

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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THURSDAY
SEPTEMBER 17, 2015

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The Hydrographic Services Review Panel met in the Pinnacle Grand Ballroom, Doubletree Hotel, 8727 Colesville Road, Silver Spring, Maryland, at 9:00 a.m., Scott Perkins, HSRP Chair, presiding.

MEMBERS PRESENT

SCOTT R. PERKINS, HSRP Chair
WILLIAM HANSON, Vice Chair
DR. LARRY ATKINSON
RADM KENNETH BARBOR
DR. LAWSON W. BRIGHAM
RADM EVELYN FIELDS
ED J. KELLY
DR. FRANK KUDRNA
DR. GARY JEFFRESS
DR. DAVID MAUNE
JOYCE E. MILLER
CAPT. SALVATORE RASSELLO
SUSAN SHINGLEDECKER

NON-VOTING MEMBERS

**ANDY ARMSTRONG, Co-Director, NOAA/University of
New Hampshire Joint Hydrographic Center**
JULIANA BLACKWELL, Director, NOAA/NGS
RICH EDWING, Director, CO-OPS, NOAA

SPEAKERS

**DR. IRVING LEVESON, President, Leveson Consulting
(participating via webinar)**
**JEFF LILLYCROP, Technical Director, Civil Works
R&D, U.S. Army Engineer Research and
Development Center, U.S. Army Corps of
Engineers**
**STEPHEN MALYS, Senior Scientist for Geodesy and
Geophysics, National Geospatial-Intelligence
Agency**
**PAUL ROONEY, Geospatial Information System
Specialist, Risk Analysis Division, Federal
Emergency Management Agency**
**SUSAN RUSSELL-ROBINSON, Acting Program
Coordinator, Coastal and Marine Geology
Program, U.S. Geological Survey**
**GEORGE SEMPELES, Senior Aeronautical Information
Specialist, Federal Aviation Administration**

STAFF PRESENT

RADM GERD F. GLANG, HSRP Designated Federal
 Official
 MICHAEL ASLAKSEN, Chief, Remote Sensing Division,
 NOAA/NGS
 TIM BLACKFORD, NOAA/NGS
 W. RUSSELL CALLENDER, Ph.D., Acting Assistant
 Administrator, NOAA/NOS
 ALISON CARISIO, NOAA/NOS/CO-OPS
 ASHLEY CHAPPELL, NOAA/OCS
 MICHAEL DAVIDSON, NOAA/OCS/NSD/NRB
 RADM SAM DE BOW, JR., NOAA
 TIFFANY HOUSE, NOAA/NGS
 HOLLY D. JABLONSKI, NOAA/OCS/NSD/NRB
 NIC KINSMAN, NOAA/NOS/NGS
 GARY MAGNUSON, NOAA
 RACHEL MEDLEY, NOAA/OCS
 LYNNE MERSFELDER-LEWIS, HSRP Coordinator
 RUSS PROCTOR, Chief, Navigation Services
 Division,
 NOAA/OCS
 SASHA PRYBOROWSKI, NOAA/IOCM
 ADAM REED, NOAA/IOCM
 RICK SCHWABACHER, NOAA/NOS

ALSO PRESENT

DR. QASSIM ABDULLAH, Woolpert, Inc.
 DR. RACHEL BERNSTEIN, National Geospatial-
 Intelligence Agency
 BILL CAIRNS, American Pilots Association
 CAPT. BRIAN CONNON, National Geospatial-
 Intelligence Agency
 J. ANTHONY CAVELL, NSPS
 DR. JOHN FARRELL, USARC
 JON HEINSIUS, GeoNorth
 DREW HOPWOOD, GeoNorth
 JONATHAN KEMMERLEY, Mariners' Advisory Committee
 BENJAMIN M. MILLER, RAND Corporation
 TODD MITCHELL, Fugro
 DR. NIKOLAOS PAVLIS, National Geospatial-
 Intelligence Agency
 RUDY PESCHEL, U.S. Coast Guard (Retired)

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 Army Engineer Research and Development
 Center, U.S. Army Corps of Engineers
 Mr. Stephen Malys, Senior Scientist for
 Geodesy and Geophysics, National Geospatial-
 Intelligence Agency
 Mr. George Sempeles, Senior Aeronautical
 Information Specialist, Federal Aviation
 Program
 Ms. Susan Russell-Robinson, Acting Program
 Coordinator, Coastal and Marine Geology
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 System Specialist, Risk Analysis Division,
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1 P-R-O-C-E-E-D-I-N-G-S

2 (9:11 a.m.)

3 CHAIR PERKINS: Good morning. We
4 would like to officially convene day two of the
5 Hydrographic Services Review Panel. If we could
6 begin today as we did yesterday with a quick
7 pledge of allegiance, please. So if you would
8 all join me, please stand.

9 (Pledge of Allegiance.)

10 Thank you. Please be seated.

11 Logistics: men's and women's restrooms are
12 directly behind me across the hall from the main
13 entrance to this building. Emergency exit is?

14 RADM GLANG: To our left, and then of
15 course they are all marked, and back out the way
16 we came in.

17 CHAIR PERKINS: Great. Our first
18 speaker of this morning?

19 RADM GLANG: Thank you, Mr. Chair.
20 My name is Gerd Glang, Director of Coast Survey
21 and your DFO. Two pieces of information for the
22 panel members: we do have Wi-Fi, I can pass the

1 sheet around so you can connect your devices.

2 Then a reminder for this evening's dinner, we are
3 asking for the \$26.00 that you can pass to Lynne
4 at some point today. Thank you.

5 CHAIR PERKINS: Great. Thank you. So
6 this meeting is a public meeting. It is being
7 held here live at the Doubletree in Silver
8 Spring. We also have a live WebEx with 101
9 people registered to be participating virtually,
10 and our first speaker of this morning is also
11 going to be virtual, calling in remotely.

12 So with that our first item on the
13 agenda is a presentation on the current NOAA
14 economic studies from Dr. Irving Leveson. He is
15 president of Leveson Consulting, he is an
16 economist with extensive experience in strategic
17 and economic consulting and research in private
18 industry, prominent research organizations, and
19 government. He founded Leveson Consulting in
20 1990.

21 Dr. Leveson has worked extensively
22 with NOAA since 2001 examining diverse programs

1 and issues. So please join me with a warm
2 welcome to Dr. Leveson. I hope you can hear me
3 and thank you sir for being with us this morning.

4 DR. LEVESON: I'm glad to be here. As
5 some of you know I was planning to attend in
6 person, but due to circumstances I am calling in.
7 I was able to catch some of the conference on the
8 webinar. What I want today is to concentrate on
9 NOS studies, even though I've done work much more
10 widely in NOAA. Just to make it manageable for
11 the time available in the presentation. Next
12 slide, please.

13 I want to talk at length about
14 approaches, or methods for benefit estimation,
15 which comes up very frequently, and then give a
16 couple of examples of studies I have been
17 involved with for NOS and others. And finally
18 make some remarks about lessons from my
19 experiences as well as my own studies and
20 research needs. Next slide please.

21 Now, on the question a
22 benefits estimation, next slide, I want to start

1 off by strongly emphasizing that economics is a
2 behavioral science. It is used for program
3 analysis include examining customer responses,
4 availability of services, responses of suppliers
5 to changes in technology and markets, and what
6 people are ultimately doing is providing the
7 framework for evaluation of benefits and costs.

8 But don't think of it as a cash tool
9 or what you think of as gross domestic product.

10 Behavior markets, and market participants are the
11 critical part of benefit estimation. Next slide,
12 please. Benefit information can be valuable in
13 improving the understanding of applications,
14 constituents, markets, returns to investments and
15 costs. It can support program planning,
16 architectures, budgeting, and legislation.

17 Assessing outcomes is important for
18 understanding impact, long term initiatives, and
19 developments, and providing a baseline to
20 determine gain or loss of benefits from
21 alternative developments.

22 Of course the major use of benefit of

1 information is advancing recognition on the
2 contributions of the program, and that requires,
3 in particular, a great deal of reinforcement both
4 through repetition of results and demonstrating
5 how things how they apply in specific contexts,
6 and what they can do for you. Next slide please.

7 It is useful to think of program
8 evaluation the way you think of hypothesis
9 testing. In other words, you want to specify in
10 advance what the outputs and outcomes are that we
11 would expect, and then evaluate the actual
12 results against it.

13 This is not the usual case. It is
14 especially important when we have new programs
15 and we are trying to understand better what is
16 going on without having existing measures of what
17 the results would be. The results that we test
18 should be related specifically to expectations
19 based on services, technology, distribution, et
20 cetera, so that we can see, not just how well the
21 program is working overall, but which component
22 seems to be configured into success and various

1 outcomes. But this is an ideal formulation and
2 you can't do it all the time. But it is
3 something that we should strive for.

4 Values that we attach to outcomes, the
5 dollar values, should be consistent across
6 programs. That goes without saying, but it is
7 very hard to do bureaucratically, so scenario
8 planning is very important in understanding
9 future benefits because you can specify component
10 trends and groups of trends that make up themes
11 that give you a feel for what the broad changes
12 are that are going on.

13 And looking at new products, it can be
14 useful to consider behavior of other programs and
15 market experiences, and not just the same
16 program, because a lot of things can be quite
17 different from simple extrapolation of what has
18 been done before. And finally, we want to
19 institutionalize the analytic process, and that
20 does not have to mean very detailed guidelines,
21 like OMB's statements of what you have to do to
22 discount future earnings, what rates to use. It

1 would be a much more collaborative process in
2 which researchers sharing information comment on
3 each other's, across departments and agencies, as
4 well as within programs. Next slide please.

5 There is often confusion between what
6 I've labeled as economic impact and economic
7 value. Economic impact, I am referring to
8 measures of the importance of sectors. We hear
9 it all the time. This what Google or Facebook
10 contributes anytime you hear of them in any
11 private studies. The value of geographic
12 information systems, so much -- which has to be
13 just measures of what the size of the effected
14 sectors are, and you can take various ones,
15 including revenue, expenditures or value added.

16 Value added being the use of resources
17 in a in particular process or sector without
18 counting what they buy from other sectors.
19 Economic value, on the other hand, is the
20 addition to the value of the economy from a good
21 or service or the introduction of a technology.
22 That is basically grown into what would have been

1 expected in the absence of that service or
2 technology. Direct economic value is the
3 increase of the value in the sector that is using
4 it. The total economic value is the full impact,
5 taking into account that what users do impacts
6 the rest of the economy. Next slide please.

