll just follow on for

2    comment on the lidar side.  So the bathymetric

3    lidar, which is blue green, there's been a lot of

4    involvement on the small UAS side.  Even Riegl,

5    which is a well-known big airborne lidar maker

6    has a bathymetric lidar built for smaller UAS.

7    There's a company, I think they're called Aster.

8    ASTRALiTe.  They have one.

9          I haven't again, tested myself.  But

10    that technology keeps miniaturizing and

11    miniaturizing.  Now of course clear water is

12    always a challenge with bathy lidar.  Like there

13    are technologies like the photon counting lidar

14    you might hear about and really sensitive

15    detectors, different things to try to get through

16    that.

17          But a lot of developments on the lidar

18    side.  And then we can thank the auto-navigation

19    industry and autonomous cars for really pushing

20    it on the topographic side, because a lot of

21    those sensors were built for just basically

22    autonomous vehicles.  They've pushed the cost

1    down.  So there's a lot of interesting things in

2    lidar.

3                There's SLAM UAV lidar, which

4    basically in theory we do it a lot in indoors,

5    but you can just fly and seamlessly construct the

6    point cloud.  It will have challenges in moving

7    environments, but there's a lot of push towards

8    that.

9                Some of the advantages of lidar too

10   are real-time, you know.  The system we use can

11   actually get a real-time point cloud.  If you had

12   a need for it, that wouldn't be a survey grade

13   quality data product but if you just wanted to do

14   rapid assessment.  But anyhow, some interesting

15   developments there.

16               CAPT KRETOVIC:  Okay.  Thank you very

17   much.  It was a great panel.

18               (Applause.)

19               CAPT KRETOVIC:  Now with the remaining

20   time before lunch, we're going to go back to the

21   priorities document, thank you.  So we'll just --

22   everyone stay seated and we'll continue on with

1    the discussion.  That way we can maximize our

2    time.

3              (Pause.)

4              VICE CHAIR THOMAS:  Thank you, thank

5    you.  Virginia's putting up -- I did take a

6    minute to just reorganize what we had already

7    discussed about.  But it's hard to read off the

8    screen, so if you have your written copies, all

9    the better.  Do we want to take five minutes and

10   talk to the panel people?

11             (Pause.)

12             VICE CHAIR THOMAS:  Five minutes?

13             CAPT KRETOVIC:  Okay.  So we'll take

14   a quick five minute break.

15             (Whereupon, the above-entitled matter

16   went off the record at 11:28 a.m. and resumed at

17   11:34 a.m.)

18             VICE CHAIR THOMAS:  Okay, all right.

19   I think we're ready.  So let's start in.  We're

20   onto the Identify and Quantify the Benefits of

21   NOAA's Services, Hydrographic Services.  Do you

22   see that row?

1            MEMBER MAUNE:  I can address that.  I

2      am currently evaluating the preliminary results

3      of the 3D Nation Elevation Requirements and

4      Benefits study, and one of the things I alluded

5      to earlier this morning is that I am seeing great

6      big holes in the input, where I don't think we

7      have reached all the right people.

8            I just talked about the holes in the

9      sea level rise and subsidence, and that we're

10     missing major areas.  But the same is true.

11     There's a total of 30 different business uses in

12     this study, of which sea level rise and

13     subsidence is only one.  But there are other

14     areas in which I'm seeing major holes.  So one of

15     the things we're going to --

16            I'm working with Ashley Chappell at

17     NOAA and with somebody else from USGS and others,

18     and we're trying to plug in those holes.  So

19     we're still keeping that study open, and people

20     can still submit their requirements to it, so

21     that we can better prove the value of these NOAA

22     products.

1           VICE CHAIR THOMAS:  All right, shall

2    we put it on the -- what fits better, the track

3    or the ongoing?

4           MEMBER MAUNE:  We can track it.

5    That's fine.

6           VICE CHAIR THOMAS:  Track.  We'll just

7    leave track there then, and I'll just make a note

8    that you're reviewing with Ashley.

9           MEMBER MAUNE:  Yes.

10          VICE CHAIR THOMAS:  Okay.  Next one,

11   Enhanced Navigational Assistance, and this one

12   really I think is focused on PORTS, continued

13   rollout and expansion of PORTS types of

14   observational data needed for safe port/harbor

15   operations.  Oh, I know.  We did have that

16   precision nav paper, so I can list this down.  I

17   started an issue paper section at the bottom.  Is

18   there anything else that we need to other than

19   track through the Nav paper, through the issue

20   paper?  Anything else that we need to do here?

21          Rich, do you know whether there are

22   any ongoing issues that the HSRP should be

1    looking at?  A multitude probably.

2              MR. EDWING:  So you know, I guess it

3    was timely I did the PORTS overview and status

4    yesterday.  But I think, you know, one of the

5    biggest concerns is it's continuing to grow and

6    at some point it will exceed capacity, you know,

7    internal capacity of the support.  You know, we

8    need to be looking at that, you know.  But I

9    think the HSRP has been weighing in on that over

10    time.

11             VICE CHAIR THOMAS:  So maybe make a

12    note just about the tracking growth and capacity

13    thresholds or something like that?

14             MR. EDWING:  Yeah.

15             VICE CHAIR THOMAS:  And then shall I

16    move that down to the issue paper section, or do

17    you think we need to also have a bullet for this

18    one up here, to keep it in there?  Or do you

19    think if it's in the issue paper tracking that

20    that's enough?

21             MR. EDWING:  I think that's enough,

22    yeah.

1           VICE CHAIR THOMAS:  Okay.  So that

2   will go to issue paper.  You can just put "issue

3   paper" there Virginia.  All right.  Marine and

4   Geospatial Information Infrastructure.  This was

5   also an issue paper from May 2018.  So unless

6   anybody has any comments here, I will move that

7   one down to issue paper to track, and it's an

8   issue paper.  Comments on that one?  Are we all

9   good?

