

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,
SEPTEMBER 13, 2017

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The Hydrographic Services Review Panel met in the Prescott Ballroom, Sheraton Portsmouth Hotel, 250 Market Street, Portsmouth, New Hampshire, at 8:30 a.m., William Hanson, Chair, presiding.

MEMBERS PRESENT:

WILLIAM HANSON, HSRP Chair
JOYCE E. MILLER, HSRP Vice Chair
DR. LAWSON W. BRIGHAM
LINDSAY GEE*
KIM HALL
EDWARD J. KELLY
CAROL LOCKHART
DAVID MAUNE, PhD
ANNE MCINTYRE
EDWARD J. SAADE
SUSAN SHINGLEDECKER
GARY THOMPSON*

NON-VOTING MEMBERS:

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

STAFF PRESENT:

SHEP SMITH, Rear Admiral, HSRP Designated Federal
Official, Director, Office of Coast Survey
GLENN BOLEDOVICH, Policy Director, NOS
RICK BRENNAN, Captain, Chief, Hydrographic
Surveys Division
ASHLEY CHAPPELL, IWG-OCM
GREG DUSEK, PhD, CO-OPS
CARL KAMMERER, NOS OCS
LYNNE MERSEFELDER-LEWIS, HSRP Coordinator
EDWARD RICE, PDAC
JIM RICE, NOS PCAD
ERICA TOWLE, NOS OCS
E.J. VAN DEN AMEELE, Chief, Coast Survey
Development Laboratory
DAVID VEJAR, Lieutenant, NOS/OCS

ALSO PRESENT:

KEITH DOMINIC, Chief, Maritime Navigation
Division and Arctic Source Lead, National
Geospatial-Intelligence Agency

* present via webinar

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

2 (8:29 a.m.)

3 CHAIR HANSON: Good morning, and
4 welcome to the final day of the 2017 fall HSRP
5 meeting in Portsmouth, New Hampshire. This
6 morning we're going to get the conversations
7 going again. We're with the panel members.

8 A little bit of a recap, if we can, on
9 some of the conversations we've had today, some
10 of the site visits. And what we're looking for
11 is topics, impressions from the last couple days,
12 for information for our recommendation letter.
13 Ideas that we might include.

14 Also open for conversation are HSRP
15 priorities and working groups, and also good
16 discussion hopefully on development of future
17 issue papers and also meeting agendas. So pretty
18 wide open. But the last day is typically where
19 we -- we do kind of recapture things and make
20 sure we're heading in the right direction. And
21 also set the course for future.

22 So I think I'll go ahead and go around

1 the horn. And, Carol, if you don't mind just
2 kind of your thoughts so far on the meetings and
3 where we think we need to be heading.

4 MEMBER LOCKHART: I guess I don't have
5 anything specific as a recommendation for the
6 letter, but I do think you guys did a really good
7 job of planning this meeting. I like the fact
8 that we had more time to discuss stuff amongst
9 ourselves rather than just being talked at
10 constantly and then having to rush our
11 discussions.

12 So I would like to just recommend to
13 the panel that we do continue that in the future.
14 I think that's going to be my main takeaway. I
15 think, you know, obviously the trips to UNH and
16 everything were great, but I've been there
17 before, so -- I don't have any specific comments
18 on that. Yes, that's kind of it for me.

19 CHAIR HANSON: Okay, great. And of
20 course as we go around the horn here it doesn't
21 mean you can't interject as -- as we wake up a
22 little bit here. Dr. Brigham.

1 MEMBER BRIGHAM: I just think that the
2 theme of education and this licensure is a topic
3 that should be part of the letter that we're
4 looking at, or whatever we're going to do,
5 whatever you all are going to do in that subject
6 area. I think it -- to me it's an obvious one
7 for a working group, but that's for you all to
8 decide.

9 But the theme, I mean, we came here --
10 theme is education at UNH and the training at
11 sea, and all of that. Plus this national
12 licensure issue should be in the letter I think.

13 CHAIR HANSON: Great. Thank you. And
14 I suspect as a member of the public you can also
15 interject.

16 MEMBER BRIGHAM: I mean, you know I'm
17 going to be a member of the Polar Research Board,
18 so I stick with Polar. And -- but there are some
19 topics that overlap between HSRP and the PRB and
20 I'll pursue them between the two organizations.

21 CHAIR HANSON: Great.

22 MEMBER BRIGHAM: Particularly the use

1 of I think academy is interested in maybe doing a
2 study of the use of autonomous vehicles for
3 charting hydrography in Alaska.

4 CHAIR HANSON: Thank you. Anne.

5 MEMBER McINTYRE: Thanks, again. I'll
6 reiterate what Carolyn said. I think this was a
7 really good meeting, and I did appreciate the
8 extra time that we had to interact with the
9 panel. The one thing that we didn't touch on
10 very much that was interesting to me during
11 Rick's presentation yesterday was the funding and
12 how the response to the hurricanes was coming out
13 of base funds, and how that might be managed in
14 the future. We didn't really talk much about
15 that, but it seems like it has the potential to
16 take funds from more routing things that we've
17 been discussing.

18 And then the other thing that just
19 struck me was -- just related to the issue papers
20 is that I think as a panel we don't need to feel
21 that we consistently have to put new issues on
22 the table. I would kind of like sometimes to

1 circle back and follow up on existing programs
2 and existing recommendations that we've made.

3 I was very interested and happy to
4 hear of Admiral Smith's meeting with the Army
5 Corps and how they're moving forward with things
6 that we've already suggested. And given limited
7 funding and it just seems to me that it might be
8 nice to continue to focus on some of the things
9 that are currently happening.

10 CHAIR HANSON: Thanks, Anne. Susan.

11 MEMBER SHINGLEDECKER: I was -- I was
12 struck by also the focus of the meeting on
13 technology and the field trips to UNH. And I
14 think sometimes we often go, you know, location
15 to location and we hear from local stakeholders
16 and that can be really great. But the way we
17 mixed it up this time, and that it -- it wasn't
18 so much about the local stakeholders. It did
19 make me think, okay, don't -- don't check off New
20 England as we've heard from the stakeholders here
21 because that's not really what our focus was. So
22 we may need to make sure we were aware of that in

1 the future.

2 From the recreational boating
3 perspective, you know, for the last 7 years on
4 the panel I've always thought, gosh, you know,
5 how do I bring recreational concerns to the
6 table. How do I, you know, with the charting
7 backlog and just the great need in the, you know,
8 outside the main shipping channels, how are we
9 ever going to get there.

10 And what strikes me is that looking at
11 panels like the -- with the use of autonomous
12 vessels and various technology, that coupled
13 with, you know, the progress we seem to be making
14 in the use of non-authoritative data sets, I'm --
15 I'm actually really optimistic, because I see
16 those two paths as really the only chance we have
17 to get to those shallower water areas that aren't
18 as navigationally significant when it comes to
19 commerce.

20 So I'm excited to see the progress in
21 those two areas coupled with what we got to see
22 in terms of visualization, because it's the stuff

1 that they're doing with visualization that is
2 going to convey these complex data sets to a non-
3 professionally trained mariner. And if we can
4 show this data whether it's currents, or depths,
5 or water levels in a way that's easy for an
6 average person to understand that's where we can
7 make a lot of progress and better and safer
8 recreational boating.

9 CHAIR HANSON: Thanks, as always,
10 Susan, for that perspective as well. Dr. Kelly.

11 MEMBER KELLY: Yes, I think the meeting
12 was good, and I attribute a lot of that to the
13 lead up with the meetings and the telephone
14 conversations. They've gotten a little more
15 structured. So we're coming into this meeting a
16 little bit better prepared with a few more issues
17 under our belt to discuss rationally.

18 I think, you know, again as we start
19 moving around the table we're going to start
20 seconding what other people have already said.
21 But I think it's a tremendous opportunity for the
22 navigational assistance programs to position

1 themselves as the central infrastructure for the
2 nation. Saving lives, promoting economics, and
3 basically just societal progress.

4 I think there's a lot of money that's
5 going to be out there as a result of these
6 hurricanes and the ongoing. And I think we need
7 to be part of that infrastructure development so
8 that we don't get left behind. The technology,
9 yes, I was very impressed. I had never been to
10 UNH before. It was quite interesting and what I
11 found as a non-science person, as I think Susan
12 just said, was wow. This visualization some of
13 the things they've got mean that now I might be
14 able to use some of what used to just stay in
15 academia and be these charts and, you know, et
16 cetera that I could make no sense out of.

17 So the visualization, I think, is
18 going to make it a whole new deliverable to the
19 maritime user population. And I think that's
20 going to be a big thing to do. I think NOAA also
21 should take a lead position, not quite sure
22 exactly how -- what that should be or how it

1 should be, but to encourage and promote
2 oceanographic students, degree programs, et
3 cetera, and to support the schools that are out
4 there trying to do that, because this technology
5 seems to be moving rather quickly apace and we're
6 going to need people that are conversant with it.

7 And we're kind of a very narrow field,
8 so to get interest in this is going to be
9 important. The unmanned, I was struck, my
10 initial thing was wow that's cool. We're going
11 to have all sorts of things we can do with that.
12 And then, you know, I have my corporate lawyer
13 friends behind me saying just wait a minute here.
14 And I think there's a tremendous amount of work
15 that has to really be gone on with before we're
16 going to be able to really make use of some of
17 these unmanned technologies.

18 So I think NOAA should also kind of be
19 engaged in this, but recognize that there are
20 some fairly large outside industries that are
21 also moving apace with this, and we don't want to
22 be in a position where we're reinventing the

1 wheel while somebody else is moving forward on
2 some of those, whether that's automobile, or
3 drones or any other type of thing.

4 So -- but like I say, I'm very
5 impressed with the meeting and I thought UNH was
6 pretty cool place to see.

7 CHAIR HANSON: Great. Thanks, Ed.
8 Colonel Maune.

9 MEMBER MAUNE: Good morning. As the
10 editor of a textbook on digital elevation models
11 I've always felt comfortable on the technologies
12 that I personally deal with. The imagery, the
13 lidar, the synthetic aperture radar. But I was
14 always uncomfortable on the wet side of the
15 mapping business, and so I relied on Guy Noll
16 back there to write the chapters on sonar.

17 And I've never been on a hydrographic
18 survey vessel before, so to me it was quite a
19 learning experience and to visit the university
20 on Monday, my gosh, that was fabulous. And I now
21 feel that I know a little bit more about this
22 technology that I've been publishing a book about

1 for over a decade. And I really appreciate the
2 help I've gotten from Andy and his crew there.

3 And the visualization part I thought
4 was exciting. So anything you can help me put in
5 that book to help promote you please send it and
6 I'll see if I can incorporate it. Thank you.

7 CHAIR HANSON: Thank you. Ed.

8 MEMBER SAADE: First of all, thanks to
9 Andy and Larry and the whole Center for the past
10 2 days, because both visits were dynamite. And
11 the interaction with your staff and students is
12 really, really good, you know, very positive.

13 Visualization, visualization,
14 visualization all the themes that have been
15 brought up, and the only -- and I think the
16 realtime updates on the hurricane response was
17 really impressive, I mean, you can't get anymore
18 realtime than when the admiral was presenting and
19 emails were coming in.

20 But we need to capture that somehow
21 because it all leads to the types of things that
22 Ed was talking about in terms of this is the

1 right -- the organizations that we're
2 representing and dealing with here are the right
3 ones to be right at the center of hurricane
4 response, whether it's the admiral, or Julianna,
5 or Rich's group, so, you know, that's -- there's
6 a lot to be said for that.

7 And then the only other ideas we're
8 going to talk about later is a couple of other
9 additional technical topics that we can go
10 forward with as far as panel meetings or in depth
11 reviews, but we'll get into that later.

12 CHAIR HANSON: Thanks. Kim.

13 MEMBER HALL: This is where I should
14 say I agree with everybody, right? As I said
15 yesterday, and I'll just take my version of
16 visualization. I think we've seen and we've been
17 talked to a lot about that in the past. And I
18 know Larry has tried in previous meetings to
19 explain what that actually means, actually seeing
20 it, making it real for us. Because I think
21 sometimes we think you can over engineer a
22 problem, or the solution to the problem. And

1 there were some things that we saw at UNH that
2 were just really neat.

3 And things, like I said, as a non-
4 surveyor I could see many other uses in the
5 maritime domain for a lot of what you had and
6 would be very helpful. So that was really cool
7 to kind of put it into practice to see how you
8 guys would -- would actually do it, rather than
9 seeing a flat picture of a screen on a PowerPoint
10 slide. So that was really great.

11 I think we're making strides. I know
12 we talked about this in our working group, or
13 working sessions in the morning, with how we
14 advance the panel and how we do our work. And so
15 I really appreciate everybody's advice. I'm
16 putting together the spreadsheet now so I can
17 send it around just for, you know, does it make
18 sense, is this how we want to pursue it.

19 But I think it's great to make this
20 even better. I didn't -- I wasn't trying to
21 improve because we were in such a bad place. I'm
22 trying to improve because little things can make

1 exponential differences in how we operate. And I
2 think I really just appreciate everybody's
3 willingness to think a little bit differently
4 about how we approach it. And, again, anything
5 we can do, I think, to help Lynne make meetings
6 like this in panels that were really geared
7 towards what we needed to hear I'm happy to do.

8 CHAIR HANSON: We appreciate your
9 willingness to do that. Thanks again. Juliana.

10 MS. BLACKWELL: So falling on the theme
11 of the virtual reality, augmented reality
12 demonstration that we have just brings to mind
13 the importance of being able to position all
14 things, and the fact that we are, you know, the
15 future is being able to position all things
16 accurately and in realtime and that's where we're
17 going.

18 And the importance of being able to
19 connect all of these things the right way,
20 whether it's on land, on the water, in the air,
21 and bringing that all together and that's, you
22 know, that's what my office is about is providing

1 that framework to be able to reference things,
2 and we're going to talk about that here in a
3 minute.

4 But as we see, you know, where we're
5 going with autonomous vehicles, you know, no
6 matter whether you're personally driving them or
7 you're watching them collect survey data on the
8 water just how we look at making the most of it
9 and getting some direction and maybe some more
10 education on the panel too just about how
11 important the components are realtime
12 positioning.

13 I know we didn't talk about that much,
14 but as we think about these future technology
15 advancements it's only going to continue to
16 increase with being able to know exactly where
17 everything is all the time.

18 And so bringing that also from indoors
19 where the saw the demo to something, you know,
20 that's outside as you're doing your business is
21 going to continue to be, you know, the future for
22 America. And so we want to be able to look at

1 how we do that within our offices from the water
2 -- from the water level side, also from the
3 geodetic side.

4 So just -- I think it was a great
5 opportunity to start thinking about that as a
6 group, just, you know, where we're going with --
7 with the research and technology and who knows
8 where we'll be in 5 years, but thank you.

9 MR. EDWING: So I, as well, very much
10 appreciated the focus of this particular meeting
11 on technology and the R&D, you know. As the
12 manager, or as a program who relies on three
13 observing networks, the in situ National Water
14 Level Observation Network, and the PORTS program,
15 as well as our short term deployments of current
16 meters, we're always looking for ways to make
17 those systems more cost effective while also
18 improving, you know, the product delivery,
19 improving those products at the same time.

20 So, you know, the automated vehicles
21 while that's not in our mission requirements
22 actually we like our technology to stay right

1 where it is when we put it there. You know, it's
2 still very relevant to what we do. So -- and as
3 I mentioned yesterday NOAA places a high premium
4 on this as well as evidenced by the emerging
5 technologies workshop they've been doing the last
6 couple of years.

7 So while we're not necessarily using
8 some of these technologies they're very -- very
9 much closely related to technologies we're
10 working with. And, again, the data visualization
11 I think actually is something I want to explore a
12 little bit more with Andy and maybe some others,
13 because a lot of people don't understand graphs
14 and things and there may be better ways to
15 display some of our information. So that's
16 something I intend to look into. Thank you.

17 CHAIR HANSON: Thanks Rich. And we
18 also have Gary Thompson, one of our panel members
19 on the line. And, Gary, as we patch in, we hope
20 you're high and dry.

21 MEMBER THOMPSON: Well thanks a lot,
22 Bill. Just trying to stay away from the mosquitos

1 in North Carolina. My comments are related to
2 the national licensing. I would just recommend
3 that (telephonic interference) current status of
4 -- like you do at the state level, and that would
5 have to occur for a national license. So I think
6 getting the Panel more information would be a
7 good first step. I actually just attended the
8 NCEES Annual Meeting and there were some good
9 presentations, so I think it's possible at the
10 next meeting we could have a Panel discussion,
11 and to learn some more about all of this stuff
12 would be very helpful.

13 RDML SMITH: I think is probably what
14 we're all thinking that we didn't understand what
15 he said.

16 CHAIR HANSON: Gary, unfortunately the
17 audio on your end wasn't -- didn't come over that
18 clear.

19 MEMBER THOMPSON: I'm sorry.

20 MS. MERSFELDER-LEWIS: He basically
21 said that it's important to brief the panel on
22 the licensure issue before we go any further to

1 get more information and make sure it's more
2 clear, and that the NCEES briefing was very good
3 and that you guys could get a lot more
4 information before you go any further.

5 RDML SMITH: Well that's -- that was
6 good. You should be a court reporter.

7 (Laughter)

8 MS. MERSFELDER-LEWIS: That's what I
9 get paid the big bucks for.

10 CHAIR HANSON: Rick, did you have a
11 point of clarification?

12 CAPT BRENNAN: Yes, the only thing I
13 would ask, and I was going to say this yesterday,
14 but is that this isn't just hydrographers, right?
15 So, I mean, I think when we talk about any, you
16 know, when we talk to folks this is not just
17 hydrography it's all the mapping industry.

18 So it's the folks that are flying
19 aerial lidar, aerial, you know, photogrammetry.
20 Even the -- even the folks just doing mobile
21 laser scanning. I mean, all of these folks all
22 fall into the same rubric, you know, of being

1 unable to get licensed. And so I think we -- if
2 we limit it to just hydrographers I think we're -
3 - I think it's going to be difficult, because we
4 don't have the numbers to warrant having a
5 national license, you know, of just
6 hydrographers.

7 But I think if we incorporate all
8 those, you know, that larger mapping industry
9 then I think we've got a coalition that really
10 can make some headway. And we've seen all of
11 them have the same problems that we're having.

12 So I would -- I would advise that if
13 we're going to -- if this panel is going to make
14 any recommendations it should include
15 photogrammetry, you know, aerial lidar in the
16 broader mapping community not just hydrography.

17 CHAIR HANSON: I think it's fair to say
18 that that was a topic of great interest to the
19 panel on all sides, so some vigorous debate and
20 discussion is forthcoming in future meetings I
21 suspect, so. Joyce.

22 VICE CHAIR MILLER: Well obviously,

1 I'd like to thank Andy and Larry for their
2 hospitality and great experiences. I have been
3 on a few hydrographic survey vessels, but I
4 hadn't seen the visualization, and I would like
5 to say that that was really very impressive. I
6 have a friend that I'm going to send her here
7 right away.

8 The one thing we discussed briefly
9 yesterday over lunch, I think we missed an
10 opportunity here. You have a bunch of very, very
11 smart students, and I'm sure some of them are
12 interested in policy and we should have made sure
13 some of them could come here. And I think in the
14 future the HSRP should do outreach to interested
15 students to, and this was I think Susan's
16 suggestion yesterday, that we should somehow
17 incorporate students from whatever area we're in
18 into at least visit the panel.

19 We did have in Charleston, I think it
20 was, we had a group of students at the local, I
21 think it was the BEAMS Program, came in and
22 presented a bunch of posters. I mean, they

1 didn't take time out of the meeting, the posters
2 were in the foyer. But I would say to Lynne and
3 the planning and engagement group that trying to
4 incorporate students into our -- and get them
5 aware of what the HSRP is doing would be a good
6 idea in the future.

7 CAPT ARMSTRONG: Well, obviously I'm
8 quite gratified at the response that you all have
9 given on the visits and the work we're doing. I
10 would like to also say that I think the ground
11 work for having these discussions and these demos
12 was due in large part to the work of Ed and
13 Lindsay in getting the technology panel up and
14 running, and getting the panel as a whole focused
15 on technology and so I think that was a great set
16 of ground work for showing you what we're doing
17 at the Joint Hydrographic Center.

18 And I also want to make clear that the
19 work we do is a very close cooperation with Coast
20 Survey as a whole, and particularly with the
21 EGA's Coast Survey development lab where the --
22 particularly the ASV work we're doing in very

1 close coordination with the work that's happening
2 in Coast Survey -- in the Coast Survey
3 development lab.

4 So that's something we hope to
5 continue to do, and I hope we can continue to
6 keep technology as a focus from time to time on
7 the panel. So thank you.

8 CHAIR HANSON: Thank you. And Admiral
9 Smith.

10 RDML SMITH: Thank you Mr. Chair. I --
11 I was just taking a few notes and I -- in with
12 the -- in the spirit of your original comment to
13 capture some things for the letter. And there
14 were a couple of things that I -- that I heard
15 around the room. And we can show these notes
16 later.

17 But there were a couple things that I
18 didn't hear and one, reflecting back to some of
19 the agenda items of the National Charting Plan
20 and your comments there. It might be helpful
21 just to note it. And if you think that we're
22 going in generally the right direction to say

1 that too, and similarly with the unmanned systems
2 road map.

3 I know you had a great deal of
4 feedback on that. We love that. That doesn't
5 need to go to the administrator, but note that
6 you did engage with that and something about
7 whether you think we're doing something important
8 would be helpful. And that might catch the
9 attention for support for this in general of the
10 -- within NOAA.

11 I heard a concern about funding for
12 emergency response. I think that's a pretty hot
13 issue right now and it might be timely for you to
14 note. I heard that you're pleased that NOAA and
15 the Army Corps are working together in improved
16 coordination in surveying and in channels. That
17 might be nice for the administrator to know.

18 I think you need to introduce your new
19 issue papers, make note of those and sort of
20 formally submit those. I really like the -- what
21 you noted about the trend toward making
22 information more accessible to deliver greater

1 value, whether that's in the form of the
2 visualization, or the really great work that CO-
3 OPS has been doing with their web site and trying
4 to make the information relevant and actionable.
5 I think is -- I think it would be -- there might
6 be a note somewhere in that space.

7 Supporting research from -- from
8 research to observations we -- to operations we
9 talked about that a lot yesterday, but that might
10 be something to get back to the surface. And the
11 valley of death caught everybody's attention.

12 The priorities for maybe looking ahead
13 along the lines of the priorities that we may or
14 may not have coming out of this meeting for sort
15 of what it is that we think should be kept using,
16 you know, our attention for the next few -- the
17 next few meetings. Had a little bit of a look-
18 ahead. I'm not sure we've ever done that before
19 for the -- in the letter to the administrator
20 and that might be good too.

21 And then we heard the -- recommend
22 that NOAA consider adding an early career member

1 to the panel, and make an effort to include
2 students at meetings and some combination of
3 those two, whatever you think is what you would
4 like to recommend. So those were my notes and
5 all that is good meaningful stuff.

6 VICE CHAIR MILLER: One thing I forgot
7 to say is that inherent in a lot of our
8 discussions are the infrastructure elements of
9 overall infrastructure ports, the fleet. So many
10 of our issue papers are really basically about
11 infrastructure. And we need to -- I think we
12 need to capture that in the paper as well.

13 CHAIR HANSON: I thank everybody for
14 their comments, and that's certainly very
15 helpful. That's the reason you're here is for
16 your input. Very diverse panel. Again,
17 congratulations to Admiral Smith and the gang for
18 putting together the group that does invest their
19 time and invest their thoughts and their
20 expertise. So I think that's the value in this
21 group. And, again, thanks for participating.

22 That doesn't mean that we have to be

1 quiet the rest of the day. There'll be other
2 opportunities to interject in the letter. Joyce
3 had already started on the letter, as she's prone
4 to do. And so she's got a few things to add to
5 it, and then condense and keep it to a manageable
6 size.

7 But as we go ahead, I apologize to the
8 folks on the webinar. On our schedule we wanted
9 to take that time to get the panelists' comments,
10 but I think we're ready now for our first panel,
11 and if we can get Juliana and Rich to go ahead
12 and prepare for that.

13 At our last meeting in Seattle panel
14 members requested that NGS and CO-OPS provide a
15 brief overview of datums. So Juliana Blackwell
16 and Rich Edwing will present datums 101 this
17 morning. And we'll get -- let them get going
18 here. It was a request yesterday perhaps a 102
19 and 103 as this goes forward, so we'll see how
20 this goes. Give us a few minutes while we get
21 prepared, please.

22 And just for the record as well, Gary

1 Thompson did say that he agreed with Captain
2 Brennan's comments about the licensure, so, Gary
3 thanks for participating, again.

4 MS. BLACKWELL: Okay. Good morning,
5 everyone. As you all have been waiting for
6 datums 101. Little enthusiasm, but, okay, we'll
7 get there, we'll get there, hopefully. Just keep
8 you awake. Okay, so this morning I'm going to
9 briefly introduce terrestrial or geodetic datums,
10 and set that in the context of the National
11 Spatial Reference System.

12 I'm going to be touching on both the
13 existing NSRS, and a little bit about the future
14 NSRS and where we're going. And you've heard me
15 give brief updates on different projects that are
16 supporting the modernization of the National
17 Spatial Reference System.

18 I'm also going to be introducing the
19 critical connection that exist between
20 terrestrial and water level datums. And
21 highlighting briefly the VDatum tool, which makes
22 translating between terrestrial datums and water

1 level datums a breeze. That's all you need is
2 the VDatum tool.

3 I hope that, you know, in this brief
4 time that we have that you'll come away for --
5 with an appreciation of the importance of having
6 a consistent accurate National framework for
7 geospatial data. You may not be experts in
8 creating a datum and understanding all the
9 geodesy behind it. And that's not really the
10 important part of it. That's our job to NGS.

11 But I really would like, you know, I
12 mean, I'm hopeful that you will at least
13 appreciate the fact that, you know, datums are
14 not really a mystery. The important thing is to
15 have a datum, to have an accurate datum that
16 you're using when you're, when you're -- when you
17 have geospatial data, knowing what that is, and
18 knowing how to go in between -- from one datum to
19 another to make your data be able to match and to
20 integrate well.

21 So in the picture here, just to, you
22 know, tying this together to the coastal maritime

1 theme, is a picture of someone on Rainier using
2 GPS, a handheld GPS to measure the position of an
3 aid to navigation. So you need to have positions
4 of things on land to be able to connect those to
5 things on the chart, and make those connections
6 to the mariner as well.

7 So it's all going to tie together by
8 the time Rich and I here are done this morning in
9 the next 50 minutes. But before I go on with my
10 slides for those here in the room you're going to
11 see just a very brief illustrative demo on
12 heights and datums.

