

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  
APRIL 19, 2017

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The Hydrographic Services Review  
Panel met in the Kimpton Hotel Monaco, Paris  
Ballroom, 1101 4th Avenue, Seattle, Washington,  
at 8:30 a.m., Joyce Miller, Vice Chair,  
presiding.

MEMBERS PRESENT

JOYCE E. MILLER, HSRP Vice Chair  
DR. LAWSON W. BRIGHAM  
LINDSAY GEE  
KIM HALL  
EDWARD J. KELLY  
CAROL LOCKHART  
DR. DAVID MAUNE  
SCOTT R. PERKINS  
CAPTAIN SALVATORE RASSELLO  
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

DR. LARRY MAYER, Co-Director, NOAA/  
University of New Hampshire Joint  
Hydrographic Center

## STAFF PRESENT

REAR ADMIRAL SHEP SMITH, HSRP Designated  
Federal Official; Director, Office of  
Coast Survey

RUSSELL CALLENDER, Assistant Administrator,  
NOS

MIKE ASLAKSEN, Chief, Remote Sensing  
Division, NGS

MARK ARMSTRONG, Geodetic Regional Advisor,  
NOAA/NGS

GLENN BOLEDOVICH, Policy Director, NOS  
CAPTAIN RICK BRENNAN, Chief, Hydrographic  
Surveys Division

JIM CROCKER, Chief, Navigation Services  
Division

BEN EVANS, Chief, Coast Survey Pacific  
Hydrographic Branch

RACHEL MEDLEY, Acting Deputy Hydrographer  
LYNNE MERSFELDER-LEWIS, HSRP Coordinator  
ROLIN MEYER, Branch Chief, Field Operations  
Division, CO-OPS

TRAVIS NEWMAN, Marine Chart Division  
AMANDA PHELPS, Budget and Program Analyst,  
OCS

JIM RICE, NOAA/NOS

E.J. VAN DEN AMEELE, Chief, Coast Survey  
Development Laboratory

**ALSO PRESENT**

**DORREL DICKSON, Geospatial Survey Analyst,  
GIS Department, Tulalip Tribes of  
Washington**

**PARKER MACCREADY, Professor of Oceanography,  
University of Washington**

**GAVIN SCHROCK, PLS, Administrator,  
Washington State Reference Network**

**LINDA STYRK, Executive Director, Puget Sound  
Pilots**

**CAPTAIN JOHN VEENTJER (U.S. Coast Guard,  
ret.), Executive Director, Marine  
Exchange of Puget Sound**

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

2 8:30 a.m.

3 CHAIR HANSON: All right. Good  
4 morning, everyone. It's 08:30. Glad everybody -  
5 - I think we are all here. Captain Rassello,  
6 good morning, sir. Scott. I think I'm finding a  
7 sweet spot here.

8 Good morning. We call to order the  
9 second day of the HSRP spring meeting. Admiral  
10 Smith, do you have any announcements?

11 RADM SMITH: I can't think of any  
12 myself, and I have not been directed to make any.

13 CHAIR HANSON: That's very safe, sir.  
14 Just a couple of points to keep in mind for this  
15 morning is that --

16 RADM SMITH: I'm sorry, I forgot I was  
17 directed. And that is just that I -- just  
18 apologies that I'm here just through this  
19 morning's break. I'll pick up and head to the  
20 airport.

21 CHAIR HANSON: All right. And I think  
22 we have the same thing for Dr. Callender.

1 DR. CALLENDER: Yes.

2 CHAIR HANSON: So if we have anything  
3 provocative or challenging, you've got a couple  
4 of hours guys.

5 So I think yesterday we got off to a  
6 good start. Joyce, you have been asked to help  
7 us do some highlights.

8 VICE CHAIR MILLER: Yes, good morning.  
9 We had a number of really excellent updates and  
10 talks yesterday. I went through and just  
11 highlighted things, take-homes that I think, and  
12 I would invite the panel members to add in  
13 anything that I may have missed or maybe I didn't  
14 think it was important and you did.

15 So we opened with getting Lindsay  
16 finally sworn in. This is your third meeting,  
17 Lindsay?

18 MEMBER GEE: Two and a half.

19 VICE CHAIR MILLER: Two and a half,  
20 right.

21 MEMBER GEE: And one virtual.

22 VICE CHAIR MILLER: And one virtual.

1 And from Dr. Callender's talk, I found it  
2 interesting to read this. As we know, things  
3 must change when you have administration changes.  
4 And I found the three refocused priorities, and I  
5 won't repeat what Russ said that this doesn't  
6 mean we are really doing anything much  
7 differently, but were -- and so those three  
8 points were safe and efficient transportation;  
9 preparedness and risk reduction; and stewardship,  
10 recreation and tourism.

11 And so I think from our standpoint, as  
12 a panel, that it helps if we know what those  
13 priorities are and can address them in what we  
14 produce and write.

15 And just a side thought there, we  
16 talked about infrastructure quite a bit. And our  
17 next agenda topic is talking about our papers.  
18 And I'm always thinking, where do we go next?  
19 What are we going to do?

20 And I'll just throw out an idea that  
21 we -- all our papers talk about what NOAA does in  
22 bits and pieces, in different bits and pieces.

1 We might consider an infrastructure paper  
2 highlighting sort of the benefits of NGS and CO-  
3 OPS and -- to our nation's infrastructure.

4 I don't really have any specific  
5 recommendations, at this point, but it's a topic  
6 I'll throw out, and we will probably talk about  
7 it later.

8 Joshua Berger, Washington State  
9 Governor's Lead on Maritime Industry Sector, I  
10 think we all know, and particularly those that  
11 live here in the Pacific Northwest, how important  
12 maritime activity is. And I particularly found  
13 interesting the idea of the military to mariner  
14 transition.

15 I thought that was very innovative and  
16 possibly important, because there just aren't  
17 enough mariners any more, partly because the U.S.  
18 shipping industry has gone down.

19 Captain Jason Hamilton of the Healy,  
20 we have talked about the Arctic. Dr. Lawson  
21 Brigham is an expert there. I found his  
22 statistic that only 3 percent of Arctic corridors



1 are surveyed to modern standards. It just  
2 reiterates what we have already read in an Arctic  
3 paper.

4 And again, so those were -- and then  
5 Lieutenant Colonel Andrew Olson, again, this was  
6 a U.S. Army Corps talk. And we have talked  
7 repeatedly in many sessions about the  
8 relationship between the Army Corps and NOAA and  
9 data issues, which Admiral Smith later in the day  
10 completed that.

11 I do agree with you that I wish the  
12 Army Corps folks had been here for your talk. I  
13 think it would have been enlightening.

14 I'll stop there for a minute. That  
15 was our morning, part of our morning session.

16 Do any of you have thoughts? Any of  
17 the panel have additional thoughts on important  
18 issues that were brought out there?

19 Okay. As always, we appreciate the  
20 three updates from CO-OPS and NGS and then, of  
21 course, from OCS. I think the four goals of NGS  
22 -- or of CO-OPS are very realistic, and you have

1 got a lot on your plate is all I can say.

2 I think the importance of NGS,  
3 National Geodetic Survey under Juliana Blackwell,  
4 I don't think we can highlight enough the  
5 importance of those products to our  
6 infrastructure, basically.

7 And then, of course, Admiral Smith, I  
8 think we -- in this meeting, the four papers  
9 which we now have at hand, the National Charting  
10 Plan, the External Source Data Policy,  
11 Hydrographic Survey Priorities, and a 20-year  
12 Survey Plan, and then an Autonomous Vehicle  
13 Roadmap, I think we need to -- we have been asked  
14 to comment on those, and I think that's an  
15 important part of our product for this meeting  
16 personally.

17 And we will be talking about our  
18 papers shortly. There is a tremendous amount of  
19 overlap there, and we need to, with the National  
20 Charting Plan, the External Source Data Policy,  
21 and Hydrographic Survey Priorities, we need to  
22 look at our papers closely to make sure that we

1 are very much in line with what we have learned  
2 this session. There is a lot of moving targets  
3 right now.

4           Something I as a surveyor found  
5 particularly interesting, particularly since I  
6 was one of the people that did the survey after  
7 the QE2 went aground, was the impact that had on  
8 national priorities, just as a personal aside.

9           I was with SEIC at the time and we did  
10 the first multibeam surveys and part of that was  
11 that area where the QE2 went aground, which was a  
12 boulder field, basically.

13           Okay. Any comments, further comments  
14 from the panel on that review? Kim?

15           MEMBER HALL: I just want to reiterate  
16 and -- for the advantage for everybody in the  
17 room. It was very helpful, and it will continue  
18 to be very helpful to hear from NOAA, from CO-  
19 OPS, NGS, and OCS about the things that HSRP can  
20 do for you.

21           And I will go a little bit into this  
22 when we get to the issue papers, but I think

1 sometimes the tail wags the dog. And so it's  
2 very helpful to know that there are four  
3 documents that we can dig into and provide value-  
4 added to NOAA. And to me, that is a little bit  
5 better than trying to figure out what the next  
6 issue paper is going to be, if we need it.

7 I think we have enough work on our  
8 plate when it comes to trying to figure out how  
9 to build comments for that. I'm not sure we will  
10 be able to do it at this meeting for some of the  
11 other ones that we have just recently been  
12 exposed to.

13 So I just kind of wanted to reiterate.  
14 Thank you again, Shep, for that and, I had a nice  
15 chat with Juliana yesterday, and I think it is  
16 always fun to hear what is going on with CO-OPS  
17 and how overburdened they kind of are. Thanks.

18 MEMBER SAADE: Okay. Any others?  
19 Lawson?

20 MEMBER BRIGHAM: Just to reiterate  
21 what Rich was saying, I mean, for CO-OPS. I  
22 mean, the public/private partnership thing is a

1 golden nugget -- and at these times and in this  
2 administration, so pushing that concept for  
3 PORTS, another opportunity might be, who knows, a  
4 gold mine.

5 MEMBER SHINGLEDECKER: I would just  
6 also pass on the way you all presented the levels  
7 of partnerships and the type of partnerships and  
8 kind of an infographic method was really clear.  
9 And I think that so many times the topics that  
10 you all work on are so complex that especially  
11 communicating with a new administration, I  
12 thought that was an excellent way. And the more  
13 that you can continue to create products in kind  
14 of that infographic way, really, really great way  
15 to communicate.

16 RADM SMITH: Yes, I really have one  
17 word for that and it's Kristin Crossett.

18 VICE CHAIR MILLER: That's two words.

19 RADM SMITH: Yes. Can I add one  
20 thing, Joyce?

21 VICE CHAIR MILLER: Sure.

22 RADM SMITH: And that is that the

1 theme that I picked up through the three  
2 directors' talks, well, it's actually other two  
3 directors' talks, which we didn't talk about, and  
4 that was not just how to get our data out to be  
5 more useful to the world, but some of our  
6 technology.

7           And to the extent that we have  
8 algorithms or software that we have developed,  
9 oftentimes those are useful for others. It's  
10 something that I think we have been, frankly,  
11 lousy at historically of how to do that, how to  
12 manage that IP transfer, and there is a more  
13 elegant way to say that.

14           And I think we are getting better at  
15 it. And all three of the offices are getting  
16 better at it. And I think it's something we are  
17 taking some pride in, and it's a point of value  
18 delivery to the nations.

19           So it's a challenge to ourselves a  
20 little bit to start to leaven those to get those  
21 to the surface a little bit. I think there is  
22 something else to celebrate.

1           RADM SMITH: Do you want to comment on  
2 that, Joyce? Regarding that specifically, I  
3 think tomorrow we are going to, in the technology  
4 session, talk about some of the success that Ed's  
5 highlight of the technology transfer specifically  
6 from CCOM, but I agree, I think it is --  
7 actually, not waiting for people to grab stuff,  
8 but actually managing the technology across the  
9 organization and out.

10           And so that needs, I think, a closer  
11 partnership. It's not a -- it's a different  
12 relationship with industry. I think sometimes  
13 there has been a standoff to well, you know, you  
14 might have some conflict when that happens, but  
15 engaging earlier and trying to transfer, with an  
16 aim to transfer is kind of important, I think.  
17 All right. Thank you.

18           VICE CHAIR MILLER: Okay. Thanks,  
19 everybody for great comments.

20           In the afternoon, we heard from Travis  
21 Newman on the National Charting Plan. I think we  
22 are going to have further discussions today, so I

1 won't -- my only comment is I think you need to  
2 show the soundings wherever you can. I think  
3 that's important.

4 Jan Newton, Dr. Jan Newton, the head  
5 of NANOOS, these IOOS projects are very far  
6 reaching, and I didn't have any specific comments  
7 on her talk, except that she talked about maximum  
8 discovery, and I think that's a useful concept as  
9 well.

10 And then I think Jeff Hummel from Rose  
11 Point Navigation certainly I think something we  
12 need to consider is the National Resource Council  
13 Commission, Charting a New Course, that was 1994,  
14 whether we, as a panel, think a re-up on that is  
15 a useful suggestion or a recommendation.

16 And Jeff Siegel from ActiveCaptain,  
17 invaluable information on crowdsourcing and how  
18 he is doing it. I think there, something that I  
19 noted was that OFS tide information is critical  
20 to make crowdsourcing work. It's something that  
21 if you survey in the deep sea like I used to do,  
22 it doesn't matter. But in coastal areas, it



1 matters a whole lot.

2 Yes, and then Admiral Smith wrapped up  
3 with the underlap issue. I believe we are going  
4 to probably in our discussion of the papers go  
5 back into that. So I'm not going to spend any  
6 great amount of time on that right now.

7 I think disproving soundings, we had  
8 an interesting exchange over breakfast about  
9 whether that is a crowdsourcing thing or not. Do  
10 you really want people driving toward a known,  
11 perhaps, dangerous object? I'm not quite sure  
12 whether that is a great idea. It depends on how  
13 deep they are. And if you don't know how deep  
14 they are, then it's a hazard.

15 Panel, any further comments on the  
16 afternoon's talks from -- any comments or  
17 questions from the audience or from other NOAA  
18 experts? No.

19 CHAIR HANSON: All right. Thank you,  
20 Joyce. Great recap. And thanks to the panel for  
21 the discussion as well.

22 Before we get into the next

1 discussion, I just want to real quickly review  
2 the day's panels. We are going to talk about --  
3 briefly about our issue papers this morning, The  
4 Planning Engagement Working Group. Then we are  
5 going to have a panel discussion late this  
6 morning. Partnerships for the Pacific Northwest  
7 on and off the chart. We have some local  
8 stakeholders.

9           Then this afternoon, the panel is  
10 going to take a field trip. Before you do that,  
11 we are going to hear a luncheon speaker: Heather  
12 Stebbings from Pacific Northwest Waterways  
13 Association. I think you will find them to be an  
14 interesting group that I think might be the best  
15 port advocacy group in the country.

16           They are very well-organized. Most of  
17 their issues are Corps. In fact, when I asked  
18 them to speak, they said well, we don't know a  
19 lot about NOAA. I said well, they need to know  
20 us more, because they do have pilots and ports as  
21 part of their membership and a lot of common  
22 issues.

1           And I think it will be interesting to  
2 learn more about what they are doing and see how  
3 they can interact with NOS as well.

4           Just to give you an idea, their  
5 effectiveness, for those of you who have gone  
6 through March Madness in Washington, D.C. when  
7 all the groups come to Washington to beg for  
8 money that is not there, typically, you will make  
9 Hill visits and you bounce from office to office,  
10 right?

11           Well, PNWA actually sets up a room in  
12 the House side one day or a room on the Senate  
13 side the next day and the members actually line  
14 up to talk to them. So very powerful, very  
15 effective and I think it's a good group for us to  
16 learn more about.

17           So with that, let's go ahead and jump  
18 into today's activities. Dave Maune and Joyce,  
19 would you lead us through the next agenda item?

20           VICE CHAIR MILLER: Dave, I'm going to  
21 let you take lead on this.

22           MEMBER MAUNE: Okay.

1                   VICE CHAIR MILLER: My voice is not  
2 great today.

3                   MEMBER MAUNE: Thank you. A year or  
4 two ago we decided that one of the more important  
5 things that the HSRP could do would be to  
6 identify issues involving the business that we do  
7 here and come up with recommended solutions to  
8 resolve those issues.

9                   And at each session, we come up with  
10 topics that we are going to address over the next  
11 six month period or so. And last September, we  
12 identified four issue paper topics that we then  
13 have monthly meetings on to determine how to  
14 modify/improve those issue papers.

15                   In your packet, originally, you had  
16 four issue papers, and then this morning, we  
17 issued three of them that had changed just last  
18 week. But in the order of -- but for all of  
19 them, we are interested in knowing how NOAA feels  
20 about the issues as we have identified and our  
21 recommended actions.

22                   And so we don't want to recommend

1 something that you violently disagree with. And  
2 so we hope that we can get some input from you on  
3 that as well. Yes?

4 MEMBER BRIGHAM: I had a technical  
5 issue that transcends all of these papers. In  
6 the Precision Navigation paper, the draft, there  
7 are in parentheses the reference for a particular  
8 number. So I take across the board on all of  
9 these, like the one on boating safety, 87 million  
10 recreational users, and my first question is who  
11 says?

12 And I don't care who says as long as  
13 it's reality and not fake news. Is it a  
14 government statistic or whatever?

15 So I think throughout these papers, we  
16 should even adjust the old ones if there isn't a  
17 reference to a number -- and that's the first  
18 question in everybody's mind I think, and so --  
19 but we are a little inconsistent, but I see the  
20 Precision Navigation paper does reference where a  
21 particular number comes from in an Alliance  
22 Global or something. That's fine to me.

1 MEMBER MAUNE: Yes.

2 MEMBER BRIGHAM: So some consistency.

3 But really the big numbers, whose authority --  
4 where do they come from?

5 MEMBER MAUNE: Yes. I'm sure there  
6 will be questions on how we go about coming up  
7 with these issue papers and do people agree or  
8 disagree with the way we worded the questions.  
9 Kim?

10 VICE CHAIR MILLER: I want everybody  
11 to keep in mind that we have a panel starting  
12 after the break at 9:45. We need to make some  
13 decisions about where to go with these papers.  
14 And so I would plead that -- I know there is some  
15 discussion that needs to be had, but we also need  
16 to move on.

17 And I would also say that in the past  
18 and one reason we had, how many meetings, Dave,  
19 five or seven, between --

20 MEMBER MAUNE: Seven.

21 VICE CHAIR MILLER: -- we had seven  
22 meetings. In the past, we have been not

1 criticized, but it has been noted that we spend  
2 too much time editing these papers in the  
3 meetings. We had seven chances for people's  
4 comments on these papers.

5 I'm not saying we are not going to  
6 change anything, but we have got a very limited  
7 time today to discuss this. So that's my two  
8 cents for that.

9 MEMBER MAUNE: Yes. We have just  
10 about 40 minutes to discuss four issue papers  
11 here, so that's not much time. We have, okay,  
12 all Thursday afternoon to further discuss. Okay.  
13 So we don't need to finalize these papers this  
14 morning. Okay.

15 Well, the first one on the schedule  
16 was Improving Data Access for You.

17 MEMBER HALL: I think we had a  
18 question though. So I was almost on all of the  
19 calls and I did usually reference something. We  
20 had an NRT paper that we ended up closing down  
21 because it wasn't something that was necessary  
22 for NOAA.

1                   So I really think we are at a  
2 crossroads right now. I think, you know, I came  
3 on this a year ago and I know that it was this  
4 really great way for us to show some value to  
5 NOAA. And so I don't want to undo that work, but  
6 I think we are at a crossroads to figure out what  
7 should these kinds of papers be, before we start  
8 nitnoid-picking on little things that we are  
9 worried about in each of the papers.

10                   Because I think the panel needs to  
11 agree. And if I'm the only dissenter, that's  
12 fine. I can shut my mouth and go on. But I think  
13 there needs to be a true discussion on this and  
14 not just kind of generically ask NGS, CO-OPS and  
15 OCS what the value would be.

16                   I think there needs to be a  
17 partnership when we write these papers. For  
18 example, when I was trying to help do the bottom  
19 line up front -- that's what I'm known for, the  
20 bottom line up front person on the panel -- for  
21 each of these papers, looking at the Precision  
22 Navigation one, I went looking for more



1 information.

2 I did some research. And there is a  
3 quote from the previous Rear Admiral, Rear  
4 Admiral Glang, that kind of is our paper in a  
5 nutshell. What that told me was no one knows  
6 about this issue. And this paper as currently  
7 written is not kicking that can farther down the  
8 road, because we didn't have the conversation  
9 with NOAA.

10 For whatever reason, I know that Lynne  
11 does a great job of trying to socialize these  
12 within, but I think there needs to be more  
13 partnership as we determine whether there should  
14 be -- I don't want to be the tail wagging the  
15 dog, but I also don't want to be producing  
16 nothing because NOAA has no questions for us.

17 So there is absolutely a balance here,  
18 but I think we have missed a mark on a couple of  
19 things, and really want to figure out the best  
20 way to support NOAA while kind of evolving this  
21 process, rather than just we need to have an  
22 issue paper written. And I think that's kind of

1 where we got: what is the next idea?

2 Does there need to be one? Again, I  
3 think for this next one, we have got four major  
4 policies that are coming out of OCS that we can  
5 spend some time on in those planning engagement  
6 sessions.

7 So I just kind of wanted to see around  
8 the room how people feel about how the issue  
9 papers have been produced recently and moving  
10 forward, because I don't think -- I think we have  
11 just gone about doing the business of producing  
12 them without having the conversation of, is it  
13 necessary?

14 And how is it best to help them? And  
15 it needs to be, again, in partnership with NOAA,  
16 because I had a great conversation with Rick  
17 Brennan, and it took us a little while to get  
18 connected, and I think there is other things we  
19 can say about precision navigation that helps  
20 NOAA make the argument to get -- again kick that  
21 can down the road with the Administrator.