10          Hydrographic Survey Fleet, another

11   issue paper.  Anything, anybody have any comments

12   there that wants to put additional comments other

13   than tracking it as an issue paper?

14          (No response.)

15          VICE CHAIR THOMAS:  Okay.  Moving on

16   to Rick Brennan on the Fleet Update.  Do you want

17   to give us a five minute update on the fleet?

18   Maybe not right now, but maybe some time before

19   we break tomorrow afternoon?

20          CAPT BRENNAN:  Certainly.

21          VICE CHAIR THOMAS:  Okay.  I mean that

22   way we are tracking, and it's an issue paper,

1  right?

2        CAPT BRENNAN:  Right.

3        VICE CHAIR THOMAS:  It's nice to have

4  an update.  We haven't really had an update on

5  that, so it would be great just when we have five

6  minutes in this session, okay.  Next one is

7  information dissemination, getting a wealth of

8  information collected, aggregated.

9  Recommendation.  This is also an issue paper from

10  2018.  So track an issue paper, okay?

11        Oh, you're right.  It was not an issue

12  paper.  It was in the letter to the

13  Administrator.  So I think it was related to

14  public-private partnership, and maybe we can

15  merge this one.  We have one up above that talks

16  about our encouraging -- I think we said continue

17  to encourage the public-private.  Maybe we can

18  merge it in there.  Everybody okay with that?

19        All right.  Then we have this AIS one,

20  and this was also in our letter of recommendation

21  to the Administrator.  This is kind of an ongoing

22  issue I believe, right?  Ed, you want to comment?

1                MEMBER PAGE:  Admiral Gallaudet

2      mentioned that it's going to happen in 2020.

3      Didn't you say that?

4                MR. EDWING:  Yeah.  So we've been

5      tracking this issue.  An officer named Kurt

6      Zegowitz is a Coast Guard liaison, a NOAA-Coast

7      Guard liaison.  Anyway, so since the letter,

8      we've been working with Coast Guard and provided

9      him technical information.  The work's really all

10     on their side to kind of make it happen.  But

11     they've recently let us know they've put some

12     funding towards it.  There was a software issue

13     where they were having trouble integrating PORTS

14     data with other kinds of data that was being

15     integrated to AIS there.

16               Put some money towards developing a

17     software solution to fix that, and they expect to

18     have that done I believe February of 2020.  Once

19     they fix that, then they can start moving on with

20     an implementation plan, and start putting PORTS

21     data out over AIS.

22               VICE CHAIR THOMAS:  Right, okay.  So

1     I'm going to put track.  Is that something that

2     we want to mention again in the letter, to thank

3     him for the progress that's been made on this

4     issue?

5              MEMBER PAGE:  Yeah, I think that's

6     good, because Admiral Gallaudet's keeping a close

7     eye on this and he brings it up with his Coast

8     Guard counterpoint.  So he's made, you know, he's

9     paying attention to it.

10             MEMBER PAGE:  But Ed, this is

11    something that really kind of firmed up at that

12    meeting up in Alaska this last summer, where

13    Michael Emerson was there --

14             MR. EDWING:  Yeah, yeah.  That's

15    really -- yeah, when Michael Emerson heard that.

16             MEMBER PAGE:  Yeah.

17             (Simultaneous speaking.)

18             MR. EDWING:  It really, you know,

19    flipped his switch.

20             MEMBER PAGE:  Yeah, and in fact they

21    were just here at my office last week at NAVCEN.

22    People talk about headquarters, about

1 implementing this and the pressure that -- or the

2 interests of NOAA and how the Admiral says do it

3 type of thing. So it's all good. It's moving in

4 the right direction, so I think if we just track

5 it --

6 VICE CHAIR THOMAS: Okay. So we'll

7 put a thank you note in the letter.

8 MEMBER PAGE: Or we just say we're

9 pleased with the progress --

10 (Simultaneous speaking.)

11 MR. EDWING: Little too early to

12 congratulate, but yeah, appreciating the

13 progress, yeah.

14 VICE CHAIR THOMAS: Okay. We're down

15 to Autonomous Vehicles Surveying. Well, we just

16 had a great panel on that. Do we -- what do we -

17 - Ed, do you want to talk about this a bit, Ed

18 and Deanne? Do we want to do anything more with

19 this in Hawaii, like an update or --

20 CHAIR SAADE: Seems to me we've been

21 updating about once a year.

22 VICE CHAIR THOMAS: Okay. So you

1    think that maybe San Francisco?

2                   CHAIR SAADE:  And maybe yeah, and San

3    Francisco's got a whole bunch of suppliers there,

4    right.

5                   (Simultaneous speaking.)

6                   VICE CHAIR THOMAS:  Or visit

7    Saildrone.  Why don't we visit Saildrone?

8                   CHAIR SAADE:  It's probably the right

9    space.

10                   VICE CHAIR THOMAS:  We have to invite

11   Saildrone people here?  Yes, okay.  So we will

12   table that one until San Francisco and I'll put

13   down there possible visit to Saildrone.  All

14   right.  Chart of the Future, Supplementary

15   Navigation Data Management and Distribution.  Ed,

16   do you want to talk about that one a bit?

17                   MEMBER PAGE:  It's a passion of

18   Lindsay's in terms of where we're going with all

19   this, but it's also part of what Admiral Smith

20   has shown a couple of times and -- do you want to

21   --

22                   VICE CHAIR THOMAS:  Yeah, go ahead.

1          CAPT KRETOVIC:  Yesterday during the

2    precision nav session, you also were briefed on

3    the HD chart and kind of where we're going with

4    it.  So I mean that was a good update I felt like

5    for the Panel.

6          VICE CHAIR THOMAS:  Okay.  So should

7    we call it ongoing tracking, ongoing?  That comes

8    under our, what are we calling it, encourage?

9    Endorse and encourage, how about that?

10          MEMBER PAGE:  I might add, I mean

11    isn't that part of also the new strategic plan

12    talks about that, right?  Did I recall that

13    correctly?  So I mean there's definitely movement

14    in that direction, and just track it I think

15    makes sense.