13 So for those of you who know more
14 about datums than I do I apologize, and I'm
15 really going to be talking at a very basic level
16 and just really to try to make a point about
17 datums and what's really important about datums.

18 So, today I have my makeshift
19 surveying instrument with me. I'm holding up a
20 tape measure, 12 feet long, and I basically want
21 to just determine the height of this microphone
22 here, okay? So if I use the table top as my

1 reference surface, my vertical reference surface
2 I can measure and I can see that the height of
3 this microphone is 12 inches relative to the
4 table top. The table top vertical datum
5 temporarily, okay?

6 If I want to know the height of this
7 microphone to the floor, and I use the conference
8 room floor as my vertical datum, I see that it's
9 3 ½ feet is what the height is of this
10 microphone. Microphone hasn't moved, I just have
11 two different heights based on what I'm
12 referencing it to, the tabletop, or the floor.

13 Well, that's fine if I'm measuring
14 things here in the room I can use something
15 that's really convenient to me and known and make
16 those measurements, measure all of the microphone
17 heights, measure the lights, everything else.
18 But that only helps me if I'm here in the room
19 trying to connect those pieces.

20 If I want to know the height of this
21 microphone relative to, let's say sea level, then
22 I got to go outside this room and I've got to

1 connect it to something that has a reference
2 surface that is equal to zero elevation at sea
3 level. I'm saying these in approximate terms.

4 So what the National Vertical Datum
5 does, and the one that is current now is called
6 the North American Vertical Datum of 1988, is
7 approximates, you know, the sea level, the is
8 zero starting point for measuring things on land.

9 So I know that if I were to go out and
10 find a geodetic control mark, and bring that
11 elevation in with real surveying equipment, and
12 I'm just going to -- I'm going to say that I
13 checked the database and I would say that we're
14 about 20 feet in elevation from -- or NAVD 88
15 elevation here in this conference room at the
16 conference room floor level.

17 So then I would add my height from the
18 conference floor up to here, which is 3 ½ feet
19 added to that 20 feet and say the height of this
20 microphone and elevation of this microphone is 23
21 ½ feet per NAVD 88 height. So simple, right?
22 Vertical datum, that's all -- that's really all

1 it is. It's just -- it's measurements that's
2 what you all need to take away. It's just
3 measurements relative to something.

4 But it's important to know what your
5 -- what it's relative to when you're trying to
6 mix and integrate different data sets. And if
7 you start with something and you don't know what
8 it's, what it's -- what the datum is you're
9 really going to be introducing some problems and
10 some unknowns. Things are obvious it's easy to
11 figure out. When things are not so obvious it
12 makes it much more difficult.

13 That's the vertical side. The
14 horizontal side, the north and east, and latitude
15 and longitude, and all those things that you
16 introduced are the same, a little bit more
17 difficult to demonstrate here in the room. You
18 know, I can -- I don't have a tape measure that
19 goes to the equator or a tape measure that goes
20 to Prime Meridian, and other things involved in
21 that.

22 But the idea is you've got to have

1 something that you're starting with. And the
2 beauty of it is we don't have to start from the
3 same point, we can use the National Spatial
4 Reference System as it stands today, as that set
5 of -- that framework, the set of control points
6 that enables everything else to be positioned
7 from so that everything is on a consistent
8 network with consistent datums, both in the
9 vertical as well as in the horizontal sense.

10 So the National Spatial Reference
11 System is this whole set of geodetic control, and
12 the datums, and everything that goes into
13 positioning that that forms this framework for
14 geospatial data. So the example here -- lost my
15 little thing. Close your eyes Rich. Using the
16 laser.

17 So when you start thinking about the
18 different pieces that go into a nautical chart
19 you've got to have information collected on the
20 water, you know, in this case with the launch
21 from, I believe, the Rainier collecting data.
22 You got to position the vessel, you got to

1 collect the data, you got to have it reference to
2 something.

3 You look at the second picture there
4 with the aircraft, and collecting aerial imagery
5 and information about the shoreline. You've got
6 to position the aircraft, you have to reference
7 those positions back to the ground.

8 You look at the third -- the third
9 picture here and you've got a crew that's out
10 there doing -- checking the shoreline with GPS to
11 check the aerial imagery and to map different
12 hazards and obstructions. Got to be able to
13 combine all those different positions, and all
14 that information and make it all match up and be
15 able to produce that in a consistent format with
16 consistent datums to create a chart.

17 And you've also got to, you know, you
18 got to add the wet side too, right? So all of
19 those different things have to come together, and
20 come together right for us to be able to say that
21 we're doing our job and doing it properly.

22 So today in the National Spatial

1 Reference System we have the primary datums that
2 are being used, or the North American Datum of
3 1983, and I have in there "(2011)" because that's
4 the realization that's the most current. And
5 then the North American Vertical Datum of 1988.

6 So this is the starting points for all
7 these other things that are part of the NSRS. So
8 we have these consistencies, we add different
9 marks to it and different stations to it and
10 different tools and things, but bringing it all
11 back together so it all has the same framework
12 for positioning whatever it is that you want to
13 position.

14 Also I just want to note that when I
15 talk about the dates 1983 and 1988 how many
16 people were using GPS back then? Yes, Ed. Ed is
17 the only one that raises -- and Joyce, okay. So
18 you were probably up in the middle of the night
19 trying to get, you know, some sort of position,
20 you know, when the satellites went over for 4
21 hours at a time, you know, per day and you had
22 three or four satellites up and you were just --

1 you had to survey when they were available.

2 But the idea is we weren't really
3 using this in a production operational mode for a
4 number of years after these datums were -- were
5 created. So all of the national datums as we
6 have then now were done before GPS, really, from
7 an NGS standpoint. And we know that with the
8 advent of GPS and all the data that we've
9 collected since then we are much more able to do
10 them more accurately and to provide a better
11 framework for positioning nowadays versus back in
12 the 1980's.

13 But there's work we have to do today.
14 We've done some tweaking to it, and we know where
15 -- where the improvements can be made and that's
16 the modernization effort that's underway now. So
17 in this slide, just for your awareness, how we
18 provide tools to access the NSRS, defining it and
19 maintaining it is NGS's job.

20 The third part of our job, and our
21 mission, is to provide access for everybody else
22 who wants to use and position things relative to

1 the National Spatial Reference System. First of
2 all, we have an integrated database of published
3 geodetic control marks. There are hundreds of
4 thousands of marks in our database. And I would
5 say realistically there were probably about
6 80,000.00 that are up to date with accurate GPS
7 information, three dimensional GPS information,
8 and then connecting them to different types of
9 heights.

10 We also have an Online Positioning
11 User Service that enables folks to collect
12 geodetic data, submit it, and have it positioned
13 relative to one of our 24/7 CORS stations that
14 are part of the partner network that we -- that
15 we manage. The network of stations is really --
16 that are collecting data 24/7 are really the
17 future of the framework for the modernized NSRS,
18 because you have this data that's coming all the
19 time.

20 You can monitor change, and you can
21 model it a lot better if you have, you know, data
22 on these same points day after day after day.

1 Because as we know the earth is dynamic. Things
2 are changing all the time, sometimes very subtly,
3 but over time it makes a big difference and
4 sometimes it's a very dramatic -- dramatic
5 change. Whether it's the shoreline post-
6 hurricane or post an earthquake in some other
7 part of the country. Everything is changing at
8 some level and needs to be kept up to date.

9 And the last slide -- the last image
10 here is a conversion tool that we have available
11 that allows stakeholders to take information in
12 one datum and translate it to another datum. And
13 there's lots of different flavors of datums.
14 We're not going to go into that today, because
15 it's more than datums 101.

16 But anyhow -- so the future of the
17 NSRS is being able to support GPS access to NSRS
18 heights. And this, again, is a rather
19 complicated topic. So I'm not going to go into a
20 lot detail, but suffices to say that geoid
21 models, and when I'm talking about geoid and the
22 whole gravity effort, are necessary to be able to

1 convert GPS measurements into real world
2 elevations, you know.

3 Don't get confused with orthometric,
4 ellipsoid, you know, unless you really -- some of
5 you already know this, you know, better than I
6 do. But the point is to be able to use your GPS
7 receiver antenna and get a real world height, a
8 height that's going to matter relative to water
9 level information, where sea level is, where
10 things are going to flood, you need to have an
11 accurate geoid model. And the way that we are
12 doing that for the future is through the gravity
13 project to get better data collection of gravity
14 information to include into that model that's
15 going to be the basis for the next vertical or
16 geoid potential datum, okay?

17 So within the NSRS the things that we
18 have to take into consideration is being able
19 from a requirement side to provide consistency
20 and convenience to our users. It's just
21 critical. It's critical to having an accurate
22 spatial reference system.

1 The expectations that we have from a
2 lot of stakeholders is that things are going to
3 stay the same. And that is not the case. And
4 with the advent of GPS, and the information that
5 we've been collecting for decades now we know
6 that the coordinates are going to change on
7 things because the land is changing. The land
8 change is the coordinates, and the elevations on
9 those marks or core stations change with time
10 too.

11 So stamping something on the elevation
12 20 years ago, or 30 years ago and you go and look
13 at it and measure it today we have better
14 information, better technology. So we can
15 measure things more accurately, but we also know
16 that over time things are moving.

17 When we first developed NAVD 88, and
18 trying to make that cohere with sea level, the
19 decision was made to pick one point up in Canada
20 and use that as the zero point for NAVD 88. And
21 that's what that fixture there on the bottom --
22 bottom right is showing.

1 And we know that we have -- we have a
2 variance now in what sea level is. It's
3 different in different places. And so trying to
4 come up with a consistent sea level potential
5 value and make that more standardized across the
6 United States and the territories is something
7 that we're going to be able to accomplish with a
8 2022 datum that's here, the North American-
9 Pacific Geopotential Datum of 2022.

10 As I mentioned yesterday in my update,
11 we're also developing reference frames, consider
12 them datums, for the four different plates in
13 which we have -- which we're responsible for, the
14 United States and our territories. So the
15 Caribbean, Pacific, and Mariana Plates as well as
16 the North American Plate will all get a new fresh
17 reference frame/datum. In addition to that on
18 the vertical side we're going to be developing
19 this new geopotential datum based on the data
20 that's being collected through GRAV-D.

21 The new reference system is going to
22 be time dependent and geocentric and, therefore,

1 being able to connect it through GPS or GNSS
2 technology is going to bring that ability to have
3 those accurate heights, those accurate positions,
4 you know, based on time and be able to get that
5 out of your GPS receiver. Whether it's in your,
6 you know, -- in the future whether it's in your
7 phone, in your car, you know, on your watch, the
8 technology is going to continue to improve and
9 you're going to be able to get the real world
10 heights out of GPS as well as your latitude and
11 longitude and how that is relative to where you
12 are on a map through these different reference
13 systems much easier in the future.

14 It's also very closely tied to
15 global/international frame because we obviously
16 are not -- we're obviously part of a global
17 community that is positioning itself too. And so
18 we want to make sure that we have the United
19 States and territories connected accurately to an
20 international frame.

21 So this slide is just to show the
22 differences between what we have today with NAD

1 83 and the 2022 geometric or horizontal datums,
2 and it's a little difficult to see with the
3 resolution here, but the -- the idea is showing
4 the difference between the red NAD 83 coastline
5 against NAD 83 imagery. And the green line,
6 which is just slightly off, shows if the
7 coastline is shifted into the 2022 NATRF datum
8 that the imagery still stays on NAD 83.

9 So geometrically things are going to
10 change a little bit. In some cases it'll make a
11 huge difference. In other cases it will be very
12 minor, but the idea is there is going to be a
13 shift when we go to 2022 from a horizontal
14 perspective.

15 As far as the vertical, the vertical
16 change is really going to be the most significant
17 and we know that once we roll out the 2022
18 geopotential datum that the shifts are going to
19 be anywhere from about zero in Florida up to
20 about a meter in the pacific northwest with a
21 gradual change, and up to as much as 2 meters in
22 Alaska.

1 So tying this more into land-water
2 interface, you know, heights matter. It's not
3 just the heights of what's on the water, it's the
4 heights of things that are on land. And when you
5 talk about infrastructure, you talk about
6 improvements to infrastructure, how high to build
7 things on land so that they don't flood, or that
8 there's enough clearance, or that you know what
9 that difference is. It's important to know, you
10 know, the relationships between the different
11 height systems and know what datum you're on, how
12 accurate the information is that you have, and
13 how that relates to the water level information
14 currently that you need, especially if you're
15 doing -- especially if you're moving large --
16 large things with not much clearance.

17 Okay, the next slide here is just
18 basically just to highlight there are different
19 types of vertical datums, again we're not going
20 to go in -- I'm not going to go into the
21 ellipsoidal on the orthometric in much detail,
22 because that would -- that would definitely take

1 me out of my time.

2 But it's just important to realize
3 that when we talk about ellipsoid heights the
4 things that folks views, and how they get
5 ellipsoid heights -- the platforms that we're
6 talking about are hydrographic -- ships and
7 hydrographic ships. Anything that's coming out
8 of a GPS receiver antenna, including positioning
9 of aircraft and the collection of overall lidar
10 data. You get a lot of -- get ellipsoid heights
11 out of that.

12 If you're talking about getting
13 orthometric heights that are heights relative to
14 the current vertical datum things that are on a
15 topo map, things that are line of sight
16 measurements with differential heights through
17 leveling -- leveling that's being done today, and
18 how things are portrayed on flood insurance rate
19 maps you're talking orthometric heights.

20 We want to be able to combine is that
21 you have real world heights and all of that that
22 ellipsoid orthometric is in the background for

1 folks in the future. And what you end up with is
2 the height that you need out of your GPS, which
3 is nice and convenient, but relative to sea level
4 and make that easy on folks. I'm not going to
5 get into the title stuff because that Rich's
6 domain.

7 The topography and the typography and
8 the bathymetry are measured relative to different
9 reference datums, okay? To mind the elevations
10 and the depth seamlessly we need to know the
11 relationship between the two. So you're seeing
12 here we've got these different things happening
13 on the green side, the typography on the black
14 line at the bottom, the bathymetry, you've got
15 mean lower low water, that's on the water level
16 side, and we've got all these things floating
17 around, the ellipsoid and the geoid on the
18 geodetic side.

19 Without a transformation tool that
20 relates the orthometric and ellipsoid heights to
21 a title datum there's significant challenges to
22 anything having to do with Integrated Ocean and

1 Costal Mapping, datum-based vector, shoreline
2 mapping, topobathy lidar, and hydro surveying to
3 the ellipsoid.

4 Using a tool such as a VDatum
5 transformation application you can link the
6 vertical datums and blend them together so that
7 they're referenced to a common vertical datum.
8 VDatums is a gridded datum transformation tool
9 that allows title datums to be made fast to
10 terrestrial datums. This is done through the
11 approximation of the -- or the development of the
12 typography at the sea surface, the TSS, which is
13 defined as the elevation of the North American
14 Vertical Datum land relative to the local mean
15 sea level.

16 So just trying to do a very simple
17 picture saying what it's doing is being able to
18 provide this TSS layer to be able to help with
19 the conversion between water level and
20 terrestrial datums. And what I'm going to say
21 and say over and over again is use the VDatum
22 tool to go from one to the other. Put the

1 information in, spit the information out and what
2 type of datum that you're looking for.

3 And there's all sorts of tools
4 available -- all sorts of ways to be able to
5 interface with VDatum. The VDatum tool is a
6 joint product of CO-OPS, Coast Survey and NGS.
7 All three offices are involved in the development
8 of it and the maintenance of it and the
9 improvements of the VDatum tool. And being able
10 to link these different water and land datums
11 together is a critical thing that we provide to a
12 number of different stakeholders.

13 There's the VDatum web site, there's
14 different interfaces that are available, you can
15 do it online, there's a download, there's a
16 command line. For whatever your desire there's a
17 way to use VDatum. I will say that the Version
18 3.7 was just released on Monday, September 11, so
19 that slide did not get updated. But there is a
20 new version that's out there and available now.

21 The last slide I have that I'm going
22 to speak you is surveying on the ellipsoid. This

1 is also something that I think this group should
2 continue to -- to hear about and just how we're -
3 - how the offices are working together using the
4 ellipsoid data, and how the advantages of
5 surveying just on the ellipsoid decouples the
6 tide measurements from surveying, reduces the
7 vertical uncertainty from the heave and the
8 dynamic draft of the vessel, and that how this
9 continues to require advanced TSS that extends
10 off shore. So we need to expand the whole VDatum
11 model, and how it requires validation against
12 existing hydro survey techniques.

13 So, again, this gets into a lot more
14 detail here, but being able to survey just on the
15 ellipsoid and be able to make those conversions
16 and apply those well, it's the future. And I'm
17 not going to go into enhancements of VDatum.

18 Before we get to the water levels --
19 I'm probably way out of time, but I'm going to do
20 it anyway. I'm going to ask if we can show one
21 video and this has to do with the VDatum COMET
22 video that's a little under 5 minutes, and it'll

1 be the segue between the land side and the water
2 level datums, and so if we can make that --

3 (Video shown.)

4 MR. EDWING: Okay, I will get started
5 on the water level datums portion once we get
6 that up. And while that's coming up let me just
7 reinforce and maybe expand a little bit on
8 something that Juliana said to begin with, is,
9 you know, between the National Spatial Reference
10 System and water level datums that is the
11 foundation or the core for the nation in terms --
12 you got to start with the reference system before
13 you do anything else, you got to have that
14 starting point.

15 And that then allows us then to do the
16 measurements and start to describe the
17 environment that's within there, charts, water
18 levels, currents, imagery, all those things.

19 And this reference, these reference
20 systems, are unique to NOS, we are the
21 authoritative source for these high-accuracy
22 national systems and NSRS is more a national, and

1 it's not too often we can say that about
2 government programs.

3 There is other people doing charting,
4 there's other people doing water levels and
5 currents, and imagery, all those other things,
6 but no one else does these reference systems, so
7 I just wanted to point that out.

8 So I am going to talk about water
9 level datums today, and really that's a general
10 term because we have the tidal datums along the
11 coast and the IGLD up in the Great Lakes.

12 My talk is going to focus mainly on
13 the water level, the tidal datums, I should say.
14 And why do these datums matter? Juliana has
15 covered some of this, but certainly mean lower
16 low water is, you know, important for
17 hydrographic surveying.

18 That number of the chart is reference
19 to mean lower low water. There is a lot of other
20 intermediate tools we use to kind of get to
21 there, Juliana's mapping to mean lower low water
22 and mean high water along the coast demarcating

1 that shoreline, which then goes on the nautical
2 charts, and dredging.

3 Dredging is using mean lower low water
4 in almost all districts right now, almost all
5 districts, as they are, you know, they are a
6 vertical control for those important federal
7 channels.

8 And mean lower low water is a parlance
9 for, you know, the maritime commerce community,
10 but there is other datums that come into play as
11 well. And, again, you saw some of this on the
12 DLE.

13 I think the VDatum video really
14 illustrated this, but coastal construction,
15 whether it's a levee or, you know, a power plant
16 or transportation roads or, you know, railroads
17 running along the coast, they need to know what's
18 going on to properly build those to elevations
19 where they're not going to get, hopefully get
20 inundated during storms and other things.

21 That very busy slide, the image on the
22 right hand, upper right hand, are marine

1 boundaries. There is all sorts of marine
2 boundaries that get charted.

3 They all kind of use one of the tidal
4 datums as they are kind of jumping off point from
5 the coastline, you know, going out there is, you
6 know, boundaries for, you know, national EEZ
7 going on out, and kind of moving inwards.

8 There is also these demarcate between
9 federal and State ownership and property
10 boundaries along the Coast and sometimes that can
11 vary from State-to-State. I am not going to try
12 to walk through that whole slide.

13 And the inundation, you know, as a
14 said mean lower low waters is the parlance for
15 maritime commerce, mean higher high water is the
16 parlance for inundation, because that's kind of,
17 you know, that was chosen because people are kind
18 of used to that as the highest average water
19 level that they see along the coast, it's kind of
20 at that point that flooding can start to occur
21 along the coast, so we use that datum.

22 And I will mention, you know, there

1 was some talk of leasing yesterday. A number of
2 decades ago there was an important court case up
3 in Alaska called Dinkum Sands because you start,
4 the leased boundaries kind of are measured
5 starting from the coastline and if you kind of a
6 coastline like this it's pretty easy to measure
7 out, but at that time they didn't know whether it
8 was a shoal or an island, and depending on what
9 it was, they could start measuring out from that
10 point and there was a lot of oil being extracted
11 from this lease and they didn't know whether the
12 feds owned that lease or the State owned that
13 lease.

14 And so there was a big project done
15 with some tide gauges and out in the shoal, which
16 is under ice most of the time, and my hat's off
17 to the people who did that work back then, but it
18 came out that the feds kind of owned that lease
19 and so the revenues went to the federal coffers
20 instead of the State coffers.

21 Of course, Senator Stevens saw that
22 those funds got redirected back to the State,

1 which was fine, but there was billions of dollars
2 literally at stake because of just that boundary,
3 that ownership issue.

4 So I am just going to walk through
5 what is a tidal datum, how we calculate them, the
6 Tidal Datum Epoch that you saw a little bit
7 about, what's the rule of the NWLON in this and
8 some of the products we put out.

9 And, again, I think it's a reference
10 elevation, right, a certain phase of the tide.

11 And think about tidal datums are a way of
12 describing or characterizing the ocean, the
13 motion of the ocean, if you will, the repetitive
14 motion of the ocean.

15 So a fairly typical diagram that shows
16 the different tidal datums that there are. You
17 have your kind of high and low water datums, and
18 I'll point out there is a little typo here, there
19 should be a low in there.

20 They are not really tidal datums but
21 at most places we also just kind of record and
22 report out the highest and lowest observed tide

1 we've ever seen there.

2 There is descriptors of kind of some
3 of your average tide levels, you know, these two
4 are really just arithmetic means between this set
5 of datums.

6 Mean sea level is really not
7 determined by the highs and lows of the tide,
8 it's an average of the hourly heights over a
9 timeframe, and then there is terms for kind of
10 the ranges of tide which I am not going to walk
11 through.

12 So we derive tidal datums from
13 continuous observations of time at specific tide
14 stations. They are referenced, two benchmarks,
15 and then the tidal datums are preserved by those
16 benchmarks, which are hopefully stable points on
17 the land.

18 And, again, an important point is we
19 are determining local tidal datums. The tidal
20 datums determined by a tide station are really
21 only relevant at that location and they can be
22 extended some distance from that station, how far

1 it really depends on the topographic and
2 oceanographic characteristics.

3 Now before 1980 there was a number of
4 different types of tidal datums used along the
5 coast for coastal projects and even charting and
6 so forth.

7 But back in 1980 there was something
8 called the National Tidal Datum Convention that
9 was put out and that standardized all that to a
10 diurnal-based tidal datum system and the tidal
11 datum definitions as determined by NOS became the
12 official U.S. policy of the government.

13 So how do we calculate the tidal
14 datums? You know, again, as the tide goes up and
15 down we're picking off the high points and the
16 low points of the tides.

17 Mean higher high waters is the average
18 of those high water elevations over time. Now
19 here is a little bit of a trick question, who can
20 tell me how mean high water, or, conversely, mean
21 low water is computed?

22 Larry Atkinson is not here, our

1 physical oceanographer is not here, so --

2 VICE CHAIR MILLER: Dave Maune can,
3 I'm sure.

4 MR. EDWING: Okay, Dave Maune, Joyce
5 has put you on the spot.

6 MEMBER MAUNE: I would observe the
7 high water every day for the 19-year National
8 Tidal Datum Epoch and compute the mean.

9 MR. EDWING: Okay. So actually mean
10 high water is the average of the higher highs and
11 the high waters over that entire timeframe, and
12 then the same thing for the mean low and mean
13 lower low water. That's why it's a trick
14 question, so, anyways --

15 (Laughter)

16 MR. EDWING: So the national tidal
17 datum epoch, that's 18 -- we measure them over 19
18 years for the most accurate tidal datum there is.
19 There is something called the metonic cycle 18.6
20 year lunar nodal cycle that occurs over that
21 timeframe, but we use 19 years to get rid of any
22 seasonal averages.

1 And just here is one illustration over
2 that 19 years, and this is just at Seattle, and
3 this is mean range, we could be plotting other
4 types of tidal datums.

5 But you can see there is this annual
6 variability and then you can see at the monthly
7 level there is a much higher range of
8 variability, but that's what we are trying to
9 average out over that 19-year timeframe.

10 And so when we compute and publish
11 tidal datums over one of these 19-year
12 timeframes, that's called a National Tidal Datum
13 Epoch, and if sea level never changed we would
14 never have to update our epoch, but that's not
15 the case.

16 And so every 20 years or so we go back
17 and do an analysis and if that change in sea
18 level has exceeded about a 1/4 of a foot we then
19 have to update our tidal datums to reflect the
20 new tidal datum epoch, or to reflect that change
21 in sea level.

22 And you can see we've really had to do

1 that, you know, every 20 years in recent history,
2 and while we have not yet to do the analysis for
3 the upcoming one my money is on we're going to
4 have to, you know, do it again.

5 So, you know, that will be the new
6 tidal datum epoch, and actually we're just
7 getting started with the planning on that
8 internally to do that.

9 But here is the last three epochs.
10 Before this there really, this process wasn't in
11 place to make those updates.

12 And so just some illustrations of what
13 is actually occurring, you know, at our network.
14 I mean certainly these things are different where
15 you go, and this is primarily a factor of what
16 the land is doing.

17 So up here at the top you can see
18 Grand Isle, sea level is rising, or appears to be
19 rising at a rate of over nine millimeters a year,
20 although most of that is driven by the subsidence
21 going on.

22 And kind of at the other extreme, in

1 Juneau you are seeing the sea level appears to be
2 falling at a rate of almost 13 millimeters a year
3 and that is being driven primarily by the
4 isostatic, you know, rebound from the retreat of
5 the glaciers millennias ago, and then here is
6 some, just more, some other representative sea
7 level trends from other stations.

8 So the NWLON, this is the
9 foundational, most basic role of the NWLON is to
10 provide that vertical control for the nation, and
11 right now we have these 210 stations around the
12 U.S. and really most of those stations are in
13 areas where you've had maritime commerce because
14 that's really, you know, the Coast Survey mission
15 goes back to that.

16 Again, these stations establish the
17 water level datums, you know, relative to the
18 land and the network of benchmarks where they are
19 located and we use these 19-year records to
20 minimize a datum error.

21 But as you'll see in another slide or
22 two there is also another important application,

1 because by comparing a short-term station to a
2 long-term NWLON station we can significantly
3 reduce the uncertainty of the error of that
4 short-term station's datum.

5 So here is just an example using
6 Providence as a control station, we call it a
7 control station, and Newport's a permanent
8 station of ours, but in this case we just use one
9 month of data from Newport computers, some tidal
10 datums with that.

11 And if we just did that as a
12 standalone tidal datum one month it would have an
13 error of about 20 centimeters for mean lower low
14 water.