22 One other overall thing is we really

1 need to determine the audience for these papers.  
2 I know it's supposed to be the Administrator, but  
3 I think we try to also balance that with the  
4 public. And I know Lawson has brought it up: we  
5 share it with Congressional staffers. Then you  
6 have two very different papers, because if it's  
7 going to the Administrator of NOAA, we don't need  
8 to explain to him what NOAA is, him or her what  
9 NOAA is.

10 And I think sometimes we get bogged  
11 down in the background information, and while we  
12 need context, I think sometimes we don't need to  
13 tell NOAA what NOAA is. And if we are going to  
14 do it, we better get it right. And I think  
15 sometimes we are not -- we don't have the most  
16 current data or information on what is going on.

17 And I think one example, I think, it  
18 was great to get that update on underlap from  
19 Shep and what you are doing with the Army Corps.  
20 That's huge. And so I'm not sure this paper is  
21 overcome by events. I think portions of it are.  
22 But that's a conversation we could have had in

1 between knowing, okay, that you have an  
2 engagement strategy with ACE. What can we do to  
3 help highlight it in a better way?

4 And so again, I'm just looking for  
5 more of a kind of partnership. I think we  
6 produce, and I completely understand where that  
7 came from, but I think, again, at a crossroads to  
8 determine how we want to do it going forward.

9 VICE CHAIR MILLER: Yes.

10 MEMBER MAUNE: Yes. Lawson?

11 MEMBER BRIGHAM: Yeah, I guess from  
12 the beginning, I thought that these were not  
13 written necessarily for the Administrator but for  
14 the external environment. So internally, sure.  
15 I mean, the partnerships, the numbers, the  
16 thoughts have to be kind of consistent with some  
17 of NOAA's interests, but not entirely, because  
18 they want our advice, and they want our thoughts.

19 So but I thought because we were going  
20 to put them on the website, that they were  
21 written in a general way for a large audience. I  
22 think the early ones were. I don't know the one

1 on the Arctic, I think, was written for a general  
2 audience but also internal audience.

3 So I kind of agree, but I don't know.  
4 This is our contribution from our expertise to  
5 the system.

6 MEMBER HALL: I don't disagree.

7 MEMBER BRIGHAM: They're our --

8 MEMBER HALL: I think --

9 MEMBER BRIGHAM: -- papers, right.

10 MEMBER HALL: And there are. But if  
11 the information is incorrect in one of the  
12 papers, we have borrowed heavily from a website  
13 that we did not mark it properly, because we  
14 didn't know or somebody found information  
15 somewhere else and we put in there, I think there  
16 are some problems. And we don't work with the  
17 folks at NOAA. Again, if we disagree with what  
18 they are asking us to do or if they disagree with  
19 what we are telling them, but we are adamant that  
20 that's how that we think it should happen,  
21 absolutely.

22 But if you haven't done the background

1 basic research on something or at least asked  
2 Ping, NGS, OCS or CO-OPS -- and again, I know  
3 Lynne tries, but I think it's the onus is on the  
4 author to kind of learn a little bit more about  
5 what NOAA is actually particularly doing in that  
6 case before we start kind of flailing, right?

7           So I'll bring up the NRT paper again.  
8 It was a great paper, but it missed the mark on  
9 what they were actually going through. And I had  
10 a conversation with Holly, and I went through and  
11 said, hey, actually, we don't really need your  
12 help right now because the problem is the federal  
13 not hiring and we are trying to figure out. But  
14 ultimately, there is going to be a problem if we  
15 can't get these people on board, because the  
16 training pipeline is long, and that's where we  
17 could use your help, but we don't want to  
18 highlight this right now until we know where  
19 everything stands.

20           And I think sometimes, Lawson, that is  
21 the case. I think that we need to be careful  
22 because we can actually hurt NOAA more than we

1 can help if we don't kind of help and try to  
2 align with what is going on.

3 MEMBER MAUNE: Go ahead, Lawson.

4 MEMBER BRIGHAM: Well, I mean, on that  
5 one particular issue, then NOAA can tell us that  
6 this is a sensitive topic. Maybe it's not timely  
7 for this. I mean, I accept that, you know, but  
8 you know.

9 MEMBER MAUNE: Yes. Well, in all  
10 cases, I know that the authors of these papers  
11 know that from time to time they need statistical  
12 input from NOAA on how do you account these beams  
13 or whatever it is we are talking about. And they  
14 do their best to try to find the right people at  
15 NOAA to say who has the answer to this question.  
16 Who can provide me the statistic we are looking  
17 for?

18 So we do tend to try to involve NOAA  
19 to the degree we can, but yet at the same time,  
20 we are supposed to be independent consultants to  
21 NOAA with our recommendations.

22 But as I said at the very beginning,

1 I don't want to propose anything to NOAA that you  
2 violently disagree with, sir. So whenever you or  
3 Rick or anybody has comments that they feel is  
4 not going to be helpful at all or you disagree  
5 with us, we are seeking your input.

6 Yes, Lawson?

7 MEMBER BRIGHAM: I mean, just I was  
8 there when we had the top ten. So if we want to  
9 have another option, and not do these issue  
10 papers, and you want us to give you a top ten  
11 which is inflexible and kind of binds the system  
12 up, I think, I mean, there are not too many  
13 options.

14 Maybe you don't want any advice, but  
15 I think that's not the case, since we have the  
16 panel. So I think this is a more flexible kind  
17 of thought-provoking kind of approach, rather  
18 than we cook up a top ten for you, which then you  
19 might not completely agree with. I mean, it  
20 strains things. So I don't know.

21 MEMBER MAUNE: Yes. Did anybody else  
22 have comments? Carol?



1                   MEMBER LOCKHART: Yes. I guess I want  
2 to go back to what Kim was saying a little bit.  
3 I sort of agree. I think -- I wonder if these  
4 are useful or not. And I think we heard  
5 yesterday at lunch time that they have been very  
6 useful. They will be useful during the  
7 transition.

8                   And so that's good. That's good to  
9 hear they have been useful, because a lot of work  
10 went into these. But my question is moving  
11 forward, is that still a useful format, or has it  
12 served its purpose, or will it have served its  
13 purpose once we have people in those positions  
14 and the transition is complete?

15                   Will it have served its purpose and we  
16 need to think about doing something else to get  
17 our voice heard?

18                   Now Lawson does use these and  
19 obviously finds these very useful, but I would  
20 like -- I mean, back to Kim's original point, I  
21 mean, does anybody else have a comment on that?  
22 Is anybody else using these as an independent

1 person outside of the panel, other than just  
2 having these things written and sitting on the  
3 website? I mean, I'm kind of curious. I'm just  
4 trying to play devil's advocate a little bit.

5 CHAIR HANSON: Perhaps I can offer a  
6 little history, and Scott you can help me out  
7 here with the issue papers. But we have two  
8 forms of communication, right? We have the  
9 Recommendation Paper that is really meant for us  
10 to highlight our high level recommendations and  
11 things that we think that they need to work on  
12 right now, kind of a summary of our meetings.

13 The second thing that we developed was  
14 issue papers and, frankly, the issue papers, from  
15 my perspective, was about us getting our thoughts  
16 together to communicate almost to us as to what  
17 we thought was important. It gave us a vehicle  
18 to talk, to meet, and to write some thoughts  
19 down.

20 And whether or not they went to NOAA  
21 was almost a secondary issue for me. It was  
22 about just getting our thoughts together as a

1 panel. And the fact that it became useful was a  
2 bonus. The fact that it allowed us to highlight  
3 as leadership the issues that their members,  
4 their panel members thought were important. It  
5 was a good vehicle.

6 Kim's point about accuracy, I 100  
7 percent agree. We need to make sure we are 100  
8 percent accurate. Do we need to communicate with  
9 NOAA? Absolutely. And I'll talk about the  
10 Corps-NOS survey issues, because I know for a  
11 fact that in multiple discussions with Admiral  
12 Shep, also with the Corps of Engineers, we know  
13 that problems exist.

14 Those problems aren't going to be  
15 solved by our paper, but they can stoke the  
16 communication. Look for a solution. And  
17 frankly, I don't care if there is an issue paper.  
18 The fact that the changes get made is the  
19 important part and their dialogue gets had.

20 So to the extent that the issue papers  
21 may have a point in time meaning, a point in time  
22 effectiveness, that's fine. It gets used once

1 and gets tossed, as long as it results in that  
2 communication, that's what we are about.

3 Carol, you bring up an interesting  
4 point, because we have actually talked about the  
5 issue papers, Joyce and I. Is there -- next is  
6 there another generation. I mean, Scott's  
7 leadership helped bring them together. They have  
8 been effective. They have been helpful and maybe  
9 even the next administration, maybe with new NOS  
10 leadership, maybe there is another vehicle for us  
11 to communicate more effectively what our issues  
12 are.

13 So I just wanted to provide that as a  
14 little bit of background context. And the  
15 dialogue is extremely important. We bring  
16 diversity and difference of opinion. That's what  
17 we are here for.

18 I appreciate all the discussion.  
19 Bringing things to closure has always been Dave  
20 Maune's specialty, and he has wrapped his arms  
21 around a very squishy group of people.

22 MEMBER MAUNE: We shall see whether

1 I'm successful or not. With the Admiral leaving  
2 this morning after this session, even though we  
3 may continue later on, sir, I would like to get  
4 your input before you go so that we can hear from  
5 you before we proceed on these papers.

6 RADM SMITH: Yes, happy to do that.  
7 I have been listening to you all, and I think  
8 that all of the reasons that you have said for  
9 why these issue papers are useful are true. And  
10 with each one to one extent more than the other.

11 I think the Underlaps paper, for  
12 instance, gave me a lot of confidence that I  
13 wasn't crazy on an issue that had languished for  
14 generations really, and has given me the courage  
15 to be a little bit more assertive.

16 I haven't actually used the HSRP's  
17 authority to beat myself over the head directly,  
18 but it is not a bad thing to have in my pocket  
19 either if I get pressure from the Army Corps for  
20 instance to, you know -- Shep why don't you just  
21 leave well enough alone? Why are you causing  
22 such a ruckus here? I can say well, look, you

1 know, I'm trying to -- you guys are really  
2 beating me up about this.

3 And so anyway, I think that has been  
4 very helpful even if nobody but me ever sees that  
5 paper. The fact that, you know, we had the  
6 discussion, you reflected it back in a meaningful  
7 --

8 MS. MERSFELDER-LEWIS: Pull your mic  
9 closer.

10 RADM SMITH: The last time it howled  
11 when I did that. So I think that was -- I think  
12 that -- in the great conversations we had between  
13 the meetings about the subject, I think that was  
14 very helpful to me. So that sort of thing, one.

15 On the precision navigation, I agree.  
16 As it is right now, if what we need is a call to  
17 action or sort of a call to do something  
18 different in how we chart and manage information  
19 in channels and berthing areas to make ports more  
20 efficient, this paper doesn't jump off the table  
21 explaining what it is that -- how the world could  
22 be better and how NOAA ought to participate in

1 that better.

2 And so a snazzier, less detailed  
3 version may be sort of a better tool for that.

4 MEMBER MAUNE: Okay. Any comments on  
5 the other three papers?

6 VICE CHAIR MILLER: Okay.

7 MEMBER PERKINS: If I may, I think one  
8 of the values of what we are doing with these  
9 position papers is filling in some of the gaps in  
10 between what is searchable and recoverable from  
11 the prior work of this backup.

12 So going back and looking at the -- I  
13 think, oldest recommendations that are online on  
14 the HSRP website are 2005. So the fidelity of  
15 information that is available and recoverable is  
16 very thin for what our predecessor groups of  
17 expertise have provided in the way of advice to  
18 NOAA.

19 And so I think part of what we were  
20 trying to accomplish with taking the time to  
21 draft these papers is create a more archivable  
22 record of what the prevailing wisdom of the FACA

1 was at the moment in time with the input, right,  
2 and the variables and the equations available to  
3 us.

4 And that what we are going to leave  
5 behind for those who sit at this table 5 years or  
6 10 years from now is something that is going to  
7 be more useful for them. So it may not be that  
8 useful to the Administrator, whoever that turns  
9 out to be for this next coming cycle, right? But  
10 for our follow-on members, I think we are doing  
11 good work here.

12 And that the length and the detail  
13 that we are producing is what is needed, because  
14 to be quite frank, the only thing we really have  
15 that's referenceable material from the prior  
16 FACAs is that top ten report. There is not a  
17 whole lot else there when you go back to look at  
18 and see what did the taxpayers' money produce  
19 from the prior FACAs.

20 So I think we are doing good work  
21 here, and we need to not get spun up around the  
22 axle and the details of how we are doing it and



1 keep going forward and identify what we want to  
2 continue to communicate.

3 The autonomous, right, positioning  
4 navigation observations autonomous movement,  
5 whether that be on land or whether that be on  
6 water, whether that be on air, right, there is  
7 valuable work and input needed from this FACA  
8 going forward.

9 So I think we -- I think Dave -- under  
10 Dave's leadership, we need to identify those  
11 topics and keep moving forward with writing these  
12 type of papers.

13 MEMBER MAUNE: Okay. Admiral, if I  
14 understand you correctly, you think we need to  
15 take a new start at the Precision Nav paper  
16 and/or rewrite it?

17 RADM SMITH: I think the basic idea is  
18 there. I think if the -- if it's supposed to be  
19 a call for us to do something fundamentally  
20 different in channels/harbors in order to support  
21 port optimization, that's kind of -- that message  
22 is a little lost, because a lot of words -- the

1 core message is a little bit lost.

2 MEMBER MAUNE: Okay.

3 RADM SMITH: The Rec Boating paper, I  
4 am interested to -- because I didn't respond to  
5 that framing, but certainly I am very sensitive  
6 to the recommendations. In fact, we are doing  
7 work with unmanned systems in very shallow water,  
8 often which is designed primarily to serve rec  
9 boaters.

10 The whole notion of going after  
11 discrepancies rather than square miles is really  
12 a way of balancing our work between sort of deep  
13 draft and rec boaters.

14 So we are not going to go and resurvey  
15 every square mile of all of the blue tent areas  
16 in the United States. It would just not be a  
17 good use of taxpayer money. But we can go in  
18 there and deal with the problems that are  
19 reported to us at a sort of onesie, twosie level.  
20 And I think we can do -- we can clean up those  
21 charts and improve the navigation safety in those  
22 areas considerably by doing it on a sort of by

1 exception basis driven by the reports of  
2 discrepancies.

3 And that's -- I think that is the  
4 implicit strategy. Now, I didn't say here is  
5 what we are doing for rec boaters, but that is in  
6 there.

7 There is still an undercurrent in my  
8 organization and perhaps in those that sort of  
9 oversee us that the main focus, and by main focus  
10 I mean only focus, needs to be on deep draft  
11 navigation.

12 I don't think that our mission ever  
13 changed. I don't think that it says that  
14 anywhere. And I think we have made a really  
15 good, through examples in the Merrimack, the work  
16 that we did on the Intercoastal Waterway, which  
17 Jeff Siegel noticed that we had improved.

18 For instance, we just didn't have the  
19 waterway going through an island any more. That  
20 those things came at very low cost and had high  
21 impact. So the next dollar spent may not  
22 dramatically improve the Port of Charleston but

1 could dramatically improve something else.

2 So looking at the value opportunity  
3 for the next dollar, rather than sort of trying  
4 to put everything on the highest priority.

5 MEMBER MAUNE: Okay. Well, the issue  
6 paper on recreational boating was the one that  
7 seemed to be the least controversial among the  
8 four and the one with precision nav was the most  
9 controversial among the four. So we addressed  
10 the bookends. How about the two in the middle?  
11 Any comments on those?

12 Well, actually, I'm asking this  
13 question --

14 RADM SMITH: I think we talked about  
15 --

16 MEMBER MAUNE: -- Rick Brennan and  
17 other people back there, too, because I would  
18 like to know how NOAA feels about some of these.  
19 Yes?

20 VICE CHAIR MILLER: Can I say  
21 something? I think all of us in developing these  
22 issue papers do communicate with NOAA. It may be

1 that the other panel members aren't aware of  
2 that. I mean, Bill and I on these last two  
3 papers spent, I would say, three or four hours on  
4 the phone with Shep, and it changed my opinion.  
5 I won't say radically, but we certainly changed  
6 our approach.

7 We were trying to get other data and  
8 Army Corps data on the same paper. We decided  
9 not to do that. And the best data concept was  
10 something that I hadn't really taken into  
11 consideration. So that's point one.

12 And point two is there is no reason  
13 that if these papers get out of date, I mean, one  
14 of my suggestions for the next go-around is let's  
15 review the first six papers and see if we need to  
16 make an update on them because things change.

17 MEMBER MAUNE: Yes.

18 VICE CHAIR MILLER: And I'm the sure  
19 Precision Nav folks spoke to people in NOAA.  
20 They may not have spoken directly to Rick, but I  
21 think there is to some degree just perhaps you  
22 are not aware that people have gone there.

1                   MEMBER HALL: I mean, you Google it  
2                   and you find different -- you find more advanced  
3                   information. So I am not saying people didn't do  
4                   their work. I think the problem is there is a  
5                   different approach that everybody takes to  
6                   writing these papers, which we are all different.  
7                   We are all going to do that.

8                   But I think one key thing that I'm  
9                   trying to stress is it's really good to touch  
10                  base with the person at NOAA who does this. And  
11                  you really should because it helps you, like you  
12                  said, with the understanding, because I know the  
13                  group, when we were on the call for those two  
14                  papers, said hey, this paper is kind of jumbled  
15                  together. And you and Bill said, you know what,  
16                  we will go talk to NOAA and figure out if it  
17                  should be two separate papers or one paper.

18                  I mean, the panelists that were on  
19                  that call, we did suggest that it might be two  
20                  different issues based on what was going on. So  
21                  I think the problem I have right now is that  
22                  there needs to be something where it's defined

1 where you come up with a topic idea with a little  
2 bit of -- you know, your thesis statement. We go  
3 to whatever office it is at NOAA and just say,  
4 hey, are we on the right track on something?  
5 Because they could have already -- like I said,  
6 the NRT one, they were already moving something  
7 down the road that we weren't aware of just  
8 because things change all the time. And I think  
9 that that really -- the onus should be kind of on  
10 us, and there should be a consistent approach,  
11 because I would hate to waste people's time to  
12 write papers and then we go, oh, no, you know,  
13 OBE not good or, hey, you missed a key topic  
14 here.

15           So that's where I'm at. I don't want  
16 to get rid of the papers. I just think that  
17 there should be kind of a common approach. And  
18 our expectations told to NOAA and we expect that  
19 if we call you, we really, we need your  
20 information. We need your input.

21           We are -- really if you could just  
22 come back, we know it's -- you have regular real-

1 time -- your real jobs that keep you busy, but we  
2 could really use it, because we want to be  
3 helpful and we want to be value-added. And  
4 that's really my point today. It wasn't to turn  
5 off issue papers, but it was to have that  
6 conversation, because I still think around the  
7 table, we all have different ideas of who the  
8 audience for this is or where there is value for  
9 it. And that creates a way of how you are going  
10 to write the paper.

11 So if you think -- and Lawson, that's  
12 an absolute valuable that you use it in other  
13 ways for general public that's on the website,  
14 but sometimes there is something we want to tell  
15 Shep or we want to tell Juliana or Rich or a  
16 higher above, Russell. And you are going to need  
17 to write them differently.

18 Again, explaining NOAA to NOAA is not  
19 value-added. Explaining to NOAA why we think  
20 there is a problem with something that they are  
21 doing, that's really value-added or a good thing,  
22 too, not always bad things, anyway.



1 MEMBER MAUNE: Lawson?

2 MEMBER BRIGHAM: A couple items. I  
3 mean, we have our working groups and it took like  
4 five years to get those things up and running.  
5 And so now we have them. And that's a way to get  
6 messages directly to the Admiral and the whole  
7 team in very sensitive topics or whatever.

8 And so, you know, you may not have to  
9 have the issue paper or whatever, so, you know, I  
10 think there are technology papers coming. We  
11 have an Arctic study report that is actually on  
12 the website and I've had people look at the  
13 download site.

14 I think there are other mechanisms.  
15 The Precision Navigation Paper started a year and  
16 a half ago between Captain Sal and myself and  
17 trying to get a paper that was kind of 101, what  
18 are we talking about Precision Navigation, large  
19 ships coming? What are some of the issues from a  
20 mariner's point of view?

21 So I think the paper has gotten  
22 twisted at least four or five times, maybe split

1 and then merged. I don't know in all the effort  
2 whether it is useful or not. I don't think it  
3 reads now what we envisioned in the beginning,  
4 Captain.

5 But -- and one more point. I think it  
6 would be a huge mistake not to have a boating  
7 safety, boating recreational issue paper on the  
8 website. It's not there, it's invisible, nobody  
9 gives a damn, right? It's the interpretation,  
10 you know.

11 So I think we owe it to a large  
12 sector, a large number of stakeholders to at  
13 least comment about the relationship of NOAA to  
14 this community.

15 MEMBER MAUNE: Anybody else want to  
16 comment before we look at some individual papers?  
17 Please so, sir.

18 DR. CALLENDER: So I'm one of those  
19 folks that like -- when you look at things like a  
20 strategic plan and somebody hands you that  
21 document, those are okay to look at and okay to  
22 read, but I think the value in something like

1 that is the process to get there and the  
2 dialogue.

3 And I think in large part, at least  
4 from my -- from where I sit, the large part of  
5 the value around the issue paper is the fact that  
6 you have stimulated that dialogue on the panel.  
7 You have stimulated that dialogue with NOAA and  
8 it's a back and forth.

9 I think the dialogue is much more  
10 valuable than a paper. I think the paper can and  
11 should be living documents. That as that  
12 dialogue matures and changes, you modify those.

13 And so, you know, I wouldn't maybe  
14 beat yourselves up on what is the specifics of  
15 each paper, but it's about the conversation and  
16 how you get there. And how the thinking evolves  
17 and how we look collectively towards the future  
18 is where I think the value of this kind of  
19 approach would be.