7 There are a lot of measures of
8 economic values. Those relating to productivity
9 cost savings are very common and tend to be quite
10 useful, may include productivity gains, cost
11 reduction, avoided costs, and value of time
12 saved. A number of studies have looked at
13 willingness to pay, which can be very useful, but
14 the kind of studies that calculate it properly
15 are costly and have very great difficulty getting
16 OMB approval, under the Paperwork Reduction Act,
17 so those have not been done as widely as they
18 need to be.

19 A willingness to accept is the same
20 thing on its head as what it would take to get
21 you to do something. For example, I recently saw
22 a study that looked at how much people would be

1 willing, would have to have to be paid in order
2 not to have ads on Internet sites, just to give
3 you a feel for that.

4 Consumer surplus is the amount that
5 some consumers would have been willing to pay, if
6 the market price had been higher than the
7 existing price. So if you take the downward
8 sloping demand curve, each additional user pays a
9 lower price, or the price of the goods is falling
10 over time. For example, those who come in early,
11 early adopters for example, are willing to pay a
12 higher price, and those who come in later on at a
13 lower price.

14 So if the price comes down quickly and
15 your early adopters pay a low price, and they
16 would have been willing to pay a lot more, they
17 would have consumer surplus.

18 Producer surplus is a similar concept
19 on the production side, and it's the amount that
20 the producers would get above the cost of
21 production. Similar to profit, a lot of times we
22 do not have to deal with that because we are

1 looking at revenue, and it is included in
2 revenue.

3 Just to mention that willingness to
4 pay, if we use productivity or consumer surplus
5 as our measure, it would include much if not all
6 of the consumer surplus. Some studies have its
7 effect on value of property, if you are living
8 near a park, or a beach, or a dock, that kind of
9 thing is part of the environmental studies.

10 Where possible studies use the value
11 of information approach, and that requires
12 looking at alternative choices where you have the
13 ability to know what the probabilities of
14 different outcomes are. So that test, the use is
15 much more limited than expected, even though it
16 is quite useful where it is used. Next slide
17 please.

18 Economists have assigned measures to
19 -- measures out values to fatalities, to loss of
20 ability due to injury and so forth, some people
21 are a little uncomfortable with that, but there
22 is a wide range of literature and government

1 agencies, routinely now, use those kinds of
2 measures.

3 Most of the benefits tend to come from
4 the valuation of lives saved. Economists use a
5 measure called the value of a statistical life,
6 which is based on comparing risk associated with
7 small changes in probabilities of that in large
8 groups and it is not intended to be assigning
9 value to the worth of individuals. It is often
10 been done in studies that look at what people
11 have to be paid in order to be willing to go into
12 high risk occupations. There are a lot of
13 estimates in use.

14 Federal agencies tend to value a life
15 at around ten million dollars. OMB reportedly
16 has recommended using no less than five million.
17 There has been a great deal of inflation in the
18 numbers used to make programs look good. Two
19 million is a more typical value in Europe.

20 For injury, the agencies have usually
21 been assigning a percentage of the fatality value
22 based on severity of injury, and a couple of

1 examples are given here, there are much different
2 life categories, but the best have undergone wide
3 acceptance and it is very important in a lot of
4 the programs that NOAA deals with where life and
5 health are significant outcomes. Next slide
6 please.

7 Now in determining the benefits of any
8 particular program, it is necessary to consider
9 what was done in the absence of that program, and
10 to compare the program's additional impact
11 relative to what the alternative was, and the
12 alternatives are called the counterfactuals. Now
13 in the simplest and most common case you could
14 pair it with another technology that exists. I
15 will show you an example, where I compared the
16 benefits of CORS with the value of -- with CORS
17 and traditional leveling.

18 But in many situations, the technology
19 would have changed, the programs would have
20 changed over time, so if you have a technology or
21 service that would have been ready to come into
22 widespread use at the time the program you were

1 evaluating began, then it is more appropriate to
2 look at what the benefits of that technology or
3 service would have been.

4 Sometimes it is not even on the verge
5 of becoming available, but you consider that
6 there would have been strong pressures to develop
7 a capability if the program didn't exist, and you
8 can look at, hypothetically, how that type of
9 program could have developed. So for this
10 purpose you need to consider some scenarios, and
11 some people are uncomfortable with that.

12 In a study that I just worked on for
13 GPS benefits where we had to take it to
14 interagency economic advisory group, there were
15 some theorists who wanted to only consider
16 comparison with programs that were available at
17 the time GPS became available, and in that case,
18 well, most notably in figuring out the value of
19 GPS timing. It turns out there are a lot of
20 other timing sources that could have come in.

21 You could have had a system similar to
22 the WAAS, Wide Area Augmentation System for

1 aviation, we put up three satellites with timing
2 on them, rather than a full GPS system of thirty-
3 odd satellites, or you could have had an eLORAN
4 develop earlier rather than dismantling LORAN.

5 Those would have been very low-cost.
6 So you get a tiny fraction of the benefits to GPS
7 timing, when you compare it to those kinds of
8 alternatives that could have come in, rather than
9 not having timing all together, to push it into
10 GPS. The point is that -- this will be the last
11 bullet -- you don't take it to account expected
12 technology market changes, you can get a huge
13 overestimate of the benefits of the program.
14 Next slide please.

15 Often we have a program which has
16 multiple outputs, or we have multiple programs
17 working at the same time, together or otherwise,
18 that are producing the outcomes that are
19 observed. And it is necessary to make
20 allocations about them to determine what the
21 benefits are to each program, or to a particular
22 program that we are interested in.

1 Usually, there is no scientific way of
2 doing that. I give the example of Electronic
3 Nautical Charts depending -- the benefits that we
4 observe also depend on the ship bridge systems,
5 GPS, weather information, and other things. So
6 you have to make assessments, and one approach is
7 to use a group of experts to allocate a
8 contribution, a share of the benefits to a
9 particular program.

10 I am not convinced that that creates
11 any increase in validity, but it does increase
12 acceptability. There are cases where you get --
13 look at changes in one program when other
14 programs do not change.

15 The problem is that, even if you are
16 able to do that for each program that was
17 operated together, to produce a specific outcome,
18 the effects of multiple programs changing at the
19 same time are not going to be the same as the sum
20 of the effects of the programs you wanted to
21 find. So you do not particularly get the right
22 answer that way.

1 In any case, you have to make the best
2 assessment you can. Then test implications or
3 alternatives allocations in decisions you would
4 make to see if other allocations would have
5 produced a different decision. Next slide
6 please.

7 Finally, we have the same kind of
8 issues in the allocation. Of course, because of
9 that some studies focus of gross benefits without
10 subtracting costs. That can still useful when
11 comparing with other programs. Let's go on to
12 talk about a couple of benefit studies. Next
13 slide.

14 There has been a long history of
15 efforts to escalate the benefits of Nautical
16 Charts. Most notable is the 2007 study by Hauke
17 Kite-Powell in which he estimate benefits of 42.8
18 million from electronic charts above the value of
19 paper charts. He measures benefits by consumer
20 surplus. That is the amount people would be
21 willing to pay above costs, not total willingness
22 to pay.

1 Since the benefits were above paper
2 charts, they do not include benefits of the data
3 collection, and charting required to produce
4 paper charts. That is all -- that is, the
5 information is also used in Nautical Charts.

6 In a 2012 scoping study of National
7 Ocean Service Coastal Mapping Program benefits, I
8 updated the estimates, based on industry size and
9 added in commercial fishing, which it did not
10 include, and looked at total benefits, including
11 spending as well as consumer surplus.

12 In a 2004 study of GPS benefits which
13 was actually completed in 2005, which I think it
14 references, I made a rough estimate of how much
15 benefits might increase, based on the fact that
16 they are charging you more than what was, in the
17 earlier Kite-Powell study, considered to be ideal
18 charts. And we get some much larger numbers with
19 all these adjustments, coming up to around four
20 hundred million per year. Next slide please.

21 This is a description of the methods
22 that I used in a study for the NGS Coastal

1 Mapping Program to determine the values of
2 different components of the program. You can see
3 the program had a lot of different products for
4 Nautical Chart production, willingness to pay,
5 change analysis, effectiveness cost based on
6 additional construction, boundary determination,
7 legal aspects, delays in offshore oil production,
8 avoidance of delays in wind power production
9 costs, title insurance; the point is that a lot
10 of different methods had been used depending on
11 what was possible in each of the cases and what
12 was applicable for that particular program.

13 Next slide please.

14 In a closer look at the Nautical Chart
15 estimates in that study, for commercial vessels
16 and recreational boating, I updated Kite-Powell's
17 willingness to pay, based on changes in the
18 number of vessels. I added commercial fishing
19 conservatively, assuming then the benefits were
20 about half as much as the commercial boaters.

21 I want to focus on this last point.

22 It was necessary to take the overall estimates of

1 the benefits of Nautical Charts and determine how
2 much was the contribution of the Coastal Mapping
3 Program's Nautical Chart Program, which involved
4 aerial views and other things.

5 What happened is that one of the
6 personnel at CMP was gracious enough to make some
7 calculations based on the vertices in nautical
8 charts. Doug Grant looked at it several types of
9 charts, looked specifically at the shapes of each
10 feature, and in each case came up with a
11 percentage attributable to the information that
12 came from CMP, and we aggregated that to come up
13 with a percentage for the share overall. So this
14 is a rare case in which we were able to find a
15 technical basis to make an allocation. Next
16 slide please.

17 We did also a scoping study of the
18 benefits of CORS and GRAV-D. CORS is the
19 Continuously Operating Reference Station program
20 that collects position information and shares it
21 among users in a crude form. What I did was I
22 built on some calculations that Richard Snay had

1 done at NGS, that system value of savings based
2 on what it would have taken in a study, of
3 course, of traditional surveying.

4 Then I made adjustments to that. The
5 first adjustment was looking at the extent to
6 which more reasonable alternatives such as real
7 time networks has become available, and how that
8 would affect use. So that is a case of looking,
9 even with comparing to an earlier technology,
10 looking at market changes that developed further.
11 Also then also looking at the fact that had they
12 had the costs of the earlier technology, none of
13 them would have used it.

14 What my part in the impact study was
15 to estimate the National Spatial Reference System
16 building on revenue from private surveying and
17 mapping and getting information on profits and
18 non-profit. There are societal benefits very
19 crudely, probably a very conservative estimate.

20 Now what would I have done
21 differently? What I have done differently here is
22 to consider the cost saving from fewer

1 traditional surveys have to be done because the
2 information is shared. Sharing is a critical
3 feature of the program.

4 Also, try to look even qualitatively
5 for a societal value of more improved information
6 becoming available as a result of the
7 constitution of course.