15 However, if we compare that to the
16 long-term record, and, you know, the 19-year
17 tidal datums at Providence that allows to get rid
18 of all that variability that you saw in that
19 datum epoch and we can get that error down to 0.2
20 centimeters, which is a magnitude, one level of
21 magnitude reduction which is pretty significant.

22 And that's just one, that's just an

1 example for this one month at this location, you
2 know, kind of an average result is more around
3 four centimeters when you do this.

4 So, but at all stations that are going
5 for hydro surveys, for shoreline surveys, for
6 habitat restoration, for all these other
7 applications, by comparing those short-term
8 measurements to the longer-term measurements you
9 can really, you know, upgrade the accuracy of
10 those shorter term datums.

11 And just a graphic that shows, again,
12 just really kind of reinforces that for low water
13 or high water there on the right, you know, this
14 is the error bound for a month station and just a
15 little, you know, the more data you collect the
16 more dramatically you can reduce the error of
17 those.

18 And just one year of data makes a
19 significant difference, but, again, by comparing
20 to the long-term stations you can, you know,
21 achieve some of these same results.

22 So because we can define the span of

1 control, we call it a span of control for NWLON
2 stations, and that's allowed us to actually
3 pretty precisely determine how many NWLON
4 stations we need.

5 And there's not too many other
6 observing systems that I see that can precisely
7 define how many do you need. So we have 210, we
8 need 324 to provide full vertical control for the
9 nation.

10 A lot of these gaps are up in Alaska.
11 There is still a fair number in the Gulf and some
12 other areas that are needed to be addressed at
13 some point.

14 Again, most of our stations are
15 already in areas of high maritime commerce, which
16 often coincides with high population centers, not
17 always, so we are looking to establish
18 partnerships, and we have been establishing
19 partnerships with USGS, Park Service, and others
20 to fill some of these other gaps. You've heard
21 me talk about these at previous HSRP meetings.

22 So, again, I've said several times the

1 tidal datums established are good locally, but
2 how do we bring them into a common reference
3 frame. Well, that's where the NSRS comes in,
4 because we can connect the tide stations to the
5 NSRS.

6 The old way of doing it was to survey
7 between the local benchmark network and the first
8 order benchmark networks that NGS I guess used to
9 maintain.

10 I'm not so sure they are being
11 maintained anymore, probably not as we are moving
12 to the technology, but we could only do that
13 where these first order networks passed
14 reasonably close to our tide stations and we kind
15 of, five miles was probably the maximum that we
16 would try to survey to, and if it was that far
17 not very often.

18 So we were able to connect a number of
19 our stations to the NSRS that way, but not all.
20 In some cases like Hawaii or Alaska the NSRS
21 didn't really exist so we couldn't do that.

22 But nowadays with GPS it's much easier

1 for us to connect to the NSRS and put our tide
2 stations into that common reference frame and be
3 able to do comparisons and things of that nature
4 and also publish and compare and publish tidal
5 benchmarks also on some of the geodetic
6 benchmarks, or geodetic framework.

7 VDatum, I think Juliana covered that
8 very well, so in the interest of time I am just
9 going to go past this slide.

10 So this has been the traditional
11 product, datum product, for the network. You
12 know, up here is just, you know, what station
13 we're talking about, you know, a number of where
14 it's located, you know, when we put this
15 information out.

16 Then here is where we tell you, okay,
17 what's the length of series that we've computed
18 the datum on, timeframe, what's the tidal epoch,
19 if we used a control station what was that
20 control station.

21 And then here are the tidal and
22 geodetic, you know, if we have the connection to

1 NSRS we would publish it as well. Mean lower low
2 water is always defined as a zero for the datums,
3 and, again, you can see we've got the highest and
4 lowest levels published here as well.

5 And then for our local benchmark
6 network here is the stampings of those benchmarks
7 and we just refer those to the mean lower low
8 water or mean high water, which are the two most
9 commonly used tidal datums by the surveying
10 community for, mainly for coastal, you know,
11 coastal construction projects and things of that
12 nature.

13 And we are in meters. I'll stop
14 there. We are in meters.

15 (Laughter)

16 MR. EDWING: So I had mentioned before
17 there was some intermediate products we did in
18 supporting a hydro and shoreline surveys.

19 Actually, one of the first things I
20 did when I got hired was cut my teeth on doing a
21 tidal zoning planning for surveys and when I, you
22 know, started we just, we just had charts we

1 pulled out of the drawers and there would be old
2 data on there, we'd update the data and draw the
3 lines and stuff, the time and range lines and
4 help plan the hydro surveys, and that was really,
5 it really stayed that way for a really long time.

6 And actually this was a very nice
7 project that we got help from the Joint Hydro
8 Center on. We pulled this stuff all into a
9 database, GIS database, and this is actually
10 available to the general public as well, because
11 other people can use these zonings for other
12 kinds of projects, so this is out there now.

13 I talked about I talked about the
14 tidal datums calculator yesterday, a way for
15 people to kind of come in externally and bring in
16 their data and compute a tidal datum, and this
17 tool actually, you know, it actually selects the
18 highs and lows.

19 And, of course, this looks really easy
20 when you have a nice, smooth tide graph like
21 this, but often there is a lot of noise, we've
22 got gaps, and it could be more. This is the easy

1 button case here.

2 And I am just ending up with the IGLD
3 slide just to kind of remind folks that it's just
4 not tidal datums but we do have, you know, it's
5 kind of a combination geodetic water level datum
6 up in the lakes, but with time constraints I
7 didn't have time to get into this piece, but this
8 is where I conclude the -- Yes, I do have one
9 more slide.

10 So the summary is, you know, the water
11 level datums are the vertical reference frame for
12 all -- that is the starting point if we are
13 talking about all the other water level products
14 that we put out.

15 The NWLON is a foundation for, you
16 know, establishing that. We've got the 19-year
17 epoch, and that, again, also allows us to, you
18 know, force multiply the value of the short-term
19 water level stations and we are continuing to,
20 you know, put out and enhance the datum tools and
21 products that our users require. And that's
22 where I am done.

1 CHAIR HANSON: All right. Thanks,
2 Juliana, Rich. Any questions, quick questions,
3 from the Panel? Go ahead, Carol.

4 MEMBER LOCKHART: Okay, nobody panic
5 it's not a hard question. The tidal datum
6 calculator is that available to the public?

7 MR. EDWING: Yes, it is. I think it's
8 actually just being launched now.

9 MEMBER LOCKHART: Okay. Because, yes,
10 I poked around yesterday after you mentioned it,
11 and I couldn't find it.

12 MR. EDWING: Yes, I was a little -- I
13 think that we were supposed to get it out by the
14 end of this month, is that right, Craig?

15 MEMBER LOCKHART: Okay.

16 DR. DUSEK: Yes, it's soft release by
17 the end of this month.

18 MR. EDWING: Yes, yes.

19 MEMBER LOCKHART: Okay, thank you.

20 MR. EDWING: So we'll get that link
21 around to you guys.

22 MEMBER LOCKHART: That would be

1 awesome, thank you.

2 MR. EDWING: Yes, yes.

3 CHAIR HANSON: All right. In the
4 interest of time I think we're going to need to
5 get to the next --

6 MS. MERSFELDER-LEWIS: No, we've got
7 five minutes. Go ahead.

8 CHAIR HANSON: Go ahead, go ahead.

9 MEMBER SAADE: Mine's easy, too. Why
10 do we care to track both MHW and MHHW? It seems
11 to add to confusion.

12 MR. EDWING: Yes, that's a good
13 question. I mean the easy answer, well, it's the
14 way it's always been done, you know.

15 Well, but there are people who are
16 interested and maybe not necessarily for the
17 navigation community, but it is important for
18 driving other applications or for models, I think
19 for one.

20 I am going to look over at my senior
21 scientist, he can maybe help me out here. But,
22 again, we're looking to accurately describe that

1 repetitive motion of the ocean and I think
2 because there are these very two distinct points
3 at either end of the extremes that's how we're
4 doing this, you know.

5 Mean lower low water, that is a very
6 conservative estimate of the water that, you
7 know, for the maritime applications you want to
8 use because with the ships passing over that
9 point at mean lower low water or even, you know,
10 and the water can get lower, you want to make
11 sure folks are aware of that to avoid accidents.

12 But on the other end, for resilience
13 and flooding it's really just those, that mean
14 higher high water elevation that people are
15 interested in.

16 So it just gives people more
17 information that they have to perhaps use. And I
18 should have said, you know, we've been approached
19 and we are working with folks like Fisheries and
20 the Corps because they have Clean Water Act
21 applications that they are using, you know.

22 Mean high water may better describe or

1 help them with some of the regulations and things
2 they are trying to, you know, enforce. And, in
3 fact, sometimes they have asked us to create more
4 datums that better reflect just spring tide
5 datums, just pulling out the highest high waters
6 of each month and kind of creating a datum out of
7 that because that better fits the definition of
8 the regulations that they are looking to enforce.

9 So there is potentially even more
10 tidal datums that could be computed and put out
11 there.

12 DR. DUSEK: So I'll also just add that
13 there is a difference depending on your location
14 in the differences between mean higher high water
15 and mean high water.

16 So if you are in a diurnal place where
17 you have really one very large high tide and the
18 other one is kind of smaller those differences
19 between those two datums could be very
20 significant when you are placed with a semi-
21 diurnal tide, so, you know, you have two high
22 tides that are about the same every day your mean

1 high water and mean higher high water could be
2 almost the same.

3 So it gives you a little bit more
4 information depending on where you are location
5 wise as well.

6 MS. BLACKWELL: If I can maybe add one
7 other potential reason is it has to do with I
8 think boundary lines along the coast and
9 different States and how they use mean high water
10 or mean higher high water for the boundary.

11 (Off-microphone comment)

12 MS. BLACKWELL: Legal boundary, thank
13 you. So I think if you took that away it would
14 create a lot of havoc in some of these States if
15 you only used one versus the other without some
16 sort of a rollout for change, it would require
17 legislation, so --

18 MEMBER MCINTYRE: From a practical
19 standpoint like in calculating clearances under
20 bridges, too, it's -- we want to know the highest
21 high.

22 MEMBER SAADE: That's kind of my

1 point.

2 MEMBER MCINTYRE: Yes.

3 MEMBER SAADE: It would be a lot
4 easier just to have one, and just talking from a
5 contractor's point of view, you know, you can get
6 wrapped up in lots of different specifications
7 working in the exact same area depending on who
8 you are working for, and that just adds to the
9 level of potential error in my mind.

10 MR. EDWING: Right, but that's for
11 your application and, as I said, I think there's
12 many other applications that rely on these
13 different datums.

14 CHAIR HANSON: All right. Well, thank
15 you. And, Ed Kelly, Sean Duff, and he has been
16 listening in on the Datum 101, has challenged you
17 to a quiz.

18 (Laughter)

19 RDML SMITH: In this apparent pause
20 while we are shifting panels perhaps we could go
21 around the room and if there is anybody that is
22 here today for the first time could you please

1 introduce yourselves.

2 MR. COLE: Hi, my name is Eric Cole.
3 I work for Woolpert, and I am our project
4 manager, and we have a NOAA Geospatial Services
5 contract.

6 RDML SMITH: Great, welcome. I think
7 we probably need a mic. Thanks, Erica.

8 MR. REESE: Hi, I'm Tom Reese. I am
9 with a local survey firm called Substructure. I
10 am here representing the company and getting a
11 little more information about the future trends.

12 RDML SMITH: Hi, Tom, welcome.

13 MR. DONZE: Jeff Donze from Esri. I
14 have been working with NOAA for quite a while on
15 behalf of Esri.

16 RDML SMITH: Welcome, Jeff.

17 MR. DOMINIC: Good morning. Keith
18 Dominic from the National Geospatial Intelligence
19 Agency.

20 RDML SMITH: Good morning, Keith.

21 VICE CHAIR MILLER: Anybody else?

22 RDML SMITH: Alright, well, thank you

1 very much, and welcome.

2 CHAIR HANSON: Okay. For our next
3 panel we have several short updates on ongoing
4 topics and updates by HSRP members, and I'm going
5 to let the panelists introduce themselves. You
6 don't mind, Ashley, starting off, please.

7 MS. CHAPPELL: That's okay, shall I
8 start?

9 CHAIR HANSON: Thanks.

10 MS. CHAPPELL: I am Ashley Chappell,
11 NOAA's Integrated Ocean and Coastal Mapping
12 Coordinator and I will be talking about the 3D
13 Nation Study.

14 Captain Brennan will be covering
15 external source data this morning and Dave Maune
16 is going to come in with sort of real world
17 example of an elevation study that he has done in
18 Florida. I think I'm up first, is that right?

19 (Off-microphone comment)

20 MS. CHAPPELL: Hang on. Okay. So
21 Lynne has instructed us to be very short, so
22 we're going to fly through. Turn it on. Okay,

1 are we all set?

2 PARTICIPANT: We're good.

3 MS. CHAPPELL: All right, thanks.

4 Sorry about that. One of the things that my
5 team, both inside of NOAA and at the interagency
6 level, my integrated ocean and coastal mapping
7 partners, have been working on is a 3D Nation
8 Requirements and Benefits Study.

9 And one of the reasons we are working
10 on this is because of a study that was actually
11 conducted really in 2011/2012 and produced in
12 2013, the National Enhanced Elevation Assessment,
13 the NEEA.

14 I think that I have briefly mentioned
15 this to the group before, maybe in Cleveland I
16 think we talked about it briefly as we were
17 embarking on this initial effort, but the NEEA
18 study was a really solid assessment of elevation
19 requirements for the terrestrial United States.

20 There were some coastal and
21 bathymetric questions, but I think it's fair to
22 say that the final report, and, Dave, I think

1 you'll agree, really just focused on the
2 terrestrial need for elevation data.

3 But it produced a really credible
4 assessment of the benefits of having that
5 elevation data and this kind of study is
6 something that on the ocean and coastal side my
7 interagency working group in ocean and coastal
8 mapping has long needed.

9 The NEEA study really resulted in the
10 3D Elevation Program. It's an interagency
11 program that the USGS leads that has made great
12 headway in covering the nation with very high
13 quality lidar data.

14 They are in the midst of an 8-year
15 program to acquire that data and at the same time
16 that they were thinking they needed to sort of
17 reexamine the NEEA study that originated the
18 program the coastal mapping group that I am
19 involved in was also thinking that we needed the
20 same kind of study, so we have aligned forces.

21 And what I'll give you is just a
22 little bit of background of where we all sit and

1 who we are before coming back.

2 So the 3D Elevation Program, again,
3 USGS lead, but many of the terrestrial mapping
4 agencies are involved. They took the NEEA study
5 and devolved it into sort of a plan to cover the
6 nation with terrestrial lidar.

7 And you can see, you know, obviously,
8 what's interested me from the get-go was how they
9 are funding not strictly through appropriations,
10 but through partnership efforts.

11 They've really managed to increase the
12 funding dedicated to acquiring this quality
13 elevation data, and so I have been watching that
14 and thinking we need that on the coastal side.

15 And we actually have combined efforts
16 in a number of ways. We share the same Federal
17 Geographic Data Committee theme, the 3D Elevation
18 Subcommittee.

19 Actually, Admiral Smith is a champion
20 of that team along with Mike Tischler from the
21 USGS. So you can see in this diagram that we
22 have the 3DEP working group and my interagency

1 working group on ocean and coastal mapping.

2 These are all the federal agencies
3 involved in ocean and costal mapping work,
4 obviously. We are paired together to be this 3D
5 Nation Elevation Subcommittee and we report to
6 different bodies but we are trying very hard to
7 maintain coherence as a group, and I think it's
8 working.

9 So the Interagency Working Group on
10 Ocean and Coastal Mapping, I know a lot of you
11 have seen this before, but I just wanted to
12 refresh that we are a mandated working group in
13 law in the Ocean and Coastal Mapping Integration
14 Act and we are charged with facilitating the
15 coordination of mapping activities.

16 One of the things that we have done
17 that you have also seen, I think you even
18 referenced it on Day 1, is the National Coastal
19 Mapping Strategy.

20 This was our first foray into a plan,
21 or a strategy, for all of the different agencies
22 that were interested primarily in sort of coastal

1 zone, shoreline/nearshore mapping mainly focused
2 on topo-bathymetric lidar, but it was our first
3 foray into what such a plan would be.

4 And we I think shared it with the HSRP
5 and received your comments and folded those in
6 and I thank you for those, but just as a refresh
7 you can see the four components of the plan.

8 But what I really wanted to draw your
9 attention to were the things that we said we
10 still needed to work on, not just the four
11 components but in our introduction and
12 conclusions we said we need certain pieces of
13 information in order to really move ahead.

14 One is, you know, is there a need for
15 seamless elevation data from the mountains to the
16 depths of the oceans, which is our sort of whole
17 3D Nation concept.

18 The second is how often should this
19 data be refreshed. What is the return on
20 investment of this data, particularly in the
21 ocean and coastal zone because, of course, we had
22 the 3DEP, the NEEA study, for the terrestrial

1 component, and then do we need a NEEA-like study
2 in the coastal zone and in the oceans to
3 compliment what the original NEEA had shown us.

4 And then back to working with the 3D
5 Elevation Program, they wanted to do a refresh on
6 NEEA, we wanted to do a NEEA-like study. Your
7 government at work, we, of course, combined
8 efforts rather than running two parallel studies
9 because that would be quite an imposition on our
10 study subjects.

11 And what we have done in this graphic
12 is sort of combine how our interests mesh, and
13 you can see that the interagency group on ocean
14 and coastal mapping is, you know, interested in
15 the outer continental shelf, the EEZ, all the way
16 inland, and we blend, that's deliberate, that
17 blending with the 3D Elevation Program into the
18 topography and landward elevation.

19 We have some overlap with bathymetry.
20 The USGS in particular is becoming more and more
21 interested in how to measure inland bathymetry,
22 lakes and rivers, that kind of thing, but,

1 obviously, most of the bathymetric component is
2 in the nearshore and offshore.

3 So we have embarked on a NEAA refresh.
4 We call it the 3D Nation Requirements and Benefit
5 Study. You'll hear NEAA Oceans and Coast, NEEA
6 Refresh, 3D Nation sort of interchangeably
7 depending on where you were when you first came
8 into the process.

9 The two agencies thus far that are the
10 sponsors, of course, are NOAA, Office of Coast
11 Survey, National Geodetic Survey, are our big
12 sponsors. We have some help from our Office for
13 Coastal Management. We have USGS contributing.

14 And these are the tasks, the main sort
15 of tool of this study is a survey and some of you
16 may have even taken this survey from the original
17 NEEA six or seven years ago.

18 It's quite an extensive survey. It
19 can look a little scary at first. I believe we
20 shared that with you all as well for comment, I'm
21 pretty sure we did that, and you may have a
22 chance to see it again before we finalize it.

1 That survey instrument will go out to
2 as many respondents as we can have take it. The
3 results will come in and there is a very
4 extensive sort of back and forth on assessment of
5 those raw results and validating a lot of I
6 think, and Dave can speak to this, too, as
7 Dewberry will be working on this for us, a lot of
8 interchange between, you know, once we get a
9 survey in, a lot of follow-up with the person
10 that provided the information to make sure that
11 they understood the questions, that we got the
12 answers that we need, because the big thing is to
13 really hone in on the benefits, the benefits to
14 the user and the extended benefits that we want
15 to calculate.

16 So next steps, we are going to be
17 building on the lessons learned from in the
18 original NEAA. Fortunately we have Dave's recent
19 lidar study in Florida which incorporated
20 bathymetric questions, very timely as we learned
21 about some challenges that we hope to overcome
22 with our questionnaire.

1 The study goes out not just to federal
2 agencies but to States academia industry. We
3 really need a very broad net of folks to take the
4 survey.

5 We'll finish up in FY 18 getting to
6 the funding to get to the last stages of the
7 report. And, of course, your input is always
8 welcome helping us to identify actual
9 participants.

10 We have, obviously, have identified to
11 this stage we have identified associations and
12 groups and, you know, the kinds of participants
13 that we'd like but we need to get down to the
14 actual name and contact information for people
15 who are willing to take it, help us to encourage
16 that participation, take the survey yourselves,
17 and once it's done we really think that this kind
18 of valuation, this requirements of benefits, my
19 hope is that it will have the same sort of impact
20 and justification for more acquisition of
21 elevation data that the original NEEA has had
22 from the 3D Elevation Program so that we are

1 encouraged to do even more work and more
2 coordination, collaboration on acquiring that
3 data.

4 That was as quick as I could make it.
5 I hope it was clear.

6 VICE CHAIR MILLER: I spoke with
7 Ashley about this before, that survey is 40 pages
8 long and I took a look at it and thought even
9 though I am a survey professional I can't answer
10 most of these questions.

11 And I would suggest that you might
12 have sort of a pre-survey, maybe a couple pages
13 to identify the people who really can drill down
14 into this because, you know, I honestly -- I
15 found it pretty daunting.

16 And I am not working full-time, so I
17 could have the time to fill it out. People that
18 are working full-time I don't know how many
19 people are going to spend, or, you know, take a
20 40-page survey. That's my comment.

21 MEMBER MAUNE: Well, a lot of that
22 appears to be a 40-page survey because it directs

1 you to the next question depending on what your
2 prior question was, and so you're not going to
3 see all those 40 pages of questions.

4 If you say I am a State you go to
5 State questions, if I'm a county you go to county
6 questions, if you're federal -- so there is a
7 whole lot of that 40 pages you won't ever see
8 because it directs you --

9 VICE CHAIR MILLER: It's an online
10 survey then?

11 MEMBER MAUNE: Yes.

12 VICE CHAIR MILLER: Okay.

13 MEMBER MAUNE: Plus it is very
14 important for us to identify the correct
15 stakeholders, and that's where all of you could
16 be involved in helping us identify the people who
17 could best represent the interest groups that you
18 might represent, recreational voters, for
19 example.

20 That's when I was saying the
21 questionnaire is so simple. It does require
22 people that understand what they need this data

1 for and what the benefits are.

2 There is a difference between people
3 that use the data and those that can develop a
4 business case for what will the benefits be to me
5 if I get what I ask for. A user and a
6 stakeholder is a different person.

7 MS. CHAPPELL: And I think Dave can
8 speak well to the challenges that he encountered
9 with the Florida study that he'll talk about now.

10 MEMBER MAUNE: Okay. Do you want to
11 switch the slides to mine, and I'll take that
12 clicker.

13 Thank you. I've got a lot of material
14 here to cover in a short period of time, so I'm
15 going to move on.

16 Going back to the goals of the Florida
17 study, were to identify the business use,
18 requirements, and benefits for not just topo
19 lidar but for bathymetric lidar as well to
20 determine the implementation scenarios that the
21 State might use to get the highest net benefits,
22 and to identify potential funding partnerships

1 for acquiring what amounts to \$51 million over a
2 three to five year cycle for doing this for the
3 State.

4 We also assume that we wanted to
5 update the NEEA study and we wanted this project
6 to serve as a pilot for the study that Ashley was
7 just telling us about.

8 Going back to the NEEA study, when we
9 looked at what the requirements and benefits were
10 we had five quality levels. They are color coded
11 from gold there down to gray, Quality Level 1
12 through 5, and we had five update frequencies.

13 So there is the potential of 25
14 different combinations of quality and update
15 frequency there. And if you look at Florida
16 there the feds came up with saying they would
17 need Quality Level 2 updated every six to ten
18 years.

19 Then when we look at the local, what
20 the State came up with, it would have been a
21 Quality Level 5 IFSAR updated every greater than
22 a 10-year period, quite a difference there.

1 And if you look at the non-government
2 agencies that we queried that came up with
3 Quality Level 5 and a little bit of lidar there
4 and Quality Level 1 through 3 are lidar, Quality
5 Level 4 is photogrammetry, Quality Level 5 is
6 IFSAR, with different update frequencies.

7 But then when we combined them all
8 this is what we got and I am going to summarize
9 in this next slide here.

10 If you were to take the feds alone the
11 net benefits would have been \$128 million there,
12 a benefit cost ratio of 2.031, States, a
13 different number, non-government organizations,
14 such as the Nature Conservancy, another percent.

15 The subtotal would have been there as
16 yellow, but when you combine these things you get
17 the synergy of a combined program between all of
18 the above and you get the annual net benefits
19 there of \$795 million and with the benefit cost
20 ratio of 4.7.

21 And with a Quality Level 2 updated
22 every six to ten years that is what came out to

1 be the 3D Elevation Program that is our national
2 standard, and so synergy is at work here.

3 In all three user groups, this is what
4 I've just told you. I've got some words here
5 that say what I just said here.

6 All the statistics in green are better
7 than the statistics in yellow, so that's synergy
8 at work.

9 We identified 30 different business
10 uses and we tried to consolidate benefits into
11 one of these 30 business uses and we had users
12 define their mission-critical activities in their
13 own words and then we say which of these business
14 uses do your words fit best into.

15 This was the current status of
16 topographic lidar in Florida and this was the
17 area that we were considering bathymetric lidar
18 for because we felt that for the majority of the
19 streams in Alaska the waters were too turbid for
20 the bathymetric lidar to work, but we know there
21 are some selected examples where you can see
22 quite nicely into springs and things.

1 The questionnaire boiled down to these
2 kinds of things, user information, what are your
3 topo quality level requirements and update
4 frequencies, what are your bathy, what are the
5 annual dollar benefits.

6 Those questions, four, five, and six,
7 are the gist of what the questionnaire is all
8 about and then we had other questions to clarify
9 uses and how you want to integrate your data and
10 stuff like that.

11 So some of that may tie up those pages
12 that Joyce was talking about and say do we really
13 need some of those other ones because Questions
14 4, 5, and 6 are the most critical.

15 Questions 7 through 9, those
16 categories of questions are the ones that you
17 might say, well, do I really need to give greater
18 information there.

19 And we needed to have a split between
20 the benefits from topo lidar and bathy lidar and
21 that has a bearing on how this 3D Nation study is
22 going to go.

1 Here are some metrics. We had pre-
2 invited 190 people to participate, in the end
3 only 78 of them provided input. They gave us 97
4 mission-critical activities, and you can that 64
5 of those gave us topographic lidar benefits, 48
6 bathy.

7 There is some summary there on the
8 range of dollar benefits if people got what they
9 asked for, and then if you didn't get what you
10 asked for it ended up being those numbers in red
11 there, because we cannot give everybody the
12 highest quality level updated annually, we just
13 can't afford it, it doesn't work out that way.

14 These were the three lidar quality
15 levels that arrived. Between the NEEA study and
16 now we have added a Quality Level 0 lidar, so the
17 national standard is QL2 or better.

18 And so USGS now has specifications for
19 QL0, QL1, and QL2, and that's what it means in
20 terms of point density and accuracy, and then we
21 had what would be reduced value multipliers if
22 you don't get what you ask for.