20 MEMBER MAUNE: Yes, thank you. Yes?

21 DR. MAYER: Yes, I would -- you almost  
22 took the words out of my mouth. I think it

1 really comes back to what is the purpose of the  
2 panel. We are all here to help NOAA's mission.  
3 And ideally, that's done with a consensus.

4 We hear reports from OCS, from NGS,  
5 from CO-OPS and we should be responding to those.  
6 If we are, as an independent advisory panel,  
7 enthusiastic about it, we should endorse that and  
8 that endorsement could help them meet their  
9 mission, but if we have concerns, we should  
10 express them. But I think it's just as Russell  
11 said, that concern was expressed in the dialogue.

12 And I don't think it serves anybody's  
13 purpose if this panel has documents on a website  
14 that contradict what the office is doing, that  
15 doesn't help. We should be striving to reach  
16 that as close as we can to the consensus, so I  
17 just absolutely agree it's the process of getting  
18 there.

19 And then again, if it turns out that  
20 we can reach a really good consensus about  
21 particular topics or if we identify gaps, that's  
22 another place. If we see something after the

1 presentation that weren't presented or if you  
2 identify an area where maybe a little research on  
3 the part of the FACA could help, all those things  
4 are good.

5 But you are absolutely right, it's  
6 that process, I think, which helps us all work  
7 together to meet the NOAA mission rather than  
8 that piece of paper is not going to, at the end  
9 of the day, do much.

10 MEMBER MAUNE: Thank you. Anyone else  
11 want to? Yes, Ed?

12 MEMBER KELLY: All right. Yes. I  
13 agree with a lot of what has been said. I think  
14 certainly, obviously, veracity and proper  
15 attribution is essential in any type of an  
16 academic or business paper. We have to get our  
17 facts straight, that's for sure.

18 But how I view these position papers  
19 is that it's an opportunity for this panel, who  
20 are constituted and recognized as experts  
21 throughout the nation, that should be able to at  
22 least put up a marker that we have identified a

1       shortcoming, a target or an opportunity.

2                   On two pages, we are certainly not  
3 going to exhaust that topic and find all the  
4 solutions. I think what we are doing is really  
5 putting a mark on the wall that this is something  
6 that needs to be addressed. The panel within  
7 that paper can express the direction or the  
8 objection or whatever it is that we need to  
9 address.

10                   And that, as you say, stimulates the  
11 conversation back and forth, so that we can move  
12 in a positive direction on that either to remedy  
13 a shortcoming or to agree that we need to look at  
14 things in a different way or these position  
15 papers can be used in any way to get a topic on  
16 the wall that stays there and then it moves  
17 toward resolution whether it comes to a dead-end  
18 and there is no funding and yet we know we would  
19 love to do that, but that's fine, too. And we  
20 can put that on a COD or on a park bench.

21                   But there is a lot of opportunities  
22 that we are hearing and I think sitting in these

1 meetings and having these discussions we are not  
2 talking about our day-to-day jobs. We are  
3 talking about systems and how things should work  
4 and what people are coming up in local regional  
5 discussions with issues that need to be  
6 addressed.

7           And by hearing this, I know, you know,  
8 I'm a maritime and a port guy and hearing  
9 different perspectives from other people that  
10 come from different disciplines helps me to frame  
11 some of these issues a little bit better and  
12 that's how I view the papers as. You're  
13 certainly not going to solve a problem.

14           Identify it. Solve it. You know, but  
15 these papers can be used as an initiative. It's  
16 a physical, tangible, living document that can be  
17 used a lot of different ways whether NOAA uses it  
18 internally to try to push budgeting or people to  
19 say look these experts say we need to move in  
20 this direction and it's a valid point, whether we  
21 use this to bring it out as papers to explain  
22 what we are doing, to either electeds or to

1 academics or to other industrial groups, these  
2 things have a tremendous amount of value as far  
3 as I see.

4 I think we have to be careful as a  
5 group that we don't overachieve. You know, if  
6 you set the bar too high, you know, nobody is  
7 happy with failure and we have to be careful.  
8 You know, like you say Scott, we have got an  
9 institutional memory here now and it took us, I  
10 think somebody mentioned, almost five years to  
11 really get these working groups in place and  
12 producing products like these papers.

13 And I think that's a tremendous amount  
14 of progress that we shouldn't abandon, but I  
15 think we have to as we move forward now be a  
16 little more selective in what we are doing with  
17 these papers to address issues, not just well, we  
18 need three topics for the next one. What do we  
19 want to write about? You know, we are not  
20 novelists. We don't get paid by the page, which  
21 is good, because we are limited to two pages.

22 Yes. Expensive pages. But I view



1 these things as, you know, establishing topics  
2 that the group collectively, between the panel,  
3 certainly NOAA and even outside contractors,  
4 participants and the public can be brought  
5 together to either remedy shortcomings and to set  
6 new targets and opportunities and to recognize  
7 that we need to reevaluate our planning process  
8 or any number of things that these papers can do.

9 But once they are there, once we have  
10 a paper, it's something around which these  
11 discussions take place. If we just have a couple  
12 of casual conversations in the hallway, it's not  
13 really structured enough to really carry forward.  
14 And I think, you know, these papers have a lot of  
15 value.

16 So I, for one, would like to continue  
17 them, but to refine them and make sure we are  
18 producing the right type of paper for the right  
19 type of action.

20 VICE CHAIR MILLER: Thank you.

21 MEMBER KELLY: Sure.

22 MEMBER MAUNE: Okay. Anyone else?

1                   MEMBER SHINGLEDECKER: Just real  
2 quickly. I think one of the things that was  
3 achieved with this move to writing the issue  
4 papers was increased engagement of panel members  
5 in between meetings. Having been one of the  
6 longer standing panel members, there has been a  
7 dramatic change in the activity level of this  
8 group as a result of this model.

9                   And so that alone, I think, has a real  
10 value that is worth continuing. I would be  
11 interested, from a business perspective, I know  
12 anything we put on our website, we are always  
13 tracking the analytics and the data and who is  
14 using it and how many downloads. And while a  
15 paper may not be measured by number of downloads,  
16 it does show you, you know, okay when a new paper  
17 gets posted, you expect it to have a little bit  
18 of an uptick.

19                   What's the life of the paper? And,  
20 you know, when you see that, okay, this paper  
21 hasn't been touched by anybody in a year, maybe  
22 that's a call that either we accomplished what we

1 set out to achieve or maybe it's time to refresh  
2 this topic.

3 I know at one point we took a look  
4 back and we catalogued the recommendations we had  
5 in the Recommendation Letters over a number of  
6 meetings and we tried to say okay, here was the  
7 recommendation. Here was the response. Where  
8 are we now? Do we need to continue to hammer on  
9 this issue or check it has been accomplished?

10 And I think that something could be  
11 done with that, with the issue papers as well as  
12 we look forward into their life, into the next  
13 ones. You know, does it need to be revised?  
14 Does it need to be, you know, crossed off and  
15 eliminated or do we need to take it in a  
16 different direction?

17 So that would be my suggestion for  
18 kind of strategically using them going forward  
19 and keeping them current. And I agree that just  
20 saying oh, well, we need four more papers, what  
21 are they going to be? Especially with NOAA  
22 having given us four documents to review, I think

1 we have got some real work to dig into those.  
2 And with that request, that should be the  
3 priority.

4 And if another issue paper topic or  
5 two rises to the surface, great. If it's not  
6 another six months before new issues arise, I  
7 don't see that as a problem.

8 MEMBER MAUNE: That's fine. Okay.  
9 Anyone else? Okay. Well, we have what, four  
10 minutes left and tomorrow afternoon? And we  
11 really haven't gotten to any of these issue  
12 papers yet.

13 CHAIR HANSON: Well, I disagree. I  
14 think you have covered them very well. That was  
15 a very important discussion that we needed to  
16 have.

17 MEMBER MAUNE: Yes. Well, it's  
18 important to discuss this, yes, but I'm trying to  
19 determine how I address these four issue papers  
20 now that we were going to hash over. And we have  
21 just a few minutes left now plus tomorrow  
22 afternoon.

1                   CHAIR HANSON: Right. As General  
2 Walsh would say, you have a full day, but you  
3 also have a full night to think about it, sir.

4                   MEMBER MAUNE: But I need input from  
5 NOAA. I won't have everybody talking to me in  
6 the middle of the night. I wish we could get at  
7 least one of those papers approved before we  
8 adjourn this morning here. The one that --

9                   MEMBER SHINGLEDECKER: If you want to  
10 try to move the rec boating, there was only one  
11 comment I had on one of the edits. Actually,  
12 two, sorry.

13                   On the first page, under the section  
14 near-shore data sets need to be more robust. As  
15 it was originally written, it said with a natural  
16 priority placed on commercial navigation. The  
17 change to national, it works, but it changes the  
18 intent of -- when I wrote natural, that was my  
19 acknowledgment that we are second or third or  
20 fourth or fifth in line and that's okay. And we  
21 understand that.

22                   So that's -- I would -- it can be

1 national. It could be natural. But I meant  
2 natural as acknowledging that place in the  
3 pecking order of priorities and that we accept  
4 that.

5 MEMBER MAUNE: Was that Lindsay that  
6 made the recommended change?

7 It was Lawson?

8 PARTICIPANT: Yes.

9 MEMBER SHINGLEDECKER: So I would  
10 leave it as natural, would be my suggestion. And  
11 then the other one, it just looks like a  
12 typographic. Under the first recommendations,  
13 the addition of the words for recreational  
14 boaters, part of me wonders, I don't think any of  
15 the data is specific to one user group or  
16 another.

17 It is how that data is used that makes  
18 it particular to those groups. So I don't know  
19 that I would add that, but if I did, I would just  
20 put it before the word needs, so it would say  
21 data for recreational boaters needs to or must  
22 continue to be available.

1                   But I, once again, question if the  
2 data is really specific to that user group or  
3 not.

4                   MEMBER MAUNE: Okay.

5                   MEMBER SHINGLEDECKER: But other than  
6 that, any of the changes were fine with me.

7                   MEMBER MAUNE: Okay. Lawson?

8                   VICE CHAIR MILLER: Wait. I'll  
9 reiterate. We need a picture for it, Susan.

10                  MEMBER SHINGLEDECKER: The pictures  
11 are coming.

12                  MEMBER BRIGHAM: And then just in the  
13 first sentence the 87 million is a powerful  
14 number, but what -- you know, out of 310 million  
15 people, so I would just like to know where that  
16 comes from.

17                   And the 12 million recreational  
18 vessels, you mean, the certified or the  
19 registered vessels?

20                  MEMBER SHINGLEDECKER: And I can  
21 provide both the statistics.

22                  MEMBER BRIGHAM: Okay. Good. Yes.

1                   MEMBER SHINGLEDECKER: The 88 million,  
2 I believe, is from the National Marine  
3 Manufacturers Association industry abstract. And  
4 I just pulled it up from a presentation earlier  
5 this week. And the 12 million registered votes  
6 is from Coast Guard statistics.

7                   CHAIR HANSON: Okay. Susan, can you  
8 make the recommended changes to the document?  
9 And then we can accept this as something approved  
10 by our panel? Is that agreed to? Any  
11 dissensions? Going, going, gone. We got one.  
12 All right.

13                   (Applause.)

14                   MEMBER MAUNE: All right. Look, we  
15 have 30 seconds left. It's kind of hard  
16 to --

17                   VICE CHAIR MILLER: I'll make one  
18 suggestion. I think it has become kind of clear  
19 that the Precision Navigation paper we may need  
20 to -- why don't we delay that one. I'm not  
21 saying take it off the table. But it seems like  
22 with what the Admiral said in the discussion that



1 this may not be ready for prime time is -- you  
2 know, and that we do that discussion.

3 MEMBER MAUNE: Okay. And then who  
4 will take leadership of continuing with this  
5 paper, if we continue with the Precision Nav in  
6 another form?

7 MEMBER PERKINS: Can I make an  
8 alternative suggestion? Can we publish it as a  
9 draft and seek comment from the public? I mean,  
10 isn't it better than going forward?

11 VICE CHAIR MILLER: No.

12 MEMBER MAUNE: I don't think so. No.

13 MEMBER PERKINS: Okay.

14 MS. MERSFELDER-LEWIS: You can't seek  
15 public comment because you are a FACA and so the  
16 FACA can make comments, but otherwise you have to  
17 be a FACA to accept public comments or you have  
18 to make a -- anyways, so just -- you guys just --  
19 you give your advice to NOAA and NOAA takes your  
20 advice.

21 MEMBER GEE: So should we -- are you  
22 proposing that we don't discuss it then on

1 Thursday? We just want to take it off the table  
2 totally for that discussion?

3 VICE CHAIR MILLER: I'm saying let's  
4 get two or three papers out and if we have time,  
5 we should discuss it on Thursday. But Dave is  
6 seeking movement and I think -- I don't think we  
7 are going to get it ready.

8 I mean, one of the -- let me just say  
9 this and I'll speak for Dave and myself. We  
10 schedule these meetings. People come and they  
11 say oh, I've got a suggestion and Dave usually  
12 says come back to us before the next meeting.

13 In three cases this time, nobody came  
14 back. So if you have suggestions and sign up for  
15 anything, you need to come back before the next  
16 meeting. We can't leave everything to the last  
17 minute. And so that's kind of the point of, you  
18 know, I don't think we are going to get this  
19 ready for prime time in --

20 MEMBER GEE: That was one of my  
21 questions about whether we were going to discuss  
22 it or not, because I think that is a problem.

1 And it would be, I think, good to continue to  
2 discuss that one particularly, because it has  
3 been around for a while.

4 VICE CHAIR MILLER: Yes.

5 MEMBER GEE: And even though it may  
6 not be -- you may now think it is further down  
7 the list to get out. It's kind of just going to  
8 keep bobbing around there I think below the  
9 surface if we don't discuss it on Thursday.

10 MEMBER MAUNE: Lawson?

11 MEMBER BRIGHAM: Yes, I mean, we  
12 started out and, in fact, we had our pilot expert  
13 write the draft, the first draft from her  
14 expertise. And I think we should go back to her  
15 and at least keep her in the loop, because she  
16 was the original drafter.

17 MEMBER MAUNE: Anne, are you on the  
18 phone? I don't know if she signed in this  
19 morning or not.

20 MEMBER HALL: Just really quickly, I  
21 think with that one though we -- the last meeting  
22 we went and kind of made the PORTS Paper to try

1 to cover some of that that we need to sensors,  
2 the data before we do this.

3 I think what needs to happen with the  
4 paper and I do apologize, I tried to get in  
5 contact with NOAA. I was working on it as of our  
6 last meeting. So I have not been quiet about my  
7 concerns about this paper for at least two of the  
8 calls that I have been on.

9 And so it just takes a little bit of  
10 time sometimes to track down the NOAA folks, that  
11 is not your fault, but we are playing a little  
12 bit of phone tag.

13 So I did try my best, but I think what  
14 we need to do and the discuss that needs to  
15 happen is what is the vision for this paper?  
16 Because there is about three or four different  
17 voices in that paper right now about what needs  
18 to happen.

19 And I think we could benefit from  
20 hearing from Rick Brennan about kind of what does  
21 NOAA need? Because I think the big  
22 recommendation is you all need to do a

1 requirements analysis from the stakeholder  
2 perspective on what that is, because I think  
3 right now they are hearing from the mariners,  
4 hey, we will know it when we see it. That's not  
5 a good way to go and do development of the next  
6 prototype or finalize a prototype.

7 So I think it is absolutely open for  
8 discussion. I'm happy to take it on, talk to  
9 Anne and try to get it into kind of some  
10 semblance of a one-idea paper and move it  
11 forward. I don't think it should be abandoned,  
12 but I think we have a different focus now on  
13 this. Thanks.

14 MEMBER MAUNE: Well, I think you just  
15 volunteered, but Lawson and Sal have been very  
16 active in this paper. I'm sorry?

17 MEMBER HALL: I'm not going to  
18 discount them, so absolutely.

19 MEMBER BRIGHAM: The reason why we had  
20 this paper, there were groundings in Europe of  
21 these huge ships. The huge ships were coming and  
22 it all goes to two Decembers ago when the Ben

1 Franklin showed up in LA Harbor. We said holy  
2 hell, what are the Precision Navigation?

3 I talked with Captain Sal here about  
4 the issues related to that. So we just spun out  
5 the issue. So I think missing in the paper is  
6 that every -- not everybody in this country knows  
7 that these huge mega-ships are coming. Sure NOAA  
8 does and everybody does in this maritime  
9 community, but not the rest of the world.

10 So there has to be a little  
11 introductory to this paper and I think that is  
12 missed, a Precision Navigation complex topic.  
13 But striving it is they are big machines.

14 MEMBER MAUNE: Okay. Whatever we do  
15 with the Precision Nav Paper is going to need to  
16 be coordinated among a lot of people. And if  
17 what we have done to date hasn't kept you happy  
18 and the Admiral is not pleased with it, I'm happy  
19 to hear you and see if you can do a better job,  
20 but you have got to coordinate with these guys  
21 who have been actively involved in the past.

22 MEMBER HALL: I completely agree.

1                   MEMBER MAUNE: Because we want to keep  
2 everybody happy here and get everybody's  
3 involvement.

4                   MEMBER HALL: Sorry, I didn't mean to  
5 not include Lawson. I just know that Lawson just  
6 met -- and Sal. He just mentioned Anne, so I  
7 wanted to make sure that that was clear. I'm  
8 happy to coordinate with everybody. But I think  
9 the problem is is that there is a different  
10 vision, that I have this list. Let's just  
11 redefine it. Let's get it done. Let's get it  
12 out.

13                   I don't think it's hard. I think we  
14 have most of what we need. We just need to get  
15 it in the right format, so that it's useful.

16                   MEMBER MAUNE: All right.

17                   MEMBER PERKINS: Can we set a goal of  
18 actually having that thing wrapped up at the next  
19 meeting? Right? I find it very frustrating that  
20 two years can go by and we can't, as a group,  
21 bring this topic to closure.

22                   MEMBER MAUNE: All right.

1                   MEMBER PERKINS: And at least -- I  
2 mean, we can modify it later, right? It's a  
3 dynamic situation as things change, but, you  
4 know, it makes us look ineffective.

5                   MEMBER MAUNE: Okay. Well, we have  
6 got 27, 28 hours to the next discussion on this,  
7 so --

8                   CHAIR HANSON: Joyce, are you okay  
9 with me giving the job to Kim to try to sort this  
10 out?

11                   VICE CHAIR MILLER: Definitely, yes.

12                   CHAIR HANSON: We would like -- when  
13 a wheel squeaks, I tend to put the oil on.

14                   MEMBER HALL: I'm not suggesting  
15 written in the next 24 hours.

16                   CHAIR HANSON: Oh.

17                   MEMBER HALL: So if he meant the next  
18 meeting as in six months from now --

19                   MEMBER MAUNE: The next --

20                   MEMBER HALL: -- absolutely, I can get  
21 it done, but not in two days.

22                   MEMBER BRIGHAM: -- discussion. Okay.



1       Okay.

2                   CHAIR HANSON: All right. Perfect  
3 discussion, guys. Thank you for all weighing in  
4 and much needed discussion.

5                   So we do have both Dr. Callender and  
6 Admiral Smith departing us. Before you leave,  
7 any last thoughts, other than you wish you were  
8 staying here?

9                   RADM SMITH: Yes, this has been so far  
10 a great meeting. I wish I were here to see it  
11 through. I feel bad about not getting to --  
12 going on the field trip and that sort of thing as  
13 well, because I think it helps to put some of  
14 these more abstract ideas that we have been  
15 talking about in this group.

16                   But I thank you all, particularly, for  
17 your passion about these things and your  
18 willingness to, both to, question and to support  
19 us on really hard issues. They take a lot out of  
20 these meetings, more than they seem at the time.  
21 Thank you all.

22                   CHAIR HANSON: Dr. Callender?

1 DR. CALLENDER: Sure. A couple of  
2 quick comments. I have been to a few, not a lot,  
3 of HSRP, but maybe, I don't know, four or five  
4 and I have, frankly, been pretty impressed with  
5 the current mix of panelists with the energy and  
6 enthusiasm that you bring, the passion, the mix  
7 of expertise I think is important and it's good  
8 to see.

9 I really have appreciated the dialogue  
10 this morning around the issue papers. I think  
11 having that kind of candid frank dialogue is  
12 useful and I really applaud you for being willing  
13 to do that and to move forward.

14 I thought the Jeff squired, Travis and  
15 Jan panel yesterday, I thought was fantastic. It  
16 was interesting. It was provocative and I think  
17 that will provide a fair bit of fodder to think  
18 about issues that are going to be important for  
19 us in the future. And I think the future is, for  
20 me, the key word.

21 I think the documents that Shep teed-  
22 up, the four documents looking for comments and

1 engagement on -- also will help us move forward  
2 in the future. And so I would urge you to dive  
3 into those. Again, do that in that dialogue  
4 spirit with NOAA I think is important.

5           Again, I apologize, I have to leave,  
6 but there was something that I really absolutely  
7 have to do that is actually important to this  
8 mission here tomorrow in D.C., so thank you for  
9 all of your efforts. I know sometimes it is  
10 frustrating, sometimes it is challenging, but I  
11 really do appreciate what you are doing and what  
12 you bring to this kind of conversation. So thank  
13 you.

14           CHAIR HANSON: All right. Well, safe  
15 travels to you both. And we will take a short  
16 break here. We do have a strong panel coming up  
17 next, so if we can make our break -- get back at  
18 9:45? I know it's quick, but we well set that  
19 high target and get back on track. Thanks again.

20           (Whereupon, the above-entitled matter  
21 went off the record at 9:39 a.m. and resumed at  
22 9:49 a.m.)