16          VICE CHAIR THOMAS:  All right.  What's

17    left here?  Okay, Disaster Response.  Gary,

18    right.  So this is issue paper.  I'm going to

19    create a bullet under issue paper.  But then an

20    additional do we want to keep anything up here?

21    Let's see.  Neeraj gave a nice presentation on

22    the importance of accurate observations and

1    modeling during extreme events.

2              Like do we want to -- we do mention

3    under AI section the disaster response topic.

4    What do you think?

5              MEMBER THOMPSON:  We do, and then

6    there was other things in the draft of the

7    Emergency Services paper that were related to AI,

8    but dealt with PORTS products.  So I think those

9    fit more in with this.

10             VICE CHAIR THOMAS:  Okay, all right.

11   So do you suggest keeping this line there?

12             MEMBER THOMPSON:  I do, uh-huh.

13             VICE CHAIR THOMAS:  Okay, and maybe

14   encourage and endorse and track, you know,

15   ongoing?

16             MEMBER THOMPSON:  Correct, uh-huh.

17             VICE CHAIR THOMAS:  Okay.  So

18   Virginia, we're going to do two.  We're going to

19   put one, an IT one down below in issue paper, and

20   also the Endorse and Encourage.

21             You can take out New Orleans.  Oh

22   okay.  Yeah, that's perfect, that's perfect.

1    Okay.  Education, oh wait.  All right.  Under

2    Education, Promoting Hydrographic Education,

3    including students, et cetera.  We've had

4    academia on our Panels.  Anything else?  What do

5    you think Ed on that one?  Inviting academia.

6    It's Promoting Hydrographic Education.  Does

7    anybody have any feelings about that?

8              I mean I think we always try to

9    include academia in the technical issue, but I'm

10   not sure we need really a priority bullet for

11   this.

12             MEMBER MAUNE:  Sometimes we've not had

13   anybody, but this time we had two universities in

14   addition to New Hampshire.

15             VICE CHAIR THOMAS:  We have Texas A&M

16   here.

17             MEMBER MAUNE:  We really had three

18   universities.

19             MALE PARTICIPANT:  Three universities.

20             CHAIR SAADE:  So we've talked

21   sometimes of having students or at least young

22   people be more directly involved with sitting in

1 on the Panel, sort of mentoring them to get into

2 this.

3 VICE CHAIR THOMAS: Right.

4 CHAIR SAADE: And we haven't, we

5 haven't done much with it. The point of it was,

6 not being discrete, we've got a lot of old folks

7 here, and we don't have much input of the very

8 much younger generation in terms of what do they

9 find that's important. We're not getting any

10 feedback at all on things like that.

11 VICE CHAIR THOMAS: Right, right. So

12 Lynne is telling me it's really not in the

13 mandate for this advice, because since we're

14 advising -- but I think what we can do, I'll move

15 it down to the archives section.

16 CHAIR SAADE: Okay.

17 VICE CHAIR THOMAS: But I think as a

18 group we always -- I mean I think it's great to

19 have university input coming from a university,

20 you know, and certainly the more we can encourage

21 young people to attend and be part of the

22 program, I think it's better. Maybe in Hawaii we

1    can think about that when we're forming the

2    program.

3              Oh, and there have been grad students

4    involved in this one too.  Yes.

5              MEMBER KELLY:  Question perhaps to

6    Lynne.  Do we send invitations or notices of the

7    meetings to targeted universities maybe in the

8    areas that we're going to be meeting?

9              CAPT KRETOVIC:  She said you might

10   have grad students on the line.  Oh we do

11   definitely on the webinar, yeah.

12             MEMBER KELLY:  And perhaps, you know,

13   as an action item on this, perhaps we could

14   actually do something and not talk about it.

15   Let's maybe try to see if we can formulate a list

16   of universities or grad programs that we could

17   target that might be in the area, so that they

18   would have a chance to attend in person and

19   perhaps have some forum.

20             VICE CHAIR THOMAS:  We did, we did,

21   and then in the University of Hawaii I've already

22   talked with Melissa.  Barb just left, but Melissa

1      Iwamoto is Barb Kirkpatrick's equivalent over in

2      Hawaii.  She's fantastic.  She's very tapped into

3      this meeting.  She wants to help out.  PacIOOS is

4      very connected to a lot of young students that

5      are right at the university.  So we will -- in

6      Hawaii we will definitely also have a broad

7      distribution there.

8              MEMBER KELLY:  Okay.  I think we ought

9      to make a practice of trying to target groups.

10             VICE CHAIR THOMAS:  I do.  I do too.

11             MEMBER MAUNE:  I would add that Dr.

12     Qassim Abdullah is a faculty professor, and he's

13     going to join our Panel in Honolulu, and he just

14     might be interested in this topic himself.

15             VICE CHAIR THOMAS:  There we go, okay.

16     Yes, all right.  So yeah, no we -- I think we all

17     like to encourage that participation, so we'll

18     keep it in mind for every meeting.  All right,

19     last one.  Hydrodynamic Modeling and Validation:

20     The need for data inputs for modeling.  Does

21     this, and we say Hawaii.  Does this actually fall

22     more into the San Francisco AI one?  Neeraj, do

1      you have a comment on this?

2                   One of our last bullets is

3      Hydrodynamic Modeling and Validation: the need

4      for data inputs for the modeling as it pertains

5      to navigation within the near shore.  Sal, maybe

6      you can show Neeraj.  Do you have a copy of it

7      there?

8                   MR. SARAF:  We probably need to take

9      a closer look.  But I have a feeling that's not -

10     - that directive, I think there's a comment

11     earlier that's another facet of AI, that you're

12     going to have many facets of AI that are going to

13     get folded in eventually.  That could be one

14     later, but probably not at the outset.