8 I should mention what I would have
9 done differently or what I would do now on
10 Nautical Charts is to, beside the updating and
11 response that we always do, is look at
12 comparisons and changes among geographic areas
13 where paper charts and things are encouraged.
14 This an approach that I suggested three years
15 ago, and for various reasons, I was not able to
16 implement it.

17 GRAV-D, which is the other part of the
18 2009 study, GRAV-D is Gravity for the
19 Redefinition of the American Vertical Datum which
20 is an attempt to get better elevation
21 measurement, basically to have virtual benchmarks
22 instead of the ones, the more physical benchmarks

1 that were being used.

2 Our study estimated some of the
3 methods based on cost savings and long line
4 leveling and floodplain management, assessing how
5 much the structures that might restrain damage in
6 other locations, and the resulting reduction in
7 damage and loss of life and injury.

8 What would be useful to do there is to
9 look at what is happening now that GRAV-D is in
10 the middle of implementation and cases before and
11 after where it has actually been rolled out and
12 see what kinds of impacts can be measured.

13 Two slides forward please.

14 Next slide.

15 I have a variety of suggestions about
16 what should be done. What extent? I choose to
17 have a long term program of studies which is laid
18 out in advance and provides a pathway to
19 achieving research objectives. The two studies I
20 just talked about were -- grew out of a 2006 NOS
21 Evaluation Conference, and that acted as the
22 blueprint. Second, it is important for NOAA

1 personnel to be better involved in the process,
2 and that includes leaders of the units of study
3 being done, involving their staff and
4 facilitating access to NOAA's data and assistance
5 in obtaining information from external sources
6 that they have contacts with.

7 Next slide please.

8 I am discussing it at length, but a
9 major part of any Benefits Study is improving
10 knowledge of users and applications, and it is
11 important to include both economic and non-
12 economic benefits. Particularly safety-of-life,
13 where appropriate, the environment, which is
14 harder to measure, and we don't have time to get
15 into that.

16 Studying the future is very important
17 in planning programs, assessing them against
18 expectations. Surveying can be very eclectic
19 regarding the methods of measuring benefits.
20 Surveying, there are a variety of methods that
21 were used, and we had to make judgments about the
22 contributions of jointly operating program, even

1 if they're very crude.

2 Next slide please.

3 We systematically research to fill in
4 gaps in adoption, productivity, cost savings,
5 safety impacts, do the comparative studies,
6 before and after as well as the case studies.
7 Much more information is needed about private
8 users of services through resellers, like
9 nautical charts, imbedded systems, the Internet
10 and mobile devices.

11 Sometimes this requires major multi-
12 year efforts with targeted new data collection,
13 which is not very often. Information needs to be
14 much more granular. One example is a study which
15 is preliminary by a new Ph.D., Benjamin Miller,
16 which compares injuries, fatalities, and property
17 damage across all three thousand counties in the
18 United States over the last several decades with
19 the dates of installation of tornado warning
20 Units, and he got quite large impacts.

21 That's similar to what I was talking
22 about with the Nautical Chart example has a

1 structure of a quantitative study that is useful
2 when you use it.

3 Finally, lags in data collection and
4 research can lead to significant understatements
5 of use and benefits of programs because often
6 those benefits are increasing as more people use
7 them and as the technology improves, as the
8 distribution of systems improve.

9 Next slide please.

10 So there are a lot of studies that
11 could be done to update the benefits of hydrology
12 and very little innovation. That goes back three
13 decades to a tiny study in Canada, and we have
14 all of the new technological changes that Admiral
15 Glang was talking about yesterday in hydrographic
16 services and in the impact of bathymetric
17 services, and there isn't really much
18 quantitative leadership when a company that
19 provides satellite-based topobathymetric services
20 that has some claims about benefits.

21 They are a private service, but there
22 is nothing systematic available, nothing that

1 allows systems to update the full benefits or
2 compare the technologies.

3 Nautical Charts we talked about.
4 Fortunately, they're undergoing enormous changes
5 with ships around the Panama Canal and other
6 developments, and the port is demanding an
7 unbiased analysis of the changes that would be
8 useful.

9 GRAV-D in actual operation, we talked
10 about, and CORS, looking at its wider impacts,
11 and finally user benefits of alternative
12 distribution systems, including the growing use
13 of mobile devices, social media, how it affects
14 ways of reaching clients, and responses of
15 markets and programs to spectrum reallocation.
16 Which is something I started researching and was
17 going to go a lot further and potentially affects
18 distribution systems. Thank you.

19 CHAIR PERKINS: Thank you, Dr.
20 Leveson. Do we have time for questions?

21 We can also accept questions from the
22 online participants, so if anyone participating

1 virtually using the GoToMeeting Chat mechanism,
2 you can put forward questions electronically as
3 well.

4 DR. LEVESON: While we are waiting let
5 me just mention that Paul can answer the same
6 questions.

7 VICE-CHAIR HANSON: I just have one
8 question. The bullet about needing more
9 information about private users and how they use
10 it is something that we have been focusing on as
11 well. We heard some of the users yesterday who
12 had a panel as well.

13 DR. LEVESON: Who is speaking, please?

14 VICE-CHAIR HANSON: I am sorry, this
15 is Bill Hanson.

16 DR. LEVESON: Who is speaking?

17 VICE-CHAIR HANSON: Bill Hanson.

18 DR. LEVESON: Yes.

19 VICE-CHAIR HANSON: HSRP Committee.
20 Do you have any thoughts about how you collect
21 that private data? That that would be useful for
22 you?

1 DR. LEVESON: I would have to look at
2 specific types of data. In some cases, you are
3 going to need user surveys and not any one single
4 survey. In some cases, you might be able to
5 collect it on the web based on numbers of visits.
6 I think you can do more in terms of asking people
7 to fill out surveys, but the Paperwork Reduction
8 Act restricts what government can do directly but
9 you can put information on the web.

10 That lets people respond with
11 unstructured answers without going through the
12 whole OMB process. You can put up materials that
13 people are asked to comment on, and I think that
14 kind of thing is worth starting even though it
15 does not reach as wide an audience.

16 So the point is there are multiple
17 methods. Ultimately, I think it is going to
18 involve a lot of customer surveys, a lot of
19 interviews, sometimes you can get a Trade
20 Association or other organization to propose that
21 they interview or survey their members and
22 provide information to you so you don't have to

1 go through the OMB process.

2 It is kind of hamstrung by that but
3 there are several things that can work.

4 CHAIR PERKINS: Dr. Brigham?

5 MEMBER BRIGHAM: Yes, Dr. Leveson.
6 Lawson Brigham, University of Alaska, Fairbanks.
7 I am an HSRP member. I just wanted to ask you
8 how you use scenarios and plausible futures in
9 your work and whether it has been helpful in
10 trying to tease out possible futures for some of
11 these services?

12 DR. LEVESON: There is no simple
13 method. I have done a lot of it. I spent a
14 decade at Hudson Institute, which was a pioneer
15 in scenario work and you develop understanding of
16 individual trends.

17 You start with the trends. You start
18 with potential developments. You consider which
19 are most probable. Which things might cause
20 particular developments to occur or not occur.
21 And you have to work through a large number of
22 possibilities in doing that, and then you see how

1 they can be grouped into major themes.

2 You have to have alternative scenarios
3 that you can assign rough probabilities to, but
4 that is one of the ways you get around the fact
5 that you are dealing with the future, which
6 nobody really knows.

7 You can do some things with trend
8 extrapolation or formal forecasting methods, and
9 really what you are doing is combining lots of
10 different ways of getting at things so if there
11 is a --

12 You can have a consensus estimate in
13 some cases, or you can have an estimate based on
14 what would happen if it were similar to what
15 happened in another sector. And you really have
16 to use a wide range of techniques. It is not an
17 instantaneous process. You get input from
18 various kinds of experts along the way. I hope
19 that answers it.

20 MEMBER BRIGHAM: Thank you. Lawson
21 Brigham, again. I just -- we use scenarios in
22 trying to develop plausible futures for the

1 Arctic, and we found in using these that there
2 was a single driver that was driving most of this
3 activity, and that was the price of oil because
4 when we did this study the price of oil, back in
5 2007, was \$148 a barrel, and then it went down at
6 the end of the study, just in the five year
7 period of the study down to \$48 a barrel, and of
8 course today it is lower than that.

9 So for the marine world, there are
10 certain drivers, and we found that one driver was
11 overwhelming in the scenarios work.

12 DR. LEVESON: Right. Well that makes
13 it easy obviously. But the commodity price
14 decline is much broader than oil, and some of the
15 commodities that you would be looking for if you
16 wanted to create a pathway to the Northwest
17 Passage, for example, would still be viable if
18 other commodity prices were higher.

19 But I see what you are saying, and
20 that is a case that makes it very simple.
21 Sometimes it can be as simple as saying well what
22 if Moore's Law continues? But usually it is not.

1 MEMBER MAUNE: David Maune. I am a
2 member of the HSRP. Bill asked a question about
3 customers, and I learned a lesson from the
4 National Enhanced Elevation Assessment that we
5 performed. I mentioned yesterday that we had
6 collected 600 plus mission critical requirements
7 from federal, state, and government agencies, but
8 I was later to find out that just by knowing who
9 downloads LiDAR data from the National Open
10 Topography Portal, they have some little
11 questionnaire that says are you private sector?
12 What kind of business are you in?

13 Asks a few questions, helped us
14 understand who is the most common user of LiDAR
15 data. The people who most commonly download it,
16 and it turns out that is mom and pop, privately
17 owned survey firms that do land surveys.

18 Why do they do it? Because they get
19 paid \$1,000 or so a pop to give a little topo
20 survey of somebody's property or a subdivision or
21 something. Where they used to go out with survey
22 equipment and have to survey a whole bunch of

1 points to come up with contour lines for the
2 shape of the terrain, and now they say oh I just
3 download this LiDAR data set, and I use this
4 software and miraculously -- I mean I did this
5 for my own son-in-law.

6 He was required to provide a
7 topographic map for a property where he was
8 building a wholesale nursery. And he said they
9 want a couple thousand dollars for it, and two
10 hours later I gave him exactly what he needed,
11 and the guy said it was the most beautiful thing
12 he ever needed. And we need thousands of these
13 kind of maps every year.

14 We go through every county; this was
15 one county. You multiply that, and you find out
16 that -- I had no idea that the mom and pop
17 surveyors were the ones who most commonly
18 downloaded LiDAR data sets.

19 My point being, if NOAA has a way of
20 tracking who downloads Electronic Navigation
21 Charts and things like that, and maybe you
22 already do, you might have a better understanding

1 of who your users are.