1 CHAIR HANSON: All right. Thanks for  
2 everybody's cooperation and almost getting back  
3 at 9:45, but that was a tall task. So and we now  
4 have a power panel discussion. Partnerships for  
5 the Pacific Northwest - On and Off the Chart.

6 I'll let Captain John Veentjer,  
7 retired Coast Guard, Executive Director of Marine  
8 Exchange of Puget Sound and Chair of Puget Sound  
9 Harbor Safety Committee.

10 John is also the Chair of the Puget  
11 Sound Harbor and Safety Committee, a member of  
12 the Puget Sound Area Maritime Security Committee  
13 and a member of the Olympic Coast National Marine  
14 Sanctuary Advisory Council.

15 And I'm going to allow you to  
16 introduce your panel members and go ahead and  
17 direct them from there. Thank you, sir.

18 CAPT. VEENTJER: Thank you very much.  
19 Good morning. I'm thankful to you for inviting  
20 myself and others here to be on this panel with  
21 you.

22 I think what I'll do is introduce each

1 of the panelists as we go through with the agenda  
2 and they do their presentation. But I'm going to  
3 -- if there is a presentation. If not, I'll just  
4 tell you a little bit.

5 I was going to share with you a little  
6 bit about what I do, which is -- has to do with  
7 partnerships certainly. The -- I have got "off  
8 the chart" highlighted here primarily for myself.  
9 I really don't know that the others will be  
10 speaking "off the chart," but I certainly will be  
11 speaking "off the chart."

12 You need to know -- I need to advance  
13 it. There. Oops. I think I would like to let  
14 you know a little bit about what the Marine  
15 Exchange does where I come from. Having retired  
16 from the Coast Guard 15 years ago, having been  
17 involved in the Marine Safety Program for most of  
18 my 28 years in the Coast Guard from vessel  
19 inspections to port safety security,  
20 environmental protection, environmental response,  
21 I got into the Marine Exchange 10 years ago.

22 And there are Marine Exchanges around

1 the country, not in all major ports,  
2 unfortunately, but there are on the west coast  
3 the Marine Exchange in every major port. And  
4 there are several on the East Coast and like  
5 organizations in the Gulf Coast.

6 What we do at the Marine Exchange of  
7 Puget Sound and similar to what they do at the  
8 Marine Exchanges along the other ports at the  
9 west coast is monitor and track the vessels that  
10 are arriving and as they depart Puget Sound  
11 coming to U.S. ports.

12 And I'll note a little bit later about  
13 the jointness of our waterways, our shared  
14 boundary waters with Canada and the challenges  
15 that we have there.

16 But anyway, we monitor and track those  
17 vessels. We keep the records. And in general,  
18 what I have found that the best source of vessel  
19 traffic in historical vessel traffic you can get  
20 from Marine Exchanges. And there are other  
21 organizations that probably collect vessel data,  
22 but they don't keep it in the same way and make

1 it accessible in the same way that a Marine  
2 Exchange does. So we have history on vessel  
3 arrivals going back to 1992.

4 We put out a daily paper so everybody  
5 can know what vessels are in-port, what vessels  
6 have arrived in the past day and what vessels  
7 have departed in the past day. We also have it  
8 electronically now. We have advanced, of course,  
9 evolved into the -- with the technology and we  
10 have it electronically and it's real-time, so you  
11 can log onto a website and you can get what  
12 happened this morning right up to within an hour  
13 probably or a few minutes. So that paper is one  
14 of our mainstays.

15 We also have our own network of AIS  
16 receivers in the area, so we provide a local AIS  
17 coverage, which is very valuable, I think, in  
18 tracking the vessels. There is interest in going  
19 much further than that. As a matter of fact, the  
20 Marine Exchange of Alaska has satellite tracking  
21 as part of their network and they have the entire  
22 north pacific.

1                   And just an example of how we use AIS.  
2                   This is a product that I use in my role as the  
3                   Chair of the Harbor Safety Committee. I -- we  
4                   run these passage lines. Actually, we have seven  
5                   of them. This is an example just one of them,  
6                   but it's the entrance to Strait of Juan de Fuca  
7                   and this counts the vessels that are arriving  
8                   through the Strait of Juan de Fuca. And that  
9                   counts all of the vessels.

10                   I know people will ask me well, does  
11                   it count the Canadian vessels? Of course it  
12                   does. It counts every vessel that has AIS on it.  
13                   So what you are seeing up here is a deep draft  
14                   vessel arrivals for the last three years through  
15                   the Strait of Juan de Fuca, whether they are  
16                   going to the U.S. or to Canada. And about half  
17                   of them go to Canada, half of them come to the  
18                   U.S.

19                   And then there is a big chunk of them  
20                   that go to both countries. About 1,500 of them  
21                   go to both countries.

22                   Now, I want to get into the



1 partnerships. This is the partnership that I'm  
2 most proud of, not that I had anything to do with  
3 starting it, but I was, at one time, the co-chair  
4 of the Joint Coordinating Group, which -- of the  
5 Cooperative Vessel Traffic Service or System.

6 And this makes management of the  
7 vessel traffic into the shared waterways between  
8 Canada and the United States extremely efficient  
9 and very safe and secure. The hatched area  
10 offshore is managed by -- well, it used to be  
11 managed by Tofino. I get used to saying it. It  
12 is actually managed by Prince Rupert now, because  
13 the Canadians consolidated some of their centers.

14 So the Canadians do the offshore and  
15 then when the vessel enters into the Strait of  
16 Juan de Fuca, whether it is -- well, if it is  
17 entering, it is, obviously, going to be on the  
18 U.S. side and it is managed by the U.S. center in  
19 Seattle. But it is also managed by the U.S.  
20 center in Seattle if it is outbound and in  
21 Canadian waters.

22 And if it goes up Haro, once -- if

1 it's going up to Canada and it is going up  
2 through Haro and boundary and the crossed hatch  
3 blue area there, it is managed by the office in  
4 Victoria. The Canadians manage that. So whether  
5 you are headed to a U.S. port over in the states,  
6 in Rosario or North Bellingham and if you use  
7 Haro and boundary, you are going to be under the  
8 management of the Canadians.

9 This Cooperative Vessel Traffic System  
10 was set up in 1979 and it has been a fabulous  
11 partnership between two countries managing  
12 traffic and it has been in place with continuous  
13 improvements being made all the time.

14 There are two -- about -- I think  
15 probably for the last 30 plus years, it has been  
16 two meetings a year. One hosted here in Seattle  
17 and one hosted up in -- usually in Victoria or  
18 Vancouver where the Vessel Traffic Service folks  
19 get together and discuss what things need to be  
20 done to improve it. So great partnership.

21 It's just repeating there on this  
22 slide things I have already said.

1                   And the other partnership that I'm  
2 more directly involved in these days is the  
3 Harbor Safety Committee. And this is a  
4 partnership, obviously, we have got it here, for  
5 success. It really helps us make continuous  
6 improvements to our Vessel Traffic System. And  
7 it also keeps us from getting complacent.

8                   We meet on a very regular basis. And  
9 we are -- it is made up of, I think it was, 12 --  
10 I actually might have it here. I do, so I'll  
11 wait.

12                   You can see what size our body of  
13 water is. I don't think there is a bigger  
14 location in the United States than here in Puget  
15 Sound. Lots of water, lots of shoreline.  
16 Sometime we like to put a slide together that  
17 puts LALB, San Francisco, the Columbia River,  
18 maybe throw in New York, Houston and still see  
19 how much water is left uncovered. But we aren't  
20 doing that today.

21                   Our major ports, as you know, are  
22 Seattle, Tacoma and Everett, but not to belittle

1 any of the other ports that are here as well.

2 And we are a very diverse community.

3 I heard that comment yesterday made by someone.

4 We have just got everything here, including the

5 Navy, so we have to bring the community together

6 and sort through our issues and we do that. We

7 have 15 private sector interest groups that are

8 represented on our Harbor Safety Committee and 6

9 Agency advisors, including NOAA, the Coast Guard,

10 Corps of Engineers are our three big ones, but

11 there are others, including the State Department

12 of Ecology.

13 The makeup of our Harbor Safety

14 Committee is -- you know, exemplifies the

15 stakeholder diversity that I just showed you and

16 a very collaborative commitment to safety. We

17 don't always reach consensus on everything and

18 then we don't move forward, but just about

19 everything we do do is by consensus.

20 And the results of this are that, as

21 I already indicated, we make continuous

22 improvement. We avoid complacency. We are very

1 inclusive, so we get everybody's maritime  
2 interest considered and we are a forum for lots  
3 of other activities from the Vessel Traffic Risk  
4 Assessment that we just did here this past year.

5 And we can also compliment the Coast  
6 Guard's Marine Transportation System Recovery  
7 Unit by bringing that diverse group together and  
8 participating in that manner. And all of this  
9 shows in the outstanding safety record that we  
10 have here in Puget Sound.

11 I'm going to -- this table is made of  
12 wood, but we definitely don't like to see oil in  
13 the water. We definitely don't like to see  
14 vessels on the ground or vessels running into  
15 each other. So we are very preventative.

16 And I think that is mine. So I will  
17 move forward and introduce Gavin Schrock. Gavin  
18 is Administrator of the Washington State  
19 Reference Network and the regional high-precision  
20 GNSS Network Cooperative in the Pacific  
21 Northwest. Gavin?

22 The bios, by the way, as you know are

1 in their package and I don't think we need to  
2 read all of those.

3 MR. SCHROCK: So this is going to be  
4 a little bit dirt-centric, rather than water-  
5 centric, but there is a reason for that.

6 I want to concentrate on something  
7 that we all have in common and that is a  
8 reference framework and that is a big concern in  
9 our state, I wouldn't say concern, an ongoing  
10 point of interest or a constant mission is  
11 synchronizing our realizations of the reference  
12 framework that comes from the National Geodetic  
13 Survey, which is buried deep, you know, in NOAA  
14 somewhere, woefully under-funded. I didn't say  
15 that.

16 So we get the reference framework is  
17 defined by the National Geodetic Survey, but the  
18 -- what to do with it on the ground is  
19 increasingly up to the local states. For  
20 instance, there is representatives here from  
21 three states that have these, you know, we will  
22 call them, ancillary real-time networks.

1 Gary Thompson in North Carolina and  
2 Mark Armstrong, NGIS Advisor for the Northwest,  
3 he is embedded down in ODOT where have a network  
4 down there in Oregon and they are all cool,  
5 except smaller, yes.

6 So the future -- the geodetic future  
7 of Washington it gets a lot of discussion on the  
8 dirt side, because of the nature of surveying and  
9 mapping changed completely in the past couple of  
10 decades and I'll go into that.

11 The reference framework, the key  
12 subject, the external drivers to what is going to  
13 happen to us here and the internal drivers or  
14 lack thereof, and then the big distinction or the  
15 shift from the passive to active reference  
16 framework. Emphasis on the self-reliance and  
17 then the education needs to get s to go there.

18 The technology is the easy part. The  
19 technology is there. The bureaucracy and the  
20 education is the killer part.

21 Our primary goal and in this era of  
22 really silly tiny short populous slogans, ours is

1 "We want to avoid becoming worse for the where,"  
2 with an "H." And I'm not kidding. You would be  
3 surprising how effective that is in an elevator  
4 speech, because in an elevator speech, you don't  
5 have the two minutes. You have 10 seconds in the  
6 elevator, so throw a silly slogan at them and  
7 then they go what do you mean by that?

8 2022 is a rallying cry for the  
9 geodetic Zeitgeist of our state, you know, the  
10 thought process. And that's something that the  
11 NGS kind of came up with. The goal is to move to  
12 the new reference frameworks in 2022 to have the  
13 single reference framework, earth-centered,  
14 earth-fixed.

15 The only survey monument in the world  
16 that can't be bulldozed out of existence is the  
17 center of the earth. And for the first time, the  
18 geodesy in reference framework in the U.S. will  
19 be earth-centered, earth-fixed.

20 Now, we've got to get people used to  
21 the idea of what the hell does that mean. But so  
22 a bunch of initiatives in our state, the target



1 is we call it a 2022 Goal, more in symbology than  
2 reality, that we are going to achieve a certain  
3 level of this geodetic independence by that time  
4 or preparedness.

5 Active and passive realizations. This  
6 is passive control. These marks in the ground,  
7 they are not always as pretty as this. They are  
8 often a nail stuck in concrete buried under 3  
9 feet of dirt or the end of a pipe or a truck axle  
10 or a spike stuck in the side of a pole or a nut  
11 on a fire hydrant, but that -- the passive  
12 control is when a geodetic value is established  
13 on a physical mark that is theoretically not  
14 supposed to move.

15 The problem with the passive is 10  
16 minutes after you set that and establish a  
17 control mark on it, it is, in some ways of  
18 thinking, obsolete. You have no idea if it  
19 moved. And sometimes that value was placed on  
20 there 40 or 50 years ago back in the year of  
21 massive public spending before it was demonized  
22 and things like Cold War spending and all of

1 that. There were massive 3 million of these  
2 marks all over the country, that was the  
3 reference framework.

4 Well, they move, they get bulldozed,  
5 they get knocked out, the earth moves. Right  
6 here in Seattle, even though the current  
7 reference framework is plate-fixed, in 23 years,  
8 you will have half a foot of horizontal movement,  
9 which means all of the GISes and all the  
10 published control that were in that 8391 are not  
11 God points any more, they have moved half a foot.

12 And you don't notice it if you are  
13 working in relative mode. If you've got a mark  
14 like this at one end of the property and another  
15 one at the end of the property, relative to each  
16 other, they don't move. But as soon as you start  
17 using GPS, which out of necessity more and more  
18 surveying, mapping, navigation need to use just  
19 out of necessity, you have to take geodesy into  
20 account.

21 This is active control in the form of  
22 permanent stations or the continuously operating

1 reference stations. The system of several  
2 thousand that the NGS monitors and there are  
3 three, four times that many in local use.

4 This tells you where it is 86,400  
5 times a day. It tells you where it is every  
6 second. You can resolve where that is. It knows  
7 where it is. You can refer to it. And as  
8 velocity, the earth moves, you can update that  
9 position based on that.

10 And when you work from it, you are  
11 tied to the center of the earth often in real-  
12 time to within a centimeter with affordable  
13 equipment. Well, that's all cool, except the  
14 reference frameworks get published and you get  
15 published values and it changes over time.

16 If you look at the slide, the active  
17 realization starting in the '80s when GPS was  
18 first used in geodesy, you had the NAD83 active  
19 realization. And then you know, it got updated  
20 to the CORS96 and then the 2011 more recently.

21 So there is -- realizations are using  
22 all of the resources available for the geodesy,

1 all of the observation data they have and can  
2 come up with a new realization, a new model for  
3 the geodesy for the country.

4 In the active, there has been those  
5 several big ones. Well, when it is passive in  
6 this one, it's state-by-state sometimes every  
7 couple of years. In the resources, it's not like  
8 people go out and remeasure every one of these in  
9 the state. No, they take the old observation  
10 data, the old baselines and networks and  
11 recompute them throwing in a couple of new values  
12 from some of these tied into it. So you get  
13 these realizations over time.

14 So the reality of the transition from  
15 the passive to the active is other than  
16 necessity, the passive is kind of not affordable  
17 to keep maintained and updated and new values on  
18 it all the time. I mean, in some countries like  
19 Switzerland, it's an actual national policy.  
20 They are not supporting that by 50 percent now.  
21 They are encouraging people to go active. But I  
22 digress, I tend to do that.

1           So if somebody goes out there with  
2 their new GPS equipment and your GPS can tell you  
3 where you are to the millimeter, but it can't  
4 tell you if it's the right millimeter unless you  
5 take into account this reference framework.

6           So the first thing that somebody does  
7 when they go out to use like our network or  
8 Gary's is I tell them -- I said when you go to  
9 shoot a published value, it's going to be wrong.  
10 You are going to say our network is wrong.

11           Well, what is the pedigree of that  
12 published value? And I want to go into some  
13 examples why there is a geodetic uncertainty that  
14 we live with right now and we are paying for all  
15 the time. It is built into our budgets. That  
16 geodetic uncertainty is something we pay for in  
17 our budgets in change orders, you know, resurveys  
18 and all that.

19           The geodetic ambiguity is what drives  
20 this uncertainty. So the notion that you could  
21 resolve a geodetic value that -- at this time and  
22 date exactly tied to the center of the earth and

1 from that you can project backward and forward  
2 from the velocities what it was at a certain time  
3 or should be.

4           So there is a way that now there  
5 should not be theoretically geodetic uncertainty  
6 and that means that if you take observation over  
7 here at one end of a highway project and you take  
8 an observation at the other end of the highway  
9 project, you -- those should click exactly and  
10 tighter than ever before.

11           The ability to get, you know,  
12 centimeter grade positions, both vertically --  
13 horizontally and vertically like your geoid tests  
14 is real now transferring a value on a benchmark  
15 over 100 kilometers within a centimeter is  
16 something that we, frankly, can't do with  
17 terrestrial digital levels, but we can with the  
18 GPS.

19           So I'm throwing too much at you at  
20 once.

21           So in our state, we -- our state does  
22 not have a centrally chartered geodetic entity,

1       apart from the DOT, which has the broadest reach  
2       in the state. So we formed a Washington Geodetic  
3       Survey, which is a nonprofit advisory, and it  
4       serves as a hub. We -- our believe is "thou  
5       shall not committee."

6                We don't meet very often. What we do  
7       is we make sure that everyone else that is under  
8       this umbrella informs all the other parties of  
9       what they are up to geodetically. This is like  
10       the real-time GNSS networks. There is the  
11       public, the cooperative and the private in the  
12       area, the professional associations only and the  
13       stakeholders and the scientific folks, which play  
14       a bigger role than you might think.

15               The -- we keep each other informed.  
16       One notable part missing in this wheel here is  
17       the hydro community. And part of the reason here  
18       that I'm trying to network with people is to get  
19       the hydro community involved, because they are  
20       using these reference frameworks.

21               And I've got to be honest, sometimes  
22       when I get calls from people using it out there

1 doing hydrography and bathymetry, they are  
2 talking about, you know, I tied to this USGS  
3 benchmark, which was propagated off of a Corps of  
4 Engineer one in 1968, and, you know, I'm not  
5 coming up with the right values here at whatever.

6 We have to get all the end users, you  
7 know, the end user constituencies to get a better  
8 understanding of the reference framework, the  
9 progression of reference frameworks, because the  
10 passive marks out there, you know, I've got to  
11 say it, you know, every county or city would  
12 develop their own network of God points.

13 And then, for example, one very well-  
14 funded city built, essentially, their own datum  
15 that they found out like 18 years later that they  
16 did the ARP versus the face center on their GPS  
17 and come to find out that although relative to  
18 itself, it was very tight but geodetically it was  
19 its own planet.

20 So there is a lot of work that has got  
21 to go into this. And we lean heavily on the NGS  
22 on this. We've had you send people out to do



1 education sessions. That's the best thing NGS is  
2 doing for us right now in this transition is the  
3 education process. And I really -- I know some  
4 of the hydro community is very -- probably know  
5 this better than we do, because dealing with  
6 vertical is your bread and butter, but there are  
7 segments that aren't.

8           So okay. There is an NGS regional  
9 advisor -- well, for a couple of weeks, and --  
10 based down in Oregon and this works well for us,  
11 so we have a way of working with the NGS. And  
12 then we have recently an NGS coordinator in our  
13 state. Now, that's an unfunded position, but  
14 that's someone in the DOT who is their geodesy  
15 expert, so it's really logical.

16           Speaking of that, the entity that has  
17 the broadest interest across the state are  
18 typically state entities, like ecology and the  
19 Department of Transportation. At least in the  
20 transportation corridors, the DOT has a Geodetic  
21 Survey Office and they maintain the passive marks  
22 in the state. This is a godsend.

1                   And they are going to continue it,  
2                   hopefully, through the transition and beyond  
3                   indefinitely so that we at least have reference  
4                   marks to check into and make sure things are  
5                   okay. And they will keep it updated along with  
6                   the epochs of the reference framework.

7                   They -- all funding anywhere in  
8                   government is tenuous. And so we have to plan  
9                   for contingencies that they might not be able to  
10                  maintain that much passive control.

11                  And then in recent years, the DOT has  
12                  become a partner in the reference network, which  
13                  has been great. So they maintain the passive  
14                  marks. They keep them updated mostly. But then  
15                  again, it's not always going out and setting up  
16                  and re-observing these. It's sometimes just  
17                  reprocessing with -- to the new reference  
18                  framework.

19                  Then we have the Cooperative GPS  
20                  Network. This is the -- this is where the users  
21                  can more readily get to a geodetic value rapidly.  
22                  NGS is providing for this transition to --

1 passive to active in things like the Online Post-  
2 Processing System or OPUS -- not named after the  
3 penguin. It means something. That's really  
4 good.

5 The NGS CORS in our state, we have  
6 about 12 in common with this network of 120  
7 stations, but the values are not updated as  
8 frequently as they could for practical reasons.  
9 So the values we get from OPUS or the OPUS  
10 projects -- which is a wonderful way for end  
11 users to more closely analyze and adjust what  
12 they are doing -- are a little bit lacking in our  
13 state in some areas.

14 So that combined with the dense  
15 network of reference stations for the real-time  
16 services -- just like Gary's in North Carolina --  
17 is more of the front line, the trenches.

18 This is a cooperative network. It's  
19 a public and private cooperative. The CORS --  
20 the Data Processing Center is a function of  
21 Seattle Public Utilities that started with a  
22 small network. And there are 85 public and

1 private partners who put up the infrastructure.

2 So there are eight of the EarthScope  
3 PBO stations involved in there. Actually, we are  
4 only using six right now, but -- and we keep  
5 contingency, but the breakdown is there that, you  
6 know, the state is about 20 percent of them are  
7 state agencies are about 20 percent of those  
8 stations.

9 Mostly just they are -- like a DOT  
10 maintenance yard is a site where we would put  
11 one. So this is completely self-funding. And  
12 this stands between us and kind of a geodetic  
13 nightmare come 2022.