15                  VICE CHAIR THOMAS:  Okay, all right.

16                  MEMBER CHOPRA:  I was going to say --

17     thanks.  That's a requirement today because we

18     are deepening our channels, and we need that

19     hydrodynamic modeling, because a ship is --

20     there's a relationship between the depth and the

21     width and the length of a vessel, and so how much

22     water it's taking out or pushing out of the

1 channel and what effect it has on the walls, on

2 the jetties, the infrastructure floating and

3 fixed.

4 So I think that's an important one to

5 look at especially today, because we're going

6 into a massive dredging program. A terrific

7 dredging program has already been started in the

8 space.

9 MR. SARAF: Thanks for that Anuj. I

10 think that's actually very good feedback, that I

11 think that we probably should consider

12 accelerating that a bit.

13 VICE CHAIR THOMAS: Maybe San

14 Francisco. They have more of a challenge coming

15 into the Port of San Francisco. It might fit --

16 there's more, I think, hydrodynamic modeling

17 going on in San Francisco than in Hawaii.

18 CHAIR SAADE: And they have a really

19 great hydrodynamic model that might even be good

20 for a tour.

21 VICE CHAIR THOMAS: I know, yeah. Oh

22 yeah, at the Bay, at Sausalito, at the Army Corps

1    facilities.

2            MR. SARAF:  So I think that's a --

3            VICE CHAIR THOMAS:  Rick had something

4    too.

5            MR. SARAF:  The last point I would

6    make is, you know, I think we're in the midst of

7    a -- Coast Survey of a -- and with CO-OPS and a

8    few others and NOS, on a five year modeling plan

9    that we just approved.  However, we do have

10   opportunities to update.  So if this indicates

11   anything we should look at, we could probably do

12   that.  Thank you.

13           VICE CHAIR THOMAS:  Okay, thanks.

14   Rick?

15           CAPT BRENNAN:  So as I remember this

16   particular item, and anybody who has a longer

17   memory than me on it please speak up, but I

18   thought -- I mean when we were talking about

19   hydrodynamic models, I think they were talking

20   about like our operational forecast systems, and

21   what the needs for those OFS were with regard to

22   navigation as far as the products that we put

1 out, how they're getting used, what the

2 resolution of those products need to be and how

3 do they need to be portrayed.

4    So I think, I think that that's what

5 we were talking about with that one, so anyways.

6 Not that hydrodynamic modeling of ships wouldn't

7 be valuable too, but that's -- we don't do that.

8 So I think that may have been what that topic

9 was.

10    VICE CHAIR THOMAS: Okay. So this is

11 as it pertains to the OFS and is there a

12 resolution that can be met that would help any of

13 the navigation. Is that what you just said? How

14 about you send me a statement. No?

15    CAPT BRENNAN: Sure. I'd be happy to

16 do that. I mean I was just trying to jog

17 everyone's memory on that.

18    VICE CHAIR THOMAS: No, no, that's

19 true, because I don't have very much information

20 on this, which means that I didn't get a lot of

21 feedback. So okay. Oh, yeah. Lynne is just

22 wondering if Juliana or Rich have any input on

1    this that should be included also?

2              MR. EDWING:  So I don't recall that

3    discussion, so it's hard for me to weigh in.  But

4    I think what Rick said is probably accurate.  I

5    would agree with what Rick said.

6              VICE CHAIR THOMAS:  Oh okay.

7              MEMBER McINTYRE:  I would agree with

8    that too, and I think it related to when we first

9    started looking at the precision navigation

10    subject and that's what it --

11             VICE CHAIR THOMAS:  Okay.  Rick, let

12    me just work with you afterwards, and we'll come

13    up with something there, just so I can get

14    something more in the comments.  Okay, yeah.

15             Say "See Rick Brennan."  That is it.

16    I really appreciate it.  I will try to update

17    this and maybe get it even back out to you

18    tomorrow, email it to you tomorrow, just to give

19    a quick glance, a once over, make sure I captured

20    everything.  I will try to highlight in yellow

21    any changes that I've added.

22             I just wanted to ask Juliana or Rich

1    or Liz, do you have -- are we missing anything

2    that is near and dear to your hearts, that you

3    feel like this committee or Panel should be

4    addressing?

5              MEMBER MAUNE:  Julie, could you give

6    us a legend for what these colors stand for.  I

7    forgot what the peach, yellow, green, blue stand

8    for.

9              VICE CHAIR THOMAS:  You know, if you

10   look in the last column, it's merely separating

11   it by Hawaii, San Francisco, ongoing, track.

12   Don't worry about the colors right now.  It's

13   really my way of organizing it, just so I know oh

14   this is like Hawaii.  Okay, we got to look at

15   this for the next meeting.

16             MEMBER MAUNE:  Okay.

17             VICE CHAIR THOMAS:  Okay.

18             MEMBER MAUNE:  All right, thank you.

19             VICE CHAIR THOMAS:  And right now it's

20   a little bit jumbled, because as you know we are

21   modifying it.  But by tomorrow, I'll send it out

22   again so it will be easier.

1          MEMBER DUFFY:  So for my humor, I will

2    tell you that I am handicapped and that I am

3    color blind.

4          VICE CHAIR THOMAS:  Because you're

5    color blind.

6          MEMBER DUFFY:  So I don't know what

7    any of them mean.  I can read.  I can read very

8    well.

9          VICE CHAIR THOMAS:  The last column is

10   really the most important for any type of

11   logistics, because that says what we're going to

12   do.  That's like the status column, what we're

13   going to do with it, okay?

14         CHAIR SAADE:  Okay.

15         VICE CHAIR THOMAS:  I think we're good

16   on this.

17         CHAIR SAADE:  Okay, great.  So before

18   we break for the audience, don't forget to do the

19   sign-in sheets please if you're new coming in

20   today, and if you are leaving to drop off your

21   badges.  Otherwise, we will be back at one

22   o'clock.  Thanks everyone.

1        MS. MERSFELDER-LEWIS:  Ed, please take

2   your valuables with you.

3        CHAIR SAADE:  Oh yeah.  Please take

4   your valuables with you.