2 DR. LEVESON: I looked into it at the
3 time, and they didn't have it. I am in the
4 process of trying to get something similar to
5 what you just described in a study I am currently
6 doing for NESDIS. So yes, it is a great approach
7 when the data is there, but maybe from my policy
8 point of view, there can be more reference to ask
9 people to fill in that data when they do download
10 it.

11 CHAIR PERKINS: Rich Edwing?

12 MR. EDWING: Yes. Good morning, Dr.
13 Leveson. This is Rich Edwing, Director of CO-
14 OPS. I kind of have a higher level question.
15 Looking at your presentation, I am kind of struck
16 by the number of individual studies we've done,
17 and I think you are familiar with the port
18 studies that my office has done, and I am
19 wondering if --

20 DR. LEVESON: Yes I am.

21 MR. EDWING: Thank you. I am
22 wondering if there is value and even feasibility

1 of doing a more holistic study. In other words,
2 these three offices provide a provide a suite of
3 proxy services whose most high-level stated goal
4 is to improve the efficiency and safety of the
5 Marine Transportation System. Is there value to
6 kind of doing a study that tries to tackle it at
7 that high level?

8 The pros and cons? Is that even
9 feasible? Pros and cons, because at the end of
10 the day we are trying to support these services.
11 Now, recognizing the CORS and GRAV-D kind of has
12 a broader mission, but there is some overlap with
13 the MTS.

14 DR. LEVESON: First of all, I do
15 think it is feasible, and I think it is
16 essential. Some of the private work that has
17 been done has been very biased. That is why I
18 said we need an objective study of meeting the
19 changing needs of CORS. This is much bigger, of
20 course, than that. We can build on the individual
21 studies that have been done, but depending on
22 resources, it might be appropriate to do other

1 individual studies at some level within the
2 context of a broader study to help fill out the
3 pieces.

4 Then there are efforts to look
5 econometrically at different industries and their
6 contribution that might be fed in.

7 I think it is definitely feasible, and
8 it -- even though there are underestimates in a
9 lot of the pieces that we have already, I think
10 we can combine those with other kinds of
11 information and the research to get something
12 worthwhile.

13 MR. EDWING: Thank you.

14 MEMBER KUDRNA: Frank Kudrna, Panel
15 Member. Dave Maune who spoke to you a minute ago
16 is leading us in presentations and discussions of
17 private and other government agencies in terms of
18 what uses and needs they have for NOAA data and
19 leading toward what the benefit cost of that
20 information would be and whether it would be of
21 value to them in some sort of cost sharing.

22 Do you have any suggestions of

1 previous studies or agencies that have looked at
2 this particularly? Are there any studies or
3 similar reviews that have been done for other
4 organizations that might lead us to some answers
5 on those questions?

6 DR. LEVESON: I didn't catch the
7 beginning. I caught everything but the noun in
8 this, so what is the studies of that you are
9 interested in?

10 MEMBER KUDRNA: We are trying to find
11 out if, either on the private side or on the
12 government side, there are agencies that have
13 needs for NOAA data information in which there
14 could be some potential benefit or potential cost
15 sharing if the benefits of acquiring additional
16 data or using data would take place.

17 I guess I am asking, have you, are you
18 aware of, or have you performed any studies for
19 any of these other agencies that might be useful
20 to us?

21 DR. LEVESON: Not really, no. I am not
22 really aware of anything like that.

1 MEMBER KUDRNA: Thank you.

2 CHAIR PERKINS: I do want to mention
3 that we are also able to entertain any questions
4 from the audience that is here in the room.

5 DR. ABDULLAH: Good morning everyone.
6 My name is Dr. Qassim Abdullah I am with Woolpert
7 Incorporation, and my question for Dr. Leveson, I
8 didn't see in your study or analysis anything
9 about increasing the public awareness about what
10 NOAA is doing. I mean, do we need to invest in
11 that to increase that kind of awareness? Whether
12 education, online courses, how to, I know like
13 Ms. Juliana mentioned, NGS has a few courses, but
14 I don't think we really have enough to educate
15 the public about what we offer. How you do it?
16 Where to get it? Example of Dr. Maune on LiDAR
17 for example.

18 That is a great thing. But the data
19 that NOAA is offering has the same greatness, but
20 does every surveyor, everybody riding a boat know
21 where to get the data and how to get it?

22 So lastly my question to you,

1 increasing the public awareness, if we invest in
2 it, would it affect the final statistic you come
3 up with for example for the user attention on
4 what NOAA is offering? Thank you.

5 DR. LEVESON: My position is the same
6 as what Dr. Sullivan stated yesterday, which some
7 people who are here today may not have heard,
8 which is that it can be really costly to
9 advertise an agency to get -- or an overall
10 organization to get it known when people don't
11 think if it that way.

12 That it is better off to concentrate
13 on each of the individual units or programs,
14 going after the types of customers that might be
15 interested in their own products. Without them
16 caring whether or not there is some overall
17 entity called NOAA behind it.

18 She gave the example of, I think it
19 was a fast food place, where you don't know the
20 name of the parent company, but you know the name
21 of the restaurant. I think that is what has to be
22 applied in this case.

1 There is really no overall way of
2 approaching it without spending a large amount of
3 money and not getting the same kind of impact as
4 focusing on individual constituents who might be
5 interested in particular services.

6 CHAIR PERKINS: Well Dr. Leveson,
7 thank you so much. I appreciate you participating
8 in the HSRP this morning. I know it is always
9 challenging to do it remotely, but from this end,
10 the audio and the PowerPoint went through very
11 well, so for not being in the room with us you
12 did extremely well in keeping our attention, and
13 I think the question and answer period here at
14 the end here reflects that.

15 So thank you sir.

16 DR. LEVESON: Thank you. It was a
17 pleasure to do it. Enjoy the rest of the meeting.

18 CHAIR PERKINS: We are a little bit
19 ahead of schedule. We have a break up next, and
20 then after break, we have our Government Panel.
21 So yesterday we had a Non-Government Association
22 Panel. Today we have the pendulum swinging in the

1 other direction, and we have the counterpart of
2 that, so the Government Panel.

3 MEMBER MAUNE: Might we be able to
4 start before 10:30?

5 CHAIR PERKINS: I see no problem with
6 that. Are all of the panelist present?

7 MEMBER MAUNE: Is Susan here? Is Susan
8 here from USGS? Okay, yes, the panelists are all
9 here.

10 CHAIR PERKINS: Okay, great. I am
11 always in favor of finishing projects ahead of
12 schedule. You know I get better marks when I do
13 that. So think that is a great idea.

14 MEMBER MAUNE: I told all the speakers
15 they had twenty minutes, and when I had up to
16 twenty minutes, we'd run past the time allotted.
17 So --

18 CHAIR PERKINS: Yes.

19 MEMBER MAUNE: So it is either give
20 them less time, or give us more time.

21 CHAIR PERKINS: Yes we would like to

22 --

1 MEMBER MAUNE: We can -- if we can
2 start in fifteen minutes, if we can start at
3 10:20 a.m. instead of 10:30 a.m., that would help
4 a little bit.

5 CHAIR PERKINS: Yes. I think that is
6 fine, because I would like to end it on time
7 because we do have a very good presentation from
8 Admiral Lopez that -- I don't want to lose
9 control of the schedule. So 10:20 a.m. we will
10 break until 10:20 a.m. and then we will
11 reconvene.

12 (Whereupon, the above-entitled matter
13 went off the record at 10:05 a.m. and resumed at
14 10:20 a.m.)

15 CHAIR PERKINS: If you could please
16 find your seats, we will get the panel reengaged.

17 MEMBER MAUNE: Well we can get
18 started, Scott, because a little bit of this is
19 going to be a repeat from what I discussed
20 yesterday for some of those who are missing.

21 CHAIR PERKINS: Yes. Dr. Maune, you
22 are going to do the introductions for the

1 panelists as well?

2 MEMBER MAUNE: Yes I will.

3 CHAIR PERKINS: Okay, then I think we
4 can start with that.

5 MEMBER MAUNE: Okay, thank you
6 everybody. In yesterday's session, we had a
7 number of presentations in which Dr. Russell
8 Callender started off by mentioning the need to
9 engage stakeholders. Then we had customer
10 support; Juliana Blackwell mentioned the need for
11 customer engagement, rather, and then we had
12 Admiral Glang mention, how do our customers use
13 our products? And how do they want them changed?
14 Dr. Sullivan said, what do our customers need
15 from NOAA? And Jeremy mentioned, what is the
16 value of what NOAA does?

17 That is all very consistent with what
18 the theme of this session is, and we just got a
19 nice presentation on benefit cost analysis and
20 that sort of thing.

21 This shows what one of our objectives
22 was by inviting our panelists today to discuss

1 what is NOAA doing right? What is NOAA doing
2 wrong? How can NOAA improve? Does NOAA need to
3 change course?

4 I was involved in a couple of studies,
5 one going back to 1998, the National Height
6 Modernization Study in which we started with user
7 forums and case studies. We documented the
8 accuracy and cost benefits of modernizing the
9 National Height System in the United States where
10 we previously used differential leveling, and now
11 we are going -- we recommended CORS and
12 differential GPS, and we documented some other
13 needs in the elevation arena as well.

14 Then in 2012, I was involved in the
15 National Enhanced Elevation Assessment in which
16 we again started with questionnaires and user
17 interviews. We documented requirements and
18 benefits for 602 mission critical activities and
19 resulted in USGS's 3D elevation program to
20 develop QL2 LiDAR nationwide and QL5 IFSAR for
21 Alaska. We looked to the future with new
22 technologies on the horizon.

1 So, the relevance to today's
2 presentation, both studies were based on
3 customers stating their problems with the status
4 quo and their need for change. Cited improved
5 accuracy as major benefits. Both studies
6 succeeded partly because dollar benefits were
7 quantified, and they both resulted in major
8 program changes.

9 To NOAA, NOAA wants to improve its
10 products and services today. We hope you can help
11 the HSRP quantify the needs and benefits, and we
12 can make some assumptions concerning intangible
13 benefits, and we had some lessons this morning on
14 the prior presentation which I thought were
15 excellent. In couching value and things like that
16 to the benefits gained.

17 Okay, we are not sure if this will
18 succeed, but we are going to give it a try and
19 hope we can get some future directions out of our
20 panelists today. These are our five speakers in
21 order. Jeff Lillycrop told me he has been
22 waiting very long time to be given the

1 opportunity to tell NOAA what he really thought
2 they ought to be doing. Is, that right Jeff, did
3 I get that?