14 The resources from the NGS are going  
15 to improve between now and then as well, so it's  
16 great we are going to have -- we will have a nice  
17 backup to the NGS. These reference stations all  
18 over the state are nicknamed CORS, put up by  
19 different entities, but the science community --  
20 because they use data from all of our stations  
21 for earthquake studies, plate tectonic movement,  
22 the isostatics used in the modeling, the geodetic

1 modeling and like JPL and USGS and everybody, you  
2 are pulling data from all our stations.

3 We meet their standard for  
4 monumentation and use geodetic-grade antennas.  
5 That GPS antenna in your phone, the technical  
6 term for it is it kind of sucks. So -- and yeah,  
7 we've got them all over the state in some really  
8 difficult places. The top of Mount Olympus and  
9 an unnamed mountain near Mount Rainier that a  
10 storm took it out and we had to snowshoe in and  
11 prop it up with logs.

12 But the -- it's running pretty well.  
13 Here is one challenge we have is we have become a  
14 default help desk for anything to do with  
15 surveying, mapping, geodesy and yeah, I have  
16 actually had people call up and want me to help  
17 them install Windows 10.

18 So we are not chartered to do this,  
19 but after 16 years of doing this, we've kind of  
20 narrowed it down to most of the problems, because  
21 it's a real-time service, it's the user  
22 communications, dealing with their cellphone or

1 hotspot to use the real-time network.

2 But the questions about geodesy and  
3 surveying, we are -- you know, we will try to  
4 answer, but that we realized the WGS -- of which  
5 this network is one of the many stakeholders in  
6 the geodetic future -- identified that it's the  
7 end user education.

8 I mean, it's not like Europe where --  
9 I hate to compare and despair, you pretty much  
10 have to have a masters to be a surveyor in a lot  
11 of countries and there is heavy geodesy. Well,  
12 in the U.S., surveyors typically never have to  
13 think about geodesy until they've started using  
14 GPS, because everything was in a relative mode  
15 from one end of this property to the other.

16 So that education is a challenge. And  
17 I see that the NGS is very well aware of that and  
18 has been putting on some fantastic seminars and  
19 webinars. That kind of thing also needs to  
20 happen in the hydro community as well. The whole  
21 thing about datums, especially in the GIS  
22 community, projections and datums and, you know,

1 a lot of GISes are frozen in time and space.

2 1991, the city GIS, then they go out  
3 with good survey gear and find out this thing is  
4 half a foot off. Well, the earth moved that  
5 much. Oh.

6 So the education, we put on a lot in  
7 our state and we invite NGS and retired NGS to  
8 come in and do the geodesy parts, because we  
9 don't have a lot of geodesists in Washington  
10 State or the U.S. for that matter.

11 The joke is there is more geodesy  
12 students hung over at any given time in Canada  
13 than there are geodesists in the United States.  
14 So -- sorry.

15 So velocity is an issue. We are a  
16 highly active tectonic area along with California  
17 and Oregon. In other parts of the U.S., you  
18 know, the glacial rebound up around the Great  
19 Lakes, so we are living the dream already. We  
20 are having to deal with velocity and when 2022  
21 comes, the people in the Middle Earth are going  
22 to have to all of a sudden deal with velocity.

1           So this is to give you an idea of how  
2 much we got out on the coast. We have to  
3 recompute the active stations. The active  
4 stations to be used geodetically, especially in  
5 real-time, have to be within two centimeters in  
6 3D relative to every other station in the state  
7 at any given time.

8           To do that on the coast, we have to  
9 recompute about every three months, new value on  
10 it. In the Central Puget Sound area, that would  
11 be every year or so. Out in Spokane, well, we  
12 can go six to eight years. It's moot. You know,  
13 some people joke nothing is moving in Spokane.

14           But the -- no. They are kind of lucky  
15 out there. So we have three states when it comes  
16 to velocity and lots of little pockets and  
17 eddies, so the denser the networks of stations,  
18 the better for us to track this.

19           The Pacific Northwest Geodetic Array,  
20 one of the first -- for tectonic plate studies in  
21 the world was out of Central Washington  
22 University. There is overlaps between all these



1 networks. They operate or they use data from 330  
2 stations in the Pacific Northwest, all of ours,  
3 and vice versa. We have a few of theirs.

4 The plate boundary or the PBO which  
5 was under EarthScope under the National Science  
6 Foundation, we -- no one knows what the funding  
7 future is for that. So the -- what is it, around  
8 1,000 stations on the West Coast? We only use a  
9 few of them, but we may -- like Oregon -- be  
10 looking at taking over operations some of them,  
11 if they lose their funding.

12 The NGS CORS, the National Geodetic  
13 Survey only owns a few of the stations, the rest  
14 are owned by other parties and they are vetted  
15 for quality by the NGS and then the NGS  
16 warehouses moves or brokers the data from them  
17 for all kinds of end uses. And then uses them in  
18 the products like the Online Post-Processing and  
19 uses that data in developing the reference  
20 frameworks. It is a great big symbiosis.

21 And on that note, we would love to  
22 stick some of our reference stations on the tide

1 gauges to solve some of the questions about how  
2 well is the vertical models going. We would be  
3 glad to, just come and talk to us.

4           So the National CORS and what we will  
5 call our stations, there are -- three NDGPS sites  
6 were decommissioned. We only really depended on  
7 one or one near it. We -- because the one in  
8 Spokane was actually one of the NGS CORS in the  
9 national process. We want to replace that with  
10 one of ours that is only a few miles away.

11           And then we want to upgrade some on  
12 the coast where our velocities are to improve the  
13 OPUS product, so that we will have a choice. The  
14 OPUS product -- you know, the front line for  
15 resolving geodesy for a lot of the end users and  
16 then our own.

17           So of our own network, we are divided  
18 up into functional areas, mainly on the plate  
19 tectonics and ionospheric and tropospheric  
20 modeling. So we manage them that way. The end  
21 users choose which one they are in. To give a  
22 little perspective, this is where geodesy is the

1 geodetic dream.

2 One agency in a country in Scandinavia  
3 that is kind of shaped like Sweden, their NGS  
4 USGS land cadastre -- private surveyors don't  
5 mention land there. It's city or country. And  
6 then they surprisingly don't have any disputes.

7 But they also run a network that  
8 unlike our network that has me and another half-  
9 time guy, they have eight people running their  
10 network. And our 120 stations in the same land  
11 mass, they have 380, which means their vertical  
12 resolution is insanely good, which means they  
13 don't have to depend on the passive marks much  
14 anymore, which means their geodetic uncertainty  
15 is gone. We can only dream.

16 Here is this valuating -- this is this  
17 geodetic ambiguity I'm talking about. Here is a  
18 single point. I could show you about 30 of these  
19 where there are four official published values  
20 that different people use.

21 There is a county one and there is a  
22 state one and three federal ones and different

1 entities are using this for different purposes,  
2 sometimes for their bathymetry and hydrography.  
3 And you can see how much different -- that's in  
4 meters -- how much different that is. You've got  
5 about five centimeter in vertical difference  
6 between those that people are using.

7 That's what we are having to -- but in  
8 2022, we want to make people aware to think about  
9 what they are using.

10 Why are there -- yes? Two minutes.

11 Yes, I'm going to wrap it up.

12 Why are there certain ambiguities?  
13 Some states are a little more progressive in  
14 funding geodesy than others. And that is  
15 reflected also in the federal products, because  
16 when the feds have good products, they can  
17 develop their reference framework.

18 This is -- I just -- one example of  
19 the change from one epoch of something to  
20 another, that's not science there, that's  
21 boundaries of two states, meaning it was more  
22 bureaucracy than science involved in that

1 realization change.

2 So our goals for 2022 is -- a lot is  
3 the education, is providing those services that  
4 people can use to check against the NSRS in an  
5 automated manner, the velocity tools, and  
6 monitoring what we are doing.

7 So I would say the biggest thing the  
8 NGS is doing for us right now is on the education  
9 side in advance of delivering that reference  
10 framework.

11 So I have been -- they are starting up  
12 the orchestra, so thanks.

13 (Applause.)

14 CAPT. VEENTJER: Okay. Dorrel Dickson  
15 is a geospatial survey analyst. He is a licensed  
16 land surveyor, certified federal surveyor, a GIS  
17 analyst and a geospatial survey analyst who is  
18 currently working with the Tulalip Tribe.

19 MR. DICKSON: Talking about -- today  
20 talking about using tidal benchmarks for  
21 measuring boundaries, property lines and  
22 regulation boundaries, rules and codes about

1 where and when you can build things.

2 In Washington State, the majority of  
3 the waterfront properties -- the salt waterfront  
4 properties, tidal properties, the majority of  
5 those property lines on the waterfront side are  
6 based on the mean high tide, the mean lower low  
7 tide or the extreme low tide.

8 In other words, if you are on the  
9 property and you are walking toward the water, as  
10 you go down and you hit the mean high tide  
11 elevation, that is your property line. The  
12 property line is determined by that vertical  
13 elevation.

14 In the reservation -- the Tulalip  
15 Reservation is no exception to that written 150  
16 years ago, part of it says and it says go to the  
17 low-water mark on the shores of Port Susan, then  
18 southeasterly with the line of the low-water  
19 mark.

20 The horizontal location of the Tulalip  
21 boundary is a vertical position based on the  
22 tides and the low-water mark there, according to

1 our court case, is the extreme low tide.

2 There is also a lot of the  
3 regulations, a lot of counties, cities, tribes  
4 all front on the water while the state  
5 regulations -- all those that front on the water  
6 have a lot of rules about what you can do where.  
7 And as you hit the water, most of those rules are  
8 written according to the tide.

9 And Tulalip code, no exception, our  
10 Tideland Management Policy Act, it says tidelands  
11 as used in this chapter means lands on the shore  
12 of Tulalip Reservation between the line of mean  
13 high tide and the line of extreme low tide.

14 There is a couple of difficulties  
15 though with using tides. The first one is that  
16 the tidal epoch -- epoch, epoch, I don't know  
17 which it is, I have heard it both ways -- but  
18 high tides and low tides, anybody that has been  
19 around them at all knows that a high tide is not  
20 a high tide is not a high tide. They are  
21 changing every day. In fact, around here we get  
22 the two high tides a day and they don't match

1 each other. They are changing continuously.

2           And the low tides don't seem to be  
3 relative to that either. They are always in flux  
4 and move. And it seems to be totally random,  
5 but, obviously, people have figured it out with  
6 the tide charts. And what it ends up being is  
7 there is a cycle to it. It takes 18.6 years for  
8 it to finally reset and replay the cycle.

9           So when it says your boundary is the  
10 mean high tide, what that is saying is it's the  
11 average of all the high tides measured over that  
12 18.6 years. So for you to be able to walk down  
13 your shoreline and say I'm at the mean high tide  
14 now, would mean that you had actually stood there  
15 for 18.6 years and measured the elevation of  
16 every high tide, which is twice a day. And you  
17 took all those and you averaged them out.

18           This is the mathematical location of  
19 the mean high tide, the average high tide. And  
20 that's actually what you have to do. I mean,  
21 that is -- that mean high tide is a mathematical  
22 location. And that is the property line or



1 sometimes depending on what the upland property  
2 owner has bought, but it could be the mean lower  
3 low tide also or the extreme low tide.

4 Extreme low tide being if you stood  
5 there for 18.6 years, this is the lowest tide  
6 ever during that time. You would have to be  
7 there during the most extreme low tide. So it  
8 can be difficult. Where is that?

9 And then the other problem is,  
10 especially here in the Puget Sound, tides as they  
11 get into -- well, the geography in the Puget  
12 Sound amplifies the tides.

13 I've got kind of a diagram here I  
14 found. If we can look close, it's kind of  
15 confusing. The blue is the water. The blue,  
16 yellow, red, that's all the water. Out on the  
17 west there, that's the Pacific Ocean. It comes  
18 through the state of -- Strait of Juan de Fuca  
19 there and it comes into the Puget Sound.

20 And as tides come into narrower  
21 channels and shallower areas, the tide actually  
22 gets amplified. Seattle, where we are sitting,

1 is right about in the yellow area over there on  
2 the -- well, it's the only yellow area. We are  
3 right in that area. And you can see this chart  
4 is showing the difference between what a low tide  
5 is and a high tide. How many feet between the  
6 low tide and the high tide.

7 And the blue is not too much change.  
8 And the red is a whole lot of change. So one --  
9 the tide coming in from the Pacific Ocean gets  
10 narrowed down and by the time it gets all the way  
11 down to those channels, it has been amplified  
12 and, as I understand it, it's even twice as big  
13 in our area as what it was out when it came off  
14 the ocean there.

15 If you -- so then the question becomes  
16 well, I'm at the mean high tide or I'm at the  
17 extreme low tide, that's my property or that's  
18 what the regulation calls for here. Which tide  
19 am I using? Am I using the tide out in the ocean  
20 and its native state or do I use the tide at the  
21 extreme end down at the very southern end down  
22 there by Olympia where it's the biggest?

1           Do I use it -- well, anyway. It ends  
2 up being the high tide or the tide that matters  
3 is the tide in front of your property. Where are  
4 you measuring the property line or the  
5 regulation? The tide right there in that spot is  
6 the tide that counts.

7           So being a land surveyor myself, I'm  
8 certainly not trained in tides. I don't know how  
9 to do this. But the -- NOAA, you guys, the CO-  
10 OPS Division, they are the authoritative source  
11 for accurate, reliable and timely water level  
12 current -- and current measurements.

13           Your CO-OPS Division are the experts  
14 on this. And in particular, your Field  
15 Operations Division within the CO-OPS, they are  
16 the ones tasked with actually setting and  
17 measuring and verifying, documenting these tides.

18           So this is where -- this is where I  
19 got involved. This is -- the City of Everett,  
20 there -- down there on the south, and up on the  
21 north that land mass up there, that's Tulalip  
22 Reservation hanging down and coming in from the

1 east there, that's the Snohomish River with all  
2 of its sloughs.

3 And so I needed to know the tides  
4 there at the Tulalip Reservation. And I was able  
5 to find the two stars there, those were NOAA Tide  
6 Gauges or tidal benchmarks they had put in. And  
7 in looking at those, I had a couple of problems.

8 The first one was out there on the  
9 east one there in the northeast corner there,  
10 that tidal benchmark had been done up there on  
11 one of the sloughs of the Snohomish River.

12 The tide that is important to me is  
13 the tide in front of a particular project on the  
14 reservation or for me it would have been I am  
15 overlooking all the reservation and therefore I  
16 need to know the tides along the reservation in  
17 many places, but it was pretty evident that I was  
18 going to have a hard time defending in court this  
19 tide that I got off one that was up a river a  
20 ways, under a river influence.

21 And then the one down there in the  
22 south in front of Everett, I was hesitant to use

1 it. One, it would have taken about 20 miles of  
2 running levels to try and get it over to the  
3 reservation.

4 But then the other concern was if we  
5 look at the area in low tide, you can see that  
6 river has a large delta there, so now these  
7 properties that are at high tide, saltwater  
8 frontage, now they are, I guess, river frontage.  
9 And I thought I would have a very difficult time  
10 trying to defend myself or anyone defending that  
11 that tidal benchmark out in the open water is the  
12 same as what we have in front of our project.

13 And -- but in our Tideland Policy Act,  
14 I don't know if it's act. Policy, our Tideland  
15 Management Policy. We had a -- the one -- the  
16 people who wrote this seemed to understand --  
17 well, this was written before I got there --  
18 understand that this was a problem. And they  
19 said in there that we are going to have tribal  
20 staff work to establish a network of permanent  
21 survey benchmarks along the reservation  
22 shoreline.

1           The purpose of the benchmarks will to  
2           be -- to be accurately and quickly determine the  
3           tidal elevations of shoreline structures and  
4           activities in the field, whether or not those  
5           activities is on or over the tidelands.

6           In other words, when somebody comes in  
7           for a permit or wanting to make some adjustments  
8           or wanting to know if they are on the tidelands,  
9           we didn't really have a good way to do it. And  
10          the tribe was recognizing that and the tribe was  
11          saying we are willing to put some effort and  
12          money into it upfront. We would like to  
13          establish benchmarks along our shorelines that  
14          would help these homeowners be able to determine  
15          it.

16          And that's where I -- when they hired  
17          me, they said oh, we've got a land surveyor.  
18          Great, we are going to have some benchmarks.  
19          Land surveyor, go put those in. I said these  
20          aren't surveying benchmarks. These are tidal  
21          benchmarks you guys need. I'm certainly not able  
22          to do that.

1           This is complicated. I explained some  
2 of this to them and they -- I said what you need  
3 is some NOAA benchmarks. These guys are the  
4 experts. And these are the communities we would  
5 need them in, the shoreline communities. We  
6 identified those as needing them.

7           Now, I ended up -- they said well,  
8 let's do it. Make it happen. And I started  
9 calling around, does anybody know anybody that is  
10 doing benchmarks, tidal benchmarks? I need some  
11 tidal benchmarks. I called everybody that I  
12 could find that I thought had anything to do with  
13 tides. I started sending emails to every email  
14 address I could find at NOAA, trying to get  
15 something going. We need some benchmarks. How  
16 do we do this?

17           I called the aquatic specialist at the  
18 state. I called everywhere. I even got a  
19 recommendation to call the NGS Advisor over in  
20 Montana. I don't know what Montana has to do  
21 with tides, but I gave the guy a call and he  
22 agreed that he doesn't have very many tidelands

1       there.

2                       But eventually after a couple of  
3 months of just everywhere I could do, I couldn't  
4 find anybody. Has anybody heard of somebody  
5 doing this in the last 30 years? No, no.  
6 Certainly this isn't a lost art. We've got to  
7 have somebody.

8                       And one day I get a phone call from  
9 Mark Bailey out of the Seattle office here. He  
10 says I have gotten word from up above that  
11 somebody -- you guys are looking for some  
12 benchmarks, some tidal benchmarks. Tell me about  
13 your project. What do you want? What do you  
14 need? And he did great.

15                      And I explained to him, you know, we  
16 want these benchmarks. We need them for these  
17 reasons. He actually came out on site and  
18 visited and we walked through it all. And then  
19 we had several conference calls with Washington,  
20 D.C. on whether or not to do this and how to do  
21 this. And those guys out there in D.C. assured  
22 us that they had plenty of benchmarks in the



1 neighborhood for what they needed.

2 And I -- well, it's not for your  
3 needs. This is for our needs. We understand you  
4 are covered, but we need something. Well, have  
5 you used the VDatum software? Well, I have  
6 looked at it, but is that accurate here? Is it  
7 good? They said well, we don't know. Well, I  
8 can't do property lines on I don't know.

9 I said does it apply within the  
10 Tulalip Bay here? Does the -- does it get the  
11 same tide? Is there a different influence within  
12 the bay? Does that restrict it? I don't know.

13 Well, anyway, so eventually we got --  
14 worked with them for about a year on this and we  
15 came up with a project, a design, a budget and  
16 came up with a two year project, \$60,000 to  
17 install the benchmarks, which included temporary  
18 tide gauges out there. You can see he is holding  
19 his temporary orifice out there, that brass  
20 thing.

21 And they set those and they monitored  
22 the tides for several months in multiple

1 locations. And one of the things they said is we  
2 want set benchmarks where we haven't measured the  
3 tide. And I thought, that's exactly what we  
4 want. We want you to measure it there and set  
5 the benchmark there. We want to know the tide  
6 there.

7 And we -- they ran levels, put in the  
8 benchmarks with the elevations and ended up  
9 putting in these permanent monuments. We put in  
10 permanent monuments, passive, permanent passive.  
11 Well, no passive monuments are permanent, but  
12 that was what was left.

13 We put in these benchmarks and now we  
14 have tidal elevations on all those benchmarks.  
15 And we have those benchmarks in all of our  
16 communities.

17 So we are one of the tribes in the  
18 Puget Sound that has waterfront property. These  
19 other tribes, as I have talked to them, they have  
20 also got the same issues going. The poor  
21 Swinomish Tribe actually has tides coming from  
22 three different directions on their reservation.

1 It comes around three different islands and their  
2 place is a mess and they don't know how -- have a  
3 clue how to pull this off.

4 In fact, there is a tidal benchmark on  
5 their property, but there is only one, and they  
6 need about 10, I think, in order to figure out  
7 their shoreline.

8 And then you have got all the other  
9 counties and cities around the Sound. And this I  
10 pulled up off the NOAA's website the other day.  
11 And these are the benchmarks they have around the  
12 Puget Sound. And if you look a little bit  
13 closely, there is a grouping of them on the east  
14 side of the reservation -- or east side of the  
15 Puget Sound about two-thirds of the way up, there  
16 is a whole group of them there. That's our group.

17 That's how dense we needed them to be  
18 able to do our measuring out there. And you can  
19 see the rest of the Puget Sound, I don't know how  
20 they are pulling it off. I mean, from Everett to  
21 Seattle, those familiar with the area, that's --  
22 Everett to Tacoma or Everett and then Seattle

1 down to Tacoma, major population. And you can  
2 see they have virtually zero benchmarks in there.

3 It's not unusual to be 20 miles to the  
4 nearest benchmark and we can see how bad those  
5 tides are amplified when they come into the  
6 Sound.

7 And so we got -- from the tribe's  
8 side, we've got our benchmarks. We are up and  
9 running. We can now regulate and we can survey  
10 out there, but who else can benefit? There is  
11 other people that benefit from our project that  
12 we did. Not Puget Sound in general, but actually  
13 on our site.

14 There is other -- it's not just the  
15 survey industry. It's not just the regulation  
16 industry, but things like the architects, they  
17 would have to stand out there for 18.6 years to  
18 figure out what the highest tide is also. And  
19 they need to know how high do they build this  
20 house, so that in 18 years from now we know it  
21 stays above the worst tide.