5        (Whereupon, the above-entitled matter

6   went off the record at 11:56 a.m. and resumed at

7   1:05 p.m.)

8        CHAIR SAADE:  Okay.  We have a few

9   short presentations on Technology Working Groups

10  and some updates.  Rick's going to start with an

11  update first.

12       CAPT BRENNAN:  Okay.  So this is just

13  to provide a brief update on NOAA's fleet

14  recapitalization plan.  So currently we've got --

15  we've got funding for two Class A's.  Those are

16  in the design process right now.  I think it's

17  out to three vendors and they'll be down sampling

18  that.  Those are not expected to be hydrographic

19  vessels, which is what I believe that this body

20  is interested in.

21       So the first approach of that would be

22  for the NOAA Class B, which is you know -- whose

1    primary mission would be charting and surveying.

2    We have an independent planning team that's going

3    to be working on that, that we've got initial

4    requirements put together.  We don't have

5    detailed requirements right now.

6              The thing that we have made

7    exceedingly clear to the Office of Marine and

8    Aviation Operations is that, you know, a 10 to 12

9    year timeframe to deliver a vessel to replace

10   these two 50 year old ships is not satisfying.

11   So what they are doing is they are investigating

12   a number of options to do that, of how they can

13   expedite that plan.

14             So one of the things that would do

15   that is to be able to take away a major element

16   of that design process, and one of those options

17   for that is to provide, as government-furnished

18   information or equipment, a hull design.  So we

19   actually, we the government actually own a hull

20   design, and that is the hull form of the

21   fisheries survey vessels.

22             So what OMAO is currently going

1　　through and looking at is can they repurpose that

2　　FSV hull form for use as a Class B.  So we have

3　　just undergone some tank tests this summer, where

4　　they have taken the models.  We've actually

5　　resurrected the model from the Navy and brought

6　　that to the Carderock Test Center just outside of

7　　D.C., and to put that in the tank.  I've got some

8　　pictures that I'll show you of that.

9　　　　　　But the original FSV when those were

10　　designed, they took I believe a 30 foot plug out

11　　of the center of that.  So basically if you

12　　imagine taking a chain saw and cutting a 30 foot

13　　chunk out of the center and removing it and

14　　sliding the bow and the stern together and

15　　zippering it back up, that's what they did, and

16　　that's the design that we have right now for our

17　　FSVs.

18　　　　　　There were issues with -- there were

19　　issues with having the size vessel that we

20　　wanted.  So this design, what they've done is

21　　they've undone the zipper, separated them, put

22　　the plug back in and they're working on that

1    length and full length version of that.  So

2    that's ultimately what it looks like.

3              This was for a single prop design,

4    which I think we've passed along and they

5    understand is an unsatisfactory version of that

6    as well.  They have another design for which they

7    did not build the model.  They had the

8    mathematical and engineering design for it.  They

9    had not built the model of that I mean, and there

10   is actually a physical model.

11             Nope, nope.  These are all pretty but

12   don't tell you anything.  There it is.  So that

13   is the -- that's the physical three dimensional

14   model of that vessel, which they actually ran

15   through the tanks.  It's about 12 feet long, so

16   it's not -- it's not something that you stick on

17   your mantle.  And so they're doing testing on

18   that, and then I think the intention is that they

19   would build out a new model for the twin prop

20   version.

21             That would be Z drive and be fully DP3

22   capable right now so that you had, you know, had

1  that as an option.  I think as we move forward

2  with unmanned systems, I think you have to expect

3  to have a vessel that's dynamically positioned.

4  There's just no way you can, in my mind, that you

5  can effectively do ROV operations without

6  significant fear of cutting your umbilicals,

7  without having some sort of DP positioning on

8  that.  So that is forthcoming.

9       So here's some other pictures of that,

10  of them putting the plug back in.  You can see

11  that giant reddish-shaped area was the plug that

12  they put back into it, and this is them finishing

13  it just before testing on that.  So they've run

14  those, they've run those tank tests with this

15  model, with a single prop version of that,

16  lengthened from the current FSVs like the Dyson

17  and the Bigelow ships that are currently in the

18  fleet right now.

19       So there is value to that, and there's

20  some thinking that this could shorten the design

21  period significantly by up to three years.  So

22  then we give them this and then they just need to

1  put the propulsion systems in and the deck

2  structure in and all the mission equipment, and

3  so that would be a significantly reduced design

4  load on that and hence shorten the delivery time.

5  So that's certainly what we're looking

6  at.  I believe the last time we reported out to

7  you that there had been some hopes of getting

8  vessels from the Department of Transportation

9  that had been repossessed.  That has

10  unfortunately fallen through.  So however, I

11  think there are still some negotiations, because

12  apparently DOT only sold the first -- well, it

13  was the most recent one that was launched, hence

14  the newest one, and that one did get auctioned to

15  the Navy.

16  And then they have I believe four more

17  out of the five that are sitting in the Reserve

18  fleet now down in Texas that they can't do

19  anything with.  So I think we are pursuing

20  options for how to engage those vessels in some

21  useful way, because at this point they're just

22  -- DOT is not making use of them and they

1  apparently got no other bids during the most

2  recent round of negotiation or sorry, the most

3  recent auction.

4          So that's my very brief and impromptu

5  update on fleet recapitalization.  I'd certainly

6  be happy to take any questions on that.

7          VICE CHAIR THOMAS:  No, I think that's

8  great.

9          CAPT BRENNAN:  Great, thank you.

10          CHAIR SAADE:  Thanks, Rick.  Any

11  questions or comments?

12          MR. ASLAKSEN:  Did you want to do an

13  update on aircraft?

14          CAPT BRENNAN:  I'm not an aircraft

15  guy, but we did just buy two aircraft, a KingAir

16  and a Gulfstream 550.  Did I talk pretty on that

17  Mike?

18          (Pause.)