4 Okay. Well Jeff is the lead technical
5 director for Civil Works Research and Development
6 and technical director for Navigation R&D at the
7 Engineer Research and Development Center, ERDC,
8 U.S. Army Corps of Engineers.

9 He is responsible for the integration
10 of the environmental flood risk management and
11 navigation R&D, and he is responsible for nine
12 R&D programs covering a wide range of topics
13 including navigation infrastructure, channel
14 dredging and performance, coastal inlets and
15 sedimentation, surveying and mapping
16 technologies, e-navigation, regional sediment
17 management and many more. He is chair of the
18 committee on the Marine Transportation System
19 Integrated Action Team for R&D.

20 Jeff, the floor is yours.

21 MR. LILLYCROP: Thanks David. I have
22 been working with NOS for my whole career, and

1 actually before my career began, I was a graduate
2 student at the University of Florida, and NOS,
3 the Tides Group, paid for my thesis, and I worked
4 with them as an employee at the Jacksonville
5 District. Then when I got into R&D -- and then I
6 was in Mobile working in operations and coastal
7 mapping, and then now in D.C. there are a lot of
8 interactions between us and NOS, and I think that
9 the most value that we have gotten out of all
10 your products is the efforts in collaboration,
11 the expertise, the professional relationships, as
12 well as the data and your products.

13 One of the key responsibilities that
14 I have in the R&D community is to identify what
15 are the priority research needs for each year and
16 over the horizon. It is always difficult to try
17 to put a dollar value on the return on investment
18 or try to quantify some way the value to the
19 nation of what we do, but if you think of Ford
20 Motor Company, if they'd stopped at the Model A
21 and put away their research program, where would
22 we be today?

1 The world is a technically-based
2 world; you are not going to be able to keep up
3 and provide the goods and services that are
4 needed without continued research, without
5 continued collaboration and without science and
6 technology.

7 So to give you a little history on
8 those not familiar with the Corps. We are civil
9 engineers. Our services are design, construction
10 and operation of water resources projects.

11 We have an incredible value to the
12 nation that is summarized in this slide. We have
13 eight mission areas in our Civil Works Program
14 that include navigation, flood risk management,
15 ecosystem restoration, water control, water
16 management, and a host of others. Emergency
17 response, and we work with NOAA in most of these
18 areas on a daily basis, at a national level and
19 at local levels in the districts.

20 Most of the water resources projects
21 were built in the last thirty to a hundred years.
22 So they are beginning to age and show their age.

1 Our annual budget is about five billion dollars a
2 year. About sixty percent of that is for
3 navigation. That is our largest single mission in
4 the Corps of Engineers, Civil Works. Thirty
5 percent is flood and the rest trickles out from
6 there.

7 If you look at our navigation assets,
8 we have really about fifty nine ports, channels,
9 coastal channels, that move about 90 percent of
10 the cargo in the U.S. by weight annually. So
11 fifty nine channels move about 90 percent of the
12 commercial cargo. About one hundred other
13 channels move 9 percent, and those are our
14 definitions for high use and moderate use
15 channels.

16 So on an annual basis, we are
17 maintaining somewhere around 150 to 200 channels
18 a year. In the total portfolio of active
19 commercial harbors, there are about 250-ish that
20 are really high, used a bit. The remaining up to
21 1000 are low use, a lot of them are recreational
22 channels like the one at East Pass, Destin,

1 Florida. It is a shallow channel that really only
2 has the recreational traffic with a few charter
3 boats.

4 So our focus is on commercial
5 navigation. In addition to the channels that we
6 consider infrastructure, we also have coastal
7 locks. You are familiar with into the New Orleans
8 over in Florida and Texas, and on the inland side
9 we've got over 171 lock sites on 27 river
10 systems, so in navigation the bulk of our focus
11 on the inland side is steel and concrete,
12 navigation locks, aging infrastructure. On the
13 coastal side, it is really all about dredging and
14 placing material.

15 Also on the inland side, we are the
16 charting authority for the U.S. just like NOS
17 NOAA is for the coastal areas. They have asked us
18 to identify what are the most used products? We
19 use these products primarily for our missions. We
20 are not mariners per se. We are not navigators.
21 We are civil engineers, and we use these data
22 sets, these products in the planning, the design,

1 the construction and the operation of our
2 projects.

3 Many of them we used as intended; many
4 of them we use probably that you would have never
5 guessed. A lot of your output is input to the
6 applications that we create around your tools and
7 products.

8 I am sure I have missed some. I am
9 sure some of these are not all from the
10 hydrographic sciences, hydrographic services
11 side. I know some of these are from other parts
12 of NOAA, and that is one thing that I will say is
13 that I get pinged on a lot that it is hard to
14 find our data, our navigation data across the
15 Corps. It is hard to find NOAA data. There is no
16 single entry point. You can Google what you are
17 looking for, but my standard is, can I get to it
18 in three clicks?

19 That is what people ask me for. Most
20 of our data you can't; we are working on that,
21 but one of the recommendations I will have at the
22 end is easier access to your data. You are the

1 big data guys in the -- in NOAA, so where you go
2 the rest of NOAA can hopefully follow. But these
3 are all products that get used.

4 I canvassed our primary communities of
5 practice to develop this list. Our surveying and
6 mapping, our planning organization, and our
7 operations groups. So all of these are great
8 products and used pretty much on a daily basis in
9 various ways.

10 To give you an idea of some of the
11 collaborations that we've had and how these
12 products are actually used, I have got a few
13 examples of where we collaborate. As I said, I
14 think the collaboration aspect is the most
15 important and provides the best value I know to
16 us and I think back to you all.

17 The Corps moved from local datums to
18 going to a Mean Lower Low Water datum. It was
19 painful. It was a change in business processes
20 for a number of the districts, and each district
21 kind of did things a little bit differently.

22 We are still -- we have been working

1 on it for a decade, and we are still wrapping up
2 some of that. New Orleans and Galveston have
3 been the very last two to fully convert over. But
4 for our purposes it wasn't important that we
5 convert. We knew our local datums. We knew our
6 charting or our dredging depths.

7 So it wasn't as important for us. It
8 was really more important for the rest of the
9 nation and other users and certainly for charting
10 purposes. So it became important and a priority
11 within the Corps, and as a result, we reached out
12 to the Tides and water levels authority, and you
13 guys helped us immensely.

14 You put together training courses, you
15 put together guidance on how to do it, and it has
16 been a very good success story.

17 We've worked together on WAVES. I
18 know waves is not exactly a hydrographic product,
19 but it is very important in navigation. We
20 developed a national WAVES plan together. Version
21 one that looked at where were observations needed
22 around the U.S..

1 Through the IOOS program we began
2 implementing that and realized that was not going
3 to work. That none of the federal agencies had
4 enough money to put out the hundreds of wave
5 measurement devices, buoys and others that were
6 needed or called for, so we took a step back and
7 developed a version 2 that looks more at
8 developing WAVES from hind casts and using
9 observations to actually validate those hind
10 casts.

11 That provides a better product for us
12 in the sense that we are able to create long term
13 records and use those long term records in risk
14 based probabilistic calculations. The ability to
15 validate that set still requires observation. So
16 those observation buoys are a combined
17 collaborative effort. We used National Data Buoy
18 Center buoys. We paid to upgrade tens of, at
19 least tens to 100 accelerometers because it is so
20 important that high precision accelerometers are
21 used in the NDBC buoys to accurately determine
22 the waves.

1 Direction. We have worked together
2 with CDIP, you all are contributing a little bit
3 to CDIP. The Corps is, the Navy is, California
4 is, so that is a collaboration.

5 We have also worked on WAVES at the
6 field research facility which was one of our
7 sites down in North Carolina. In developing new
8 gauges, looking at ways of taking new
9 measurements. So that has been a great experience
10 and success in collaboration.

11 The guy who came up with the Joint
12 Center, what a brilliant guy, I would like to
13 meet him some day.

14 This was really a no brainer. This was
15 leveraging a lot of things that were going on in
16 the Federal community back into the late
17 seventies. NOAA, Navy, NASA, have done a lot in
18 bathymetry, LIDAR bathymetry. The Corps came
19 along, we really leveraged what everybody else
20 was doing, Navy, NOAA, was involved in the
21 development of all the sensors, the NOAA's depth
22 extraction algorithms are still used in the third

1 generation of sensors.

2 Gary Guenther's work was/is phenomenal,
3 but there is a lot that can still be done in this
4 area. There have been, there is really two
5 components to it. The operations side and the
6 research and development side. Both can stand to
7 continue the collaboration and take a new look at
8 some of the things that are going on to see where
9 we can expand that collaboration.

10 One of the areas that is important to
11 us, and I know to you all as well, is the ability
12 to push data out to the public, we think that the
13 digital coasts is a great capability for public
14 distribution of information and data.

15 We contributed to its development
16 directly financially and we contribute our data
17 to it.

18 We actually used it as a leverage to
19 get the Corps to use our data. It is sometimes
20 easier to get other agencies and other groups to
21 use your data. Outside of Federal Agencies and
22 your own guys inside but this graph is produced

1 by us for by the Digital Coast every year and
2 since 2004 when we started we have had over
3 26,000 people download our data.

4 What we told our internal organization
5 was that if you are going to court, you better
6 believe that other people are using this data.
7 You better at least know what they've got. It
8 took a while, but getting a new technology
9 accepted, getting it into practice is always a
10 challenge and R&D products don't just fly off the
11 shelves at times. Sometimes it takes a little bit
12 more.

13 But this is a great capability. It
14 really accentuates the need to share data to make
15 data accessible and that is a theme that keeps
16 coming back to the Corps in just about every
17 meeting.

18 We are moving from a project centric
19 perspective over the last decade to really
20 looking at regional concepts. Regional management
21 of our projects within that broader context. What
22 are the interdependencies, how do they all work

1 together, and it really takes measuring,
2 monitoring and data to determine some of that and
3 you guys are a huge data source.

4 Making your data available is as
5 important to us as us getting our own data out.
6 And I will say more about that in a bit.

7 Another area that we collaborate on
8 that is all interconnected is in this committee
9 on the Marine Transportation System. E-
10 navigation, Interagency Action Team, and its co-
11 led by NOAA, by the Coast Guard and by the Corps.
12 We are the big agencies in that effort. One of
13 the things we are working on now is developing,
14 and e-navigation was all about harmonizing data,
15 making authoritative data sources available to
16 all those that need it. And really getting into
17 the exchange of data and turning that data into
18 information for decisions.