22 The engineers, when they are building

1 roads, you can see there when it hits high tide,  
2 this waterfront community, their road under the  
3 right conditions -- it doesn't happen every year,  
4 but certainly there are years where that road  
5 goes under water. Saltwater in the  
6 infrastructure isn't the greatest thing.

7 Emergency planners, they need to know  
8 when these tides are coming in. You get a storm  
9 with it, where are damages going to be? Who is  
10 going to be isolated? Who do we need to keep an  
11 eye on?

12 And then the people building  
13 bulkheads, you can see the debris has come over  
14 the bulkhead there. And I talked to one of the  
15 homeowners there and he said oh, yeah, we get  
16 blue water coming over that bulkhead all the  
17 time. In fact, when I walked around the corner  
18 there between the buildings, I saw a fish laying  
19 there on the deck.

20 I mean, but these guys that are  
21 designing and building these things need to know  
22 what the tides are in their specific spot.

1                   And that's it.

2                   (Applause.)

3                   CAPT. VEENTJER: Okay. Next up is Dr.  
4 Parker MacCready. Parker works to advance the  
5 fundamental understanding of estuarine and  
6 coastal physical oceanography. He is a professor  
7 of oceanography at the University of Washington.

8                   DR. MACCREADY: All right. Thanks  
9 very much. Can you all hear me properly? So as  
10 he said, I'm a physical oceanographer at  
11 University of Washington, which means I study the  
12 physics of ocean currents, tides, mixing, things  
13 like that. And I run the UW Coastal Modeling  
14 Group. I do a lot of work in coastal and  
15 estuarine waters.

16                   And one of the tools that we build to  
17 conduct science, but also applied science  
18 projects, are these realistic circulation models.  
19 And I'll show you some -- an example of that and  
20 the ways it uses and benefits from NOAA data of -  
21 - particularly the types that we have been  
22 talking about.

1           So in terms of the products we use,  
2 I'll be talking about use of NDBC buoy data, some  
3 of the Olympic Coast National Marine Sanctuary  
4 data, some other types of NOAA data not from NOS,  
5 but from NOAA cruises conducted by other parts of  
6 the organization, and also the tide stations that  
7 are extremely important. And those are just part  
8 of what goes into making these realistic  
9 circulation models.

10           And then the other part is more of --  
11 speaking as a stakeholder -- thinking about  
12 improvements to both the ways data is delivered  
13 that would benefit me and the types of research I  
14 do, but also the types of data that I hope you  
15 collect in the future and make available as we go  
16 to more and more instruments in the water.

17           So the context in which I see most of  
18 these things comes from a model which we call  
19 LiveOcean. And this is a daily forecast model  
20 that is much like a weather forecast model, but  
21 it's for the ocean. And there is a number of --  
22 sort of a good handful of models like this around

1 the United States or also globally, a large  
2 handful in that case. And so I'm one of the  
3 people for small regions who creates such a  
4 thing.

5 You can see the model domain in the  
6 right hand side. It includes a lot of Oregon,  
7 all of Washington and a lot of Vancouver Island,  
8 British Columbia. Both the coastal waters and  
9 the inland waters of the Salish Sea and Puget  
10 Sound.

11 In that map, the colors are surface  
12 salinity, so the blue is relatively fresh water  
13 that is coming from a whole variety of rivers  
14 that are included in the model.

15 It is built on a community model  
16 called Regional Ocean Modeling System or ROMS.  
17 The model is designed to be realistic, as  
18 realistic as possible. And just in the same  
19 sense that weather forecast models are trying to  
20 predict, you know, an actual day or the weather  
21 in an actual place and time and this involves  
22 bringing in a wide variety of types of forcing



1 data.

2           Actually, one of the most important  
3 ones I don't stress in this talk, but it was very  
4 stressed in the first talk of this panel, which  
5 is the bathymetry. And these issues of the exact  
6 bathymetry, the exact sea level, what the  
7 vertical datum is are extremely important,  
8 especially as we expand the use of these models  
9 to high resolution nested models that do model  
10 the intertidal.

11           And so getting the vertical datum  
12 correct has a great deal of importance for  
13 shellfish growers. They need to know if there is  
14 going to be water or not in their shellfish beds.  
15 But in any case, the model includes realistic  
16 tides, winds. Actually, all types of atmospheric  
17 forcing from a weather forecast model. And that  
18 means atmospheric heating, humidity, things like  
19 that. A wide variety of rivers from USGS and  
20 Canadian sources and also open ocean boundary  
21 conditions that comes from a Navy global model.

22           The amount of resolution is about a --

1 the horizontal resolution is about 1.5 kilometers  
2 on the coast and inland. As I said, we also  
3 construct nested high resolution models that  
4 would be more appropriate for Puget Sound.

5 And then as I said there, the model is  
6 three-dimensional, so it resolves depth. What  
7 I'm showing here in the figure is just surface  
8 fields, but we know the salinity and currents and  
9 temperature and, in fact, a lot of chemical and  
10 biological properties throughout the whole depth  
11 of the water column.

12 It runs on a super computer or a small  
13 super computer every day. And then a daily  
14 forecast -- a three-day forecast is pushed up  
15 into the cloud and then served on -- to the  
16 public on the NANOOS Visualization System, which  
17 is what Jan Newton talked about yesterday, and  
18 I'll show an example of that.

19 Here is how the model appears in the  
20 NANOOS, NVS. In this case, the color is surface  
21 temperature from a day in February. You can go  
22 to this website and it actually serves model

1 fields from at least four, I think, ocean models  
2 and several atmospheric models in the region with  
3 overlapping domains.

4 My model is focused on trying to work  
5 well in estuarine and the inland waters of the  
6 Salish Sea at the same time as it crosses into  
7 the coastal ocean, because those waters influence  
8 each other.

9 The extraordinary thing -- which I  
10 hope Jan stressed yesterday, but I'll stress it  
11 again -- in the NANOOS, NVS, is that it is able  
12 to combine modeled and observed fields. So on  
13 the map there is all those little icons. Those  
14 are data buoys that are out there and a number of  
15 them -- a large number of them are NOAA assets  
16 like NDBC buoys. And they report back in real-  
17 time.

18 Then using the NVS system, you can  
19 compare the modeled and observed fields, so  
20 that's the plot, the inset plot shows about four  
21 days of surface temperature from one buoy  
22 offshore near Grays Harbor.

1           The blue line is the observed  
2           temperature and there is three red lines and  
3           those are three overlapping model forecasts, so  
4           they go a little bit into the future.

5           We -- in order to validate and improve  
6           the model, we make extensive use of much longer  
7           data records. And one of the best sources or --  
8           is the NDBC buoys. They have data going back  
9           sort of 30 years, in many cases.

10           And here is an example of a three and  
11           a half year time series from two different NDBC  
12           buoys offshore, again looking at surface  
13           temperature and then comparing it to two  
14           different versions of the model forecast. The --  
15           you can see they follow each other pretty well,  
16           which means -- and this is the nature of these  
17           ocean models these days.

18           They actually do a lot of things  
19           surprisingly well, in terms of being able to  
20           reproduce observations. The -- including things  
21           like there was a big warm water event that showed  
22           up on our coast in the winter of 2014/15 called

1 the Blob or the Marine Heatwave. And that shows  
2 up very strongly. It was a huge signal and shows  
3 up very strongly, in, of course, the NDBC records  
4 and the model as well.

5 The -- as a user of NDBC data, I sort  
6 of -- I come across lots of issues that I think  
7 could be improved. The way the data is designed  
8 to be accessed, if you want to get historical  
9 data, you go to a website, you click on a link  
10 and it -- and you get a file, and a CSV file,  
11 comma, separated values. Things you -- something  
12 you could easily read into Excel, for example.

13 And with a little bit of munging --  
14 and I code in a programming language called  
15 Python, many data scientists use this language --  
16 you can design a thing that will sort of go  
17 through the back door of this system and  
18 automatically scrape out year after year of data  
19 from many sites as opposed to somebody having to  
20 click on it. And that's what I need in order to  
21 do any kind of serious and automated validation.

22 I described this process as brittle.

1 You see and this is a word data scientists use,  
2 which means that it's liable to break in the code  
3 and that's -- there is ways of designing data  
4 delivery that are more robust. For example,  
5 using XML instead of CSV files.

6 This is -- the XML is how I get data  
7 for USGS rivers. And I think of this as just --  
8 it's -- I deal with lots of data sources and data  
9 users and they are all on different pages about  
10 how easy it is to automate the delivery of data.  
11 That is, can somebody write a program that will  
12 get your data in a reliable method? And I think  
13 that is what you want to shoot for. It's not  
14 quite there for this particular data source, but  
15 I think it would be easy to get there.

16 The -- nonetheless, I want to stress  
17 that this is an extraordinary and valuable data  
18 source, especially for the long time series that  
19 they have. It would be great if they had more  
20 subsurface instruments. Almost all of the NDBC  
21 records are surface fields. They combine wind  
22 measurements, wave height and direction and also

1 water temperature, but there is so much more you  
2 could do with a buoy that is out there already  
3 designed to deliver data in real time.

4 As an example of one of the little  
5 data challenges -- this is down in the weeds, I  
6 apologize, but this is what it looks like from a  
7 user's point of view. If I go and want to get 30  
8 years of data from an NDBC buoy, I can write a  
9 program that does that automatically. And in  
10 fact, I had a class doing this recently. They  
11 were able to automate the extraction of data.  
12 But the -- you have to deal with the fact that  
13 the header format changed a lot of times over  
14 that 30 year period.

15 So the top row shows what the original  
16 header line looked like, the YY means that all  
17 the data below that in a column represented the  
18 year as two numbers. And MM the month, that's  
19 two numbers. That's fine. As long as you know  
20 what the code is, you can write a program that  
21 will ingest it.

22 But then the next year, it changed a

1 little bit. It changed a little bit back. 1999  
2 the year became four numbers instead of two, so  
3 your program is going to break unless you know  
4 that and there is no way to automatically look  
5 for everything that is going to happen.

6 Later the tide field was changed,  
7 that's the 2000/2004 change. Then in the next  
8 year minutes were added, that's great, but it's  
9 another column. And then finally, in 2007, it  
10 changed again to add a hashtag in front of the  
11 year, which went back to two numbers and they  
12 added another line that was all the units. Also  
13 great, but they changed a couple of times in  
14 different years. It was sort of random fashion.

15 So this is a lot of if statements.  
16 But this is the life of a data scientist. You --  
17 and so I think these are the kind of things that  
18 if somebody -- somebody could easily go back in  
19 the record and make all these NDBC records the  
20 same format and make them more readily  
21 discoverable and accessible.

22 Another kind of data we use is



1 vertical casts. The four columns here are from  
2 our -- are versus our different biogeochemical  
3 properties, oxygen in the water column, nitrate,  
4 alkalinity dissolved or total inorganic carbon.  
5 And they -- so this is just -- this data was  
6 collected by a ship going -- a NOAA ship going  
7 out and they do this every few years. And this -  
8 - and then after a while the data is processed  
9 and validated and then they would make it  
10 available to us and we use it to test the  
11 biogeochemical predictions in the model.

12 The model was constructed to make  
13 predictions of the corrosiveness of seawater,  
14 that is -- it's an ocean acidification property  
15 that is very important for the ability of  
16 shellfish growers to grow oysters on our coast,  
17 which is a huge industry, both down the coast and  
18 in Puget Sound.

19 And so we need to get the ocean  
20 properties -- the chemical properties right as  
21 well. And there is -- while there is a lot of  
22 sources of data like surface temperature of the

1 water, as you get deeper in the water column and  
2 as you get to more chemical properties, there is  
3 many fewer sources. These NDBC -- these NOAA  
4 cruises are one of the most important ones.

5 Another NOAA data source that we use  
6 extensively that is important for the predictions  
7 we make for shellfish growers comes from the  
8 Olympic Coast National Marine Sanctuary. They  
9 have their own problem and they operate about a  
10 dozen buoys in relatively shallow water on the  
11 coast. And so because it's close to the coast,  
12 much closer than the NDBC buoys, they are very  
13 important for us for validating the model as we  
14 try to predict, you know, is the representation  
15 of rivers and storms and moving of that water  
16 along the coast, is it correct?

17 And so you see here three time series  
18 of temperature at different depths. This is a  
19 pretty good comparison. The grey line is the  
20 model. This is over a whole year, 2013. The  
21 black line is the observations. Again,  
22 temperature, in this case.

1                   And well, you can see that sort of  
2 fine scale. Every storm that comes by changes  
3 water properties quite substantially and these  
4 are the types of changes that are important to  
5 simulate correctly to be of use for the shellfish  
6 growers.

7                   The model is also being used or is  
8 about to be used this year for the prediction of  
9 the arrival of harmful algal blooms on the coast.  
10 We know the blooms are spawned offshore of a  
11 certain diatom and then when it gets to the shore  
12 it causes a type of shellfish poisoning that is  
13 dangerous to humans, and we try to predict that  
14 as well. These data sources are essential for  
15 that purpose.

16                   We make -- in order to get the model  
17 to work right, we also make extensive use of all  
18 the tide stations that we heard about in the  
19 previous talk. These are -- the tide stations  
20 that we use are all the green dots in the map at  
21 the right. And then we try to represent them in  
22 various ways that allow us to improve the model.

1                   That is looking -- well, I won't go  
2                   into the details of tidal analysis, but we try to  
3                   make sure that the model is reproducing the  
4                   spatial pattern. That is what -- the previous  
5                   talk talked about this. There is a great deal of  
6                   spatial variation of tidal amplitude throughout  
7                   the system, especially as you move into the  
8                   inland waters and we try to reproduce that as  
9                   well as we can.

10                   There is also in the lower panel you  
11                   see a one-year time series of two lines. One is  
12                   the model as red. The tide gauge from one of the  
13                   coastal stations is blue. And then that  
14                   variation is actually what you think of as the  
15                   non-tidal part.

16                   That is, if I average over the tides  
17                   -- all the tides in a day, I would get something  
18                   that is like mean sea level, except that mean sea  
19                   level varies on the order of half a meter  
20                   depending on whether there is a big storm coming  
21                   through or not. And that's the kind of thing you  
22                   also want to be -- well, you want to do it right

1 in the model and the only way you know you did it  
2 right is because of these amazing tide gauges we  
3 have.

4 The tidal -- so as I said, we use a  
5 lot of tide station data. And these have similar  
6 data access issues to those I mentioned for the  
7 NDBC buoys. You have to download things by hand.  
8 You get then hourly records for one year at a  
9 time. There is amazing long tide records around  
10 from some of the tide stations.

11 The one in Seattle goes back to before  
12 1900, so you can see things like sea level rise  
13 and these 19 year tidal epochs that were  
14 mentioned in the past talk. They are quite  
15 apparent. The long time series only give you  
16 monthly data, so that would be the type of thing  
17 I would like to see the data access made easier  
18 and more extensive. That is, I would like the  
19 hourly records back to 1900.

20 Nonetheless, I want to really give a  
21 compliment to the NOAA Tides and Currents  
22 website. It is a fabulous source of data. I use

1 it for teaching, because it is such a great -- it  
2 has all the information that a student could need  
3 and more.

4 So that's it. Questions?

5 (Applause.)

6 CAPT. VEENTJER: Before we take any  
7 questions, we will --

8 DR. MACCREADY: We will wait on  
9 questions.

10 CAPT. VEENTJER: Yeah, we will wait on  
11 the questions. Okay. We now have Ms. Linda  
12 Styrk, who is the Executive Director of the Puget  
13 Sound Pilots. She handles all their business  
14 operations and external affairs.

15 Before she became the Executive  
16 Director of the Puget Sound Pilots, she was the  
17 Director of the Port of Seattle Seaport.

18 MS. STYRK: All right. Thank you.  
19 I'm really pleased to be before you today to talk  
20 about pilots, ports and partnerships with NOAA's  
21 navigation products.

22 So just a little bit on -- I guess I

1 need to draw a mouse here -- the pilots. Really,  
2 the pilots, as you can imagine, these are ship  
3 pilots that rely on NOAA's navigation products to  
4 really augment the skills that they have in  
5 navigation and the other tools that they utilize.

6 And as background, the pilots here are  
7 licensed both by the U.S. Coast Guard, of course,  
8 and by the Washington State Board of Pilotage  
9 Commissioners and their region Puget Sound  
10 Pilots, who I work for, is the Puget Sound area,  
11 which is really -- the pilot station that you see  
12 here on the left panel is Port Angeles at the  
13 east and at the Strait of Juan de Fuca. And so  
14 it goes from there all the way down to Olympia.

15 There is a second pilot district in  
16 Washington State in Grays Harbor. And basically,  
17 our customers -- our commercial customers, they  
18 are both domestic and international. We do  
19 handle a few yachts and pleasure craft  
20 occasionally, but it's mostly commercial traffic.

21 And we have a shared mission -- which  
22 I imagine you guys are well familiar with -- but

1 really it's protecting the loss of lives and  
2 damage to the vessels or properties and  
3 protecting the marine environment here in  
4 Washington State. And needless to say, the  
5 pilots are going to use as many tools as they  
6 have on hand and available to help serve and  
7 execute that mission.

8           So ports -- the partnership with ports  
9 is really on the berth side of things. Ports are  
10 primarily property owners. Here is an example of  
11 the Port of Seattle and the diversity of  
12 properties they get involved in. On the left is  
13 the Pier 66 Cruise Terminal and in the distance  
14 you can see the Pier 91 Cruise Terminal.

15           Next to that is a recreational marina  
16 at Shilshole Bay. They also have multiple rec  
17 marinas.

18           And then there is a commercial marina  
19 known as Fisherman's Terminal. I think many are  
20 familiar with. And the Sea-Tac Airport is also  
21 operated by the Port of Seattle and many other  
22 ports also operate airports as well.



1 I didn't show any cargo terminals. I  
2 figured that was what people were most familiar  
3 with already.

4 So it's kind of interesting how that  
5 came about with partnership between these fine  
6 organizations. So when I was at the port, we had  
7 a situation with a marine pilot, who happened to  
8 be a Puget Sound Pilot before I was affiliated  
9 with them. And we got the word that the pilot  
10 was holding off bringing a cruise ship into the  
11 berth at Pier 91, that you just saw.

12 And so of course that requires  
13 immediate attention if you are the Port Director.  
14 And I tried to figure out what was going on.  
15 Well, what was going on is the Port of Seattle  
16 had taken berth soundings and they had provided  
17 this depth information to the pilots, and NOAA  
18 had on the chart depth information that the  
19 pilots were looking at and there was also depth  
20 information from the Army Corps of Engineers.

21 So you had three different sources,  
22 three different data elements and three different

1 methods of, you know, getting that data.

2           So, needless to say, the pilot just  
3 went with the most conservative, because it's  
4 really hard to validate whose information is most  
5 correct when you are out there underway. And  
6 that was the right thing to do. And you know, it  
7 wasn't a huge delay, but it was an impact. And  
8 it just goes to show you that there is a huge  
9 value to continue to move in the direction to  
10 harmonize information amongst the different  
11 agencies.

12           Every agency has their own role. You  
13 know, everybody knows that NOAA is the expert for  
14 publishing the data, especially if you are doing  
15 anything related to navigation. That's the go-  
16 to.

17           And then the Corps, you know, is known  
18 for actually measuring and providing the data in  
19 so many waterway areas.

20           And then the Port of Seattle and other  
21 ports, their role would really be on the  
22 commercial side or the safety side where they

1 have berthing areas adjacent to their properties  
2 and they need to make sure that they understand  
3 those depths, especially if there is contract  
4 obligations linked to that.

5 So those are all the reasons that  
6 springboarded a partnership between these three  
7 agencies to look at how we might, you know, work  
8 together and not have a situation like that occur  
9 again.

10 So I put this out here because the  
11 ports -- so I came from a maritime background. I  
12 went to Cal Maritime and we were using lead lines  
13 back then just for fun more like. But the port  
14 was -- and this was an example of a lead line we  
15 used.

16 This one is called a valve lead line.  
17 You stick something soft like tallow soap, you  
18 know, in there and then when it hits the bottom  
19 it makes a mark, so that you can also detect what  
20 is the nature of the bottom, not just the depth.

21 So the way the port was using it  
22 alongside this berth -- this is a close-up of

1 Pier 91 -- they actually had a boom truck. I  
2 didn't have a picture of that, so you get this  
3 other look at a historic photo of someone tossing  
4 a lead line overboard.

5 So and the concept is a boom truck --  
6 which looks like a pickup truck with a boom that  
7 could hover over the water -- and they drop the  
8 lead line at different distances off the dock and  
9 then they move the boom truck along the dock and  
10 they made their marks and took their notes.

11 Now, the port has a survey group, but  
12 most of their activity and operations, as a  
13 property owner, are landside and they were mostly  
14 Sea-Tac Airport-oriented. So this is why they  
15 adopted this method, which they, you know, claim  
16 was very accurate. They are very proud of that  
17 practical method that they came up with. But  
18 that was our, you know, datum source at the port.

19 And this is an example of the data  
20 source that pilots can view from the Army Corps.  
21 So this is a picture of the South Harbor of  
22 Seattle. You see the east and the west waterway

1 adjacent to Harbor Island. And they use this  
2 data all the time to, you know, validate what  
3 they are dealing with. So I wanted to show you  
4 what that looks like and pilots use this all the  
5 time.

6 And then here is NOAA data, again, it  
7 looks like a chart in electronic fashion. This  
8 has continued to be enhanced over time by NOAA.  
9 You see these red vectors on there. This is  
10 extremely helpful to the pilots as they are  
11 navigating to see the directional information  
12 relative to their movement.

13 And I'm not keeping up with what I'm  
14 saying here, sorry. So, you know, the tidal data  
15 is critical. Of course, the currents and the  
16 direction of the movement, having that real time,  
17 having the predictability of that data as things  
18 are moving along is, you know, very critical to  
19 the pilots.

20 And you know, forecasting, the things  
21 that NOAA is doing and if this can be expanded  
22 on, anything related to forecasting is very

1 helpful and it's definitely utilized by the  
2 pilots.