1 That's some of the main points on how
2 to do a cost benefit analysis. What's the
3 reduced value to you if you do not get what you
4 ask for, because I told you we might have 25
5 implementation scenarios, not all of them are the
6 highest quality updated annually.

7 Reduced value multipliers there, we
8 have if you asked for one and you get something
9 else we have some reduced values there and that
10 becomes an interesting fact on how that works.

11 Here is how the update frequency
12 multiplier of 0.5 works. If you get what you ask
13 for, it's a \$100,000 benefit if you stayed you'd
14 get \$100,000, but if you got one update frequency
15 lower it drops to \$50,000, two update frequencies
16 lower it drops \$25,000, and that sort of thing.
17 So that's the idea of how reduced value
18 multipliers work.

19 In the final analyses topographic
20 lidar ended up with 15 possible scenarios there
21 and the one that gave the highest net benefits
22 was Quality Level 1 updated every two to three

1 years and that has a benefit cost ratio of 3.71
2 and net benefits of \$21.5 million per year.

3 So we came up with some final
4 conclusions on what are the benefits, what's the
5 cost, what's the ratios, what's it going to cost
6 to you.

7 And then if anybody wants Quality
8 Level 0, and there were some people that said
9 they needed Quality Level 0, they are shown here
10 with darker colors, they are free to buy up to
11 Quality Level 0 if they pay the cost difference
12 between what Florida is planning on getting as
13 the Statewide standard of Quality Level 1.

14 So the national standard is Quality
15 Level 2, Florida's new standard is Quality Level
16 1, but if you want to buy up to Quality Level 0,
17 as Leon County and some others specified there,
18 they would pay the difference between that and
19 what the State would otherwise fund.

20 When we looked at the -- Oh, this
21 shows what different people, what their benefits
22 would be, and what they asked for differently.

1 Okay. Bathymetric lidar, we had five
2 bathy quality levels there, which was very
3 interesting because it turns out that Quality
4 Level 0 and Quality Level 2 are very similar and
5 Quality Level 1 is similar to Quality Level 3, so
6 that complicated things for us a little bit but
7 that's how it worked out.

8 That's the rules on the guidance we
9 gave on the different quality levels of bathy
10 lidar and I've got -- This takes too long for me
11 to explain, the cost differences there.

12 That, the Quality Level 0(b) and
13 Quality Level 1(b) gives you IHO Special Order
14 standard, and this is the reduced value
15 multipliers we had on if you asked for one
16 thinking you got a lesser quality level how your
17 benefits would be reduced by these reduced value
18 multipliers.

19 We ended up having a near tie between
20 Quality Level 0(b) and Quality Level 2(b).
21 Quality Level 2(b) came out slightly better than
22 Quality Level 0(b), but we said since Quality

1 Level 0(b) satisfied that IHO Special Order
2 standard we are going to recommend Quality Level
3 0(b) as the highest quality bathy Statewide.

4 So the State came up with Quality
5 Level 0(b) topo bathy lidar as the Statewide
6 standard. Those statistics summarize the annual
7 benefits and annual cost and we came up with a
8 dollar that we are going to have to come up with,
9 for example, if executed as a 5-year program the
10 annual cost would be \$6.2 million for the bathy
11 lidar.

12 Okay, my final slide here is inland
13 bathy. We had difficulty there because a lot of
14 people said they needed bathymetric data inland,
15 but we felt that in the majority of cases the
16 bathymetric lidar would not work because the
17 waters were too turbid.

18 So we still need to address what we
19 are going to do there and here we might have to
20 say if it works bathy lidar, if it doesn't work
21 you're going to have to have sonar or some other
22 solution to the problem.

1 So that sort of summarizes the Florida
2 study as quick as I can. Any questions? This is
3 summarizing a 1-hour briefing down to ten
4 minutes. Any questions?

5 (No audible response)

6 MEMBER MAUNE: It's very timely now
7 that Florida got clobbered because we came up
8 with funding and implementation plans saying that
9 all of the South Florida Water Management
10 District needs to be mapped in its entirety in
11 year one, two other water management districts in
12 year two, and two other water management
13 districts they have a total of five in year
14 three, and then repeat the cycle going over and
15 over again because things are changing and their
16 elevation is very critical and it's very
17 important.

18 The reason they chose Quality Level 1
19 over Quality Level 2 as their standard is because
20 Quality Level 1 has much higher point density and
21 the higher point density is very important for
22 trying to see through mangrove and sawgrass and

1 some of the dense vegetation they have.

2 So that's the primary reason why
3 Florida chose Quality Level 1 as their standard
4 compared to Quality Level 2 nationwide. Yes?

5 MEMBER SAADE: The presentation from
6 Juliana yesterday of the long survey along the
7 Florida Keys, does that one tie into this or does
8 that quality, does that meet the quality
9 standards that were recommended?

10 MEMBER MAUNE: I believe it does. I
11 believe it does, but I personally don't know, Ed,
12 and Florida is going to have to work out how they
13 work with JALBTCX and different people in NOAA on
14 acquiring bathy lidar.

15 That's beyond what my study did, how
16 you pull the logistics on who is doing what.
17 It's just that they are trying to pull together
18 the funding to help make it happen on that cycle.

19 And, of course, they have to get the
20 legislative support to budget this whole thing.
21 They are laying out this as a business case to
22 try to get the funding to make it happen but they

1 don't have that funding yet.

2 They have yet to make that case
3 because this study was just completed at the end
4 of June.

5 MEMBER SAADE: I just want to make a
6 comment, it seems like an incredibly timely
7 dataset for change detection. I mean you're not
8 going to get much better than the timing on that
9 one.

10 MEMBER MAUNE: Absolutely.

11 CHAIR HANSON: Okay, thank you. Rick,
12 Captain Brennan.

13 CAPT BRENNAN: So at the last HSRP we
14 were asked for a briefing on our external source
15 data efforts and there was some concern that this
16 was something that we perhaps maybe hadn't been
17 doing enough of, and so I am hoping that I can
18 talk a little bit about what we have been doing.

19 And so this is going back to 2003 and
20 you'll see that there is a fairly large hump
21 there between 2003 and 2011. I think the Admiral
22 can take responsibility for a large portion of

1 that hump as harvesting Joyce's data from Hawaii.

2 So I know that was the stuff that the
3 Admiral began to process at the Atlantic
4 Hydrographic Branch while he was there and I
5 certainly finished it up and in 2011 was about
6 the time that we finished those Northwest
7 Hawaiian Island surveys and then we started going
8 out and looking for other ones.

9 In that time there were other surveys,
10 and I'll talk about those in a little bit, but
11 you can see this year we are actually poised to
12 get 35 percent of our surveys processed are from
13 external source data.

14 So, you know, I think we've -- It's a
15 bit of a bumpy record, but I mean I think we've
16 been getting it. A large part of that is the
17 discovery effort, which I think that there has
18 been a lot of thought that that's just something
19 we should do, but really to do data discovery is
20 a solid, full-time effort.

21 It is a certain skillset and it's not
22 something that you can do as a collateral duty,

1 that's my personal opinion. So over this time
2 we've had 258 outside source or external source
3 data surveys.

4 That's 18,000 square nautical miles
5 within the EEZ and then 683,000 just in global
6 ocean total, so the total of 700,000 square
7 nautical miles.

8 So this is the breakdown of where
9 those surveys have come from. So 13 from
10 academia, and I think probably a large portion, I
11 don't have the breakout of which ones came from
12 UNH, but I know we get a large number of those
13 from UNH every time they do a summer hydro class,
14 and I'll show that, but if you look we get a
15 large number of those from the Navy.

16 And so both of those humps, there was
17 a big slug that we got from the Navy and
18 processed those through. We did have a number of
19 JALBTCX and the number of JALBTCX surveys that we
20 are processing through now is going up.

21 We've got a large number of those that
22 we're processing along the east coast. But then

1 the other one which I think is certainly
2 interesting are the ones that are within NOAA and
3 not part of Coast Survey.

4 So not within our hydrographic
5 specifically, but done for habitat or other
6 mapping. And so we've had a very long and I
7 think very prosperous relationship with NCCOS
8 within NOS but doing mapping for habitat.

9 And Tim Battista gets a lot of credit
10 for that because he has been very good about
11 mapping to our standards, providing the same
12 deliverables that we require, and when he gets
13 done he provides us those surveys, and to scratch
14 his back we provide expertise, so we'll send out
15 RPSes on those cruises to acquire that data and
16 help him acquire that data and make sure it meets
17 our needs, and so there is a large number of
18 those in there.

19 And so this is just a quick, some
20 quick visuals on that so you can see the very
21 narrow polygons. It's not the greatest picture,
22 but those are the ones that Joyce and Scott had

1 done in the Northwest Hawaiian Islands.

2 The bottom are the ones that are
3 mostly, the purple ones are mostly the ones that
4 are done by Tim Battista. This just shows, well,
5 this shows Puerto Rico and the Virgin Islands,
6 which is where a lot of his area is just for
7 coral mapping.

8 These are the UNH surveys that have
9 been conducted that we've processed through.
10 There is a large repository of the extended
11 continental shelf that we have brought in already
12 and that we continue to bring in.

13 We are currently working on the Arctic
14 right now, and so -- Oh, and there are some State
15 surveys as well. Three minutes to spare, Lynne.
16 Here we go.

17 (Laughter)

18 CHAIR HANSON: Questions?

19 RDML SMITH: I have a question, Rick.
20 So that's a substantial accomplishment,
21 particularly in the last year, but data doesn't
22 get on the chart for free.

1 About what level of effort would you
2 say between the discovery and, you know, various
3 translations, conversions, documentation, you
4 know, processing and cartography would you say is
5 associated with that 32 percent?

6 CAPT BRENNAN: There is not a single
7 answer. I am sure that is a loaded question from
8 the Admiral. I mean he knows as well as I do,
9 but it is a -- yes, I mean I think it depends,
10 right?

11 You know, Joyce's surveys were
12 beautiful. I'm not saying that just because it's
13 Joyce, but I mean, you know, to be fair, right, I
14 mean her and Scott had been, you know, surveying
15 for NOAA for 15, 20 years before they embarked on
16 that endeavor so they knew what the deliverables
17 needed to look like and they required very little
18 effort on our part.

19 That's not always the case. And so
20 not all surveys that we get in the door are
21 created equal, and so some of them take a lot of
22 effort.

1 I mean we had some data that we knew
2 was very high value that was acquired by JALBTCX,
3 it was of Chatham, Massachusetts, showed a breach
4 in the shoreline, so there was a whole new inlet
5 where there was land before and there was no --
6 but it was all on the ellipsoid, now that you all
7 know what datums are, it was all relative to the
8 ellipsoid.

9 And so we had no -- At that time we
10 had no datum transformation so we had to go
11 through, process that through, get it down to the
12 ellipsoid, and then since it went offshore
13 significantly we had to do some tide lines.

14 So the Admiral, who was then at that
15 point CO on the TJ, went out and ran tide lines
16 to confirm that we did our datum transformation
17 correctly, particularly on the offshore, because
18 I think we had a single-point datum
19 transformation at the Chatham tide gauge.

20 So we knew that it was a little bit
21 squirrely, but the value of that data, to be
22 able to get that inlet on the chart, you know, in

1 a place where we knew that there was a major
2 chart discrepancy was very significant.

3 And so there was a lot of extra
4 processing that we had to do for that data but
5 the value was there as well.

6 MS. CHAPPELL: I'll just add that the
7 data may not actually make it to the chart but it
8 has value and reconnaissance or other uses for
9 Coast Survey certainly.

10 VICE CHAIR MILLER: I have one
11 question.

12 CAPT BRENNAN: You can pay me later by
13 the way.

14 VICE CHAIR MILLER: Yes, thank you.
15 Can I get a copy of that one slide, please?

16 CAPT BRENNAN: You can have all of
17 them, Joyce.

18 MEMBER MUANE: I saw some of that
19 bathy lidar data, Puerto Rico, and we were seeing
20 these globs in the water and wondered what they
21 were. We drew cross-sections through them and
22 you could see the fins. We didn't know if they

1 were sharks or dolphins but you could tell that
2 they had fins on them and that's pretty good for
3 bathy lidar, the most expensive fish-finder in
4 the world.

5 MEMBER SHINGLEDECKER: I'm going to
6 ask a question that I hesitate to ask but in the
7 list of very impressive -- really excited about
8 seeing that -- in the list of where the data is
9 coming from, Army Corp. is not there anywhere.
10 Are they in the "other?" What's the hope. I
11 know that there's huge -- still huge issues. I
12 know that there's been tremendous progress.

13 CAPT BRENNAN: Well, so that's a good
14 point to clarify. I mean so we don't -- I mean
15 we consider their data authoritative within the
16 channel. So that is their data. So that comes
17 in and goes straight to the charts; it bypasses
18 us. So because that is, you know, in the federal
19 channels, when data they acquire there is
20 considered authoritative, it -- we're not
21 counting it against that. And that's why you
22 don't see the Corp. of Engineers on that list.

1 MS. CHAPPELL: Yes. We already had a
2 very well-established process for bringing that
3 data in and we didn't want to, you know, disrupt
4 everything that has been built up over the years
5 for bringing in that data. So the external
6 source data definition kind of puts them as the
7 authoritative source of their data and separate
8 from the ESD process.

9 MEMBER BRIGHAM: I noticed two cruises
10 by the Coast Guard, maybe the Healy perhaps. I'm
11 just interested in the long-term. I mean it is a
12 huge fleet that the Coast Guard has, particularly
13 the buoy tenders. I mean it's everywhere in the
14 coastal areas and just in the decade ahead how we
15 can integrate better that operation with kind of
16 autonomous vehicles or better systems on the
17 Coast Guard vessels. The icebreaker is going to
18 -- the new icebreakers are going to be world
19 class survey vessel from a standpoint of where
20 they go and what they do. But I just think for
21 economy of scale and just for a contribution of
22 the Coast Guard in this arena, not to replace at

1 all any of the missions or authority of the NOAA,
2 it just seems like an opportunity as the Coast
3 Guard plans its new buoy tender fleet.

4 CAPT BRENNAN: Did you want to
5 respond, sir?

6 PARTICIPANT: Well, I get -- you know
7 --

8 CAPT BRENNAN: So certainly we've had
9 a number of buoy tender crews, particularly the
10 Spar out of Kodiak and our hydro training classes
11 and we've had our crew on board them. The
12 Hickory is another. We've had a number of them
13 that we've participated in and so where
14 outfitted, they've been able to provide valuable
15 data and as you pointed out, certainly the
16 vessels transiting to and from the Arctic helped
17 us, particularly the Healy helped us map the PARS
18 route, you know, going up and back in to the
19 Arctic so.

20 MEMBER BRIGHAM: Training the Coast
21 Guard personnel is a component to this.

22 RDML SMITH: Yes. Maybe I can add

1 something there and this is not directly on this,
2 but I think it's important to note that surveying
3 is more than putting a sounder on and driving
4 around in the ocean. You know, if you look at
5 the screen, you're never going to get a product
6 like that out of a few random lines following the
7 same track in and out of a port. And so while we
8 can -- while there is value from random track
9 lines like that, we're concentrating our external
10 source data efforts now on calibrated systems
11 from trained observers, you know, from other
12 applications first because that's going to have
13 the highest value. All those other things are
14 really valuable for sort of reconnaissance,
15 comparison, that sort of thing, as Ashley said.
16 But it's very hard to get it to add up to
17 something like this. It would take an enormous
18 number of systems and a whole lot of work.

19 So without discounting that, you know,
20 I assume the Coast Guard already has a job and
21 driving back and forth in a little tight pattern
22 is not one of them. And so there's some value

1 there but we just need to temper expectations for
2 whether we can replace real survey efforts with,
3 you know, happenstance lines of opportunity.

4 VICE CHAIR MILLER: In fact, in Hawaii
5 where, you know, Honolulu is the main port, after
6 a while, I told people to turn off their
7 echosounders going in and out because you're
8 starting out, you don't have a sound velocity
9 profile in, nobody's paying attention to the
10 system because they're tying down gear and it
11 took much more effort to get rid of that data
12 that -- and the synthesis because the philosophy
13 of the person that was doing it was just take all
14 data and dump it in and that's not what you want
15 for a chart, that's for sure. So, you know,
16 there is value but it's limited I would say.

17 MEMBER BRIGHAM: Just to add, I mean,
18 and just looking for all kinds of opportunities,
19 if 4.7 percent of Alaska's charter to modern
20 standards, we really have to think out of the box
21 and different opportunities; and maybe it's the
22 contract world, maybe it isn't synergism with

1 other -- with the Coast Guard or whatever except
2 for maybe the ice break, I think, is a special
3 machine. Just, you know, I -- just thinking out
4 of the box. That's all.

5 CHAIR HANSON: Okay, thanks. Go
6 ahead, Carol.

7 MEMBER LOCKHART: I guess now that
8 we've tempered expectations, I think Lawson does
9 bring up a good point. He mentions, you know,
10 with the advent of autonomous systems, if that
11 would help and I think the key word there is
12 "system," not "vessel" or "vehicle." I think it
13 may be a little ways in the future but the
14 thought of being able to have an autonomous kit,
15 not necessarily a boat going out by itself but
16 even something you'd strap on an existing vehicle
17 that could be calibrated in the lab and could do
18 all the things you need to do, collecting things
19 remotely like sound velocity could -- you could
20 work on that would be able to collect some more
21 calibrated data as opposed to just running an
22 echosounder or fishliner that in the future could

1 be useful. I don't think we're there yet but I
2 think there is some hope in that.

3 RDML SMITH: Yes. And I'm sorry I
4 made it sound like it had such a negative
5 sounding response to that, but it -- and I think
6 Andy's going to tell us now about a very
7 proactive effort we have to make that -- to
8 maximize the value for -- from exactly that type
9 of effort. But in the grand scheme of things, I
10 like to just temper that expectation there
11 because pretty soon people say, well, you don't
12 need real ships; you already have Coast Guard
13 ships, and they drive around doing buoys and
14 they're mapping as they go. It just doesn't add
15 up but please, Andy.

16 CAPT ARMSTRONG: Thank you. I think
17 that's important context here. So one of our 60
18 research projects -- and when I flashed that
19 table up the other day real quick -- is a project
20 for a trusted system and just the kind of system
21 that Carol's talking about. And so some of our
22 research faculty are working on a system that

1 includes an echosounder and a GPS and a data
2 processing concept that is initially intended for
3 mega-yachts but also has a potential application
4 in Coast Guard cutters, I think. And the idea
5 would be that the system can be trusted at a
6 certain level of quality and then behind that is
7 a data analysis system that deals with issues
8 like water levels and sound speed in a coherent
9 way. So that is a bit out in the future but we
10 are working on that and I think there's real
11 potential there.

12 CHAIR HANSON: Okay. Great dialogue
13 and that's what we're here for so appreciate all
14 that, me and Lawson as well. So we need to take
15 -- you go ahead and tell us.

16 MS. MERSFELDER-LEWIS: I think we are
17 actually going to skip the break and you guys can
18 -- we're going to just change the panel. Please
19 take water, coffee, cookies as you'd like, but we
20 want to give enough time to the Arctic Session,
21 and we're going to skip the break.

22 (Pause.)

1 CHAIR HANSON: Whenever you're ready,
2 Lawson.

3 MEMBER BRIGHAM: Yes. Mr. Chairman,
4 you might introduce the Senator's staff who's
5 here, Travis Kennedy. Travis? Or I can
6 introduce Travis Kennedy from --

7 (Simultaneous speaking.)

8 CHAIR HANSON: -- good -- from Angus
9 King's shop. Are you in Portland?

10 MR. KENNEDY: I'm in Portland, yes.

11 MEMBER BRIGHAM: Yes. Sure, I think
12 we've met in the past. Yes, great to have you
13 here and great to have the message. So we have
14 an -- to give a little bit of profile, at my last
15 meeting on the HSRP of the Arctic, just to keep
16 some momentum going, we have, of course, Andy
17 Armstrong -- Captain Armstrong talked to us about
18 national interests in Article 76 and surveying
19 the Arctic Ocean and Keith Dominic from NGA and
20 their maritime geospatial program, I'll call it -
21 - it has a longer title -- and so we have some
22 expertise here, and do appreciate, first, that

1 the Senator has some words for us about the
2 Arctic.

3 And if you want to roll it, please.
4 I've watched the Senator speak about Arctic and
5 Iceland and other places.

6 MR. KING: First, I want to thank
7 Admiral Shep Smith and NOAA for inviting me to
8 join you today to set the stage a bit for your
9 discussions about the Arctic. At the beginning,
10 here's an interesting way to think about what's
11 going on in the Arctic today. It's as if mankind
12 was suddenly discovering the Mediterranean Sea, a
13 large body of water, lots of neighbors and
14 countries on all sides, lots of potential for use
15 and utilization, lots of potential for conflict.

16 This is a body of water that
17 essentially has been unavailable to any of us for
18 all of human history. Now, suddenly, it's
19 opening up. That creates a whole host of issues,
20 challenges, and opportunities, and I'm really
21 glad to be able to talk to people from the
22 scientific communities because the scientific

1 questions will largely guide our policy decisions
2 and how we utilize and use this new resource
3 available to all of us. There are enormous
4 questions starting with just charts, what's the
5 bottom like, what are the depths, how do we know
6 how to navigate through this part of the world
7 that has never really been full charted before.

8 Of course, another issue is ice and
9 icebreakers. The United States is woefully
10 inadequate in terms of icebreakers. We have
11 essentially 1-1/2 heavy icebreakers. They aren't
12 really adequate to what we need. There's been a
13 proposal for an additional one but as I did the
14 math, the additional one is really a replacement
15 for the current icebreaker and so we aren't
16 really gaining anything. As all of you know,
17 there -- the Russians have something -- I've
18 heard estimates ranging from 17 to 40. I'm not
19 sure what the number is but it's a lot more than
20 one. And the icebreaker is the basic piece of
21 infrastructure for the Arctic Ocean.

22 Now I don't think we ought to get

1 overly enthusiastic about trade through the
2 Arctic Ocean, at least not for a while. It's
3 going to come. If current trends continue,
4 there's no doubt that the transit through the
5 Arctic Ocean, which is shorter considerably from
6 Asia to Europe and Asia to the East Coast of the
7 United States, is going to become a major trade
8 route. That may not be, however, for 10, 20 or
9 perhaps 30 years. It's always going to be
10 seasonal to some extent and also a question of
11 where the ice is, where the icebreakers are.

12 But even in that, we need to be
13 thinking ahead. We need to be thinking about how
14 to take advantage of this resource, how to be
15 ready when the trade occurs.

16 Why is a Senator from Maine interested
17 in this issue? Well, something happened last
18 summer that'll give you the answer. The first
19 cruise ship, the Crystal Serenity, went through
20 what I call the Northwest Passage, through the
21 Arctic Ocean, from west to east and, lo and
22 behold, the first port of call in the United

1 States was in Maine for that ship. That's what
2 we see as the future, particularly for trade, for
3 carrying commerce through that area, not
4 necessarily cruise ships although I suspect that
5 will happen but more goods flowing. And Maine is
6 the first set of ports that a ship from Asia
7 would reach on the East Coast of the United
8 States. So we see an economic opportunity.

9 There are also many other challenges.
10 There are scientific challenges. For example, in
11 terms of oil and gas, are there -- is there oil
12 and gas resources up there? Almost certainly,
13 yes. We know that. How will they be utilized
14 and used? Will we have to talk about additional
15 protections and precautions given the special
16 nature, the cold weather, the ice, the snow, in
17 terms of what happens if there's a spill or an
18 accident of some kind? Dealing with that in the
19 Arctic may and will be very different from
20 dealing with something like that in the Gulf of
21 Mexico, for example. So there are scientific
22 issues there.

1 There are also national security
2 issues in terms of our relationship to our
3 northern neighbor; in this sense, not our
4 neighbor but Canada's and Alaska's, Russia. They
5 are significantly militarizing their border on
6 the Arctic Ocean. We now know that and there's
7 no question. On the other hand, our relationship
8 with Russia through the Arctic Council and other
9 international bodies with regard to the Arctic
10 has been generally positive, has been generally
11 conflict free and clearly, we want to keep it
12 that way but we can't ignore the national
13 security implications.

14 Additionally, and this is a matter of
15 policy for the Administration and this Congress,
16 we ought to get on with a seating to the UN Law
17 of the Sea Treaty. By not doing so, the United
18 States is basically standing outside of the
19 international structure for settling maritime
20 disputes, particularly boundary disputes and
21 particularly in the area of the Arctic. There
22 are claims being made right now about where the

1 lines are, where the international boundaries
2 are, and we're not at the table. And for our
3 country to not participate in that process is
4 just, to me, a self-inflicted harm that makes no
5 sense from a public policy point of view.

6 Over the last two or three years,
7 we've -- I'm on the Armed Services and
8 Intelligence Committee -- we've had a number of
9 military and national security officials appear
10 before the committee. Generally, either I or
11 Senator Sullivan from Alaska asked them the
12 question, "Should we accede to the Law of the Sea
13 Treaty?" The uniform 100 percent unanimous
14 answer is "yes." And this is something that's
15 within our power and right now, we're standing
16 outside of this process and I believe it's a real
17 mistake.

18 This is an area of the world that has
19 enormous potential and we have the structures as
20 opposed to the Mediterranean Sea which saw 1,000
21 years of conflict. We have the international
22 structures like the Arctic Council and the UN to

1 try to deal with the opening up of this new very
2 valuable and important water body in a
3 constructive, conflict free cooperative way. And
4 I hope that that will be the case. This is an
5 opportunity for all the Arctic nations, for the
6 Native peoples that live around on the perimeter
7 of the Arctic Ocean, and for our country as well.
8 And I believe that it's a big part of how we
9 solve these problems will rest upon the science
10 and the work that you'll be doing in terms of
11 research, charting and those kinds of things, for
12 search and rescue, for commerce, for trade, all
13 of that is going to be the basis upon which we
14 can build, hopefully, positive and good and
15 productive policy for the future of this critical
16 region.

17 So, welcome to the conference. We're
18 delighted to have you in New England, and I look
19 forward to the results of your work and again, I
20 want to thank Shep Smith and the NOAA folks who
21 put this all together, and godspeed to what
22 you're doing. It's important, and we will

1 continue to work with you down here to try to put
2 your recommendations into action. Thanks, and
3 have a great day.

4 MEMBER BRIGHAM: Fantastic. Travis,
5 please pass to the Senator our thanks for
6 articulate and great message to kick off our
7 working group. Hopefully, we'll send a letter to
8 the Senator, I think, from our group maybe, of
9 thanks for this particular really articulate
10 expression of all of the issues that are related
11 to the United States and its interests, so thank
12 you.

13 I have two topics just to kick this
14 off. One is a study I participated on as a
15 member that's outside the Government from a think
16 tank, the Council on Foreign Relations, many of
17 you heard about, and it focused on the Arctic.
18 And I also will just touch on our working group
19 study that was out in 2015 answering questions
20 that NOAA provided to us.