19 So one of the products we were working
20 on together is an Integrated Notice to Mariners.
21 We each produce some sort of notice that goes out
22 and typically we cut and paste the unique

1 information from the other agencies to stick in
2 ours. So the concept is can we create a website
3 that through web services in real time, based on
4 your geographic location provides you with the
5 most authoritative information for marine safety
6 from the agencies and is created in real time
7 when you need it.

8 The challenge is moving a lot of that
9 data from the way we use it now, store it now and
10 create it now into services architecture that
11 really allows this. We have got a working
12 prototype that is pulling data from the four
13 agencies, but we need to continue to fill out all
14 the fields that the agencies have identified as
15 priority.

16 We need more collaboration in research
17 and development. That is an area that is
18 extremely near and dear to my heart. We have had
19 many successes on the R&D side not just on the
20 using your products and data side. The R&D side,
21 we are in this together and there is a lot of
22 things that we have created looking at the upper

1 left hand corner modeling.

2 We have used some of our models with
3 NOAA data and created capabilities for storm
4 prediction that is being used by the Pacific
5 Disaster Center. Transferred some of that
6 technology that we helped create to one of your
7 operational groups.

8 Measuring and Monitoring in the upper
9 right Coastal Mapping, Coastal Data, Coastal
10 Measurements, We have collaborated a lot, as I
11 said in our Mapping Program and in the FRF
12 designing and creating new ways to collect these
13 measurements. Better, faster, cheaper, more
14 robust, more resilient.

15 The bottom one is, we really leveraged
16 the concept of the data integration framework. To
17 make our data available Margaret Davidson was on
18 our Coastal Engineering Research Board for a few
19 years. She would not let go that it was
20 impossible to get our data. If you wanted data
21 from Seattle you had to go to Seattle. If you
22 wanted data from Jacksonville District you had to

1 go to Jacksonville District.

2 Well we worked on that and taking a
3 lot from the IOOS concept, from the Digital Coast
4 concept and put together our navigation portal
5 which gives you one door into all of our
6 navigation data across the Corps and it is
7 navigation.usace.army.mil, and it has been up and
8 running for a few months and we are continuing to
9 make all the links behind the scenes to our data.
10 And you can't get everything in three clicks but
11 the idea is that it is simple, self-explanatory
12 and a tool not only for the public but for
13 developers.

14 If somebody wants to access our web
15 services for our data that is where you go. So my
16 recommendations, Dave asked me to try to quantify
17 some of these, first I would like to unofficially
18 say we are more than happy to pay for half of
19 your charting program. We would love to
20 contribute as long as you guys are willing to pay
21 for half of our dredging program.

22 But these products I think are

1 important, again these are from our guys in the
2 field and across the Corps. The OPUS projects
3 should be used to establish and publish new
4 control points within the National Spatial
5 Reference System. We calculated that it would
6 save us about ten hours per time that we did it
7 at a guy's salary of about \$100 per hour. We do
8 about a thousand of them a year. That would be
9 about a thousand bucks per 200 a year. 220, meant
10 to be 200.

11 So we would save about \$200,000 that
12 is a rough estimate, don't send me a bill please.
13 But it is an indication of the value of that one
14 capability.

15 Another one is that online tools for
16 data conversions. We have had our Corpscon
17 software that we developed back in the nineties I
18 think it was, maybe even in the eighties and it
19 has been limping along. I know that you all are
20 developing your own and we see that as a
21 phenomenal step for us because it will have the
22 Tides authority produce what we have been trying

1 to keep going out of passion for decades and it
2 really moves it out of our area and into yours.

3 We have been using ours for pretty
4 much all of our projects for a long time. The
5 problem is, it hadn't been funded. So it doesn't
6 save, we can't put a dollar value on it but it
7 does provide great capability. I was told that we
8 need to release WALI? I don't know who WALI is, I
9 feel sorry for him.

10 But WALI needs to come out and be
11 available to the public. He turns water level
12 measurements into tide datum calculations which
13 would be very valuable for our dredging program.
14 We use local Tide, staff's Tide gauges and the
15 closer they are to our dredging channels the more
16 accurate our surveying is and along those lines I
17 know you are working on channel forecasting water
18 levels, anything that you can do to provide a
19 real time water level anywhere along a navigation
20 channel will improve our hydrographic surveys.

21 I think in the Coastal Mapping Program
22 there are a lot of, we spend about five million

1 dollars a year covering about 20% of the U.S.
2 coast. Repeat cycle of about every five years.

3 We also survey after storms. There has
4 been a lot of work through the interagency
5 working group on Ocean and Coastal Mapping. There
6 is a new plan that is out and I know there is a
7 lot of collaboration in there. I think if the
8 charting organization would take a look at the
9 data right now I believe you are only using the
10 mean high water line that is calculated. There is
11 a lot of value in that data. It is surveying
12 areas you are not typically and can help update
13 some of your products and I also think that if
14 you look at the operations you could collaborate
15 on where they are going to survey in a given year
16 and try to match some of your requirements with
17 theirs.

18 And get a lot of bang for the buck
19 that way. On the research side there is a list
20 here that has been produced through a
21 collaborative effort. Through the Joint Center,
22 these are research topics that could yield both

1 organizations a lot of value. Maybe not just the
2 charting organization but throughout NOAA and the
3 Coastal Zone Management Group.

4 Then all data available through REST
5 and web services. We are getting further and
6 further away from just trying to access data. We
7 spent a lot of money putting our tools or
8 plumbing into our pools, tools, the actual
9 location of the data so that the user of the tool
10 doesn't have to go out and find data all over the
11 community.

12 We are trying to make it so that the
13 tools actually access data and figure out what's
14 needed or at least provide the user of that tool
15 with the ability to format or make decisions
16 about the data.

17 So being able to access it through
18 applications is more important than being able to
19 access it through a website just by clicking and
20 looking.

21 Likewise a lot of your final products
22 like your charts are not as important to us

1 because they represent a shoal-biased situation.
2 The bathymetry is actually your raw data, is
3 actually more important for us because that's
4 what we are trying to use to look at, compare it
5 with what's been previously for that area and
6 determine change and rates of changes. So that is
7 different than perhaps many other users.

8 Then my last is three clicks to access
9 all the data for all purposes for all of NOAA
10 that would be nice. Thank you.

11 Then these were some that I was not
12 exactly sure how to roll them up and I will just
13 leave them here. I think the ability to
14 collaborate, the ability to work together, the
15 ability to leverage each other's expertise has
16 been the best value that we have had. There are a
17 lot of tools, there are a lot of challenges that
18 we have got that if we work together on, continue
19 to work together on, we will be able to solve
20 more efficiently and effectively and the more we
21 collaborate, I think the better it is for the
22 nation.

1 CHAIR PERKINS: Thank you.

2 MEMBER MAUNE: Much appreciated Jeff.

3 CHAIR PERKINS: Are you doing
4 questions now? Or, holding at the end?

5 MEMBER MAUNE: I am going to wait at
6 the end.

7 CHAIR PERKINS: Okay. Thank you.

8 MEMBER MAUNE: Our next speaker is Mr.
9 Stephen Malys, Senior Scientist for Geodesy and
10 Geophysics at National Geospatial Intelligence
11 Agency. Steve serves as the NGA senior scientist
12 for Geodesy and Geophysics. He has earned a B.S.
13 in Earth Science from Penn State in 1981 and an
14 M.S. in Geodetic Science from my Alma Mater Ohio
15 State in 1988. He represents NGA on the DoD
16 Positioning Navigation of Timing Executive
17 Committee and the International Committee on
18 GNSS.

19 He is a founding member of the
20 Editorial Board of the journal GPS Solutions. He
21 was designated as Science and Technology Fellow
22 by the Office of the Director of National

1 Intelligence in 2007. Welcome Steve.

2 MR. MALYS: Thank you very much David.
3 Happy to be here. I think all of you are familiar
4 with NGA but if not I will just remind you we are
5 both a defense agency and an intelligence agency
6 as you probably know we have a longstanding
7 relationship with NOAA. We will go through some
8 of the highlights of that.

9 Before we get into the slides I do
10 want to mention we have a couple of team members
11 here with us. I am happy to say our Director of
12 our Maritime Safety Office, Navy Captain Brian
13 Cannon is here with us as well as one of our
14 senior experts in gravity field modeling and the
15 geoid, Dr. Pavlis and one of our scientists
16 working on Arctic issues, Dr. Bernstein so it was
17 a team effort to put this together. We appreciate
18 the opportunity to do that.

19 While we are not going to hit
20 everything that we do with NOAA there are a few
21 things we will highlight and I will have a few
22 recommendations to discuss for your

1 consideration.

2 So let's see I have the button here.
3 Right side. Okay. No, there we go, went too far.

4 So in terms of outline I will just
5 give an overview of the broad working
6 relationships we have regarding nautical charting
7 and other issues we jointly work on. I will talk
8 about our complementary geodetic missions you are
9 aware that NGS and NGA share a lot of Geodesy
10 goals. I was here yesterday and I was trying to
11 count how many times I heard the word Geodesy.
12 Which is really rare because it is a very niche
13 field.

14 For me it was a pleasure, so I feel
15 right at home here. We do have a lot in common
16 with NGS on that. We will talk about recent
17 Arctic initiatives, I know there is discussion
18 about that and a lots of interest about how we
19 can better support the country at large in those
20 areas and there are certainly things we can do
21 together on Arctic issues to do good things for
22 our nation.

1 And then a couple of recommendations
2 to summarize at the end.

3 So nautical charting, you know that
4 NGA is in the business of supporting nautical
5 charting around the world. Of course NOAA has the
6 mission of U.S. waters, U.S. territories. We deal
7 with other parts of the world as well.

8 We actually use different formats, you
9 are probably all aware of the ENC's and the
10 DNC's. Digital nautical charts are what the Navy
11 continues to use and we certainly support to the
12 extent we can. And Navy transitioning to the
13 ENC's as they are able to do that. But these
14 things are closely coordinated. There are regular
15 meetings between our NGA, Maritime people, and
16 NOAA on how to move forward with nautical
17 charting.

18 I won't focus on that, just to remind
19 you we do that together. We also coordinate on
20 things like the IHO. What is the U.S. position
21 when it comes to the International Hydrographic
22 Organization. There are regular meetings among

1 our agencies to help coordinate a single position
2 on that. Things like digital bathymetry, GEBCO,
3 the crowd sourcing effort was mentioned yesterday
4 under IHO. We are certainly interested in that
5 and again establishing a U.S. position on any
6 policy issues related to crowd sourcing. If
7 volunteer geographic information like bathymetry
8 is collected somewhere that some countries might
9 object to or might not agree with sharing it.