3           And I didn't mention earlier, but the  
4 pilots have an important piece of safety  
5 equipment and many of you probably are familiar  
6 with this. It's called a personal pilot unit.  
7 It's also known as a PPU. It looks like a  
8 laptop, but it does so much more. It has things  
9 like rate of turn indicators, GPS, Bluetooth. It  
10 has the software for displaying the charts.

11           So every time the ship is moving, it  
12 is changing all the other information relative to  
13 the ship movement, so they can see real-time and  
14 anticipate what is the best approach to make when  
15 navigating the ship. And also that piece of  
16 safety equipment is completely independent from  
17 the ship's navigation equipment. So should the  
18 ship go down or have some failure, it -- you have  
19 100 percent redundancy there with the pilot.

20           So the more that information can  
21 become visible to the pilot in real-time and it's  
22 very accurate, the more that the pilot can do for

1 that mission of, you know, safety and security  
2 and preventing, you know, some kind of incident  
3 from occurring.

4 Here is another example. This is when  
5 they are looking at tides and currents, this is  
6 an example of a screen that they are looking at  
7 real-time. Now, they have a phone when they are  
8 navigating to that they have a lot of these apps  
9 downloaded on their phone in addition to the PPU.

10 Again, they have multiple ways to get  
11 at it. A lot of it depends on the person, right?  
12 They have their different navigating styles, so  
13 the tools that pilots favor may be slightly  
14 variable, but the nature of the information that  
15 they care most about is the same. And that's the  
16 tides and currents, the predictability, the  
17 accuracy of chart information, navigation  
18 hazards, any ability to anticipate threats that  
19 might be there.

20 For example, if there is a sense of a  
21 tsunami coming their way, that might be kind of  
22 important. And I think the future goal is to

1 continue in this realm. And one of the  
2 suggestions was for the tide data to have the  
3 tide levels corrected for barometric pressure and  
4 increasing the accuracy of that.

5 So you know, in close I just really  
6 want to thank NOAA again for having this  
7 opportunity to share how, you know, different  
8 groups are using this information, how critical  
9 it is to the daily work of many of these  
10 maritime-related organizations.

11 Even though the maritime sector is  
12 really small and hovers mostly under the radar  
13 screen, because there are so many successful  
14 operators out there that have prevented incidents  
15 from occurring, especially in this region, I  
16 think it frequently gets taken for granted.

17 But if any of these tools that are  
18 currently at play were to diminish, I think you  
19 would see that it would be even more challenging  
20 to keep that kind of good record going. And the  
21 more we can enhance it by improving these tools  
22 and, specifically again for us, it would be, you



1 know, the accuracy of information, the real-time  
2 data, the predictions for tides and also the  
3 weather, which I didn't really mention earlier,  
4 risk mitigation, so if you have threats, such as  
5 tsunamis, the immediate response.

6 I also had an example with a pilot who  
7 told me, you know, I had this issue coming into  
8 the Blair Waterway, which is in Tacoma. It's a  
9 very narrow waterway. There is a lot of vessel  
10 traffic usually berthed there. And he said, you  
11 know, there was this navigation aid, I think,  
12 that he was concerned about.

13 You know, I picked up the phone, that  
14 1-800 number, and I called and I really did not  
15 have any expectation at all, but I was so  
16 surprised that I had someone immediately answer  
17 that call and answer my question and validate the  
18 information I needed. And I said that was great.  
19 He just thought that was really great and it was  
20 so critical to him at that moment in time.

21 So, you know, whoever is behind that  
22 resource, there is an example it was really used

1 and it was really helpful real-time in a narrow  
2 waterway.

3 And this unification of data where I  
4 started out my presentation, I think that that is  
5 so critical. The more that you can have one  
6 resource that is consistent instead of having  
7 multiple resources where everyone has to think  
8 about reconciling or making an assessment about  
9 which resource is the best or the right is  
10 critical.

11 You know, frequently these pilots are  
12 coming into areas with these big ships and they  
13 have, you know, less than three feet of underkeel  
14 clearance. That is not a lot of variation and  
15 with suctioning and other factors, it can be  
16 quite stressful.

17 So I want to thank Crescent Moegling.  
18 She is one of the people that was in that NOAA  
19 partnership box and John Hicks at the time was  
20 with the U.S. Army Corps of Engineers and  
21 Navigation Division and now that is Kim Anderson,  
22 who I'm sure is doing just as fabulous of a job

1 there.

2 I understand they are continuing to  
3 work together in those areas and that's the end  
4 of my presentation. So thank you very much.

5 (Applause.)

6 CAPT. VEENTJER: Well, now we have  
7 some time for questions. So, yes, sir.

8 MEMBER MAUNE: I have a question for  
9 Gavin. Gavin, I'm one of those rare geodesists  
10 you referred to and I think you did a real good  
11 job in explaining the difference between passive  
12 and active control and the reason why we are  
13 converting from one to the other.

14 A group of us on Monday night went to  
15 a restaurant called Von's Restaurant on 1st Avenue  
16 and back out the back window was a robotic total  
17 station there. And a lot of us were wondering  
18 what that thing was doing. It was rotating  
19 around. It was measuring the angles and  
20 distances to something, probably to detect  
21 movement of something.

22 But occasionally like every 30

1 seconds, it was shining on a piece of canvas and  
2 I can't imagine you're measuring angles and  
3 distances to a spot on a piece of canvas. So  
4 that was probably an anomaly. But can you  
5 explain what that total station was doing? And  
6 does it have any bearing on what we do?

7 MR. SCHROCK: So there is a major  
8 transportation project that is going through  
9 Seattle or more exactly under that for a lot of  
10 legal reasons I can't talk too much about it, but  
11 one of the contractors and the subcontractors is  
12 monitoring effects on the surface of the mining.

13 So they have a series of total  
14 stations that are daisy chained together and they  
15 are working purely on a relative mode to --  
16 relative bench -- relative control points. So  
17 it's just constantly shooting reflectorless and  
18 reflector targets to look for relative movement.

19 Why it is shooting the canvas? It may  
20 be part of a -- it's a calibration check on  
21 itself, is my guess. We use a lot of those for  
22 our own structures in the city. And we will

1 shoot a reference mark as a calibration.

2 So I could get you exact details at  
3 some other time. But it -- no, it's -- the --  
4 when a major project happens, they agree upon  
5 what geodesy they are going to use and then they  
6 use it throughout the life of the project. The  
7 challenge becomes if it's a really long project  
8 and it's over a very long period of time, that  
9 stuff moves, so that has to be taken into  
10 account.

11 MEMBER MAUNE: Thank you.

12 CAPT. VEENTJER: Yes, sir?

13 MR. ARMSTRONG: A question for Dr.  
14 MacCready and it ties, I think, many of -- it has  
15 impact on all of these. So when your models are  
16 operating, are the -- you have a water level  
17 prediction that comes out of the model, I  
18 understand. And are those model outputs tied to  
19 a tidal datum or a geodetic datum or some ocean  
20 baseline value?

21 So in other words, is there  
22 connectivity between tide gauge readings and your

1 model? And so could a mariner use that directly  
2 or is there some translation required?

3 DR. MACCREADY: That's a really good  
4 question. I think as the model exists right now,  
5 that connection is a little imprecise, in the  
6 sense that I have done the best I can to make  
7 sure that the bathymetry map I use and the  
8 offshore boundary conditions and tide forcing is  
9 all using something like the same datum.

10 But it's -- surprisingly, there is a  
11 big -- I use a number of different bathymetry  
12 sources, for example, and there is  
13 inconsistencies about the datums for those. And  
14 I think I was really excited to hear about the  
15 greater use of the active geodesy in GPS to  
16 improve the vertical datum.

17 So I would say right now, I mean, we  
18 predict the tidal elevation and the outputs  
19 available hourly. It does a pretty good job with  
20 both the tides and the non-tidal part that I  
21 showed in one of those plots.

22 As far as -- yeah, I think there is

1 still a little work to do getting it actually to  
2 line up with the tide gauge itself, the datums.  
3 But it's not far off.

4 MR. ARMSTRONG: So it is -- the  
5 prediction from your model is with reference to  
6 mean sea level or mean tide level or --

7 DR. MACCREADY: That's correct. What  
8 we use as zero is mean sea level and then we -- I  
9 try to, you know, coordinate my use of the  
10 datums, whether it is from the bathymetry or from  
11 my offshore boundary conditions to all be  
12 consistent. That becomes much more important as  
13 you get into the inland waters and you are  
14 talking to a shellfish grower that really wants  
15 to know what is happening in the intertidal.

16 And I think that's the direction we  
17 are heading is towards finer and finer  
18 resolution. And so it's going to push that  
19 issue.

20 MR. ARMSTRONG: Okay.

21 CAPT. VEENTJER: Yes, sir?

22 MEMBER THOMPSON: So during all the

1 presentations we heard about the importance of  
2 heights, which NGS provides. But it also  
3 stresses the point that as we make this  
4 transition to 2022, if we need -- NOAA needs to -  
5 - and they are already doing a good job, they  
6 need to continue that to make sure we educate all  
7 the users of heights of this change that is going  
8 to occur in 2022, because if we mix apples and  
9 oranges, it could be disastrous for a lot of  
10 things.

11 So I think that -- this really  
12 stresses the point of the outreach that is needed  
13 to educate everybody that is dealing with  
14 heights.

15 CAPT. VEENTJER: Thanks.

16 MR. EDWING: Rich Edwing with CO-OPS.  
17 I just really want to kind of comment and amplify  
18 on some of the -- what Dorrel talked about in his  
19 presentation.

20 So the purpose of the NWLON, the Water  
21 Level Observation Network is to provide tidal  
22 datums for the nation. And we have 210 stations



1 right now. And we know we need 316 because if  
2 you just look at -- each tide station provides a  
3 span of vertical control.

4 In other words, we were able to get  
5 very accurate tidal datums from the short-term  
6 tide gauges put in for Dorrel's project by  
7 comparing them to an NWLON station. We got to  
8 get rid of a lot of the seasonal variability, all  
9 the annual sea level variability and other  
10 factors by comparing them to that long -- that  
11 goes -- those multiple tidal epochs that we have  
12 measured over at the NWLON stations.

13 And that's also what has allowed us to  
14 define that network. There is not too many  
15 observing networks. I can tell you exactly how  
16 many stations they need, because it's -- just  
17 constraining it to that vertical control, I can  
18 tell you how many stations I need to provide that  
19 very foundational, you know, reference system for  
20 the nation.

21 It doesn't take into account storm  
22 surge or tsunamis or all of those other factors.

1 And the reason you see multiple dots along that  
2 map in addition to the NWLON is because there has  
3 been multiple projects done over the years.

4 Hydrographic survey, shoreline surveys, habitat  
5 restoration projects, property boundary surveys  
6 and that's what kind of adds those dots to the  
7 maps so we have benchmarks.

8 It's kind of for those short-term  
9 projects, for local requirements and that's what  
10 allows us to kind of populate, you know, the  
11 predictions and datums along the coast, because I  
12 certainly don't have the resources to, you know,  
13 establish the many -- I don't know how many  
14 thousands of tide gauges would be needed to kind  
15 of really get down to the level, you know, of  
16 detail and accuracy that people like Dorrel and  
17 other people need.

18 So I just wanted to amplify on. And  
19 thank you, Dorrel, I really appreciated that  
20 presentation. I'm thinking about spacing my  
21 employees along the coast and having them stand  
22 there for 18.6 years. That's right, it will just

1 -- Okay. Thank you.

2 CAPT. VEENTJER: Yes, ma'am?

3 VICE CHAIR MILLER: This is a  
4 curiosity question as much as anything for Linda.  
5 We were in the Great Lakes last and one of the  
6 things we heard from them was that they don't  
7 have reliable enough communication in the middle  
8 of say Lake Michigan to really use their pilots  
9 or --

10 MS. STYRK: PUs, yeah.

11 VICE CHAIR MILLER: -- PUs. So I  
12 wondering is that, I mean, not down in the south,  
13 Tacoma, Olympia, but certainly up at Juan de  
14 Fuca. Is that any issue here?

15 MS. STYRK: I have not heard that  
16 being of any issue here, thankfully.

17 VICE CHAIR MILLER: Yes. I have  
18 another question. My sister lives in this area  
19 and I heard a lot about risk assessment. You  
20 know, she has the emergency kit and the whole  
21 thing. But I also heard a lot about the big risk  
22 being earthquakes and what happens to the

1 infrastructure there.

2 You, sir, are on the --

3 CAPT. VEENTJER: Harbor Safety  
4 Committee.

5 VICE CHAIR MILLER: -- right. What --  
6 I mean, I have seen a simulation where the areas  
7 around the ports, essentially, liquefies. What  
8 kind of emergency management strategy is there  
9 for that?

10 CAPT. VEENTJER: Well, that's a good  
11 question. On the marine side, there is probably  
12 very little. And that's one of our concerns,  
13 clearly, is to be more engaged in the earthquake  
14 planning, the contingency planning for an  
15 earthquake.

16 From a marine side, will we even have  
17 time to do much about it. We're not even sure.  
18 I'm not an earthquake expert, but what I have  
19 heard is we are overdue for the big one. It's  
20 somewhere between 300 and 500 years and we are  
21 beyond 300 or something like that. So we are  
22 overdue.

1                   What is that going to do to the  
2 infrastructure here? What is it going to do to  
3 the waterfront? I have watched videos that show  
4 that some of the things that used to be on the  
5 west side of the Sound are now on the east side  
6 of the Sound and vice versa and applying that  
7 there was a sloshing effect in the Sound.

8                   So if there is anybody who is an  
9 earthquake expert, you can correct me, you know,  
10 if you want. But those are the kinds of things  
11 that we are living with. We see on TV. We hear  
12 in different presentations.

13                   So one of the things we want to do is  
14 build into our Harbor Safety Plan some preemptive  
15 planning for that event. And do we try to get  
16 the ships away from the pier or do we wait until  
17 they all end up on the piers, you know, that type  
18 of thing. It's something we have to look at.

19                   VICE CHAIR MILLER: All right.

20                   MS. STYRK: Yes, I can add to that  
21 just from my port experience as Sea Port  
22 Director, so this would be more relative to the

1 sea port properties at the Port of Seattle.

2 I know that they were familiar because  
3 of the last big earthquake we had in Seattle  
4 where the liquefaction, if I'm saying that right,  
5 occurs on port-owned properties, which is not all  
6 the properties on the waterfront, but the ones  
7 that they own. So they have some past experience  
8 of where the risk areas are. Then there is  
9 modeling. They very much coordinate with the  
10 academics who have these models to try and  
11 anticipate.

12 They have many, many of their  
13 engineers who are trained to do assessments, you  
14 know, after an earthquake incident. As far as  
15 the commercial traffic and, you know, the  
16 customers who lease properties from the port, for  
17 the seaport, the ships are mobile assets, so they  
18 are just going to redeploy the ships to a  
19 location where they don't have issues.

20 If they are alongside, that will just  
21 have to be, you know, addressed like an incident  
22 response type of situation. So they are

1 planning, you know, as best they can for risk  
2 mitigation, but how far you go, I mean, you can  
3 spend endless time and energy on this, but the  
4 return on value, I think they are trying to find  
5 the right balance of how much time to spend  
6 relative to the return on value.

7 VICE CHAIR MILLER: Yeah, I was on the  
8 Hawaii or the Honolulu Harbor Safety Team right  
9 after the tsunami in Japan.

10 MS. STYRK: Oh.

11 VICE CHAIR MILLER: And there was a  
12 little problem. They had a plan for how to get  
13 the boats out of the harbor, but not back in.

14 MS. STYRK: Oh.

15 VICE CHAIR MILLER: I mean, basically  
16 -- and they had this traffic pattern that was --  
17 there was no coordination. And then you had a  
18 lot of small boats that were out there with no  
19 VHF or anything.

20 MS. STYRK: Um-hum.

21 VICE CHAIR MILLER: And a whole  
22 section of the piers were destroyed and there was

1 nowhere to put those boats. You know, it was --  
2 so I would just give you fair warning, it's good  
3 to think about thoroughly before, you know,  
4 something like that happens.

5 MS. STYRK: Um-hum.

6 CAPT. VEENTJER: Well, Linda, might  
7 know this as well, better than I, but some of the  
8 planning that I have been involved with the  
9 state, sometimes they are talking about  
10 infrastructure, roads, buildings, whatnot and  
11 they are not even talking about the waterfront.

12 So we need to get more involved with  
13 those folks in planning that. Yes, sir?

14 DR. MAYER: Yeah, I know just on the  
15 other side of the street, Ocean Networks Canada  
16 and the Province of British Columbia are setting  
17 up a Tsunami Early Warning System. Is there any  
18 equivalent on this side of the border?

19 CAPT. VEENTJER: Not that I'm aware  
20 of, because they are taking advantage of a cabled  
21 array infrastructure, which they have established  
22 on the Canadian side, but the University of



1 Washington has an equivalent.

2 DR. MAYER: It -- would NOAA be  
3 involved in that in any way?

4 CAPT. VEENTJER: Well, you have the  
5 buoys, the surface buoys, but this is --

6 MR. EDWING: Well, sort of the Tide  
7 Gauge Network is a part of the Tsunami Warning  
8 System. I wouldn't call it an early warning  
9 system, because -- Well, so, yeah, the first step  
10 is (A) the seismometers around the world trigger  
11 and they start doing models and the DART buoys  
12 hopefully pick it up and that's when they really  
13 start doing the forecast. And really, the tide  
14 gauges are used to validate those forecasts. And  
15 if they need to adjust where it is going next,  
16 you know, how bad it is going to be.

17 DR. MAYER: Right. But it's the --  
18 the sea floor seismometers that are far off  
19 shore.

20 MR. EDWING: Right.

21 DR. MAYER: That really provide the  
22 most accurate early warning.

1 MR. EDWING: Right, right. I agree,  
2 yeah.

3 MS. STYRK: What I can add from the  
4 Puget Sound Pilots' perspective is I know that  
5 the pilots, especially the location there in Port  
6 Angeles, they are very active on various marine  
7 drills that occur for incidents that they model,  
8 such as tsunami or, you know, a cruise ship that  
9 dumps all the passengers overboard or something  
10 like that.

11 And there is multiple agencies  
12 involved in that, including NOAA. I think they  
13 have a person there who looks at different  
14 threats and works with the pilots on that.

15 So I think regionally there are some  
16 exercises that are going on and I don't know what  
17 else is supporting that, but I just thought I  
18 would add that to the conversation.

19 MEMBER PERKINS: Great. Thank you.  
20 Mr. Chairman?

21 CHAIR HANSON: Yes?

22 MEMBER PERKINS: I have a question and

1 comment. You know, what your panel has  
2 described, in my mind, is very critical  
3 infrastructure, you know, that is needed for  
4 maritime commerce and for positioning. And so I  
5 have a two-part question, you know, in looking at  
6 your slides of where, you know, your active, you  
7 know, stations are, you know, physical security  
8 and cyber security for this critical  
9 infrastructure that is necessary for this  
10 positioning.

11 You know, I didn't see a lot of fences  
12 around those GPS receivers. And I'm just  
13 wondering, you know, where in your risk  
14 management plans is protection of this  
15 infrastructure against physical threat and cyber  
16 threat?

17 Because you are distributing  
18 electronic data that is critical, right, to the  
19 safety and navigation. And how vulnerable is it?  
20 And what's your risk mitigation plan, you know,  
21 to secure that data and make sure that it can't  
22 be disrupted or altered, you know, negatively?

1           MR. SCHROCK: Well, when it comes to  
2 the GNSS infrastructure, in the United States  
3 that's not really viewed as critical  
4 infrastructure, unfortunately. The reality is is  
5 it is for a lot of people. There is a lot of  
6 dependence on that.

7           So we do the best we can, you know.  
8 We are not funded. We are self-supporting. But  
9 actually all those sites do have fences around  
10 them somewhere.

11           We have only had vandalism one time.  
12 Somebody shot one of the domes and the bullet got  
13 this far from the element and it kept working and  
14 we didn't notice it until the wasps were building  
15 a nest in there.

16           But no, so the cyber security is --  
17 another problem is we are damned if we do and  
18 damned if we don't. If we go through like the  
19 state's Internet, and it is, you know, cables and  
20 wires and fiber, well, if you have any kind of  
21 event, especially an earthquake or something,  
22 cables and wires and fiber are a nightmare.

1           So I know this is making a deal with  
2 the devil kind of thing, but we kept thinking  
3 that the cell companies have a huge financial  
4 incentive to make sure that their system is going  
5 to be working. So we actually will run primary  
6 through a cell network wirelessly and -- because  
7 that may be the first thing that is working  
8 again, you know, the coop. We thought about  
9 coop.

10           And then the secondary is the -- going  
11 through the state's Internet, because the hazard  
12 of going through a bureaucratic Internet is they  
13 change things like IPs and it can take weeks or  
14 sometimes months to get things back.

15           So there -- and we have looked at some  
16 countries where they do treat it as critical  
17 infrastructure and they have a full coop plan and  
18 they run it through something like -- for  
19 instance, there is a radio network for our State  
20 Highway Patrol that is independent, you know. If  
21 we could run through something like that, we  
22 could meet those needs.

1                   The cyber security part of it about  
2                   somebody hacking it is the nature of the GPS  
3                   observations is someone would have to be insanely  
4                   clever in hacking and faking data from nine  
5                   surrounding stations to pull off some kind of --  
6                   denial of service would be the immediate thing.

7                   CAPT. VEENTJER:   Somebody else?   Yes,  
8                   sir?

9                   MEMBER MAUNE:   This panel prepared an  
10                  issue paper on the changing datums in 2022.   It's  
11                  only five years from now.   And if I'm not  
12                  mistaken, the elevations up in this area are  
13                  going to be changed by over a meter.   And I  
14                  expect that you are going to have your hands full  
15                  and Mark and other people trying to help people  
16                  sort through all of this.