19          CAPT BRENNAN:  I'll let Mike talk to

20  this.  July was a good month for us though.  We

21  did buy two planes, so that's -- that's positive.

22          MR. ASLAKSEN:  Correct, so yeah.  OMAO

1 awarded two contracts, one for a G550, which is a

2 Gulfstream aircraft for hurricane reconnaissance,

3 but also is used to support the GRAV-D program

4 and then also a KingAir 350 ER, which is the

5 exact make of the aircraft that we primarily use

6 in NGS for the coastal mapping program.  While it

7 would be primarily to support Weather Service and

8 there's no survey program, it will be outfitted

9 for us to put our cameras and systems in as well

10 as a backup.

11 CHAIR SAADE:  Thanks for that update.

12 I'm going to go ahead and summarize a little bit

13 on the Technology Working Group.  We haven't met

14 much since the last time we met.  I'll blame it

15 all on Lindsay because he's on boats all the

16 time.  Anyway, two things that we're definitely

17 going to try and accomplish between now and going

18 to Hawaii, which will be we've been promising a

19 Seabed 2030 update for the masses, and we'll do

20 that.

21 We can easily do that as a telephone

22 call, a conference call with the associated

1      slides.  And then we'll probably, once Lindsay

2      gets back, we'll organize an artificial

3      intelligence background update, the kind of

4      things that are going on.  Again, just to get

5      everybody a little bit of background information

6      on what we'd be planning ultimately for San

7      Francisco.  That's about all that's new and

8      different, or that we should be pending.  But

9      we'll get back into the swing of things about

10     doing these briefings every couple of months.

11     Any questions?  Any ideas?  Okay, Ed.  Do you

12     want to do any Arctic update?

13              MEMBER PAGE:  That's a cold call.

14     Well, other than we have a position paper, I

15     think there's nothing else.  I mean you can't go

16     a couple of days without having some meeting in

17     D.C. or somewhere in Europe or whatever on Arctic

18     issues and it's in the news.  It's melting, it's

19     still melting, melting faster than anticipated.

20     All kinds of projections for us, how much more

21     trade, how much more cargo going through there.

22              But actually the most recent report

1 that came out of CMTS was fairly modest as far as

2 increase of traffic. So when we talk about New

3 Orleans and other places like that or LA or you

4 name it, we're talking about maybe 500 deep draft

5 ships going through the Bering Strait a year ten

6 years from now or something like that, which is

7 not a huge amount of traffic really.

8 Most of those ships will just be going

9 to Russia, you know, to haul out LNG or mining

10 zinc and other products, or condensed, gas

11 condensate and I'm still not sure. There's a lot

12 of hesitation, you know, reading the news of

13 shipping companies like MSC. I'm sure you

14 followed this, Anuj, have said we're not going to

15 take the chance of transiting the Arctic waters

16 with all the environmental issues, uncertainties

17 and lack of infrastructure, et cetera, et cetera.

18 So that sounds kind of like the big

19 part is not going to happen as anticipated. On

20 the flip side is it's a zero tolerance issue. So

21 I still think there's going to be more shipping,

22 a different type of shipping. There's still a

1  need.  It's the Wild West, I use that term a lot,

2  but it is truly the Wild West as far as

3  infrastructure capabilities.

4  So and Congress is very interested and

5  the Coast Guard's interested in icebreakers, et

6  cetera.  So there's going to be some more

7  activity up there, and so I think it still

8  warrants what NOAA has been doing all along.  And

9  so our position paper really just talks about the

10  challenges and what the needs are.

11  So the challenge is obviously remote

12  area, limited infrastructure in the past, no aids

13  to navigation to speak of, and I mentioned the

14  other day how the Coast Guard hasn't put much in

15  over the years.  Basically said we don't have

16  enough money to deal with the Arctic, so we'll

17  let people figure out on their own how to get

18  around up there.

19  That's starting to change.  The Coast

20  Guard and NOAA are going to have more of a role

21  in that, and so I think today, and the paper just

22  kind of speaks to that.  I mean we're not -- I

1    think everyone recognizes, those other agencies

2    recognize it's going to be a new mission up

3    there, other things to do.  We're just validating

4    there, providing HSRP's position that that's a

5    new mission, new opportunity.

6              But this is nothing new.  NOAA's

7    already, you know.  Rick and his crew have been

8    prioritizing where they're going to survey and

9    have been spending a lot of time up there

10   surveying waters, especially in light of the fact

11   that some tankers are going up there and lidaring

12   and other activity.

13             And it's going to be new, what they

14   call Arctic PARS if you will, that's going to be

15   routing measures off the Beaufort Sea.  Right now

16   there are routing measures to the Bering Strait.

17   The next step is move that all the way across the

18   Arctic, across the Beaufort Sea.  That also kind

19   of drives what my understanding NOS would do, is

20   make sure that any corridors outlined basically

21   are safe to transit, there's no surprises, not

22   going to come across something in those

1    corridors.

2              So that's one of the things the Coast

3    Guard does, has asked in the past.  Can you

4    validate that I'm not sending people into harm's

5    way?  I know last time you tried it, it was the

6    1800's.  I know you were a little uncomfortable

7    with that datum and perhaps we can upgrade that.

8    So a lot of the activity has been done already on

9    that, and there's still a lot of gaps and holes

10   so that's my story and I'm sticking to it.

11             CHAIR SAADE:  So you know, obviously

12   you hear a lot about a tremendous amount of

13   melting and green linen and the heat waves that

14   you guys have gone through this summer.  Is there

15   any awareness where you sit relative to Russia's

16   Arctic?  I mean do you just assume it's

17   retreating dramatically?

18             MEMBER PAGE:  They have kind of --

19   they have less heavy ice than we do, but they

20   also have a very -- there's a real business,

21   there's a real economy coming out of the Arctic

22   for them.

1          So everybody invests in these super-

2     duper icebreakers that are huge and nuclear

3     powered and way bigger than us to make sure ships

4     get in and out and they charge heavily for that

5     capability to get in and out, and they consider

6     all those waters their territorial seas, even

7     though somewhat challenged that they've gone a

8     little bit too far on that.