10 We want to have a common U.S. position
11 on those things. We expect not everyone will want
12 to share that data as much as we would like for
13 them to share that data and we think it is
14 important to have a common position when it comes
15 to the U.S. position on that.

16 There are nations around the world
17 that don't like to share with us. You probably
18 know that.

19 International standards and of course
20 we heard yesterday also map once, use many times
21 we are certainly in favor of that. We know
22 resources are limited to the big wet world and

1 there is lots of data to collect and we don't
2 want to be duplicating anything wherever we can
3 avoid that.

4 Okay, moving on to other more
5 geospatial functions. I mentioned NGS, I will get
6 to that in a minute. You may or may not be aware
7 that we are hooked up with the National Center
8 for Environmental Information formerly known as
9 NGDC. One of our missions within NGA is to
10 produce on a five year cycle a world magnetic
11 model.

12 A global mathematical model of the
13 Earth's magnetic field which is still necessary
14 and still needs to be updated because it changes
15 that rapidly it needs to be updated every five
16 years. That is more or less a standard product at
17 this point. However, we continue to be closely
18 following data sources that we use for that world
19 magnetic model, not all of those data sources
20 come from U.S. sources.

21 So we have been using recently for
22 example the European Space Agency's SWARM Mission

1 as a source of data to go into that world model.

2 We are interested in improving that
3 model and through NCEI we are pursuing what is
4 called an enhanced magnetic model and there are
5 potential new uses for that kind of modeling for
6 the magnetic field at a higher resolution. So
7 that is something we do with NOAA.

8 NGS, I'll start off with the Corbin,
9 Virginia facility. If you are not familiar with
10 it, it is a test facility in Virginia that is a
11 survey training area as well as a very useful
12 place to test out the geospatial accuracy of many
13 different sensor types. So we have ongoing use of
14 that facility in collaboration with NGS and
15 expect to continue to use it for LIDAR, just one
16 example of the types of sensors we evaluate at
17 that test site.

18 Yesterday was also mentioned the
19 conference for the Geospatial Summit that NGS
20 held back in the springtime, we became much more
21 aware of and participated in that Geospatial
22 Summit which outlined NGS's plans to update or

1 replace NAD 83 and NAVD 88. So by 2022 we will
2 hopefully be in a much better position to
3 minimize any differences between WGS 84, which we
4 created and maintained in the DoD and the
5 national system that is based on NAD 83.

6 So that is a very good thing in the
7 long term. We can pursue much more
8 interoperability. There will be small, hopefully
9 statistically insignificant differences between
10 NAD 83 and WGS 84 for example. Also the vertical
11 datum we should be much more consistent with from
12 a defense side versus NGS's side.

13 We look forward to that. We look
14 forward to working with NGS as we can to pursue
15 those goals.

16 Another area we collaborate on you may be
17 familiar with the U.N.'s International GNSS
18 Committee ICG. That is an annual gathering of all
19 the nations that are so called providers. So
20 providers of global navigation satellite systems
21 like GPS. The Russian GLONASS, the Chinese BeiDou
22 system, the European Union Galileo system. All of

1 those provider nations try to coordinate under
2 that UN body to maintain interoperability to the
3 extent we can so of course we have a global
4 mission. I am sure NOAA's interests in exploiting
5 those other GNSS's in the future you are probably
6 aware that commercial vendors of GPS equipment
7 are already marching down the path of producing
8 multi GNSS type devices and that has certain
9 advantages in certain situations and they have to
10 be interoperable to use them. We have to
11 understand what differences might exist between
12 those GNSS's and our own GPS so that's another
13 area we have in common that we participate in,
14 there is a meeting coming up in November out in
15 Boulder for this year's International Committee
16 on GNSS.

17 Just to focus a little bit on the
18 reference frame. As NAD 83 gets updated by 2022
19 we have been for a number of years trying to
20 align WGS 84 with the best international
21 standard. The ITRF, the International Terrestrial
22 Reference Frame. That is produced by a group of

1 scientific contributors that have really done a
2 great job using GPS and other methods to improve
3 our knowledge of the size and shape of the Earth.
4 The center and mass of the Earth. And the
5 orientation of the axes we defined so I would
6 like to use the postage as a good example in that
7 we know where the center mass of the Earth is to
8 less than the size of a postage stamp now.

9 That little postage stamp by the way
10 is 19 millimeters x 22 millimeters and if you
11 compare our knowledge of today's WGS 84 to that
12 postage stamp, we are in that little green box
13 shown there in the diagram.

14 The ITRF, at least ITRF 2008 is
15 somewhat better than that. It is at the level of
16 5-8 millimeters and if we are to get better as
17 this 2010 National Research Council study
18 suggests, if we are going to reach the goal of 1
19 millimeter reference frame by 2030 then we need
20 to understand how that geocenter moves. So when
21 you are measuring sea level changes at a few
22 millimeters per year and other very precise

1 measurements of geodynamics we believe, the
2 people who did that study believe we need a
3 reference frame that is accurate to 1 millimeter
4 with a 1/10 of a millimeter per year drift.

5 Now if we do that together with NGS
6 with their thousands of stations around the U.S.
7 I think we can do a better job if we do it
8 together and coordinate on that. So it's another
9 area we have in common in the geodesy area.

10 We also have common interest in the
11 vertical datum, the new updated vertical datum
12 NGS is working on is being assembled, data is
13 being assembled over the continental U.S. as well
14 as Alaska, Hawaii and other areas. We have our
15 global model at the moment. Earth Gravitational
16 Model 2008.

17 We have been using that vertical
18 reference surface, a gravimetrically defined
19 reference surface for many different applications
20 within the DoD. So it's again a common goal.

21 We would better like to understand the
22 geoid over Alaska, the U.S. Gravimetric Geoid

1 2012 is the current best realization of a geoid
2 over Alaska. It does become important for Arctic
3 issues and I will mention that again in a minute.

4 So the highest area of interest for us
5 concerning the GRAV-D collection would be in the
6 Arctic area. Our mission of course is more
7 global. We as a DoD agency do support national
8 interests in the Arctic. It is recognized that
9 climate change and other things going on in the
10 Arctic is a national security issue so we are
11 interest in supporting that to the extent that we
12 can. We don't dictate what happens within NGS,
13 they decide their own priorities. But if we had a
14 voice in it, we would suggest that the Alaska
15 area and other nearby Arctic areas would be of
16 the highest priority to do collection of gravity
17 data perhaps at a lower altitude than what
18 current missions are collecting to get the kind
19 of resolution that we need.

20 What I am recommending here is that we
21 join these studies for the benefits of a better
22 geoid over and around Alaska. Not just the land

1 areas but the ocean areas as well. Because a
2 better geoid around the Alaskan waters will help
3 oceanographers and others understand the currents
4 around that area which of course would be of
5 interest to NOAA. So we think there is a, some
6 benefits to studying that at least to begin with
7 understand the current accuracy of the geoid over
8 Alaska now.

9 To our knowledge that has not been
10 assessed accurately. So if the geoid is to be
11 used as a reference surface for elevations for
12 example. First of all we want to know if there
13 are any biases between what NGS uses and what we
14 might use when we collect digital elevation data.
15 Or oceanographic data of any kind.

16 So that is one recommendation. We also
17 have gravity data of our own that we collected
18 under this Arctic Gravity Project which ended a
19 few years ago. We believe some of it is still
20 being processed. But there may be some data we
21 can contribute to a regional geoid if that were
22 to be a desired goal in and around Alaska.

1 So we just want to point out this is
2 a scenario we should discuss together and see if
3 there is a benefit to focusing on it in more
4 detail than has been done to date.

5 You are all aware of the President's
6 involvement in the Glacier Conference just a few
7 weeks ago? This is a top of a press release from
8 NGA, the President did mention by name NGA and
9 NSF working together on digital elevation models
10 over Alaska which is one of our contributions as
11 the Arctic gets more and more focus from the
12 Administration.

13 We produced this particular graphic in
14 support of that Glacier Conference. It more or
15 less outlines a number of important layers of
16 information in the Arctic region at large. I know
17 you can't read it from there. There are paper
18 copies that we left on the back table if anybody
19 would like to take them with you, you are welcome
20 to do that.

21 A number of these layers are based on
22 NOAA data. We collaborated with NOAA and others

1 to produce it. We expect this type of information
2 will continue to be important as we develop our
3 national policy. Especially when it comes to
4 boundary disputes and territorial claims and
5 other things in the Arctic and our Maritime
6 Safety Office again is the primary point of
7 contact for that.

8 There are other polar issues we are
9 interested in. Of course we think it is important
10 to prioritize bathymetry collection. We of course
11 support any increased bathymetry collection or
12 reprioritization and of course crowd source data
13 anywhere in the Arctic would be valuable. We are
14 also interested in understanding NOAA's possible
15 role in the Southern Ocean.

16 Currently we don't know what that role
17 might be. I think it is worth a discussion. We
18 have interests certainly in the Southern Ocean.
19 As well Antarctica is a very unique place and it
20 has a very sparse data collection. Even more
21 sparse than what is in the Arctic.

22 So just a recommendation to

1 understand, at least for us to better understand
2 if NOAA has a role and if so, what is it in the
3 Antarctica area?

4 Finally, this is really the final
5 recommendation. I think it is a significant
6 opportunity. We heard about CORS. You are all
7 familiar with CORS, the Continuously Operating
8 Reference Station. You know that GPS of course
9 has enabled countless applications for
10 positioning navigation and timing at many
11 different levels of accuracy.

12 The CORS network is really a unique
13 asset with thousands of stations somewhere in the
14 vicinity of two thousand stations if not more.
15 Because the positions of those stations are known
16 very accurately for survey quality purposes, they
17 can be used to detect interference to the GPS
18 signals. Either intentional interference or
19 unintentional interference. You know that the
20 spectrum is becoming more and more crowded. There
21 are concerns about how we can protect the GPS
22 infrastructure so using the CORS network as a

1 tool to detect and warn of or localize
2 interference sources in my view is a very rich
3 opportunity to use a NOAA resource for a national
4 purpose that has our defense interests of course.
5 We want to protect GPS we depend on GPS for many,
6 many things. The feasibility of this has already
7 been demonstrated.

8 So we know it can be done, I am
9 recommending that it be pursued in a more
10 operational sense with other government elements
11 like DHS or possibly the Coast Guard.

12 I certainly can't speak for them but
13 I know they are interested in this kind of
14 detection tool. So again because the locations of
15 these thousands of stations are known very well,
16 it is straightforward to detect anomalies in the
17 GPS signals or other GNSS signals should they be
18 used operationally.