17                  And I'm just wondering what you think  
18                  the challenges are going to be for you to pull  
19                  this thing off, because you are bound to be asked  
20                  a lot of questions on what do we need to do?

21                  CAPT. VEENTJER:   You're asking  
22                  Juliana?

1 MR. SCHROCK: This we will defer to  
2 Ms. Blackwell.

3 CAPT. VEENTJER: Okay.

4 MR. SCHROCK: Because you'll make the  
5 decisions and we're going to follow suit. We're  
6 going to take your lead.

7 MS. BLACKWELL: Right. And so this is  
8 Juliana Blackwell. So the one thing that we want  
9 to make sure that we have ready and available for  
10 folks when we do switch the datums is  
11 transformation tools that they can easily go back  
12 and forth with the datums that they currently  
13 have and bring them to the new datums and vice  
14 versa.

15 So we realize that there are going to  
16 be, you know, projects that people have underway  
17 that are going to take years to complete that  
18 are, you know, set up on a particular datum. And  
19 whatever datum is chosen for those projects to be  
20 finalized on is up to the -- to that group that  
21 is doing them.

22 We just want to make sure that the

1 tools are available for folks to be able to go  
2 from one to the other efficiently. And I think  
3 in the digital age that we live in now, as long  
4 as that tool is available, it should be a lot  
5 better than when we went from, you know, the  
6 datums of the 1920s to the 1980s and everything  
7 was done, you know, more or less by hand in old-  
8 fashioned computer systems.

9 So I think that the opportunity is  
10 there for a much smoother transition. It's  
11 really the education part of it that I think is  
12 the key, making sure people are aware, one, not  
13 only that it is happening and that, two, that  
14 help is available through the tools, through our  
15 partners, through, you know, the apps that will  
16 come, etcetera and making that as, you know, easy  
17 as can be. But it's still going to be a huge  
18 lift.

19 And the other thing that we want to be  
20 able to show through the development of  
21 experimental geoid models, which we are producing  
22 every year, based on the data that we have



1 collected and processed and made available to the  
2 public, is the magnitude of change that people  
3 can expect.

4 And it's estimated, because it's  
5 really just going to be that the geoid, an  
6 experimental geoid model, but people can take  
7 that and start plugging in information that they  
8 have to get an idea of the change, the magnitude  
9 of change that they should expect in 2022 for the  
10 height component.

11 Here, in this area, we are still  
12 collecting the data for -- through GRAV-D, so we  
13 don't have any experimental geoid model yet, but  
14 we hope to have at least the coastal part  
15 collected and available soon, so people can start  
16 to play around with those models and start to get  
17 a sense of what is future.

18 Anything else you want to add to that,  
19 Gavin?

20 MR. SCHROCK: Well, there is --  
21 actually, people have been doing this all along.  
22 It's called a localization. If they are working

1 on a project or something that has a local  
2 reference, an historical reference, they localize  
3 now, because they know that the earth has moved.

4 So they are going to be able to --  
5 there will be a lot of utilization of that,  
6 especially when the differences for about four  
7 feet horizontal and 1.1 feet vertical, but the  
8 nice thing about a jump that big is it's really  
9 obvious which one you are on.

10 When they are very subtle like from  
11 one epoch to another, that's when people can get  
12 lost. But that will do -- the surveying and  
13 mapping software all, you know, provides really  
14 great tools for localization. And even the --  
15 right now, a user can observe directly in ITRF or  
16 IGS now, which is what the new reference  
17 framework is essentially going to be, and some of  
18 them do it by accident and go gosh, I'm four feet  
19 off, that they can actually just in the software,  
20 on the fly, go into the new projection.

21 We're hoping by then all the  
22 parameters are good and the manufacturers have

1 implemented those.

2 MEMBER MAUNE: Yeah. Well, I  
3 appreciate what a big challenge that is, because  
4 I come from what I thought was a pretty modern  
5 county, Fairfax County, Virginia, and I talked to  
6 the County GIS Coordinator and he is still using  
7 NAD27 and NAVD -- no, I'm sorry, NGVD29. And if  
8 that happens in Fairfax County, Virginia, I can  
9 only imagine what the problem is going to be  
10 nationwide.

11 CHAIR HANSON: All right. So we are  
12 going to have to -- this is a public meeting, so  
13 we do need to open up to the audience as well as  
14 folks on the phone to see if you have any  
15 questions.

16 MR. MEYER: This is Rolin Meyer with  
17 NOAA. Can you hear me out there? Or with --  
18 anyway, I'm with CO-OPS. And we are in our third  
19 year of collecting currents data this year up in  
20 the San Juan area.

21 And my question for Dr. MacCready is  
22 are you using any of the data from that three

1 year project to help validate your circulation  
2 modeling?

3 DR. MACCREADY: That -- no, not yet,  
4 but I plan to. I have been in repeated  
5 communication with the people collecting the data  
6 and that it is going to be extremely valuable  
7 when we do start using it. The current meter  
8 records are surprisingly few and they are quite  
9 important.

10 The -- one problem around a lot of the  
11 waters here is that the patterns of currents are  
12 quite variable like from one part of a basin to  
13 another. So we try to account for all of that.

14 MR. DASLER: Hi, John Dasler from  
15 David Evans and Associates. I think that was a  
16 great presentation, Gavin, you had. I know we  
17 were -- did some work with WSDOT after the Oso  
18 slide, so some of the concerns there were the  
19 gravity models aren't very good in that canyon,  
20 so use of passive marks for the active LIDAR  
21 sortings that were being done in the hydrographic  
22 surveys of Landslide Lake, WSDOT was coordinating

1 that, the use of those marks.

2           So there are still areas, you know,  
3 where the gravity miles were GRAV-D. I don't  
4 know if it will get to that resolution to improve  
5 those areas of pretty extreme topography, but  
6 there are still needs, I guess, in those areas  
7 where the geoid models aren't to the level that  
8 is needed to support some of the operations  
9 there.

10           And then I guess also, I guess to Mr.  
11 Dickson's project that he was discussing, I think  
12 it really stresses the importance of referencing  
13 tidal benchmarks to the National Spatial  
14 Reference System and having that relationship to  
15 orthometric heights, so as soon as you start  
16 leveling away from a tidal observation, you are  
17 following the geoid.

18           And knowing that relationship, so  
19 oftentimes NOAA is publishing the relationship to  
20 NAVD88 relative to tidal datums. That's not the  
21 case in all stations, but that's really helpful  
22 when you are trying to assess is it close enough

1 looking at stations across the Sound and what  
2 that relationship is to NAVD88. And you can do  
3 some inferring of what the tidal datums are  
4 relative to that relationship.

5 And I think continuing to do that and  
6 I think the effort to put in CORS sites at -- co-  
7 located with tidal stations is going to be  
8 critical, especially as we move forward into  
9 2022. I think that is going to be very  
10 important.

11 MS. MERSFELDER-LEWIS: Anybody want to  
12 comment up there on that?

13 MS. BLACKWELL: This is Juliana  
14 Blackwell. So just one thing to keep in mind  
15 when we start talking about putting CORS on tide  
16 stations. It was brought up before, I mean, NGS  
17 owns few. I would say there is probably in the  
18 number of maybe 40 we consider few. And they  
19 were put in for various reasons over a long  
20 period of time.

21 We are in the process of establishing  
22 what we are calling foundation CORS sites that

1 aren't necessarily CORS on tide gauges, but CORS  
2 that would be co-located with other geodetic  
3 measurement, methodologies, etcetera, to get the  
4 best of the best stations that could be used for  
5 international monitoring and just be the absolute  
6 cornerstones of the bigger CORS network that  
7 would be NOAA-owned and GIS-owned stations.

8           So if we start talking about putting  
9 CORS on tide stations and other water level  
10 monitoring sites, whatever you want to call them,  
11 you know, we don't have that capacity. We, as  
12 the offices represented here, don't have that  
13 capacity for creating those new stations and  
14 managing and monitoring currently.

15           We don't -- I guess what I'm trying to  
16 say is I don't see how that is going to happen in  
17 the current environment. And we would still be  
18 looking for those partners who are in the state  
19 and regional and local areas to continue to help  
20 with providing those types of equipment and  
21 making those connections to those stations.

22           I'm not saying it's something we

1 wouldn't want to do on our own, but I just don't  
2 see in the current environment how we can do  
3 that. So we can talk about it and say it's a  
4 great idea, but if you start talking about  
5 adding, you know, lots and lots of CORS to tide  
6 stations or anything else, where is that going to  
7 come from? Thank you.

8 CHAIR HANSON: All right. Gary and  
9 then Captain Rassello, I know you raised your  
10 hand earlier. Do you still want to talk? Okay.  
11 Let's let Gary go first.

12 MEMBER THOMPSON: So just to reply on  
13 Juliana's comment. North Carolina is very  
14 interested in installing CORS at our tide  
15 stations. So I would ask that NGS provide some  
16 flexibility in their 70 kilometer, because there  
17 is nowhere left in North Carolina. It's not the  
18 same.

19 So we would like for -- if we were  
20 going to finance putting in a CORS at tide  
21 stations, we would like for it to be a national  
22 CORS. So just consider some flexibility in that



1 for certain situations.

2 MS. BLACKWELL: Sure. And if I may  
3 just respond to that before we move off that  
4 topic? So the current requirements that we have  
5 that sort of manage what other stations we take  
6 into the National Network are going to be  
7 reviewed. And a new project plan for CORS in the  
8 future is something that we have -- we know we  
9 need to do.

10 And so including things like  
11 additional CORS for particular reasons and what  
12 the value is for adding those additional stations  
13 is something that has to be considered as we  
14 develop that new project plan for CORS, which  
15 would also include the foundation CORS, those  
16 superstations that we want to build and own and  
17 maintain within NGS.

18 So all of that is going to be revised  
19 and we will certainly bring that toward -- to the  
20 group for further review once we get to that  
21 draft phase. Thank you.

22 CHAIR HANSON: All right. Captain

1       Rassello?

2                   MEMBER RASSELLO: I have a question  
3       for Captain Linda on pilotage. You said that  
4       your pilot navigated with this PPU. My question  
5       is, and please take it as a curiosity question,  
6       do they override the official navigation system  
7       of the ship or do they use the ECDIS of the ship  
8       and comply with the other system UF or UPP or  
9       which I think is not officialized as a system of  
10      navigation for that kind of ship, because our  
11      electronic and display information system takes  
12      into consideration all of the ships model, as far  
13      as land, maneuverability, size and that to draft.

14                   MS. STYRK: Right.

15                   MEMBER RASSELLO: I don't know where  
16      we stand with that.

17                   MS. STYRK: No. So the ship's  
18      navigation equipment is absolutely part of the  
19      tools that the pilots are drawing from, you know,  
20      when they board a ship and bring it into Puget  
21      Sound.

22                   I think the Personal Pilot Unit is to

1       augment those tools that are already available  
2       for the ship and, again, it provides 100 percent  
3       redundancy, plus it also provides that additional  
4       dimension of continuity. So as they go ship-to-  
5       ship, you know, they have a toolbox of  
6       information that is always formatted, looks the  
7       same way to them no matter what ship they are on.

8                I think this really comes to great  
9       benefit when you are docking a ship, because the  
10      pilots here in Puget Sound are not only channel  
11      pilots that take it to the berthing areas, but  
12      they actually do the docking as well.

13               So I think a lot of the tools on the  
14      PPU unit are really helpful in berthing the ship  
15      and maneuvering the different tugs that they may  
16      need to make that happen safely.

17               So definitely the ship's navigation  
18      equipment is respected and part of the tools that  
19      they are using in navigating.

20               MEMBER RASSELLO: So they do use the  
21      ship's navigation system primarily as the primary  
22      mean of navigation?

1 MS. STYRK: It is a primary source of  
2 a navigation tool. And again, they are using  
3 everything that they can get their hands on  
4 pretty much. So how they use it in their  
5 navigation, I think, is a real personal thing,  
6 but I think they are using all the tools.

7 You know, I know they walk up to their  
8 -- the different equipment on board the bridge  
9 and they are looking at this, looking at that.  
10 I'm not a ship pilot, so I can't say from  
11 personal experience.

12 MEMBER RASSELLO: Oh, I'm sorry.

13 MS. STYRK: Yeah, I can't say from  
14 personal experience. But I can tell you for the  
15 52 pilots that are members in the group, you  
16 know, they are all using all the tools.

17 What they are using the most, I think,  
18 is a preference.

19 MEMBER RASSELLO: No, because that  
20 triggers another question now. Is -- in case of  
21 an incident, as far as liability and  
22 investigation purposes, which system is going to

1 be taken in consideration? The ship's official  
2 navigation system or the PPU?

3 MS. STYRK: It's my understanding they  
4 take everything into consideration if there is an  
5 investigation. So they actually have understood,  
6 you know, that in some major incidents, they  
7 actually request the pilot's personal laptop and  
8 they want to have that for complete review in  
9 addition to, you know, the blackbox on the ship's  
10 bridge that might be recording any information  
11 and all that, at least that's my understanding.

12 MEMBER RASSELLO: Because as IMO, we  
13 use the ECDIS as official navigation system where  
14 we plan our passage from A to B, berth-to-berth,  
15 that's including the berthing.

16 MS. STYRK: Because --

17 MEMBER RASSELLO: Now, it seems like  
18 it's a bit of inconsistency if the system, which  
19 is being used to berth the ship is different from  
20 the one that the ship's plan originally.

21 MS. STYRK: So I think, you know, what  
22 you are highlighting is what the pilot brings to

1 the table above and beyond what the ship and the  
2 ship's master has, which is the local knowledge.

3 So the shipmaster knows exactly  
4 everything about that ship and how it works and  
5 everything like that. The pilot is bringing on  
6 complementary information about the local  
7 knowledge and some additional tools to augment  
8 that, such that those can work in harmony  
9 hopefully to, you know, prevent an incident and  
10 increase the safety.

11 So I think just I see it as very  
12 complementary and not at odds or trading off one  
13 for the other. It is augmenting what you have.

14 MS. MERSFELDER-LEWIS: We have a  
15 question in the back.

16 MR. KINSMAN: Hi. My name is Terry  
17 Kinsman with the Naval Facilities and Engineering  
18 Command Northwest. And my question is for Mr.  
19 Dickson.

20 I was curious to see if you guys used  
21 the VDatum tool prior to setting any of your  
22 vertical tidal benchmarks? And if so, if you can

1 describe any differences in results between using  
2 it before and after you guys installed your tidal  
3 benchmarks.

4 MR. DICKSON: Yeah, that VDatum  
5 question is kind of interesting. How did it turn  
6 out afterwards versus before. I have no idea.  
7 We got our benchmarks and we didn't care after  
8 that. But I suspect that NOAA got their fingers  
9 into that. I would expect there is software,  
10 they would be checking that. So that would be a  
11 great question for NOAA.

12 MS. MERSFELDER-LEWIS: Rich, do you  
13 want to comment or Juliana?

14 MR. EDWING: I guess I don't know, but  
15 I guess for Dorrel's purposes, he doesn't need to  
16 transform the datum. So, Rolin? I see Rolin's  
17 hand going up back there.

18 MR. MEYER: Sure.

19 MR. EDWING: Yes.

20 MR. MEYER: In addition to doing  
21 precise vertical leveling, we do at each of those  
22 specific locations that he noted, we did do GPS

1 observations. And those were submitted through  
2 OPUS DB. So we have resolution from those.

3 CHAIR HANSON: We do have a call on  
4 the line, but before that, Lindsay, please.

5 MEMBER GEE: It was a comment to Dr.  
6 MacCready's interesting comment you had about  
7 data discovery. I think NOAA and the government  
8 generally is being really good about putting  
9 their data out, but I think we are seeing, what  
10 you said, a transition from just having data  
11 available and useable by a user on a webpage or  
12 something.

13 I think we have the example from the  
14 Captain. And also regarding the pilots of a  
15 pretty good sort of tide station or we had a  
16 report, all that sort of stuff. And you  
17 mentioned to make sure it was discoverable and  
18 useable as a data science.

19 And I think that will see that  
20 progress coming, you know, with not only data  
21 science but commercial systems, do you want to  
22 develop and then have those algorithms to use



1 that development.

2 I just wondered with your models that  
3 you produce, you have them coming through the  
4 NANOOS website, do you have your data then  
5 discoverable and be able to be used by others, if  
6 they had other systems?

7 DR. MACCREADY: Yes. The data ends up  
8 in -- pushed to the Azure cloud --

9 MEMBER GEE: Right.

10 DR. MACCREADY: -- in Microsoft Place  
11 and you can just by using a URL, you can download  
12 all the files. They are big.

13 MEMBER GEE: Yes.

14 DR. MACCREADY: You need to know what  
15 to do with them.

16 MEMBER GEE: Yes, I know, but --

17 DR. MACCREADY: But no, right. You  
18 could download them onto your laptop right now,  
19 you know.

20 MEMBER GEE: Thanks. Lynne?

21 MS. MERSFELDER-LEWIS: We are going to  
22 try to have somebody call in. Jennifer Hennessy,

1 would you go ahead and unmute your thing and we  
2 will have you speak? If this doesn't work, would  
3 you please text in your message through the  
4 webinar?

5 CHAIR HANSON: While we are waiting  
6 here, I just want to compliment the panel that  
7 you have hit a homerun here. You have hit the  
8 trifecta. You have had great presentations  
9 allowing us to ask questions. You have got great  
10 questions from almost all of the panel members,  
11 from the audience and now you will round home  
12 with a question from the cloud as well.

13 MS. MERSFELDER-LEWIS: We are going to  
14 take another question in the audience while we  
15 are waiting to see if we can unmute her.

16 MR. RICE: I'll fill the gap here.  
17 The comment about the Tsunami Warning Network, I  
18 just wanted to make the observation, you will  
19 have Dr. Chris Sabine, the Director of PMEL, here  
20 tomorrow who can probably comment at greater  
21 length, but I believe PMEL has an Ocean Noise  
22 Strategy that involves hydroacoustic monitoring,

1       which could pick up small earthquakes  
2       potentially.

3               And they used to have a geophysical  
4       observatory, I think, somewhere in the Pacific or  
5       off the waters of the Pacific Northwest, but he  
6       can comment at more length about that.

7               MS. MERSFELDER-LEWIS: Thanks, Jim.

8               MS. BLACKWELL: This is Juliana  
9       Blackwell. Just back to the VDatum question. I  
10      don't have a specific answer that the audience  
11      asked about the use of the VDatum for the project  
12      that was discussed earlier, but when we go  
13      through the update of the models region-by-  
14      region, we do look for new data and new  
15      information that is available to be pulled in, so  
16      that when we do update the VDatum models, we use  
17      the most, you know, the most up to date  
18      information on the control that is available.

19              And I don't have an idea of when we  
20      are planning on doing that update, but just, you  
21      know, we will look at that.

22              Also as far as updating geoid models,

1 if we do put out another hybrid geoid model, we  
2 will go back and pull information on, you know,  
3 published leveling heights and GPS on benchmarks  
4 and try to use that, if it's available, to update  
5 a hybrid geoid.

6 And that is still to be determined  
7 whether or not we are going to put one of those  
8 out between now and 2022.

9 MS. MERSFELDER-LEWIS: So she is  
10 actually non-unmutable, because she didn't dial  
11 in through the webinar. So that's not happening,  
12 so we are going to wait for her question via  
13 email or chat.

14 Are there other comments or questions  
15 before we close?

16 MR. SCHROCK: Back to the note about  
17 putting reference stations on tidal gauges, they  
18 don't necessarily have to be CORS, which means  
19 they are in the NGS system. If the data was  
20 available, you know, other entities could use it.

21 So, you know, making it have to be a  
22 national CORS because that's being worked out

1 about the spacing, but there is also a lot of  
2 opportunity here.

3 We are three decades into high-  
4 precision GNSS or GPS, you know, down to the  
5 centimeter stuff. There is a lot of equipment  
6 out there. I have got a closet full of equipment  
7 that could go on a tidal station and a lot of  
8 private firms have a lot of old equipment. The  
9 static -- used for static we can run that real-  
10 time.

11 And the costs are, essentially just  
12 the communications, the live telemetrics to their  
13 existing networks -- several -- there is the  
14 university one. There is the -- you know, that -  
15 - like I said, the technology is there. The  
16 equipment is there. The willingness is there.  
17 It's just a tiny amount of funding for the  
18 telemetry, the live coms and people to just go do  
19 it.

20 And when you say hey, your local tidal  
21 benchmark, can you guys get together and, guys  
22 and gals get together, and put one of these on

1           there?  You bet they would.

2                       So I think we've got more of a  
3           coordination issue than anything else.

4                       CHAIR HANSON:  Okay.  All right.  
5           Well, again, you know, I want to thank the panel  
6           for a great presentation.

7                       (Applause.)

8                       MS. MERSFELDER-LEWIS:  Sorry, Bill,  
9           Bill, could I?  There is one last comment from  
10          Jennifer Hennessy.

11                      She wants to note the importance of  
12          leveraging NOAA's survey assets to assist with  
13          data and products to meet the shared priorities  
14          established by state, tribal and federal  
15          partners.

16                      This is a critical baseline.  This is  
17          critical baseline data to support a range of  
18          ocean planning issues.

19                      And she is a senior ocean planner with  
20          the Washington State Coastal Program.

21                      So Jennifer, thank you.  And I'm sorry  
22          we could not find a way to unmute you.

1                   Because we -- I'm sorry to do this,  
2                   but we have a working lunch, so everybody who is  
3                   not at the working lunch, we are going to ask you  
4                   to take your conversations outside, because we  
5                   are on a very short time frame for lunch.

6                   There is a -- you are welcome to hang  
7                   out in the lobby or anywhere else, just not in  
8                   here.

9                   CHAIR HANSON: All right. And this  
10                  public meeting is actually adjourned for the day.

11                  (Whereupon, the above-entitled matter  
12                  went off the record at 12:05 p.m.)

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Before: US DOC/NOAA

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