9          But you know, who's going to fight

10    them off on that?  It's not worth fighting over I

11    don't think, so I mean they have the same issue.

12    I mean it's less of a challenge getting ships in

13    and out.  The season's extending further and

14    further.

15          Ice is leaving, you know.  It's a much

16    longer transit season.  Where it's just a couple

17    of months beforehand now it's almost six months

18    where you see vessels going to the Bering Strait

19    in December and these aren't icebreakers.  These

20    are tankers going through December, which is

21    almost unheard of in the past.

22          So you know, the next time you go up

1     there, you know, if you just wear your New

2     Orleans clothes you'll be fine.  Not quite there

3     yet.  And but so -- and my theory is that I don't

4     think we're ever going to have -- my colleague

5     here, my chocolate colleague here might think

6     otherwise, but I don't think we're going to have

7     a big growth in shipping activity on our side of

8     the Arctic, until such time there are ice

9     retreats beyond the Northwest Passage.

10     So you can do a straight shot to

11     Iceland, because the Northwest Passage is just

12     like a big plug.  It's shallow, it's a lot of

13     channels, navigational challenges.  There's ice

14     that only gets stuck in certain, blocks it off

15     and you can't get there, and they don't have the

16     infrastructure like Russia, where they have these

17     huge icebreakers willing to facilitate trade, nor

18     are we.

19     Our icebreakers are not going to be

20     opening the sea lanes.  They're there to provide

21     a presence and they're deliberately not designed

22     like they are in the Great Lakes to open sea

1    lanes.  They're just there to be there, and

2    search and rescue, environmental protection and

3    some research, et cetera.

4              So nevertheless, I mean vessels will

5    be going across our waters, but not to any great

6    extent.  You won't see container lines or

7    tankers, whatever, bulkers going to any large

8    numbers until they can actually clear the

9    Northwest Passage and go above it, and then I

10   think they get a clear shot over to Europe and

11   that will be a different ball game.  When's that

12   going to happen?  20 years, I don't know.

13             MEMBER CHOPRA:  I'd love to add

14   something valuable.  I was going to say two

15   things happening.  On our side, there's not much

16   happening.  But because of the way the rates are

17   at the moment, shipping rates are now -- so last

18   time shipping rates were high was 2006-2007, and

19   then it's being continuously in recession.

20   There's been the longest recession in shipping as

21   such.

22             Now the rates are coming up to some

1  extent, although there's something with this

2  trade war going on that the bulk is going down.

3  But they're still at multi-year highs.  That

4  makes it viable for them to run that short route

5  between Europe and Asia.  So Asia is the consumer

6  engine.  Europe is the one coming in from there.

7  That engine, that's what we're talking

8  about, 80,000 to 170,000 dollars per transit what

9  they're charging on those, the Russian side of it

10  and their requirements.  But that's what's

11  happening.  The other bigger problem with melting

12  is multi-year ice is coming into ship channels.

13  So it's actually a bigger problem in shipping

14  than this melting, than otherwise.

15  So first, that multi-year ice which

16  slides into shipping channels will have to melt

17  and go away or get grounded somewhere before it

18  opens up for shipping, because multi-year ice is

19  stronger than steel.  So that's our challenge at

20  the moment.

21  CHAIR SAADE:  Any other comments on

22  Alaska or on technology or --

1           (No response.)

2           CHAIR SAADE:  Okay.  Julie, you want

3    to pick up where you left off or the next

4    conference?  Thanks.

5           VICE CHAIR THOMAS:  Sure, okay.  One

6    comment is I have just updated the matrix, the

7    priorities matrix.  I want to just get together

8    with Rick for that last sentence.  But I'm going

9    to mail it out to Lynne and Virginia and they'll

10   send it to you, and maybe we can just look at it.

11   Not tonight, because we're going to be busy, but

12   maybe some time over breakfast or some time.

13           I'd love to just have consensus

14   because we included this in the letter to the

15   Administrator last, after the last meeting.  So

16   it would be nice to have it pretty well done by

17   the time we leave here.  And then I think we're

18   going to break into breakouts for the working

19   group.  There were a lot of people to go with

20   Gary.

21           I think that maybe since we have most

22   of them that are going to be in Emergency

1  Management you just stay here, and you could

2  consolidate a bit.  Arctic?  Was it Anne?

3             (Off mic comment.)

4             VICE CHAIR THOMAS:  I know.  I'm going

5  to have to pay somebody 100 to sit on mine.  Dave

6  and I are the only ones.  Is there anybody else

7  on Sea Level?

8             (Off mic comment.)

9             VICE CHAIR THOMAS:  Oh, I wanted to

10 mention that.  We have fabulous offers from our

11 partners here in this room, and we definitely can

12 benefit from subject matter experts also.  So I

13 note for Audra has volunteered.  Mike, I think

14 you've been tapped for a couple.  Maybe you can

15 kind of go between the two groups, and Neeraj,

16 Galen I mean any --

17             You know, if anybody in this -- you

18 are welcome to join these groups in other words.

19 Officially, I believe that we can receive advice,

20 that we have to craft the wording and really do

21 it ourselves.  But we are more than welcome.

22 There's a lot of expertise that's out there,

1  Susan, anybody.  Anybody that wants to join us is

2  welcome.

3          So I think that Dave, why don't you

4  and I go next door to where we had breakfast,

5  right, or lunch that's open, and maybe Ed too.  I

6  think that we take our two groups into the lunch

7  room and do it there, okay?  Great.

8          MS. MERSFELDER-LEWIS:  It's only for

9  how long Julie?

10          VICE CHAIR THOMAS:  Oh, for how long?

11  When are we leaving?  You tell me Lynne.  What is

12  the time?

13          MS. MERSFELDER-LEWIS:  Are you going

14  to want to recap?

15          MEMBER McINTYRE:  Let's do the recap

16  in the morning.