21 I'll comment on that just to get some
22 closure to it but this study, which I'll give you

1 the website -- I passed out a few copies last
2 time, the motivation of the Council on Foreign
3 Relations was to have this out at the end of the
4 U.S. Chairmanship of the Arctic Council and at
5 the beginning of a new Administration so that we
6 wouldn't lose momentum, so there would be
7 something out there because we figured that the
8 Government itself probably wouldn't have an
9 Arctic study in this transition period but that
10 we had a lot of profile when the United States
11 was the Council Chair; Admiral Thad Allen, who
12 you know is a former Commandant out of the Coast
13 Guard -- I guess, and Governor Whitman from New
14 Jersey, an EPA Administrator, they were the
15 chairs, and we had about 20 members.

16 The areas -- themes that we covered
17 were expansive across policy issues, security,
18 energy, economics, people, indigenous people on
19 the coast of Alaska, and then we had some
20 additional views and dissenting. But I've quoted
21 one strong statement and the one thing that is
22 covered in this report in some depth and of

1 interest is all about this word called
2 "infrastructure and assets" and I think we
3 crafted some pretty good words and you can see
4 them there; safeguarding our strategic interest
5 is why we need this infrastructure; defending the
6 borders, obvious stuff; protecting environment
7 but also maintain our scientific and
8 technological leadership in this area.

9 We did outline a few goals and right
10 at the top is ratifying UNCLOS. I would say that
11 20 percent, maybe a third of the group were not
12 necessarily supporters of going in this
13 direction; bipartisan study group but
14 nonetheless, we argued that whether or not the
15 Senate will do anything in the next few years
16 about ratifying UNCLOS, that we needed, in this
17 report, to not only put this in the report but to
18 put it essentially the number one item. So you
19 heard the Senator speak about it. And our
20 national interests, all of our national maritime
21 interests are so intricately tied to ratifying
22 UNCLOS but for the Arctic context, of course,

1 it's more practical. It's how much of the
2 seabed, of which Captain Armstrong will talk
3 about, how much of that seabed is ours, so to
4 speak, in the extended continental shelf.

5 We did directly the icebreaker issue
6 and called for six icebreakers, whether we ever
7 get six or not but at least there's some momentum
8 to move ahead with the Icebreaker Acquisition
9 Program. But we did look at this in some depth
10 and the statement of having at least three
11 operational icebreakers in the polar regions at
12 any one time is -- means that you have
13 icebreakers at both ends of the plant, at least
14 that's what we call for.

15 Telecommunications, energy,
16 infrastructure including -- you'll see where
17 it's, if you look at the report, including
18 hydrography and charting, they're all in this
19 report and so infrastructure relates to what, the
20 economy, economic diversification we called it,
21 but economics; economics of natural resource
22 development; and sustained security presence.

1 And so all of that infrastructure, particularly
2 the marine infrastructure is directly related to
3 the security from our perspective; working with
4 the Arctic Council; building confidence measures
5 between Russia and all the Arctic states hugely
6 important to the United States and its interests
7 in the Arctic.

8 And then two more goals; this study is
9 related to mostly international affairs but we
10 had to address a whole host of domestic issues
11 and needs and one, of course, is for sustainable
12 life on the coast and our own citizens who live
13 in coastal Alaska.

14 And then finally, an important point
15 is to continue the research funding to understand
16 all of these changes in the region and their
17 impact not only on, you know, the Arctic but, of
18 course, the globe.

19 Recommendations: Again, UNCLOS, using
20 the Arctic Council for diplomacy in the Arctic.
21 The Arctic really is, other than Antarctica, the
22 most peaceful place on earth today so we try to

1 keep it that way. We did have a direct
2 recommendation for the current Administration to
3 maintain this Arctic Executive Steering Committee
4 but it's really unclear without a science advisor
5 to the President and whether that mechanism for
6 coordinating federal agencies it will be
7 continued.

8 Designate Antarctic Ambassador, not
9 sure that's going to happen but nonetheless, we
10 thought we needed that profile; again, the
11 icebreaker issue; boundary dispute in the
12 Beaufort Sea needs more attention; you can see
13 the issues; maybe a joint SAR center; also,
14 extended the Central Arctic Ocean moratorium on
15 commercial fishing, extending it beyond five
16 Arctic states but to a more global community;
17 lots of issues and challenges related to TAPS,
18 the Trans-Alaska Pipeline System; and then
19 finally, some issues related to subsistence
20 hunting, preserving that for indigenous people.

21 One of the real challenges, as you
22 know, is funding and coordinating the movement of

1 communities from the coast to inland, and that's
2 really a challenging issue in the future.

3 Not finally, but spread again
4 throughout the report, are infrastructure issues,
5 safe harbors, entrance to safe harbors, SAR
6 stations, deep water port, charting hydrography,
7 communication systems, and more satellite
8 coverage over the Arctic for telecom and, of
9 course, environmental monitoring.

10 The report can be looked at at that
11 website and I can get copies of the report and
12 pass them to you.

13 Just a few words about our internal
14 working group report which we passed out to the
15 Administrator in September of 2015 and during
16 Admiral Glang's tenure, we were -- "we," the
17 working group, were passed some specific
18 questions to try to answer. Here are some of our
19 answers back 2015 and they still, I think,
20 speaking on behalf of the working group, still
21 exist and need to be readdressed perhaps.

22 One that we, the working group, are

1 hard over on and I think most of our colleagues
2 on the HSRP agreed -- maybe NOAA wouldn't agree
3 but nonetheless, we think that the only way to
4 get the place charted, the frontier and Alaska is
5 to have a specific line item that calls for
6 hydrography and charting and all the geoid
7 environmental measurements we need. It's the
8 only way in the future is to have the line item
9 in the budget.

10 NOAA's strategy and if there is a new
11 strategy, when? This Administration works on
12 Arctic topics. That strategy should have -- the
13 highest priority should be hydrography and
14 charting as baseline framework for everything we
15 do in the marine world.

16 And then we were asked about
17 prioritizing requirements within the U.S.
18 maritime Arctic, and it was a little unclear
19 about the priority of national security but it's
20 in there, as the Senator mentioned, national
21 security issues. Clearly, it's there. Offshore
22 leases; coastal communities offshore; the North

1 slope resupply; fisheries issues; whether we have
2 an Arctic port or not; ID-ing places of refuge;
3 and then, of course, the Red Dog Mine complex is
4 its own -- has its own support needs and has been
5 well-charted in that region.

6 We were asked about survey rates and
7 there's still some question about what that
8 number should be for annual survey rate in
9 Alaska; what could be attained given the seasonal
10 constraints. And then what, as we discussed
11 already here, what are alternative strategies for
12 maybe using crowd sourcing, of course, new
13 technologies to reduce -- well, to increase the
14 charting and hydrography of Alaska. And then
15 finally, what -- again, thinking out of the box,
16 what new public-private partnerships are useful.

17 I've shown these slides several times
18 but just to remind everyone, that's a picture
19 that's 2013, looks the same today really. For
20 the operational ice-free season and for half the
21 year, still today, and likely through the
22 century, there isn't any traffic around Alaska.

1 The only place where there may be new traffic and
2 extended navigation will be to the left side
3 there -- you see Chukotka -- will be the Russians
4 extending the Northern Sea navigation season,
5 especially with L&G carriers for another month or
6 two. So we may see large ships through the ice
7 in Bering Strait on the Russian side within the
8 next year or two.

9 And then finally, just a few comments
10 about the challenges are many. Almost all of
11 these relate to infrastructure and investment.
12 This implementation of the Polar Code as a new
13 governance framework is important, but most of
14 these all require infrastructure, investment,
15 research, and then the one at the bottom is a
16 sensitive issue, only in the sense of where to
17 place this Arctic port.

18 So that's just an overview of two
19 topics, Council on Foreign Relations report that
20 has some influence around and people are looking
21 at it on the Hill and our internal work that
22 we've worked on the last couple of years. So I

1 think I'll turn it over to maybe Captain
2 Armstrong.

3 CAPT ARMSTRONG: Thank you, Lawson.

4 So I want to kind of just give you a brief
5 overview of the bathymetric mapping that's been
6 done in the Arctic as part of the extended
7 continental shelf project. As you see there,
8 it's been an extensive campaign over 14 years and
9 our goal has been to determine the U.S.
10 entitlement to continental shelf beyond 200
11 nautical miles.

12 So the Senator and Lawson both spoke
13 about Convention on the Law of the Sea, so it's
14 often called the United Nations Convention but,
15 in fact, it's a treaty convention that was
16 written at the UN. It's not technically part of
17 the UN although the UN supports the
18 infrastructure. So the U.S. is not -- they
19 signed -- we signed the Convention and we had a
20 lot to do with its drafting but it hasn't been
21 ratified yet. Much of it is considered, by the
22 U.S., to be established international law and so

1 we operate in the Arctic under some of those
2 terms. And -- but for our purposes here, there's
3 one part of it that's of import and that's
4 Article 76.

5 And Article 76 is a fairly short part
6 of the Convention and it -- in it, the
7 continental shelf of a coastal state is
8 essentially redefined from what we would view as
9 the traditional or geologic scientific
10 continental shelf. And there's a mechanism for
11 the state to identify the limits of its extended
12 continental shelf. So you often hear the word
13 "claim" but the fact of the matter is there's
14 complete agreement that every coastal state has
15 the entitlement. So Article 76 is about how you
16 define the limits of that entitlement.

17 So quickly, there are a couple of ways
18 that are defined in there. So there are two sets
19 of lines. The first one's called the formula
20 lines and those are the parts that determine the
21 extent of this continental shelf. The first is
22 what's often called the bathymetric formula, so

1 we start with the foot of the slope. The foot of
2 the slope is basically where the continental
3 slope joins with either the continental rise or
4 the flat sea floor depending on the situation,
5 and then we add 60 nautical miles. And so that
6 line is one of the ways that we can define the
7 limits.

8 The next approach is what's called the
9 gardener line or the sediment thickness line.

10 And again, we start at the foot of the
11 continental slope but this time, we're looking at
12 measuring the thickness of settlement -- of
13 sediment and so in this case, we don't use
14 bathymetry but we use seismic profiling. And
15 what we want to define is the place where the
16 thickness of the sediment is equal to one percent
17 of the distance back to the foot of the slope.
18 That's a fairly complicated thing but basically,
19 if we know the sediment and we know where the
20 foot of the slope is, we can figure out where
21 that line is.

22 We get to use the best of these two

1 cases so we can pick whether we want to use the
2 bathymetric formula or the thickness formula or a
3 combination of the two. But there are limits as
4 to how far we can go and we call these the limit
5 lines. So the first limit line is the 2,500-
6 meter contour plus 100 nautical miles. So we
7 can't go farther than these limit lines but
8 there's another kind of limit line, too, and
9 that's 350 nautical miles from the baseline.

10 So in some cases, we get a better deal
11 with 350 nautical miles; in some cases, we get a
12 better deal with 2,500 meters plus 100 nautical
13 miles. Turns out in the Arctic, we get -- we're
14 going to use a combination of those two.

15 And so then our final claim to
16 extended continental shelf is the best of those
17 formula lines but no farther than the best of the
18 limit lines.

19 Okay. So -- all right, so how do we
20 get that? And this is where we come in. So you
21 heard the foot of the slope so we have to
22 determine that with bathymetry or the 2,500-meter

1 depth contour. We need to determine that with
2 bathymetry. So this is why we're out mapping in
3 the Arctic for that, to establish those
4 locations.

5 So we've actually been doing this in
6 lots of places. The U.S. has potential
7 entitlement. I say potential because we need to
8 figure out where it might be and where it might
9 not be based on this mapping so the Joint
10 Hydrographic Center has been leading the U.S.
11 bathymetric mapping effort here in partnership
12 with Ocean Exploration, Coast Survey, and USGS
13 and, of course, all under the guidance of the
14 State Department. So we've been mapping in lots
15 of places but -- so the Arctic is where we're
16 focused on here. You can see we've spent probably
17 the most amount of time in the Arctic beginning
18 in 2003 up until our most recent cruise in 2016.
19 We think we've actually finished the bathymetric
20 mapping that we need for the Arctic.

21 Okay. So the Arctic is a bit unique
22 in that in addition to being a basin with land

1 all around it like the Mediterranean, it's also
2 pretty full of continental shelf. And so that's
3 different than most of our margins in that
4 there's really a lot of continental shelf
5 potential beyond 200 nautical miles up here. And
6 so when we start to do that, the question comes
7 of how in the world are we going to map up here.
8 This is a pretty tough place to get to. You
9 know, it's covered with ice for a significant
10 part of the year and particularly when we started
11 in 2003, it was mostly still covered with ice in
12 the summer.

13 And so what we've been using is the
14 U.S. Coast Guard Cutter Healy. It's equipped
15 with a modern multibeam echosounder with full
16 ocean depth capability. It also has what we call
17 a CHIRP sub-bottom profiler. That lets us look
18 in detail into the first 50 meters or so of the
19 sediment. The USGS has also been working up here
20 with deeper seismic profiling. And it's equipped
21 with sort of other instruments and tools that
22 dredge. You see "dredging" in here but that's

1 not Bill's kind of dredging. We're just dragging
2 a basket on the sea floor in this case.

3 So the Healy has been our mapping
4 instrument. We've gone up many years and we take
5 a science party up there, and the ship operates
6 taking us where we want to go, and we've been
7 pretty successful with this ship.

8 So when we started out, there was
9 still a lot of ice up there and we began saying,
10 well, this is pretty tough work. We're going to
11 trace along the 2,500-meter contour so you can
12 kind of see this line here. We said, well, let's
13 see if we can follow the 2,500-meter contour,
14 find that, and then we're going to go look for
15 the foot of the slope. It must be somewhere down
16 here, and it turns out that we didn't really find
17 what we were looking for here. And so we kept
18 going out and it turns out that the foot of the
19 slope is a lot farther out than we thought. And
20 so then we had to start a new series of lines
21 kind of tracing the foot of the slope. And most
22 of this was done, you know, when there was still

1 lots of ice on the surface.

2 And so we got this kind of product.

3 You can see here on some of the -- some of areas
4 are very steep slope and then the flat sea floor.

5 So we found the foot of the slope here. It was a

6 little tougher farther up but in the course of

7 doing that, we made lots of additional

8 discoveries that are particularly interesting

9 here. So we found a seamount, 11,000-foot

10 seamount in the place where the existing map

11 showed a bump of a couple hundred meters. So

12 significant finds there. Every time we go out in

13 the deep ocean and map, we find new things and

14 the Arctic was no exception.

15 We found this area of pock marks here,

16 so these are pretty big things. They're 20

17 meters deep and 200 meters in diameter. They're

18 right here on the middle of this plateau here

19 which is the Chukchi Plateau. And so the

20 implication of this is fluid seeping from the sea

21 floor, most likely gas, and so this certainly

22 indicates the potential for hydrocarbon resources

1 in this particular area.

2 We also found an area nearby with
3 these great big scour lines you see here and
4 these big sea floor bedforms, and so based on
5 this, we were able to kind of get fundamental new
6 insight on the presence of ice shelf during the
7 glacial period that really -- before this
8 evidence was uncovered, the thinking was that the
9 glacial ice sheets had not extended out into the
10 Arctic basin that far. So this was significant
11 new evidence for a change in our thinking in
12 Arctic evolution.

13 So then sort of about 2007, we went up
14 there and we began to see the ice diminishing.
15 And so you can see here that there's been a
16 steady rate of summertime ice cover diminishing
17 here. But still, I have to tell you there was a
18 lot of ice around here. But in 2007, we dropped
19 way down and it allowed us to begin to think
20 about new approach to mapping up there and then
21 again in 2012, it was similar. So as before, we
22 could only kind of try to follow on line, we --

1 now we're looking at open water in significant
2 parts of the Arctic and we can begin to do some
3 more systematic type mapping.

4 And so ultimately, we ended up with
5 pretty extensive coverage of this part of the
6 Arctic. You can see where we're actually able to
7 kind of completely map this area here and we
8 believe provide, you know, compelling evidence
9 that the foot of the slope is actually up here as
10 opposed to down here which will ultimately have
11 significant impact on where our Extended
12 Continental Shelf limits are.

13 So over this time period, we've mapped
14 129,000 square miles of the sea floor in the
15 Arctic. You can see we've got a pretty big
16 network of coverage here. This is all flat so we
17 haven't spent too much time there although we did
18 discover a new sea map right here so there's
19 possibly others along here. So that data set has
20 greatly improved our knowledge of the sea floor.
21 You can see we've also kind of mapped extensively
22 along the slope here north of the Arctic. We

1 haven't added too much to this shelf area up
2 here. The Healy's multibeam is a deep water
3 system and our mission has been continental shelf
4 break outward, so there's still lots of work to
5 do in the Arctic, but I think, you know, we've
6 made significant progress in the deeper parts.

7 So that data is not -- while it's
8 intended for extended continental shelf purposes,
9 we're -- we now have enough data that Coast
10 Survey can begin thinking about some new charts
11 in the Arctic. So there's a new plan to add
12 charts here using this data in the deep water at
13 very small scales and at maybe less small scales
14 here.

15 You'll notice sort of the odd shapes
16 of these charts. I think the electronic charting
17 world is still locked into the Mercator
18 Projection for the chart standards, and so we end
19 up with some fairly odd looking rectangles here
20 in terms of the shape of the earth here in the
21 Arctic. Hopefully -- I'm talking out of school
22 here maybe -- but hopefully, we'll begin to get

1 the electronic chart world set up to begin to use
2 more polar appropriate projections for the
3 products. That's not just a NOAA problem.
4 That's an international issue.

5 So Lawson asked me to talk a little
6 bit about some of the potential neighbors'
7 extended continental shelf claims here. So there
8 are five Arctic nations with extended continental
9 shelf potential entitlement, and so the U.S. and
10 Canada, obviously Russia has a huge piece of
11 this, Norway and Denmark. And Denmark in this
12 case acting for Greenland.

13 So because there are lots of nations
14 or there's five nations there, we've been trying
15 to work together. So as the Senator noted, we
16 have a lot of peaceful cooperation in the Arctic.
17 So we -- all the five nations meet every year to
18 share our plans and accomplishments and in most
19 cases, share data. Not all of that data is
20 shared yet but we -- and so when we say we're
21 working closely together, we really mean it here.

22 So here's the Healy in the process of

1 freeing up the Louis S. St. Laurent. In this
2 case, the Healy was the leadership and the Louis
3 was doing seismic profiling. In other areas
4 where the bathymetry was more important and there
5 was still heavy ice, we'd switch places and the
6 Louis would go in front and then the Healy could
7 map in the broken up areas. And so we did this
8 for four years. You see there 2008 to 2011.

9 So a little bit about the potential
10 overlapping claims here. You can kind of look at
11 this picture and start thinking well, the U.S. is
12 going to go out this way, Canada's going to go
13 out this way, Russia's going to go out this way,
14 Denmark's going to out this way, Norway's going
15 to come out this way, and so these continental
16 shelves extend way out, and so what happens now
17 is we're all having entitlements that overlap
18 each other's entitlement. And you often see in
19 the press, you know, some battle for the Arctic
20 or the Arctic land grab is heating up but, you
21 know, in fact, this all happens under a fairly
22 amicable approach of diplomatic interaction.

1 The Law of the Sea Convention doesn't
2 say who gets what. It doesn't describe how these
3 boundary overlaps happen. It doesn't come on a
4 first come, first serve basis so if one nation is
5 a little behind in surveying, they don't lose
6 out. And so -- but nonetheless, there is all
7 this area of overlap.

8 In 2013, Canada was -- in fact, they
9 had the truck on the way to New York with their
10 submission in the back and this news article came
11 out showing this map and the Prime Minister said,
12 "Wait a minute. The North Pole is ours." And so
13 they called the truck up and turned it around and
14 started over with their approach. You know, it's
15 -- I don't quite know how that happened but it
16 was pretty interesting and so it affected all the
17 other nations, too, who sort of had some
18 expectations about what was going to happen. So
19 Canada is finishing up their rework of their
20 submission. They'll be coming in later. It'll
21 look a little different than this. I think it'll
22 include the North Pole.

1 Russia has -- you know, they have
2 about half of the Arctic coastline and so they're
3 going to have the lion's share of the Arctic
4 Extended Continental Shelf. They put one of the
5 very first submissions in 2001. I think they
6 thought they would sort of beat the clock and get
7 in right away. The Commission on the Limits of
8 the Continental Shelf, which reviews these
9 submissions, not to approve them but to either
10 endorse the nation's idea or recommend changes,
11 rejected the Russian submission, said no, we
12 can't go along with that. It's not that you
13 might not have this entitlement but you've not
14 given us any data to support it. So since then,
15 the Russians have been busy doing a lot of
16 additional data acquisition all along the areas
17 they think are critical. So they've had their
18 icebreakers out; they've had research submarines;
19 they've had ROVs; they've taken bottom samples
20 all over, really done a lot of work and they have
21 a new submission that's since gone in that
22 actually ended up expanding a little bit on some

1 of their other submission.

2 You notice here that they've got a
3 nice sharp line there. This was the Chukchi
4 Plateau area that I talked about. Alaska's right
5 over here. So we actually have an agreement with
6 Russia that dates from the Soviet Union. They
7 have not ratified that in the Duma but as you can
8 see, except for the North Pole, they honored that
9 agreement. So we really don't have a boundary
10 issue with the Russians in the Arctic. Canadians
11 and the Danes do. Take a quick look at that.

12 So Greenland obviously has some
13 connections out into the Arctic Ocean in this
14 area, and they've claimed all the way from
15 Greenland here through the North Pole all the way
16 over to the Russian EEZ. So the point here is
17 that's actually what they view as their
18 entitlement. They actually would claim all the
19 way to our EEZ because they think they're
20 probably entitled there, but they don't have the
21 data to support that so they've simply decided,
22 for political reasons, I think, to just -- to

1 limit their proposal going this way. The U.S.
2 would be off here. Canada, of course, off here.

3 And so they have a huge overlap with
4 Russia. Russia, of course, goes well passed the
5 North Pole and then moves almost to the EEZ of
6 Denmark and Canada.

7 So ultimately, we end up with some
8 overlap here in Greenland or Denmark, Russia;
9 Norway's involved over here; again, some overlap.
10 Norway and Russia have come to an agreement. I
11 don't know that they've come to an agreement with
12 Iceland yet. This line here is agreed between
13 Russia and the U.S. but the U.S. and Canada have
14 significant overlapping entitlements and, in
15 fact, we haven't even agreed on the EEZ in this
16 area so you can see this area right here where
17 the U.S. and Canada have not yet come to a formal
18 agreement. And certainly, then that whole
19 overlapping entitlement extends well out into the
20 Arctic Ocean for the Extended Continental Shelf.

21 Okay. So you can -- if you want, you
22 can look at all the data we've acquired up there

1 on the Joint Hydrographic Center website.

2 There's an interactive web page that's marked
3 there. You can go there and interactively zoom
4 around and look at those data sets at your will.

5 And then there are some other buttons for some
6 other data that's also been collected up there.

7 So that's available for anyone who wants to.

8 That's my report. Thank you.

9 MEMBER BRIGHAM: Thank you, Andy.

10 Just to remind everyone that most of the
11 resources that people think might be out there
12 are really under the Sovereign State Control,
13 even before Extended Continental Shelf but with
14 this Extended Continental Shelf, whatever's out
15 there, and it probably isn't a lot out there in
16 depths of 3,000-4,000 meters, like drilling
17 through the ice in Antarctica to get to
18 something, you know, through a couple miles of
19 ice, couple miles of ocean, so it is under
20 Sovereign State Control. But the symbology of
21 whoever owns the North Pole has some, you know,
22 karma value and that might be some tension there.

1 But I think the science, just limited I know,
2 going to be difficult for the Danes and Russians
3 to sort out who might own it. So it might be --
4 have utility that the North Pole might be joint,
5 I had to say "ownership," just a joint -- some
6 overview. Anyway, good. Thank you, Andy.

7 And Keith from NGA and you've also
8 done some work with IHO you might mention to us
9 as well.

10 MR. DOMINIC: Yes. So thank you for
11 giving me some time to speak. I'm going to show
12 you or talk about the IHO's Maritime Special Data
13 Infrastructure in the Arctic and also NGA's
14 Arctic data, public police data that we have on
15 our website.

16 So first, to step back to explain what
17 MSDI or Maritime Spatial Data Infrastructure
18 actually is, this is a high-level -- a quick note
19 there to show you the four pillars of what we
20 look at as SDI from -- basically, it goes to the
21 infrastructure which you heard a lot today, but
22 it's looking at the policy and governance, the

1 standards, the information systems and actually
2 the data itself and bring that all together and
3 making it available to non-traditional users.

4 That's the big advantage of the MSDI,
5 is looking at our hydrographic charts and
6 products that we have and making it available to
7 the non-standard mariners out there from
8 academics to political to whoever wants the data
9 that is available that sometime falls off the
10 charts and products that we build. So it's
11 really making more data discoverable, accessible,
12 and interoperable.

13 So this is a graphic of exactly --
14 kind of showing what I'm talking about here is
15 with taking -- possibly using the four -- using
16 the sounding point there, the sound data of 4.1
17 meters and pulling it into a database that's in
18 excess -- well, not just in a chart or a database
19 or an ENC, but making it available in a
20 centralized chart geometric database that search
21 and rescue can pull or fisheries can pull from
22 it, academia can pull from it, anybody pull from

1 it and not looking at a chart product per se but
2 they would be able to get this data and use it
3 however they want, maybe not in a navigation
4 sense but in another sense that they see more
5 beneficial. And so it's taken the data that we
6 put in our products and making it available to
7 other users.

8 And the goal would then also be for
9 the people that use it in the non-traditional
10 sense to give us data back into this database to
11 help improve the data, sometimes not. If we
12 don't have the sounding data, as the example in
13 the Arctic where we lack a lot of sounding data,
14 if there's some data they could push back into
15 this database, it would help all users as well.

16 So this is the Arctic Regional MSDI.
17 So this is kind of showing that the Hydrographic
18 Office will be pushing it to the database and
19 then it'll be pushed out to the Arctic users,
20 which is not just the traditional users but
21 again, the non-traditional users. And it flows
22 back into the Hydrographic Office as well where

1 if they have information that they see that's not
2 on our chart or in this database, the can push it
3 back to the Hydrographic Office which then we
4 would be able to validate and update our products
5 as well.

6 So where this came from is the IHO
7 obviously has 87 member states that attends their
8 assembly that happens every three years and that
9 covers the globe. So at that large scale, it's
10 hard to manage it. So the IHO is broken up into
11 regional hydrographic committees. So for this
12 presentation, we're focusing on the ARHC, which
13 is the Arctic Regional Hydrographic Commission.
14 And that's -- we'll go through slides what that
15 is but you can see all the other regional
16 commissions on there as well, and they are all
17 moving towards this Maritime Spatial Data
18 Infrastructure that we're discussing.

19 So under the Arctic Regional
20 Hydrographic Commission, you can see the member
21 states. You have Canada, Denmark, Norway,
22 Russia, United States. Those are the members.

1 And then you have associate members which is
2 Finland and Iceland.

3 So the Arctic Maritime Spatial Data
4 Infrastructure really started at the fifth
5 meeting back in October of 2015 when Denmark and
6 the United States proposed this regional
7 approach. Then the following the year, last
8 year, 2016 in October, the actual Arctic Regional
9 Maritime Spatial Data Infrastructure working
10 group -- they came up with the fancy name of
11 ARMSDIWG -- was established.

12 (Laughter.)

13 MR. DOMINIC: So if you can say that,
14 it's a bonus. So the current nations on it, you
15 can see are Canada, Denmark, Finland, Iceland,
16 Norway, and the United States. So NGA's the
17 current chair of this but we do have members with
18 the NOS on that as well. So the only member that
19 is missing is Russia right now and we are hoping
20 to get them a part of this initiative as well.

21 So once they were established last
22 year in October, they held their first meeting

1 this year back in April. And you can see the key
2 topics they discussed was the MSDI Arctic Voyage
3 Planning Guide, the pan-Arctic bathymetry and
4 they also combined their first meeting with a
5 meeting of the Arctic SDI, which focuses on topo
6 SDI, which is -- was led by -- the USGS was the
7 chair last year so they did combine their
8 meetings where they met together and then they
9 broke off to form a marine and a topo site as
10 well.

11 So one of their initiatives that they
12 want to start with is the actual Arctic Voyage
13 Planning Guide for the pan-Arctic -- for the
14 Arctic. So right now all the Hydrographic
15 Offices have their separate planning guides as
16 they sail through the Arctic. And the goal of
17 this group is to try to bring this together to
18 one location that looks similar with all the data
19 available so anybody that travels into the Arctic
20 will be able to go there no matter what nation
21 actually is -- has the hydrographic requirements
22 for it but they will go to it and get all the

1 information they need to sail through the Arctic
2 with all the information. So you can see those
3 different sites are different countries or
4 different Hydrographic Offices, their websites
5 right now. So the goal is to try to bring this
6 together and make it available to the -- more
7 publicly available.

8 So they also looked at the digital
9 bathymetry. They had access to, obviously, all
10 the bathymetry that NOAA collects but with the
11 GEBCO 2030 initiative, they decided that they
12 would not be pursuing this. There's enough
13 efforts with the bathymetry work that's going on
14 that they would just link this together and make
15 it part of the MSDI but they wouldn't be looking
16 at the -- make it really the database. It's more
17 going to be a link to it because they felt there
18 was enough initiatives already that are tackling
19 the bathymetry needs.

20 So NGA itself, knowing this was coming
21 down and also with President Obama's trip to
22 Alaska, he reached out to NGA to see what we

1 could support two years ago with public-released
2 data of the Arctic. And NGA was or is currently
3 trying to push more data available to the public
4 as well which -- so any data we have that's
5 available, our goal is to push on a public
6 website. So we took the Arctic as topic that we
7 could -- feel that we could provide a benefit to.

8 So two years ago, we established an
9 Arctic website which anybody can get to by going
10 to nga.mil. And then about in the middle of
11 nga.mil, there is a NGO Geoint Services. You
12 click on that and it'll take you to our public
13 websites. You can see there are not many of them
14 but there are three. We have wildlife tracking;
15 hurricane support, so that is supporting
16 hurricane Irene right now so you can get more
17 data from NGO on that; and then we Arctic as
18 well. Those are our three public websites that
19 are up.

20 So once you go to our Arctic website,
21 it's kind of taking the MSDI and then showing
22 what we could do with it. So what you see here

1 is the list of data sets that you can pull and
2 download and do what you want with. You can
3 also view it on a website but they're all
4 shapefiles that you can download and get the metadata
5 as well and use in any kind of product that you
6 want. So it's taking these from a traditional
7 product sense and making it available to any user
8 that wants it, that could use it in a different
9 way that we might not know how they want to do it
10 but it gives them the data that they can build
11 whatever product they want.

12 So an example of this is -- so you can
13 view it. This is going up to Barrow, Alaska and
14 looking at the port infrastructure up there. So
15 you can click on the Anchorage signs. They'll
16 tell you all the information about that port. So
17 it'll give you the latitude/longitude it; it'll
18 tell you the type or the size of the vessels. It
19 recommends it from a large scale harbor to a
20 small scale harbor.

21 Similar, with the air fields, it does
22 the same thing. It tells you about the air

1 field, how long the runway is so you can
2 determine what kind of aircraft will be able to
3 land there as well. So again, these are all
4 downloadable shapefiles that you can use and
5 they'll have all the air field support facilities
6 of the whole Arctic to pull and build products as
7 you see fit.

8 So when President Obama did travel to
9 Alaska, we built this map or this chart for him
10 to take up there. And this is pulling all that
11 data set you saw in the previous slide into one
12 quick viewable map. This is also downloadable on
13 our website and we getting ready to start a new
14 edition of it because it is now two years old, so
15 we're going to update it. But you can see it has
16 in the upper left-hand corner, it has the ice as
17 it recedes; this projection looking forward; this
18 here is the oil and natural gas probability up in
19 the Arctic; and down here is your search and
20 rescues, who's responsible for search and rescue
21 areas.

22 The upper right-hand corner shows you

1 the navigation warnings so any vessels that go up
2 into the Arctic, it'll say how you should be
3 getting navigation warnings while you're up in
4 the Arctic.

5 And this middle graphic is the claims,
6 so you just had a presentation on here, but here
7 is a graphic that you can actually see and use
8 and download as a pdf if you want to see, look
9 into the boundaries as well.

10 This was worked together with the
11 State Department two years ago. And this was the
12 bathymetry data in the Arctic.

13 And then in the center, you have just
14 the map and that's where we'll have all the
15 Arctic -- or it has all the air fields
16 identified. It's kind of hard to see at this
17 scale but this is what the United States does
18 concerning the Arctic so they do count all the
19 Aleutian Islands as part of the Arctic. That's
20 why it has that little bump-out. But that is
21 what the U.S. terms the Arctic.

22 So another project we had is -- and

1 we're just completing now after two years is the
2 Digital elevation model, the DEMs. So the NGA
3 worked with the National Science Foundation,
4 University of Minnesota and other academics to
5 build elevation models that covers the whole
6 Arctic. So this was another White House
7 directive from the Alaska trip but -- and gave us
8 two years to do it so we're just coming up on it
9 now and we just released last week one of the
10 final modules of it that gets us down to anywhere
11 from two to five-meter resolutions for the Arctic
12 and digital elevation models.

13 So the digital elevation models, what
14 that shows is the elevations around the Arctic
15 and what it also has, if there are multiple
16 imagery, it will show you a chance so you can
17 show how either the shoreline or the elevation is
18 changing over time. So it does have a change
19 module that you will be able to view on our
20 website but also, you can download these as
21 shapefiles as well and build other products. As
22 you can see on the right, those are kind of

1 examples of what it shows you as DEMs. This is
2 the DEMs and this is available, again, on our
3 website.

4 So to give you an example of what a
5 DEM could do, what an elevation model can do and
6 show you is -- this is an example of it. This is
7 a -- this is in Sweden. This is -- you see the
8 track starts here. They run snowmobiles up
9 through here and this is an imagery that was
10 taken from a digital globe back in 2016. So if
11 we add the elevation model to it, the DEM
12 process, it'll turn into this and you can
13 actually now see the impacts of the snow trails
14 showing up there and you can see where the snow
15 machines run. So this is the kind of scale that
16 we're building for the whole Arctic Region that
17 is freely available on our public website now for
18 the whole Arctic.

19 And also another function we do at NGA
20 is we find navigational warnings. There is --
21 under the GMDSS system for SOLAS class vessels,
22 they have NAVAREAs they received at -- the

1 United States Navy doesn't use that system. They
2 rely on NGA to provide those navigation warnings
3 to it, so NGA collects all the navigation
4 warnings around the world to provide to the Navy
5 but since those are all unclassified, we do
6 provide those on our website as well. We break
7 them up into different groups. We don't call
8 them NAVAREAs. We call them HYDROPACs,
9 HYDROLANTs, which HYDROPACs is the yellow;
10 HYDROLANTs is the dark blue, and then HYDROARC is
11 the light blue up there.

12 So back in 2011, they established five
13 new NAVAREAs up in the Arctic which Russia,
14 Norway, and Canada are the coordinators for those
15 areas but other broadcasts we do get at NGA and
16 we host on our website. And you can see the
17 numbers from establishing it in 2011 to 2017;
18 2017 is last week's number and you can see the
19 examples from more recent ones that we put out
20 from anywhere from stations being out to survey
21 operations going on and then scientific moorings.
22 Obviously, this is important to ships so they

1 don't run into it and so these are the messages.
2 But it does give you a data set. You can see the
3 amount of messages changing throughout the year
4 and it was increasing until 2016 and then it did
5 drop off but it just shows you kind of the
6 activity going on with buoys being dropped,
7 survey operations because those all go out to --
8 in the NAVAREA form as well.

9 So again -- so in conclusion, this is
10 all available on our website, nga.mil. There's
11 an Arctic link right in the center which I asked
12 you guys to take a look at. If there is any data
13 -- we're trying to build it like the MSDI to
14 where you put information -- we're putting
15 information out but if you have information you
16 want to add to it, we would accept it and host it
17 on our website as well. So we're trying to get
18 that MSDI really going from the NGA point of
19 view. So the Arctic is what we see as our
20 starting point but we're also staring in the
21 Caribbean as well looking at that as another area
22 that needs a system like this, with getting more

1 data available. So NGA is also the chair of the
2 MSDI in the Mesoamerican-Caribbean area as well
3 so.

4 MEMBER BRIGHAM: Thank you, Keith.
5 Great, fantastic data source. I failed to
6 mention that Ashley Chappell, who is a member of
7 our working group, has been from the beginning
8 keeping us honest and keeping us moving -- and
9 how much time do we have? Maybe 10 minutes or
10 so? And as we have Q and As, Travis, if you want
11 to weigh in either with a question or maybe
12 answer a question or comment on any of these,
13 please.

14 MR. KENNEDY: I don't think I'm
15 qualified to do either.

16 MEMBER BRIGHAM: Oh, yes, you are.
17 Sure you are. You're in the flow of policy at
18 least. You know what's happening so -- but yes,
19 go ahead.

20 CHAIR HANSON: Lawson, I guess I'll
21 start off here because this has been a passion of
22 yours since you've been on HSRP. You've very

1 eloquently pursued this initiative. Where do we
2 stand aver eight years?

3 MEMBER BRIGHAM: Well, I mean stepping
4 outside of HSRP, what you heard today is that --
5 and I hear a lot of negativity, a lot about the
6 United States in the Arctic, and my view is that
7 we're the world's leader in the research and the
8 information and actually the seabed. I mean Andy
9 wouldn't say it or Larry but probably we have the
10 best data. So in some areas, and some practical
11 areas, we're really the world's leaders.

12 What we miss and what are the
13 practical investments, like we've talked about
14 even on our working group report, hydrography,
15 geoid measurements, you know, oceanographic
16 measurements and all of that, practical
17 investment -- and particularly for the United
18 States maritime Arctic I'm focusing on -- and the
19 icebreaker issue is a special thing; survey ships
20 are a special thing. It's investment and that
21 kind of infrastructure that we lack, and it's all
22 -- the missing link for the United States in the

1 Arctic is the economic connection. It's really
2 had as Alaska in my mind, as an Alaskan, how does
3 Alaska relate to the world in natural resource
4 development and send those resources to global
5 markets and that, you know, and needs -- needs
6 the maritime work to facilitate it.

7 But HSRP, practical issues, I think we
8 should keep the working group going to influence
9 internally a little bit, as much as we can the
10 politics of strategies and whatever related to
11 the Arctic and particularly in navigation
12 services.

13 MEMBER MAUNE: I have a question.
14 Does NGA bathy data agree with NOAA's bathy data?
15 Do they share, go back and forth or is it
16 different? You have different sources?

17 MR. DOMINIC: No. We share our data
18 so the big difference NOAA and ours is we're
19 looking at international so we're looking outside
20 your EEZ zones typically for the -- the United
21 States Navy is our primary customer so we rely on
22 NOAA for the U.S. waters but outside that, we

1 use -- that's where the data that we're looking
2 for so we typically don't overlap surveys.

3 CHAIR HANSON: Other questions from
4 panel members? Go ahead, Rich.

5 MR. EDWING: So, Andy, I was curious.
6 After you do all these continental extensions,
7 are there a few square meters left here and there
8 that nobody has a claim to?

9 CAPT ARMSTRONG: In the Arctic, only
10 a few but yes, that -- the area -- well, in fact,
11 that's the name of it. Those places that are not
12 under the sovereign jurisdiction of the coastal
13 states are in what's categorized as "the area"
14 and the area and the resources of the area are
15 managed by a body that's part of the Convention
16 on the Law of the Sea. And so that's -- U.S.
17 relationship to that is potentially one of the
18 issues in ratification but, you know, I can't
19 say.

20 So in the Arctic, there will be some
21 area but actually, not a whole lot.

22 MR. EDWING: Thank you.

1 MS. CHAPPELL: Andy, if you could --
2 Andy, could you also comment on the fact that Law
3 of the Sea is really seabed resources and all of
4 the rules apply for the water column and surface?

5 CAPT ARMSTRONG: Yes. So within the
6 Exclusive Economic Zone, the coastal state has an
7 extensive list of rights to the water column and
8 the resources in the water column. In the
9 Exclusive -- in the Extended Continental Shelf,
10 the sovereign rights are limited to the resources
11 of the sea floor and the sub sea so initially,
12 hydrocarbon resources were the main issue along
13 with deep sea minerals and also included in that
14 are the sedentary species of the sea floor, so
15 fish in the water column are not subject to
16 national jurisdiction or sovereign rights in the
17 Exclusive Economic Zone.

18 MEMBER BRIGHAM: We -- in non-
19 traditional terms, the donut holes or the
20 leftover, pretty small and they're all at 4,000
21 meters or something, couple miles down so you can
22 drill until your heart's content, whoever --

1 China wants to come in the middle-central Arctic
2 Ocean 30 years from now, it's okay. It's really
3 the rest of the place is under the -- the sea bed
4 is under the tight sovereign jurisdiction, even
5 if it's overlapping.

6 For navigation rights, of course, the
7 central Arctic Ocean itself is defined by the EEZ
8 so -- and that's where the fisheries people are
9 trying to negotiate under Ambassador Bolton's
10 leadership, really, is to get an accommodation
11 that has a moratorium on fishing until we know
12 and do the science. But that requires bringing
13 in a lot of stakeholders because it is a global
14 commons and it's not owned by the five Arctic
15 Ocean coastal states, the fish aren't. So
16 there's some tension and issues but a lot of
17 diplomacy ongoing so -- and the United States is
18 in the leadership position despite not having
19 ratified UNCLOS, so interesting situation.

20 But I would say that our data, for
21 what Andy and Larry have done, have provided us
22 complete -- well, very substantial authoritative

1 evidence of our claim whenever we do the
2 political stuff.

3 CAPT ARMSTRONG: If I could add one
4 thing, though, on the Extended Continental Shelf.
5 One thing that's of some concern in the research
6 community is that the Law of the Sea Convention
7 gives coastal states control over marine
8 scientific research in the extended continental
9 shelf and in some cases, that's granted
10 automatically in the EEZs now but in other cases,
11 it's not. And so potentially, there's more of
12 the ocean that's going to be restricted in terms
13 of research access.

14 MEMBER BRIGHAM: I should just comment
15 about the future of the working group. I think
16 that we should continue. I think Captain Ed
17 Page, new HSRP member, will hopefully take the
18 leadership of this group and keep us in the flow
19 of Arctic issues and see how we, HSRP, and NOAA
20 fit into Arctic issues and nav services in
21 particular fit into the picture here so, you
22 know, I recommend we continue. You know, we

1 don't know where this Administration is going on
2 lots of things. Arctic is probably not the
3 highest priority but we do know there are still
4 interest and infrastructure so I think we should
5 keep the press on.

6 CHAIR HANSON: Okay. Before we go to
7 public questions, I want to personally thank you,
8 Lawson, for your leadership on this issue over
9 the last eight years. It's a great example for
10 us of how our issues come on a panel, how we need
11 to be strident and persistent, and that's how we
12 continue to make progress. And so eight years is
13 a long time. So again, thanks for your service
14 to the panel and on this working group so.

15 Let's see, we're ready to go for
16 public comment now. I open it up for the
17 audience as well as the webinar. We do have one
18 question already from Jason Creech.

19 (Pause.)

20 CHAIR HANSON: This is a public
21 question in regards to Captain Brennan's
22 presentation on implementation of externally-

1 sourced data. To Captain Brennan; is there
2 anything that could be done to get some of these
3 outside source surveys closer to being equal and
4 taking less validation an evaluation, from Jason
5 Creech. Do I note that face for the record?

6 CAPT BRENNAN: I think we're doing a
7 lot of that. I believe that the -- you know,
8 what the IOCM team does in our collaboration with
9 other people acquiring ocean data is valuable.
10 We certainly are reaching out to those
11 communities to help provide our expertise and
12 provide our personnel when that acquisition is
13 done, trying to harmonize our requirements to
14 ensure that if somebody's going out to do ocean
15 mapping that they understand the requirements in
16 order to get good data and not just how they
17 acquire data but then how they document that data
18 because frequently, that's the heavy lift that we
19 have to do, is trying to get the metadata about
20 how it was acquired. And so that's a significant
21 portion of that, so educating those people that
22 are acquiring that.

1 And then finally, the quality control
2 measures is under -- you know, educating people
3 on the, you know, what we believe is good sound
4 data, both accurate and precise is -- and how to
5 clean that and we have a set of tool sets that we
6 have that are publicly available, that we've
7 developed in collaboration with the University of
8 New Hampshire, that we give to anybody that's out
9 there that does that and so that would be the
10 final thing is that, you know, anybody that is
11 acquiring that data, I would invite them to use
12 our tools and to reach out to us. So those would
13 be the three that I would point out.

14 VICE CHAIR MILLER: I think help in
15 setting up the systems, you know, providing --
16 because that's really one of the places where you
17 can get inherent errors in the data that make it
18 basically unusable if you don't have your offsets
19 right and so forth. And so I think coast
20 surveys, expertise in that could, you know, if
21 it's set up right in the first place, I mean
22 things can happen aft rewards but if it's not set

1 up right in the first place, you're never going
2 to be able to use it. And so I think that's an
3 important element of it, Rick.

4 CHAIR HANSON: Other questions? There
5 we go.

6 MR. NOLL: Thank you for the great
7 morning. This is Guy Noll. I'm asking about the
8 outreach and the importance of sharing the
9 Government-produced information. And in
10 particular, I really the coops presentation, but
11 I'm also thinking about the NGS presentation and
12 the VDatum connectivity and how we might be
13 offered opportunities to build off of that, maybe
14 through an API or some sort of software
15 development kit so that everyone's using the same
16 tools and we don't have to recreate that wheel.

17 MS. BLACKWELL: This is Juliana. I'll
18 just start with on the NGS side, the
19 transformation parameters that we have available
20 through our tools are all things that we are
21 hopeful that vendors will use in any of the added
22 value products and services that they provide

1 through their off-the-shelf software packages,
2 etc. And it's one of the reasons why we want to
3 have an Industry Day in 2018, is to talk about
4 this in more detail and we would love to have
5 folks be able to just extract what they need from
6 our work and port it into their products and
7 services, and how that's done and kept up-to-date
8 is a concern. So I think we need to look at how
9 those things can be handled and what the
10 alternatives are.

11 I think probably similar things
12 related to the data, although I'm not the expert
13 in the guts of how that works, but if there are
14 things that can be managed so that that is kept
15 fresh and however people are using it beyond, you
16 know, the tools that we provide, I think that's
17 something that we strive for and would like to
18 find out how we can do that best.

19 MR. EDWING: And I'll just echo a lot
20 of what Juliana just said from CO-OPS, again, we
21 make our data available as many ways as possible
22 in the hopes that other people take it and add

1 value to it. But it's also helpful to know what
2 people are thinking and there may be other things
3 that we can do to help make some of those
4 connections, so glad to discuss further. Thanks.

5 RDML SMITH: As I recall, this is a
6 fairly specific request that has come from both
7 Google and Esri about access at a kind of a more
8 nuts and bolts level rather than sort of a GUI
9 level to the VDatum transformation so that within
10 the Esri environment or the Google environment or
11 some sort of superbatch level, you could take
12 huge data sets and transform them without ever
13 going to -- without ever running them through
14 some NOAA service exactly. And so I'm not a
15 software developer but as I understand whatever
16 we're doing right now isn't quite scratching that
17 itch. And I have talked to some of our
18 developers about it and they think it's going to
19 be possible but we need to work -- I guess I
20 would like to invite, you know, Esri to work with
21 us on outlining exactly what it is that success
22 looks like here so that we don't miss the mark.

1 MR. NOLL: Thank you for the
2 opportunity to extend my remarks. So for
3 awareness of the HSRP, the software development
4 life cycle typically, at Esri, is every six
5 months or so we have a new release. And in order
6 to build in the appropriate testing, et cetera,
7 if we are talking about it in 2018, we're not
8 going to see it until 2019, maybe even 2020
9 depending upon, you know, what has to be done so,
10 you know, the -- it is rather -- I think in order
11 to be prepared for the 2022 ITRF and everything
12 else, we need to get going. We need to figure
13 out how we're going to tie into it and whether
14 it's going to be something that builds on top of
15 our core software or in our geodic calculations
16 internal, way down deep we have the ability to
17 connect. And I'm sure Google or Apple or anybody
18 else that's doing high-resolution, you know, very
19 large scale mapping, including indoor GIS or
20 indoor mapping of some kind will want to have
21 that level of accuracy.

22 MS. BLACKWELL: This is Juliana

1 Blackwell. Just one other comment on that. You
2 know, we also want to be certain that we are
3 being fair to all private sector entities that
4 are interested in this. So the only thing I can
5 recommend at this time is that, Guy, if you want
6 to contact Stephen White, who is the VDatum
7 Program Manager; he works for NGS but he's really
8 overseeing the entire VDatum team that
9 encompasses all three offices and have some
10 offline discussion with him about that, keeping
11 in mind that, you know, we'll be talking about
12 this also back in Silver Spring. I'd welcome
13 that you contact him directly and have some
14 further technical discussions with him on that
15 matter. Thank you.

16 RDML GLANG: Gerd Glang, IIC
17 Technologies and past DFO behind Admiral Smith
18 just over a year ago, for the record. I'm
19 getting all choked up. No. I just want to
20 congratulate Bill Hanson on serving eight years
21 on the panel. We served alongside on the panel
22 and greatly appreciated your contribution and

1 your patient leadership. I very much want to
2 thank Lawson for bringing a very new style of
3 leadership, very engaged, very enthusiastic to
4 the panel and just extend my congratulations to
5 all the members. I think you've done great work,
6 especially in the last two years. I think the
7 issue papers are -- have evolved and are really,
8 really good and really useful and I look forward
9 to those being made available publicly so I can
10 stakeholder are those back with our folks back at
11 the IIC. So thank you all and congratulations
12 Bill and Lawson.

13 CHAIR HANSON: Thank you, Admiral
14 Glang.

15 RDML SMITH: Can I add something to
16 Admiral Glang's comment, and that is that
17 although Scott Perkins is not here as a -- he was
18 -- he did chair the panel for several years and
19 has been a very engaged member throughout his
20 eight-year tenure, and this would have been his
21 last meeting had he been able to make it. So I
22 wanted to be sure to thank him as well on the

1 record.

2 CHAIR HANSON: And for a lot of you
3 who may or may not know, Scott was instrumental
4 in making issue papers a priority for the panel,
5 so even though he was vice chair and then chair
6 but only for a short time, his impact and legacy
7 is going to go -- be for a very long time, so
8 well done, Scott. All right. I --

9 MEMBER BRIGHAM: Can I --

10 CHAIR HANSON: Sure.

11 MEMBER BRIGHAM: I think the issue
12 papers are out there on the website, are they
13 not? And I know that I've handed them out to
14 hundreds of people, staffers and everyone else as
15 information tools so I think maybe they're
16 publicly available today, as much as you can be.

17 VICE CHAIR MILLER: But we have two
18 additional issue papers, precision navigation and
19 R&D benefits that will be presented with our
20 letter to the Undersecretary and those will be
21 immediately made available on the website as
22 well, just for information.

1 CHAIR HANSON: Great. Thanks. And
2 with that, the HSRP will have a working lunch and
3 we will reconvene at 1:15 p.m.

4 (Whereupon, the above-entitled matter
5 went off the record at 12:10 p.m. and resumed at
6 1:17 p.m.)

7 CHAIR HANSON: All right. Ed Saade's
8 got a little presentation for us.

9 MEMBER SAADE: Hello, everyone. I'll
10 be real quick here. One of the items that would
11 have been -- that we were hoping to talk about
12 because we're in this part of the country is the
13 explosion of offshore wind farms on the East
14 Coast of the U.S. here. So keep in mind that the
15 first offshore wind farm that started to produce
16 energy was December of 2016, so that's roughly 10
17 months ago. And all these colored boxes you see
18 here are all the upcoming offshore wind farm
19 sites that are going to get developed.

20 Our company is working on the
21 Deepwater Wind one here right now and it's all
22 about site characterization so it's survey, it's

1 geophysical survey and it's geotech to prepare
2 these sites.

3 And I wanted to read a quote from our
4 party chief and he says, "NOAA's bathymetric data
5 that are made available to the public have been
6 invaluable to the offshore wind industry. We use
7 the multibeam data to help site wind farms and
8 cable rights. These data were instrumental in
9 modifying an initial 80-kilometer long export
10 cable route that would not have been feasible due
11 to the presence of unfavorable ground conditions,
12 parentheses, boulders. We used the NOAA data --
13 we used the NOAA bathy data to develop cable
14 routes that were in pretty good shape. We only
15 had to do re-routing for the small sections that
16 we didn't have NOAA MBES data for. We also used
17 the historical NOAA bathymetry data, the 2000
18 vintage MBES and older, going back to 1930 to
19 1990-ish to perform time series analysis on the
20 sea floor features, e.g., large sand ridges and
21 sandways, to determine their mobility rates.
22 Backscatter's becoming more common to use in wind

1 farm work. It is recommended to be collected but
2 not required at this time."

3 So Ashley's not here. I also wanted
4 to give credit to Ashley with her program for
5 brining all these different data sources to
6 people -- the public can have access to and
7 that's become a critical element of the way we
8 put projects together. So that's it. Thanks.