17          VICE CHAIR THOMAS:  No.  Well yeah.

18  Let's do the recap, you know.  I mean we'll see

19  how far we get.  But I'm assuming we're going to

20  use up our time.

21          MS. MERSFELDER-LEWIS:  Do you want to

22  come back in here as a group at 2:15?

1          VICE CHAIR THOMAS:  Oh sorry.  2:15,

2     and then we have to leave at?

3          MS. MERSFELDER-LEWIS:  You're going to

4     break at 2:15.  You're going to have to talk

5     about whatever you want in 15 minutes, about what

6     you just discussed, and then you'll leave at 2:30

7     and we'll leave.

8          VICE CHAIR THOMAS:  Okay.  So let's

9     take -- let's come back at 2:15 and regroup, and

10    we can just get -- if we're not done, we're not

11    done.  If we're done, you know, at least we can

12    kind of update on the status.  So that gives us

13    45 minutes.  So that should be enough to make

14    quite a bit of progress.  Does that sound good?

15    Any questions?

16          MEMBER THOMPSON:  And Emergency

17    Services stays --

18          VICE CHAIR THOMAS:  Emergency, you are

19    right here Gary.

20          (Whereupon, the above-entitled matter

21    went off the record at 1:27 p.m. and resumed at

22    2:17 p.m.)

1           CHAIR SAADE:  Okay everyone.  Could

2    you take your seats please?  We're going to

3    reconvene and do a wrap-up for 15 minutes.  So

4    Kim, being that you're in that corner, you get to

5    start, if that's okay.

6           MEMBER HALL:  Well, I'll just give a

7    quick readout from what happened.  Does that work

8    too, or we don't hear this right now.

9           CHAIR SAADE:  Wrap-up for the day.

10          MEMBER HALL:  I'm going to save my

11   comments for the morning.  Thank you.

12          CHAIR SAADE:  Okay, that's fair.

13          VICE CHAIR THOMAS:  I thought we --

14   we're not giving a wrap-up on the breakout

15   groups?

16          CHAIR SAADE:  What are we giving a

17   wrap-up on?

18          VICE CHAIR THOMAS:  On the breakout

19   groups.

20          CHAIR SAADE:  Oh sorry, my fault.

21          MEMBER HALL:  I can start.  That

22   works.

1          CHAIR SAADE:  It's not in my script so

2     I'm --

3          MEMBER HALL:  You're lost.  I

4     understand.  So we haven't been doing this and I

5     apologize.  I'm Kim Hall and I was with Gary

6     Thompson talking about the issue paper related to

7     AI and automation related to emergency response

8     and disaster response.

9          So where we got to with our small

10     group is we have an outline of how we move

11     forward.  I will rewrite the paper within the

12     next week or so, share that with the smaller

13     subsection of folks.  Then once we're happy we

14     have something, we will share that with the rest

15     of the committee and the subject matter experts

16     that very thankfully added some flavor to our

17     discussion today, and then we will move forward

18     with a plan that I guess in Hawaii it will likely

19     be finalized if everybody agrees.

20          But it is going to be completely

21     rewritten, so we have nothing to offer for this

22     meeting.

1          VICE CHAIR THOMAS:  We got to line 6.

2          CHAIR SAADE:  Not Sentence 6, line 6.

3          VICE CHAIR THOMAS:  Line 6 of the

4     paper literally.  We just had a really good

5     discussion, because once again talking about sea

6     level, it's like how broad do we make that within

7     NOAA?  It's hard to exclusively talk about these

8     three divisions, just exactly what we do without

9     tying it into the bigger picture.

10          So but we've kind of come up with

11    something we think is pretty good, and Anuj and

12    Dave are reworking that first sentence, and then

13    we are going to still be -- we still need more

14    time.  If we had any time, like an hour tomorrow.

15          (Off mic comment.)

16          VICE CHAIR THOMAS:  Yeah.  So I'm

17    hoping that tomorrow we can, with a -- Anuj is

18    going to update that text and then email it back

19    out, and then we can having some time tomorrow to

20    look at it again.  I think the context -- it was

21    really that first sentence, getting the idea of

22    how broad are we going to make this and what are

1   we really addressing for the three.

2               I think the examples and everything

3   will fall into line after that.  Okay, thank you.

4   Yeah, thank you all for being in that group.  It

5   was a really good discussion.

6               MEMBER McINTYRE:  Yeah.  So we looked

7   through the Arctic paper and -- yeah, because

8   he's not here.  Oh sorry.  We reviewed what Ed

9   had put together, and this is essentially kind of

10  an update paper for the paper that had been done

11  in 2015.  And at this point what we discussed,

12  that it should be reorganized a bit and focused

13  more on the areas where NOAA has the input to

14  effect.  Is the speaker working?

15              CHAIR SAADE:  Yeah, we're hearing you.

16              MEMBER McINTYRE:  Okay, so it's not

17  feeding back right, and then the other.  Closer?

18  Okay.  So we're going to reorganize it a bit.  We

19  didn't feel, because the other one is out there,

20  that that's a big push and get this paper out at

21  this meeting, and then the other thing that we

22  discussed was related to some of the issues that

1   Dave Maune had put forth from his observations up

2   in Juneau with the small coastal communities, is

3   that perhaps we could add a sentence and a bullet

4   point within the Arctic paper, addressing the

5   concerns that David brought to the attention of

6   the Panel today.

7                   CHAIR SAADE:  Anyone have any other

8   topics that they'd like to discuss today?

9                   (No response.)

10                  CHAIR SAADE:  That's it.  Let's go.

11  We're going to call it for the day.

12                  (Whereupon, the above-entitled matter

13  went off the record at 2:22 p.m.)

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## A

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C E R T I F I C A T E

This is to certify that the foregoing transcript

In the matter of: Hydrographic Services Review Panel

Before: NOAA

Date: 08-28-19

Place: New Orleans, LA

was duly recorded and accurately transcribed under
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_____
Court Reporter