9 CHAIR HANSON: Thanks, Ed. As always,
10 very enlightening. I think you guys are in for
11 some exciting few years with Ed and Joyce's
12 leadership here.

13 Before we go any further, I probably
14 neglected to do this in front of the whole
15 audience but I wanted to thank Will and Dave, our
16 audio and IT guys for a great job. It's nice to
17 be able to have videos that work.

18 (Applause.)

19 CHAIR HANSON: So now we have to do
20 that thing called consensus. So, Joyce?

21 VICE CHAIR MILLER: Did Shep want to
22 say anything -- okay. First of all, we already

1 had consensus on the precision nav paper I
2 believe, and we had a vote on it yesterday.

3 Ed, Lindsay, and I revised the
4 research and development benefits to NOAA and
5 U.S. industry if we can bring that up. I
6 highlighted simply the areas that were changed.
7 The goal was to emphasize more that it is the
8 model JHC/CCOM that is valuable in facilitating
9 the transfer of R&D rather than -- I won't --
10 well, some people said it was marketing the
11 Center and so what we changed was the operational
12 model and structure, implemented the blah-blah-
13 blah...has made the rapid transfer of R&D from
14 NOAA-funded research to industry possible, and
15 then I just modified -- I used instead of -- it
16 looked like the whole thing was full of JHC/CCOM
17 and so I used Centers or Joint Centers as the --
18 I think those are the only changes from
19 yesterday's version. Any comments?

20 (No response.)

21 VICE CHAIR MILLER: Ed and Lindsay
22 said they were happy with it. Andy?

1 CAPT ARMSTRONG: Of course I'm happy
2 with it.

3 VICE CHAIR MILLER: Okay. Shall we
4 have a vote? Is this paper ready to go?

5 (Chorus of yes.)

6 VICE CHAIR MILLER: Okay, awesome.
7 That was fast. Shall we work on the letter for,
8 hopefully --

9 MEMBER HALL: Joyce?

10 VICE CHAIR MILLER: Yes.

11 MEMBER HALL: Can we just really
12 quickly go to the autonomous comments because we
13 want to finalize this at this meeting?

14 VICE CHAIR MILLER: Oh, the -- okay,
15 yes, go ahead. I'm sorry. I missed that, Kim.

16 MEMBER HALL: No problem. So we only
17 had one comment from Lawson. I completely
18 understand where he's coming from. I prefer to
19 leave it but I just -- the comment, we all should
20 have gotten it via email this morning about
21 taking out the strategy comment about is it a
22 plan or a strategy. The only reason I say we

1 leave it is we already gave E.J. that advice
2 yesterday. So I just -- looking for everybody
3 else -- if nobody minds; Lawson, if you don't
4 mind, just leave it as is. I think it's not too
5 strong of words but if it is, I am happy to
6 change it but right now it's probably easier to
7 leave it as is so.

8 MEMBER BRIGHAM: I mean I see that as
9 an administrative kind of thing. I -- my point
10 was just that I thought call it what you want and
11 what you have utility in. I'm not sure it's a
12 plan, strategy, maybe even roadmap, white paper.
13 It doesn't necessarily matter to me whether we
14 should tell you that. I just -- it's fine, I
15 guess, to leave it in. Give you free advice but
16 I don't think it's a plan or strategy, any of
17 those things. It's an expression of effort and
18 knowledge, that we're looking at the topic. I
19 mean I don't know how you -- I know you have many
20 roadmaps now so it is the utility of the words --
21 word "roadmap" is maybe overused now. So -- but
22 I don't -- I defer to the group's consensus.

1 MEMBER HALL: I did try to clarify
2 there where it said -- where we asked for intent
3 and scope because we think there needs to be kind
4 of a clearer intent and scope. We talked with
5 E.J. about it yesterday. And then maybe whatever
6 it is, plan, strategy, roadmap will emerge. So I
7 don't think we told them what to call it, just to
8 clarify. I think we just said, hey, right now
9 it's not clear what it is and so helping with
10 that -- so E.J. is -- are we being too strong?
11 Are you okay?

12 CAPT VAN DEN AMEELE: I think it's
13 fine the way it is.

14 MEMBER HALL: Okay. Thank you very
15 much. Other than that, I had no other comments.
16 Carol did tell me that she was fine with what was
17 in there. I seem to have captured what we talked
18 about yesterday but I want to leave it open one
19 more time. Any other comments?

20 (No response.)

21 MEMBER HALL: Hearing none, shall we
22 leave it to the Chair or Vice Chair to --

1 VICE CHAIR MILLER: Okay. Are we all
2 okay with the OCS Autonomous Systems Strategy or
3 whatever it is?

4 PARTICIPANT: Yes.

5 VICE CHAIR MILLER: Yes. Okay, good.
6 Will, can you put up the --

7 RDML SMITH: Sorry, Joyce, just to
8 clarify, the panel is okay with its comments on
9 the --

10 VICE CHAIR MILLER: The strategy?

11 RDML SMITH: -- on the strategy --

12 VICE CHAIR MILLER: Yes, with our
13 comments.

14 RDML SMITH: -- rather than the
15 strategy as written.

16 VICE CHAIR MILLER: Yes, we're fine
17 and I would say that -- well, we'll discuss this
18 with the letter what we want to say about the
19 strategy. Okay. A little background. I --
20 having written three of these letters so far with
21 Bill, I realize that there's a lot of stuff that
22 we can get in in advance and make it pretty easy.

1 And I had already gotten comments from Ed and
2 Lindsay of words they wanted to say regarding
3 U&H, JHC, and I'd also -- we have had several
4 infrastructure discussions and so I had already
5 drafted those up. And then there has been so
6 much happening at this meeting so I added in and
7 I also added in -- and they're in -- those are in
8 pretty draft form -- comments from -- that we
9 received this morning as we went around the
10 table, things that people thought were important
11 to put in the letter. So -- and I'm going to go
12 through it on kind of a -- it's -- the only thing
13 about it right now is I think it's a bit too long
14 but again, there was so much in there.

15 So I -- the only thing we may be
16 missing is a small paragraph about the Arctic and
17 everything else, it's totally draft. Feel free
18 to modify it. Just please don't lengthen it much
19 is my only request.

20 Okay. So this is an assumption. One
21 of my problems was I didn't know who I was
22 writing the letter to, if Rear Admiral Gallaudet

1 is selected, then this is conditional and it's
2 just a welcome to the -- do you think that's
3 appropriate, Shep?

4 RDML SMITH: Yes. I would say
5 depending on how long it takes you to get to a
6 final version, you know --

7 VICE CHAIR MILLER: Yes.

8 RDML SMITH: -- check in and see who's
9 the boss at the time and address it accordingly.
10 But you really should not address it to him until
11 he's confirmed.

12 VICE CHAIR MILLER: Until he's -- oh,
13 no, I didn't mean to at all.

14 RDML SMITH: Yes.

15 VICE CHAIR MILLER: Yes. That was --

16 RDML SMITH: So it's just we don't
17 have a timeline on that.

18 VICE CHAIR MILLER: Well, his hearings
19 are late September, are they not? Yes. And we
20 usually aim for one month after the meeting. In
21 fact, it's pretty much been more like six weeks
22 until we got the letter out so we have probably

1 until the beginning of November.

2 CHAIR HANSON: And plan B would be
3 back to Mr. Friedman?

4 RDML SMITH: Ben Friedman, yes.

5 VICE CHAIR MILLER: Back to Ben
6 Friedman. So okay, next page or next -- okay, so
7 this is -- again, this is some boilerplate partly
8 thanking everyone. We really -- I mean given
9 that you guys were dealing with a hurricane, I'm
10 impressed at how many people were able to come
11 and stick with this. But we did have --
12 suggested that we should say something about
13 disaster-rated services. So if everybody will
14 read that over and comments?

15 MEMBER HALL: I just would change
16 "dealing with" to "responding to" just to make it
17 a little bit more professional.

18 VICE CHAIR MILLER: Okay.

19 MEMBER HALL: I don't know what the
20 word is.

21 (Off-microphone comments.)

22 VICE CHAIR MILLER: Okay. And Anne

1 suggested that we -- the last sentence, Anne
2 suggested that we mention the funding aspects of
3 it and so -- in that we aren't fully informed on
4 that, it might be a topic that we'd want to hear
5 more about how that happens. Lawson?

6 MEMBER BRIGHAM: Yes. I think we
7 should straight up and say -- put in the words
8 "relationship with FEMA." I mean there's no
9 beating around the bush. It's a -- part of this
10 is the relationship with the federal agencies to
11 FEMA and other federal agencies and how are -- I
12 don't know. That's what I learned from here.
13 It's like talking about the Corps and NOAA's
14 relationship is another one that's -- I don't
15 know we weave it in but suggestion.

16 VICE CHAIR MILLER: Well, how about
17 the mechanisms realities for funding hurricane
18 response and interagency funding mechanisms. And
19 nobody laughed when I put in "inconveniently"
20 there.

21 MEMBER SAADE: I'd put --

22 MR. SHAPIRO: -- instead of

1 "inconveniently happened" would be "occurred"
2 rather than happened.

3 VICE CHAIR MILLER: Okay.

4 MEMBER SAADE: And "coincidentally
5 occurred," not "inconveniently."

6 VICE CHAIR MILLER: Okay. I just --

7 PARTICIPANT: It wasn't more
8 inconvenient for some other people.

9 MEMBER SAADE: You could say an
10 inconvenient truth.

11 VICE CHAIR MILLER: Yes. Okay.
12 Everybody good with that?

13 RDML SMITH: Joyce, one through is
14 that if you do plan on prioritizing a deeper dive
15 into emergency response surveys for Miami, this
16 could be a place to put that.

17 VICE CHAIR MILLER: I have that a bit
18 later.

19 RDML SMITH: Okay. And Doremus is a
20 U, I think. Somebody -- is that right? Check
21 spelling on Doremus.

22 RDML SMITH: M-U-S.

1 VICE CHAIR MILLER: M-U-S, okay.

2 Sorry.

3 MR. EDWING: And this is Rich.

4 Instead of saying "storm surge prediction an
5 assessments" there, if we could just convert that
6 to "and issuing the QuickLook product" or
7 something along those lines.

8 VICE CHAIR MILLER: Okay. Oh, and --

9 MR. EDWING: -- because we're really
10 providing updates on actual conditions, not so
11 much predictions and assessments at that point.

12 VICE CHAIR MILLER: And issuing the --

13 MR. EDWING: Yes, and issuing the
14 storm QuickLook product around the clock,
15 something like that.

16 VICE CHAIR MILLER: Okay.

17 MR. EDWING: And I should note when we
18 stand up QuickLook, we're pulling people out of
19 their day-to-day jobs and they're compiling a
20 product every six hours; you know, sometimes at
21 midnight, sometimes at six -- right on the heels
22 of every time The Weather Service updates their

1 hurricane cone product, StormTrack.

2 VICE CHAIR MILLER: Okay. All right.

3 More comments?

4 (No response.)

5 VICE CHAIR MILLER: Next paragraph,
6 please, Will? This is the one that -- I've had
7 Ed look at this and I added in the second to the
8 last sentence, the visualization comments. Ed,
9 you might want to take a look at that -- Ed
10 Kelly.

11 PARTICIPANT: You got used to doing
12 last names.

13 VICE CHAIR MILLER: Yes. There's
14 going to be three of you. And then -- and
15 Lindsay and Ed -- Ed, too, specifically wanted to
16 recognize the great work that Andy and Larry have
17 done there.

18 RDML SMITH: We've seen your civilian
19 alumni as well --

20 VICE CHAIR MILLER: What's that?

21 RDML SMITH: -- of the U&H.

22 CAPT ARMSTRONG: Yes.

1 RDML SMITH: It says "many NOAA
2 Officers including..."

3 CAPT ARMSTRONG: And civilians?

4 RDML SMITH: Yes.

5 CAPT ARMSTRONG: Yes. So more than
6 just the two names, more of a general --

7 RDML SMITH: Yes.

8 VICE CHAIR MILLER: You mean more than
9 you and Larry?

10 CAPT ARMSTRONG: Yes.

11 VICE CHAIR MILLER: Well --

12 CAPT ARMSTRONG: Lots of people have
13 --

14 VICE CHAIR MILLER: Ed, I'll let you
15 weigh in on that one.

16 CAPT ARMSTRONG: Or an "and" --

17 VICE CHAIR MILLER: And -- okay,
18 Captain Armstrong, and --

19 MEMBER SAADE: I think I -- at one
20 point, I just said the entire staff.

21 VICE CHAIR MILLER: Okay. All right,
22 got it.

1 RDML SMITH: Then two-thirds of the
2 way down, "many NOAA officers and civilians."

3 VICE CHAIR MILLER: Okay, and
4 civilians.

5 MEMBER KELLY: Then go all the way
6 down to the penultimate line, an understandable -
7 - this will lead to greater collaboration between
8 NOAA and development -- - industry to develop new
9 products.

10 VICE CHAIR MILLER: Just NOAA or NOAA
11 and industry or NOAA?

12 MEMBER KELLY: NOAA and industry.

13 VICE CHAIR MILLER: Okay. Further
14 comments?

15 (No response.)

16 VICE CHAIR MILLER: My changes aren't
17 going in there because this is on the general.
18 And you will get another chance to review. Yes.
19 Okay, next paragraph?

20 MEMBER HALL: Are all of our -- what
21 that sheet is, are they recommendations or
22 comments and recommendations?

1 VICE CHAIR MILLER: Well, when Admiral
2 Smith spoke, he requested that we kind of weigh
3 in on the -- on this document.

4 MEMBER HALL: Just to clarify what our
5 comments were, comments --

6 VICE CHAIR MILLER: Oh, where are you;
7 one which line?

8 MEMBER HALL: Upon a set of
9 recommendations. I think that one's fine, three
10 lines up from the bottom.

11 VICE CHAIR MILLER: Oh, a set of
12 comments?

13 MEMBER HALL: Set of recommendations.

14 VICE CHAIR MILLER: Comments and
15 recommendations?

16 MEMBER HALL: Yes. It's not repeated
17 there.

18 VICE CHAIR MILLER: Okay.

19 MEMBER HALL: Observations.

20 VICE CHAIR MILLER: Shep is -- I was
21 trying to say, you know, we -- I think the ASVs -
22 - my take is that the ASVs are definitely, you

1 know, a real asset.

2 RDML SMITH: We think they have strong
3 potential in the long run and for a few
4 applications, like the very shallow, they're
5 valuable today.

6 VICE CHAIR MILLER: Yes.

7 MEMBER BRIGHAM: Here's where you can
8 slip in maybe a word or two about Arctic.

9 VICE CHAIR MILLER: Sure.

10 MEMBER BRIGHAM: Yes. I mean just say
11 shallow areas of interest to a recreational but
12 and also applications for frontier Arctic regions
13 something --

14 VICE CHAIR MILLER: Okay.

15 MEMBER BRIGHAM: -- just to get the
16 Arctic in.

17 VICE CHAIR MILLER: And for -- let's
18 see -- and for use in frontier regions such as
19 the Arctic? The word "Arctic" is -- comes again
20 a bit later. And Admiral Smith wanted me to note
21 that it does not diminish the need for ships and
22 that certainly was very strong in E.J.'s document

1 and I agree.

2 MEMBER HALL: Can we thank E.J. for
3 his multiple briefs to us? I mean he has -- he
4 gave us a presentation here, he gave us -- he's
5 talked to us several times.

6 VICE CHAIR MILLER: I think that may
7 be a little low-level for the letter to the
8 Administrator. We do certainly appreciate it,
9 E.J.

10 RDML SMITH: Consider him thanked.
11 There.

12 VICE CHAIR MILLER: Yes. Thank you.

13 MEMBER HALL: I guess my take is --
14 just my take was that it was more -- it was above
15 and beyond what he provided to us. It wasn't
16 just, say, a normal speedy quick brief. It was
17 talking to us, taking very, very gracious
18 acceptance of our comments. And no, I didn't
19 want that on the record.

20 VICE CHAIR MILLER: Okay, next
21 paragraph.

22 CAPT VAN DEN AMEELE: I was just

1 wondering instead of might be stronger as a
2 suggestion rather than saying that you made a
3 number of suggestions, I'm going to document
4 that. Maybe you made a number of suggestions on
5 the future applications and uses of unmanned
6 systems for our -- you know, for our mission.
7 That might be a little bit more of a stronger
8 statement than just -- you did more than comment
9 on a document. You commented on how we're going
10 to use these in the future, right, so --

11 VICE CHAIR MILLER: Okay. Yes, on the
12 future of the use of unmanned systems --

13 MEMBER HALL: Use and applications.

14 VICE CHAIR MILLER: -- for
15 hydrographic applications. Great. Thank you.
16 All right, next paragraph or two paragraphs.
17 This was Bill's and we certainly need to always
18 keep in mind to stress the cooperative agreements
19 and so forth and the -- and efforts toward
20 collaboration.

21 MEMBER HALL: Should it be Mr.
22 Lillycro? And then it's the wrong Rear Admiral.

1 VICE CHAIR MILLER: Oh, what --

2 MEMBER HALL: Should be RDML.

3 VICE CHAIR MILLER: Oh -- thank you.

4 Yes.

5 PARTICIPANT: Spell PLOVER.

6 VICE CHAIR MILLER: Spell out what?

7 PARTICIPANT: PLOVER, say what PLOVER
8 is.

9 VICE CHAIR MILLER: Oh, what is --

10 MEMBER HALL: We use that later.

11 PARTICIPANT: RDML is Rear Admiral,
12 not RDL --

13 MEMBER HALL: I'm not dyslexic but --
14 okay, I'll put a note in here to spell out. All
15 right.

16 VICE CHAIR MILLER: Yes, typing
17 PLOVER. And then in his comments, Shep asked
18 that we comment on the Draft National Charting
19 Plan. I put in here that they -- the National
20 Charting Plan which the panel endorses was the
21 comments that have been provided to OCS. Kim,
22 you want to weigh in on that?

1 MEMBER HALL: That's --

2 VICE CHAIR MILLER: The Charting Plan?

3 MEMBER HALL: The Charting Plan was
4 Susan's tasking.

5 VICE CHAIR MILLER: Yes -- or no, this
6 is the -- oh, right. Okay. Yes, the Charting
7 Plan.

8 MEMBER SHINGLEDECKER: I mean it looks
9 all right to me. I think the abbreviation of OCS
10 and then we spell it out later, probably work
11 that out, and there's --

12 VICE CHAIR MILLER: No. OCS is
13 before.

14 MEMBER SHINGLEDECKER: But we say
15 "provided to OCS" and then we later say "Office
16 of Coast Survey." I'd probably reverse those.

17 (Off-microphone comments.)

18 MEMBER SHINGLEDECKER: Yes. And then
19 I think it's probably my typo in the last
20 sentence and "are pleased" instead of "is
21 pleased."

22 VICE CHAIR MILLER: Yes.

1 MEMBER SHINGLEDECKER: Correcting my
2 typos publicly.

3 VICE CHAIR MILLER: No. It's -- no,
4 I changed your sentence and I didn't get that one
5 but I already -- yes, I got that one. And here
6 again, we mention the Army Corp. Okay. Next
7 sentence or next -- this is kind of Glenn's theme
8 and here I basically mention the two attached
9 papers. Comments?

10 (No response.)

11 MEMBER SHINGLEDECKER: Do we mention
12 anything else about the neighbors later on or do
13 you want to say the recent papers on precision
14 navigation and technology transfer --

15 VICE CHAIR MILLER: Actually, I
16 already mentioned the --

17 MEMBER SHINGLEDECKER: Two topics,
18 okay.

19 VICE CHAIR MILLER: -- I already
20 mentioned the -- Ed Saade's paper. I don't have
21 a specific -- well, I do have precision. In the
22 recommendations, I do have precision navigation

1 but I have specifically -- and we'll put out
2 attachments; on the bottom, we'll put out the
3 names of the two papers.

4 MEMBER SHINGLEDECKER: I just wasn't
5 sure if it's two most recent precision -- papers
6 on precision navigation and R&D, whatever, you
7 know, a quick one, technology transfer.

8 JUDGE SHERIDAN: Lawson.

9 MEMBER BRIGHAM: Just put them in
10 right at the end of that sentence, just express
11 what they are.

12 VICE CHAIR MILLER: Okay. Yes. I'll
13 put --

14 MEMBER BRIGHAM: You can make them
15 attached, you know, or whatever you want to do.

16 VICE CHAIR MILLER: Okay. And I'll
17 probably take it out of the first and our --
18 okay. All right. Good comment. I thought it
19 wise, Bill. I added this. Next paragraph? And
20 these are the recommendations. It might be a
21 great chance, especially if RADML Gallaudet is
22 confirmed, to invite him to the Miami meeting and

1 the PORTS. Would you be in favor of that?

2 MR. EDWING: In favor of having the
3 next meeting in Miami? Is that --

4 VICE CHAIR MILLER: Well --

5 RDML SMITH: And invite Gallaudet.

6 MR. EDWING: Oh, yes, certainly.

7 MEMBER BRIGHAM: We don't need to put
8 it in the letter but I think we all agree that
9 having the Secretary of Commerce at one of these
10 ventures that relates to the maritime world,
11 since he's a maritime guy, makes a lot of sense.
12 I mean getting the Admiral is great -- Admiral
13 Gallaudet but getting the Secretary of Commerce -
14 - have we ever had a Secretary of Commerce
15 related to this? Probably not.

16 VICE CHAIR MILLER: Well, he might not
17 come to the meeting but --

18 MEMBER BRIGHAM: Yes. But he would be
19 there with the PORTS maybe.

20 VICE CHAIR MILLER: Yes.

21 MEMBER BRIGHAM: Maybe the ceremony --
22 I'll bet.

1 VICE CHAIR MILLER: Yes.

2 MEMBER SHINGLEDECKER: You guys, I
3 suggest taking out inviting him in the letter
4 because then -- they don't -- then they think
5 it's an invitation letter and not a letter to
6 respond to.

7 MEMBER BRIGHAM: Yeah, that's what I'm
8 saying --

9 MEMBER SHINGLEDECKER: I know, I just,
10 I am saying take that out, and we'll invite him
11 internally for our own mechanisms.

12 RDML SMITH: It can get misrouted --

13 MEMBER SHINGLEDECKER: Yes.

14 MEMBER BRIGHAM: Oh, yes.

15 RDML SMITH: -- if it looks like an
16 invitation.

17 VICE CHAIR MILLER: All right, it's
18 out.

19 MEMBER HALL: And then do we need to
20 have for the recommendations to the -- is it
21 wrong to say Acting Administrator because no
22 matter what, at that moment, it'll be still --

1 still be an Acting Administrator.

2 VICE CHAIR MILLER: Yes.

3 MS. MERSFELDER-LEWIS: Don't worry
4 about that. We'll help you guys make sure
5 whatever is the right name is in there.

6 VICE CHAIR MILLER: Yes. All right.
7 I put in Acting. Okay. And I'm very open to
8 change these -- this is what I could come up from
9 kind of before the meeting and my question is, do
10 you all feel that there are strong
11 recommendations from this meeting that -- you
12 know, should these be our recommendations; should
13 there be others? This was just -- and what I
14 tried to do on the first one, you'll notice
15 there's the word "Arctic," there's the word
16 "PORTS," there's the words "precision
17 navigation." This is sort of the whole
18 infrastructure discussion that -- so I'd really
19 appreciate input on these two.

20 (Off-microphone comments.)

21 VICE CHAIR MILLER: Oh, okay. Lynne's
22 suggestion -- this is kind of a -- is to when he

1 gets -- if and when the confirmation takes place,
2 to do a separate letter that says welcome and
3 invite him to the next meeting so that is an
4 invitation letter.

5 So, yes, we'll take that under
6 advisement. So --

7 MS. MERSFELDER-LEWIS: Someone else
8 suggested we just make this letter two pages and
9 anything else that you need to take out, you make
10 an addendum to the letter.

11 VICE CHAIR MILLER: Okay.

12 MEMBER SHINGLEDECKER: So as I
13 understand it, your question is -- we have two
14 recommendations and your question to us is are
15 there others?

16 VICE CHAIR MILLER: Do you agree with
17 these, one; or, you know, and are there others?

18 MEMBER HALL: So I was just talking
19 about Ed about the second one. What we're trying
20 to say is we want to see the JH/CCOM model
21 replicated and that sentence doesn't quite say
22 that the two other Centers should kind of create

1 themselves like -- because it makes them sound
2 like they are equals with JH/CCOM already so I
3 don't know if there's a better way to -- that's
4 what I was trying to ask Ed. To institute that
5 model at other Centers because I think the --
6 just so that paper is specifically that is the
7 way that we have gotten -- and I was saying the
8 other day, with Andy saying they're batting about
9 500 is pretty great so it's actually that model
10 we'd like to see. It's not just the R&D
11 transfer, it's the paper specifically says that.

12 VICE CHAIR MILLER: So what about
13 something like for organizations and -- with
14 structures that facilitate rapid transfers for
15 organizational structures -- I'm sorry, for
16 organizations with structures that facilitate
17 rapid transfer?

18 MEMBER HALL: Similar to JHC/CCOM --

19 VICE CHAIR MILLER: Yes.

20 MEMBER HALL: -- so that you can say
21 you want them to be like JHC/CCOM.

22 MEMBER BRIGHAM: It's just stylistic

1 but when I look at the first bullet and
2 paragraph, all this merged together and so
3 bulletizing them, you'll see PORTS, precision
4 navigation under it, the survey replacement and
5 maybe I'll come up with better language,
6 hydrographic mapping and services overall but
7 particularly in Alaska or somehow particularly
8 closing a hydrographic gap or something in
9 Alaska. We need a little bit more there but I
10 think bulletizing each of these, then my eye
11 would go to those particular things and see them.
12 I think they're -- I know it makes the letter
13 longer and all of those problems but it's a blur
14 to me and it is a nice solid list of things that
15 we --

16 VICE CHAIR MILLER: We have talked
17 about.

18 MEMBER BRIGHAM: Yes.

19 VICE CHAIR MILLER: Yes.

20 MEMBER BRIGHAM: It may be just
21 stylistic we could change that.

22 VICE CHAIR MILLER: Yes, I agree. I

1 was -- again, I was trying to shorten it but
2 right now with 12 point, we're at three pages and
3 --

4 MEMBER BRIGHAM: Oh, okay.

5 MEMBER SAADE: I'd like to see one
6 more in that long list of what you're talking
7 about to make some reference to specifically the
8 funding for hurricane response type of things.
9 But in here, you should say hurricane response
10 with the fact that there's a supplemental coming
11 up.

12 VICE CHAIR MILLER: Disaster response?

13 MEMBER SAADE: I'd say hurricane.

14 MEMBER HALL: Hurricane and flood?

15 MEMBER SAADE: Hurricane and flood. I
16 mean if disaster's good enough, it's good enough.

17 JUDGE SHERIDAN: I mean hurricane and
18 flood makes it very timely and pertinent so --
19 and one thing I've decided it might be wise to do
20 because we've all heard that there's no new
21 money, there's -- instead of requesting
22 additional funding, prioritizing funding, that --

1 MEMBER SAADE: But there is going to
2 be funding coming from the supplemental, that's
3 the whole point.

4 VICE CHAIR MILLER: Yes. Maybe
5 "request" and -- or -- well, the first one is the
6 infrastructure services that -- yes. Does
7 anybody think there's anything major missing that
8 we should --

9 MS. BLACKWELL: Joyce, this is
10 Juliana. I would just recommend instead of
11 saying the 2022 Latitudes-Longitudes Elevation
12 Change Projects -- I mean I know that that is
13 more meaningful perhaps to the group but for us,
14 it's the modernization of the National Spatial
15 Reference System, or NSRS, modernization, that
16 that would link more directly with what we have
17 within our mission priorities.

18 VICE CHAIR MILLER: Say that again,
19 Juliana, modernization?

20 MS. BLACKWELL: The National Spatial
21 Reference System modernization or reverse it but
22 rather than Latitudes-Longitudes Elevation Change

1 Projects.

2 VICE CHAIR MILLER: Okay.

3 MS. BLACKWELL: I mean the NSRS is our
4 mission and so that just makes a cleaner tie to
5 the National Geodic Survey.

6 VICE CHAIR MILLER: Yes, that's fine.
7 That's what I was hoping for, was to make it more
8 clear.

9 MR. EDWING: Well, and so one thing
10 I'm hearing and I think we're mixing a little bit
11 of things in here in this first bullet -- are you
12 advocating for support and increases through the
13 President's request? Or are we, you know,
14 advocating for support through the supplemental,
15 because those are two different processes.

16 VICE CHAIR MILLER: Should I say and
17 should --

18 CHAIR HANSON: I would leave it, yes,
19 the answer to that. I think you want to --

20 MEMBER HALL: Whatever way you get the
21 money.

22 CHAIR HANSON: Yes, whatever way you

1 can get it because if you don't get one, you'll
2 get the other. So I think just mentioning it,
3 it'll add the -- because otherwise, you get so
4 specific you miss an opportunity.

5 MEMBER HALL: And, Joyce, we're not
6 capital -- I mean I know that you capitalized the
7 beginning of each of them but precision
8 navigation, we opted for just italicize, not
9 capitalized.

10 VICE CHAIR MILLER: Oh, okay. All
11 right. Well, I just -- I capitalized it. I know
12 you're not supposed to but I think it looks
13 better personally but we'll let the NOAA editors
14 fight with that. What we're going to have to
15 fight with -- okay, given all you've seen, if you
16 had to take something out of this, what would you
17 take out?

18 CHAIR HANSON: Eight point font.

19 VICE CHAIR MILLER: It works at 10.
20 I've already tried it.

21 MEMBER BRIGHAM: Where did we put in
22 the comment about the Corps-NOAA relationship;

1 was that earlier?

2 VICE CHAIR MILLER: Yes.

3 MEMBER BRIGHAM: Okay.

4 VICE CHAIR MILLER: Twice.

5 MEMBER BRIGHAM: Twice, okay.

6 VICE CHAIR MILLER: Twice.

7 MEMBER BRIGHAM: Because I think it's

8 almost a recommendation to continue but that's

9 okay. If it's twice in there, it's --

10 VICE CHAIR MILLER: Yes. It's in

11 there twice.

12 MS. MERSFELDER-LEWIS: You guys, you

13 could think about what could be an addendum, and

14 so as opposed to taking something out, you could

15 have pieces that in the letter to short it,

16 because three pages is really too long.

17 VICE CHAIR MILLER: Well --

18 MEMBER HALL: I just think if you take

19 it out, it's out of context. There's nothing

20 there for a specific addendum yet. It's try to

21 take some sentences out to shorten it up but --

22 VICE CHAIR MILLER: Well -- and before,

1 I had tried to create an addendum that was kind
2 of a summary so that we get those things in and
3 that has been absolutely kyboshed so, you know,
4 trying to create an addendum that is not -- you
5 know, that is incomplete I don't think works, you
6 know, and Andy advised me he really didn't think
7 it was a good idea to do a summary of the
8 meeting.

9 CAPT ARMSTRONG: I thought the detail
10 was -- for this kind of letter was too much.

11 VICE CHAIR MILLER: Yes. But we've
12 got detail in the letter here so.

13 MEMBER HALL: I think if we could play
14 with it a little bit, I mean have some time to
15 think, walk away and realize what do I really
16 remember about the meeting and what did I want to
17 stress. I think right now, trying to take out a
18 half page is going to be difficult.

19 VICE CHAIR MILLER: Yes. I mean why
20 don't --let's do this. If you're okay with what
21 you've read at this point, I'll make sure I get
22 in any of the things -- I won't be home until

1 Wednesday next week and after I get home, I'll
2 send the draft around, particularly to the people
3 that aren't here right now and I'll play with it
4 and see what I can get in terms of two pages.
5 But that may be the request, is tell me what you
6 think --

7 MEMBER HALL: Yes. Let us help you.

8 JUDGE SHERIDAN: Yes.

9 MEMBER HALL: Yes, put us to task.

10 VICE CHAIR MILLER: Okay. Yes, Rick.

11 CAPT BRENNAN: Just a point of
12 function or mechanics here is that, I guess, as
13 far as process goes, there is a whole process if
14 you really are wanting to invite him. This
15 should not be --

16 MEMBER HALL: We've already done that.

17 CAPT BRENNAN: -- received with the --

18 MEMBER HALL: She's already removed
19 it. It's going to go in a separate letter so --

20 VICE CHAIR MILLER: Yes.

21 MEMBER HALL: -- already talked --

22 DR. BUCHANAN: -- or even a letter,

1 there's a whole process, so you should let us
2 help with that if you do want to give an
3 invitation.

4 MEMBER HALL: We'd already said that.

5 VICE CHAIR MILLER: Okay. I'll put a
6 note at the end of it to --

7 MEMBER BRIGHAM: The most important
8 part of this, from my perspective, is the word
9 "infrastructure" in that particular paragraph and
10 "needs." All the rest is --

11 VICE CHAIR MILLER: Yes.

12 MEMBER BRIGHAM: -- a bit of
13 gibberish. It's important but I think we talked
14 a lot about infrastructure and that's the hot
15 topic now and potential for interest. So, you
16 know, that's -- to me, that's pretty key to this
17 whole letter but maybe I'm not in the majority
18 here.

19 VICE CHAIR MILLER: No, I agree.

20 Andy.

21 CAPT ARMSTRONG: Joyce, I was just
22 wondering if you're looking for shortening the

1 letter and considering the addendum, maybe the
2 specific recommendations could be the addendum.

3 No? You want them --

4 MEMBER HALL: I think that takes power
5 away from the recommendations that we put them as
6 an afterthought. I think I agree with Lawson on
7 that last one because I think our issue paper
8 that will be attached gives you exactly what we
9 want you to do for the facilitating rapid
10 transfer. The one above is a very general all
11 the things we talked about, trying to put it into
12 one kind of here's where we're at. So I would
13 tend to agree with Lawson on that one.

14 But I think putting them in an
15 addendum, I think the thing that's going to get
16 highlighted to him by whatever staffer is going
17 to be the recommendations, right, and probably --
18 and the issue paper, too. So here's "yellow"
19 highlight. It's going to be that bullet point
20 and the bullet points in the two issue papers.

21 VICE CHAIR MILLER: Actually, it may
22 not be so bad. It, right now, is at two pages

1 and I'm at -- no, I'm at 10 point. Yes.

2 MS. MERSFELDER-LEWIS: I'd also
3 recommend that the recommendations go first.
4 It's also -- the two issue papers and the comment
5 that should be first, and things like reporting
6 out that Jeff Lillycrop spoke, that is not an
7 integral -- that's not a recommendation; that's a
8 recap from the meeting which is great to capture
9 but I would put that in an addendum. And I could
10 go through your whole letter and do that once you
11 have the next version you want and just take what
12 out -- if you look at the last letter you did,
13 that is what you did. You put the
14 recommendations in and then you had an addendum
15 with like one page of here's what we also saw at
16 the meeting that was useful or important. If you
17 want people to take notice, you really got to put
18 here's the two issue papers and here's the
19 comments we made on the autonomous strategy right
20 at the very beginning. Thank you, Kim.

21 MEMBER BRIGHAM: Can I ask a technical
22 question again? I think I know the answer but

1 I'm not quite sure. Don't these letters
2 eventually go on the website?

3 MS. MERSFELDER-LEWIS: They're all on
4 the website.

5 MEMBER BRIGHAM: So that -- you know,
6 I -- who I want reading this is staffers and
7 other people. Yes, the Admiral would and
8 Administrator but I actually think that they
9 might look at this stuff to see what one of the
10 FACAs presents and so I think the stakeholders
11 and actors in this thing is a lot larger than
12 just the chain of command.

13 MS. MERSFELDER-LEWIS: So you guys can
14 imagine for the next meeting, if we're lucky, his
15 staffer or he might look at this letter as prep
16 for the next meeting maybe, if we were lucky?

17 (Off-microphone comments.)

18 MS. MERSFELDER-LEWIS: Then with that
19 in mind, what would you want in your letter for
20 him to see on the first paragraph which he may
21 not get any farther than that?

22 MEMBER HALL: And remember, he's Navy

1 so he's used to bottom line up-front but

2 --

3 MS. MERSFELDER-LEWIS: Yes, exactly.

4 So I think Kim's got it like 100 percent. You
5 got to put what you want him to vote on. If its
6 precision navigation and RNV, put precision
7 navigation and RNV, and we've given you 10
8 recommendations in the two attached papers and
9 the -- we pdf the papers to the letter so they
10 don't get lost as a separate attachment.

11 MEMBER BRIGHAM: I -- you -- I meant
12 staffers on the Hill and stuff. I mean that's
13 what I was really meaning, not the chain of
14 command staff.

15 MS. MERSFELDER-LEWIS: Right, but it's
16 less likely that staffers on the Hill will see
17 the letter. They might see it if we gave it to
18 them, but they'll more likely see issue papers.

19 MEMBER HALL: I think it's worth a try
20 and, Joyce, I'm happy to help with that.

21 VICE CHAIR MILLER: Yes. I -- it's
22 just that for instance, the recommendation --

1 making the recommendations makes sense standalone
2 by themselves without, say, the explanation of
3 JH/CCOM, you know. Would anybody really
4 understand what that meant?

5 MEMBER HALL: So this is the typical
6 theme that you get with an administrator,
7 especially someone who used to be an Admiral -- a
8 Navy Admiral. He knows that. That's -- he
9 really only wants to see a half page or one
10 bullet point and that's all that he's really
11 going to look at. So I understand giving the
12 context is important but right up front, he
13 should kind of know NOAA. There -- they should
14 have prepped him a little bit so these words
15 aren't -- and if he doesn't know, then he'll ask
16 more questions and he'll read further on so it's
17 that kind of pyramid structure where you give
18 them the bottom front, this happened or this is
19 what we think and then this is why we think that.
20 I don't think it's, you know, an inappropriate
21 way to approach it.

22 VICE CHAIR MILLER: Okay. Well, are

1 we satisfied with the content that is there now?

2 MEMBER HALL: Absolutely. No, and
3 thank you so much always for putting that
4 together because it's -- that's the hard -- it's
5 easier for us to come in here and edit and give
6 you suggestions than it is to put it all down on
7 paper first. So you always do God's work. Thank
8 you.

9 VICE CHAIR MILLER: Okay. It's 2:07.
10 Bill, we will certainly miss you.

11 CHAIR HANSON: We got -- don't you
12 have to talk a little bit about the next meeting?

13 RDML SMITH: Yes. I can set that up
14 for you if you'd like, Joyce, and then turn it
15 over to you --

16 VICE CHAIR MILLER: Sure.

17 RDML SMITH: -- to -- for further
18 discussion. We have the next meeting. It sounds
19 like everyone is happy with Miami to coincide
20 with the PORTS dedication. If for some reason
21 that falls through, we can have a backup to the
22 DC area which we've been wanting to do anyway and

1 that's logistically pretty easy for us.

2 And then -- so that's Spring. Next
3 Summer-Fall, we're planning on Alaska with, I
4 think, a leaning toward Juneau at this point but
5 we can work that out as we look at options for
6 facilities.

7 After that we have a notional plan
8 that goes all the way out to 2025 but after that
9 we have sort of penciled in DC area and then a
10 mid-Atlantic port such as Philadelphia. And
11 we're at a sort of point in our contracting for
12 support for these meetings that we'd like to put
13 in a two-year contract, and we have to have a
14 sort of a notional idea of where we plan to go in
15 2019. We can change it if necessary but it --
16 we'd at least like to start with that. There had
17 been a suggestion for Puerto Rico at some point
18 as well if that's -- that would be important.

19 So with that introduction, I will turn
20 over the deliberations on that to Joyce.

21 VICE CHAIR MILLER: My immediate
22 comment, I believe Florida was on our horizon

1 regardless of PORTS or the recent disaster down
2 there. But I don't think we should forget
3 somewhere in Florida, particularly given Irma,
4 that if we -- I would suggest that if we go to --
5 if we have to go to DC next and don't go to
6 Miami, that we might then go to -- well, maybe go
7 to Alaska first and then go to Miami. But I
8 think Miami or somewhere in Florida should stay
9 on the bill.

10 MS. MERSFELDER-LEWIS: Please, can you
11 talk about 19 because we're really set on --

12 RDML SMITH: So I think what she's
13 suggesting is if we switch to DC, that we then
14 use the DC that's in 19 and go back to Florida.

15 VICE CHAIR MILLER: Yes.

16 RDML SMITH: So we would just switch
17 those two spring meetings.

18 VICE CHAIR MILLER: Yes.

19 RDML SMITH: And then we're back to
20 mid-Atlantic in the sort of larger rotation that
21 we had -- that we discussed a few meetings ago.

22 VICE CHAIR MILLER: That would seem to

1 make sense to me, yes.

2 RDML SMITH: So should we carry on
3 planning with this for rough budgeting purposes,
4 etcetera? I welcome other comments.

5 MEMBER HALL: I concur. And I really
6 don't have any objections, either, right, so.

7 VICE CHAIR MILLER: Okay.

8 CHAIR HANSON: So as we wrap up with
9 the business, we always conclude with closing
10 comments going around the horn again one more
11 time for anything that you think we might have
12 left. I'm going to start with Susan. We'll go
13 this way and then Lawson and then myself. We'll
14 close it up -- Admiral Smith as well along the
15 way there. So Susan, what did we forget to
16 cover?

17 MEMBER SHINGLEDECKER: My summary
18 comments this morning kind of covered most of my
19 thoughts. What struck me was, you know, in the
20 days leading up to the meeting thinking gosh,
21 should we really be having this meeting in New
22 Hampshire when this hurricane is about to hit the

1 U.S., and are we detracting from attention and
2 where it should be placed, and I think it just
3 speaks volumes to the teams that the three
4 offices have behind them and their leadership
5 that they were able to be here for the whole
6 meeting, giving us their time and attention and,
7 you know, the work is getting done behind the
8 scenes and so we just really appreciate your time
9 and your attention and frankly, I'm astonished
10 and impressed that you can get it all done.

11 CHAIR HANSON: Mr. Kelly.

12 MR. KELLY: I think we've covered
13 quite a bit during the course of the meeting and
14 I think we summed it up fairly accurately. I
15 once again want to say how really impressed with
16 UNH and some of the technological things and some
17 of the visualization stuff that's starting to
18 come out of there, because so many times in the
19 past, I've seen output from scientists that I've
20 said, "eh," you know, I don't know what it means.
21 But when you can see things like that -- and I
22 think the technology and the, you know, software

1 is getting to be so robust that it makes people
2 like -- operating folks like me start having
3 ideas as to what we could do with some of this
4 stuff. And that leads towards productive
5 products and I'm quite excited about that.

6 MEMBER MAUNE: I sort of said it this
7 morning but I really appreciated the focus on
8 education, science, technology, R&D, that kind of
9 stuff. I think I learned from this meeting than
10 I have in the prior ones and I really appreciate
11 that.

12 MEMBER SAADE: I think we've covered
13 all of it. I want to say thanks to the entire
14 panel for putting your faith in me for coming up
15 as my new position, really appreciate the
16 opportunity. I'm really looking forward to it
17 and I hope we can meet the standards that we've
18 set in these last couple of meetings,
19 particularly this one. The bar has been set
20 really high. It will be fun to try and get --
21 push it higher. Thanks.

22 CHAIR HANSON: Kim.

1 MEMBER HALL: So some of you all
2 notice that I had sent you a spreadsheet today.
3 It's still going to grow. I mean that is a
4 really basic rough outline. Talking, emails back
5 and forth with Shep earlier. I've got some work
6 to do on how we actually capture each
7 individual's numbers. So I'm still going to work
8 on that within the next couple weeks. I have
9 another FACA meeting next week but I plan to keep
10 the momentum that we have built there and get
11 that sorted out. But plan on it being a living
12 document. It may never be final or hopefully
13 never final because we'll keep updating it.

14 But I appreciate everybody's interest
15 in letting me push a little bit as strategery, as
16 they say, and process. So I am very much
17 thankful for that and I look forward to co-
18 chairing with Dave, the Planning and Engagement
19 working group and hopefully they've already had a
20 running start with that this meeting. Thank you.

21 MEMBER MAUNE: And Kim and I will need
22 to work together to see how we translate her

1 priorities and things, the priorities we come up
2 with into the future issue papers because right
3 now we don't have anybody committed to write any
4 issue paper. But I think that's going to result
5 out of the process that you're starting.

6 MEMBER HALL: Absolutely and I really
7 hope that we can use that process to do that
8 because I know there's a lot of interest in
9 writing papers but part of the problem is that if
10 somebody writes a paper, then it's the job of the
11 panel to edit and comment and be part of it. So
12 we've got 10 outstanding papers, that makes it a
13 lot harder in a time sense. So if we can do that
14 prioritization which also includes the issue
15 papers and how we attack those -- that doesn't
16 mean people can't be writing them right now so
17 that when we get to that point, we've got
18 something in hand but I think as it looks at the
19 work that we're doing, it allows us to have that
20 flexibility if Shep comes to us or Juliana or
21 Rich to ask a question and ask us to comment on
22 something. We have that power and we're not tied

1 up doing too many of our own things. Thanks.

2 MS. BLACKWELL: I just want to thank
3 everybody for their support and understanding,
4 appreciate the opportunity to brief on the
5 terrestrial datums and to give you all updates on
6 what's happening, you know, realtime with the
7 damage assessment, imagery collection. And just,
8 you know, we do go back and talk to our staff
9 about things that come up and things that we want
10 to be better prepared for or look into, even if
11 it's stuff that doesn't rise to the level of
12 being a recommendation to the Administrator. So
13 some of the things we'll be following up on are
14 including the VDatum and just other ways of
15 improving our outreach and education.

16 But if at any time there are things
17 that you think of, you know, even if they're just
18 -- they're small things that you want NGS to get
19 back to you on, you know, we're here and you can
20 just contact me and we'll try to get you the
21 information you're seeking. Whether it's remote
22 sensing information or something to do with

1 datums or something that hasn't been discussed
2 that you're interested in knowing about, there's
3 always some help so please don't hesitate to
4 contact us. Thanks.

5 MR. EDWING: So without repeating
6 them, I'll just circle back to my comments this
7 morning about the importance of merging
8 technologies and infusing them into our systems.
9 This is -- that's just critically important and
10 that's really what a lot of this meeting was
11 about but I'll also say, you know, every time I
12 listen to one of these panels, I always learn new
13 things. I think there's a lot of value in these
14 panels because I think there are connections that
15 are being made; you know, not just among the
16 membership but often with members of the audience
17 and new relationships and those sorts of things.

18 But one thing that I saw that I really
19 liked was these kind of little 10-minute updates
20 this morning, and I think it maybe gets to Anne's
21 kind of request which would be circling back and
22 kind of checking on things. And I think these

1 little 10-minute updates might be a very
2 effective way to do that, you know, moving
3 forward so that might be a feature the panel
4 wants to consider, you know, building into future
5 agendas. Thank you.

6 CAPT ARMSTRONG: Well, I would like to
7 thank the panel Bill and the Admiral for sort of
8 coming up to New Hampshire for this meeting. I
9 think that we're really pleased that you did and
10 on behalf of the Center and Larry and myself, we
11 really appreciate the time and attention the
12 panel played to -- paid to our Center. I think
13 getting two full afternoons of your time was very
14 generous and we feel very fortunate that you were
15 able to put that much time in visiting us. Thank
16 you.

17 CHAIR HANSON: Gracious as always;
18 thanks, Andy. Lawson.

19 MEMBER BRIGHAM: Yes. Thank you, Mr.
20 Chairman. I think one of the real positives of
21 the meeting -- maybe we should even hint at in
22 the letter -- is the Congressional involvement

1 this time was quite robust compared to other
2 meetings. And so great involvement with the
3 staffers and a couple of great presentations by
4 quite eloquent legislators. And so I think
5 that's real positive. If we can keep that going
6 at each of these meetings, that's great and
7 connections with the Hill.

8 Like I said at lunchtime, I've been
9 honored to serve here and it's been a great
10 education for me and I very much enjoyed and
11 respect the great talent with have in NOAA and
12 all of the staff and the maritime professionals
13 we have. They give their time on the HSRP.

14 It's kind of interesting I spent my
15 life in the Coast Guard and difficult many times
16 to argue -- we saw it every day, of course --
17 that we relate to the sea and we see it around
18 HSRP but boy, it's a tough argument for Iowa and
19 North Dakota but we're doing it and everyone that
20 serves on HSRP becomes a good ambassador and I
21 think reaches out to a broader community and
22 educates. Our issue papers are right there at

1 the heart so we spread them around the community.
2 So thank you very much.

3 CHAIR HANSON: Great. I'm going to go
4 next and then Joyce and then Admiral Smith. Said
5 a few things at lunchtime but I guess a little
6 more of a point is I want to congratulate HSRP
7 for the focus on technology innovation. As
8 somebody who's spent most of my conversations
9 with the Corps or the Region -- I know Jeff so
10 well -- is pushing for R&D funding because I
11 believe if we don't invest in research, we are
12 really going to fall behind the rest of the
13 world. It's a great country. We have a lot of
14 great assets and we need to use them and we don't
15 need to defer to others. We need to be leading
16 the world in all these issues. We are a maritime
17 nation and we need to act like it.

18 To the point that these FACAS -- you
19 have an opportunity to serve on others. I
20 encourage you to do that. I found this to be a
21 very good venue to stop the NOAA whining, as my
22 wallpaper says, and it gives you a chance to

1 engage.

2 And to Lawson's point about Iowa and
3 North Dakota, so one of the other FACAS I serve
4 on is supply chain and it's with Department of
5 Commerce, Joint DOC/DOT FACA. And Iowa, soybean
6 growers who were our best advocates in the whole
7 Harbor Maintenance Trust Fund discussion. You've
8 got corn grower. You've got coal guys. When
9 they start talking about the stuff we do, it
10 makes it a lot easier conversation. That's how
11 you bring them in so it's kind of just changing
12 that conversation a little bit.

13 So keep the focus on innovation, not
14 just ASVs or AUVs, whatever you want to call
15 them. Look for new technologies. Look for
16 things that NOAA and collaborators should be
17 working on as we move forward. I ask students
18 all the time when I get speaking to universities,
19 containers are our generation, right? So what
20 are you guys going to come up with that's better
21 than containers? And the thought process just
22 being don't pen those guys in. So much has

1 happened just in the last 10 years of technology.
2 Think what's going to happen in the next 10
3 years. I don't think we can -- we'll have a
4 clue.

5 So -- and as to a challenge maybe to
6 the panel remaining, one of the things I found in
7 HSRP, I think you've got a very good group now,
8 very proactive but I challenge you to aim a
9 little higher than you historically have done.
10 We had a lot of discussion about operational
11 issues and you need to understand operational
12 issues as you advocate for an agency or cause.
13 But if you're not looking to change the
14 foundation, the way things get done, then there's
15 really not a point to an advisory committee.
16 It's just -- then you're just kind of nitpicking.
17 So aim higher; that would be my challenge to you.

18 As I mentioned, it's been a privilege
19 and honor and maybe as a symbolic act, I'll now
20 turn it over to Joyce and let her have the last
21 word.

22 VICE CHAIR MILLER: Well, I thank you

1 all for the -- my election as Chair and I'll try
2 to do as well as Bill did. I did learn a whole
3 lot. I just learned something more; aim higher.
4 So we will try to aim higher. I think -- I'm
5 really pleased how much the panel has supported
6 NOAA and I think that's great. We also need to
7 criticize them always.

8 Anyway, thank you, Bill, and also, I
9 wanted to say to Andy once again, great time last
10 night and I've been to the Center many times but
11 I always see something new.

12 RDML SMITH: Thank you, all. What a
13 great meeting and thank you to our hosts up here
14 in New Hampshire. This has been -- it's been
15 great. I -- you all never disappoint in your
16 hosting but this was really spectacular with the
17 on-the-water demonstration in particular. That
18 was really, really impressive.

19 A couple of things -- agree with
20 everything everybody said. A couple of things I
21 just wanted to highlight were Kim's really
22 proactive and top down approach to figuring out

1 what we should doing and thinking about it
2 strategically. These are all the things we could
3 do. We can't do everything at once. You know,
4 what should we be doing first and when is it
5 right, when is it timely to be doing these
6 things.

7 And the second was a comment that
8 Captain Brennan made a lunch about a
9 communications plan, and I think that's really
10 about -- look, if we believe in a recommendation
11 that we're -- that we make here, we should try to
12 get it effected. And writing a letter and
13 thinking that that's the end of it is sort of
14 like writing a weather forecast in "all caps" and
15 putting it out in some obscure way and expecting
16 everybody's going to do the right thing. We need
17 to own the communication to the point of action
18 and that's -- you know, I think that's a -- you
19 know, when we think about these things, we need
20 to think about how we can use our influence and
21 the various ways we have of communicating to
22 effect those -- the change. And I think that's

1 in the spirit of Bill's call to us to think
2 bigger and aim higher, to think about how we're
3 going to effect the change that we envision here
4 in this group.

5 So I'm excited to continue to work
6 with you all and although we will miss those that
7 are leaving us, I'm excited about the level of
8 talent that you all have been able to attract
9 through your work here on the panel and we're in
10 good hands going forward so thank you.

11 CHAIR HANSON: You definitely
12 upgraded.

13 VICE CHAIR MILLER: Safe travels
14 everybody.

15 (Whereupon, the above-entitled matter
16 went off the record at 2:26 p.m.)
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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
Public Meeting

Before: National Oceanic & Atmospheric Administration

Date: 09-13-17

Place: Portsmouth, New Hampshire

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