19 So if it is something that could be
20 done, it is something that could support a
21 national level mission, it is a good fit with
22 what NOAA already does. This CORS network is

1 going to be in place for the foreseeable future
2 and I think it could be used very effectively for
3 that national interest.

4 With that I think I will stop. I just
5 have a summary of the recommendations here which
6 is nothing new, the bottom two are the most
7 significant to the contributions or
8 recommendations that we are offering at this
9 time.

10 To study the geoid around Alaska to
11 understand it in more detail. And to pursue this
12 interference detection tool using the CORS
13 network so I will stop there. Thanks.

14 MEMBER MAUNE: Thank you very much.

15 Our third speaker is an old friend of
16 mine, Mr. George Sempales. Aeronautical
17 Information Specialist Air Traffic Safety
18 Oversight, FAA. George is an Aeronautical
19 Information Specialist responsible for oversight
20 of navigation products and services provided by
21 FAA. As a credentialed Air Traffic Safety
22 Inspector George performs audits and assessments

1 to ensure the Nation's Air Navigation Products
2 and Supporting Digital Data and information
3 comply with FAA and international standards.

4 George helped me a whole lot when I
5 did a study on Alaska a few years ago and helped
6 determine the direction for ASR mapping of
7 Alaska. I really appreciate that, George, and the
8 podium is yours.

9 MR. SEMPELES: Good morning everyone.
10 Thank you very much for the invite to address the
11 Hydrographic Service Review Panel today. I want
12 to segue a little bit off of what Dr. Maune said
13 earlier about the questions he wanted answered
14 and what you are going to find with this
15 presentation is it only answers one question.

16 What are the things that NOAA is doing
17 right? So with that said, one might think it odd
18 for an aviation employee to be addressing the
19 Hydrographic Services Review Panel today but as I
20 am about to explain the FAA and NOAA in 2016 is
21 about to celebrate a ninety year relationship.

22 Which represents a long, long

1 relationship.

2 Next slide please.

3 Now as we know, NOAA is the oldest
4 scientific agency in the United States. It was
5 created by none other than Thomas Jefferson in
6 February 1807. As the Survey of the Coast. It was
7 renamed U.S. Coast and Geodetic Survey in 1878
8 and of which in 1903 the USC&GS transferred to
9 the Commerce and Labor Department.

10 The actual relationship between NOAA
11 and the FAA didn't actually occur until the Air
12 Commerce Act of 1926. Obviously we had to wait
13 for the invention of the aircraft and then its
14 practical use so it took a little while for that
15 industry to develop.

16 Of which in 1926 Coast and Geodetic
17 Survey began charting the nation's airways in
18 providing weather service to civilian aviation.
19 In 1927 the very first aeronautical chart was
20 published which was Kansas City to Moline,
21 Illinois. The next major milestone in 1946, the
22 Airports Obstruction Charts Program began. Which

1 was a program for five years that I ran for the
2 FAA.

3 Next slide please.

4 You will get there. Yes, I am sorry.

5 In 1957 the first aerial photographic
6 mission was performed by the Coast and Geodetic
7 Survey of which in 1959 the first survey was
8 performed using photogrammetry. Which is used to
9 this very day to produce the products and
10 services.

11 In 1970 Richard Nixon created NOAA of
12 which C&GS was reorganized into the National
13 Ocean Service of which aeronautical services were
14 assigned.

15 NOAA was reorganized in 1977 of which
16 aeronautical services were assigned to Office of
17 Ocean and Atmospheric Services. Of which in 1994
18 the Airport's Navigation Approach Program began.

19 Finally in the year 2000 Public Law
20 106-108 transferred aeronautical charting
21 functions from NOAA to the FAA but, next slide.

22 But, the NOAA FAA relationship did not

1 just stop in 2000 as a result of the transfer.

2 Next slide.

3 After the aeronautical services were
4 transferred to the FAA, an interagency agreement
5 was quickly drafted and put into place to
6 continue the services NOAA provides in support of
7 the safe and efficient use of the National
8 Airspace System. Within this IA, NOAA agreed to
9 continue to provide, first off quality review of
10 third party aeronautical surveys. I believe the
11 gentleman from Woolpert would be familiar with
12 that.

13 This is in direct support of the FAA
14 office's Airport Surveying Geographic Information
15 Systems program.

16 Also, of course NOAA our surveyors
17 also that entered into the agreement asks NOAA to
18 continue to conduct aeronautical surveys in
19 accordance with those office and airports
20 advisory circulars of which we use the data for
21 downstream programs within the FAA, of which
22 aeronautical information services is one, the

1 Wide Area Augmentation System Program is another
2 one. Transponder Landing System Program. Airway
3 Facilities Tower Integration Lab and now the new-
4 fangled GPS navigation stuff that goes along with
5 performance based navigation and procedures.

6 Next slide please.

7 Also within the IA, NOAA is asked to
8 continue obstruction verification. This is
9 basically your redetermination of the accuracy of
10 legacy FAA obstruction data. The effect of this
11 is the increased of the FAA hostable databases
12 which also improves the downstream products.
13 Primarily instrument approach procedure
14 development and required navigation performance.

15 Finally the IA asks for technical
16 advice, studies, and public education.

17 Next slide.

18 Now as mentioned NOAA continued to
19 provide airport surveying and as depicted on the
20 screen was the tabular result of the universal
21 data delivery format of either a NOAA conducted
22 or a NOAA verified aeronautical survey of

1 Ontario, California. What we see in the
2 collection of the airport safety critical data
3 that includes on the left all the runway data.
4 Top right are all the navigational aid data. And
5 on the bottom is data concerning obstructions in
6 the way, in front of the airport itself. Next
7 slide.

8 In addition to the ground survey, we
9 see on the screen the actual air photography of
10 Ontario California Airport, of which aeronautical
11 data is extracted. Next slide.

12 The combination of the ground and air
13 survey produces the venerable airport obstruction
14 chart of which is a state required product
15 according to the International Civil Aviation
16 Organization Annex IV. Now I say venerable
17 because we no longer produce airport obstruction
18 charts. But as you will see shortly, what we do
19 have is the ability to produce a digital version,
20 of which the data was either NOAA collected or
21 NOAA verified.

22 So we have all these services. So

1 what we do from that? Well, next slide.

2 So from these services, the FAA makes,
3 next slide, instrument approach procedures.

4 Which basically includes approach, departure,
5 circling and satellite navigation varieties.

6 NOAA collected or verified third party survey
7 data supports the production and/or maintenance
8 of these procedures, which as of the 20th of
9 August 2015 publication cycle, numbers at 33,119.

10 This literally means NOAA has been involved in
11 either the collection of millions upon millions
12 of obstructions and tens and tens of thousands of
13 runway ends, displaced thresholds and
14 navigational aids. Next slide.

15 Airport diagrams, otherwise known as
16 the airport surface navigation map, the majority
17 of these, which now numbers more than 800 range
18 were created from those airport obstruction
19 charts previously mentioned. Next slide.

20 The digital obstacle file, otherwise
21 known as DOF. This is a collection of all known
22 manmade objects reported to, or surveyed for, for

1 the FAA under 14 CFR Part 77. In the case of
2 what we see on the screen, I know these objects
3 were either NOAA collected or NOAA verified
4 because of the very high accuracy code of 1A
5 that's assigned to each one of these objects.
6 This is a public product of which third party
7 procedure developers can also use to create
8 procedures themselves. Next slide.

9 The airport facility directive. NOAA
10 data also appears in FAA publications such as the
11 Airport Facility Directory, which we call the
12 AFD. Now at this point the NOAA data has been
13 transformed into usable information critical to
14 air operations. Information such as runway
15 lengths, runway declared distances, runway
16 slopes, navigational aid positions all derive
17 from original NOAA collected data. Next slide.

18 Okay. Now earlier I mentioned we no
19 longer produced the traditional Airport
20 Obstruction Chart. But what we do produce is all
21 the data that was either NOAA collected or NOAA
22 verified, that can be used to make any airport

1 related product in the FAA inventory. On the
2 screen we see data layers, which are the same as
3 required on the Legacy Airport Obstruction Chart.
4 In the airport's GIS environment, which depicts
5 the runways, the obstruction identification
6 surfaces and areas of vegetation which penetrates
7 those surfaces. With this NOAA collected or
8 verified information, not only can we make
9 instrument procedures, but the airport now knows
10 which trees are to be removed or cropped in order
11 to protect the air space in the terminal
12 environment. Next slide.

13 Also, as I earlier mentioned, FAA
14 airport diagrams used for airport service
15 navigation were made from Legacy Airport
16 Obstruction charts. In the airport's GIS
17 environment, we can now simply turn on those data
18 layers required to produce and/or revise an
19 airport diagram. Again made possible by NOAA
20 collected or verified airport survey data. Now
21 two more slides for you, and they're a little bit
22 different. Next slide.

1 Now so far I've talked about NOAA
2 airport survey surfaces in support of FAA
3 products. But airport surveys are not the only
4 geographic data NOAA provides to the FAA. Now
5 depicted on the screen is a portion of the U.S.
6 Gulf Coast Visual Flight Rules Navigation Chart.

7 Produced annually, this chart is
8 heavily used by the helicopter community in
9 support of the offshore oil industry. See all
10 those little black dots that are out in the Gulf
11 of Mexico? Those are the positions of each and
12 every offshore oil rig in the Gulf of Mexico.
13 And on an annual basis NOAA provides the FAA a
14 revised plot of each and every oil rig depicted
15 on this chart.

16 Then on the final slide, now this is
17 something that doesn't happen very often. Now
18 what doesn't happen very often, perhaps every 50
19 or 60 years, the nation requires a new
20 realization of its geographic reference system.
21 It's data. And when new realizations occur,
22 usually the magnitude of geodetic shift is not

1 large enough to visibly affect most air
2 navigation charts which are produced at scales of
3 1 to 250,000, 1 to 500,000, 1 to 1,000,000 and
4 smaller.

5 And as a general rule of thumb, this
6 old cartographer learned back when he had black
7 hair and a lot more of it, if the geodetic shift
8 is equal to or less than the width of the
9 projection line, there is virtually no difference
10 in the data. I think we've all done that in one
11 shape or another, especially with the scales that
12 we work at.

13 However, when we went from North
14 American datum 1927 and updated to North American
15 datum 1983, Hawaii was visibly in the wrong
16 place, literally. So much so that Diamond Head
17 and Honolulu vortex were literally sitting in the
18 Pacific Ocean. NOAA provided the geodetic shift
19 values in order to place the islands in its
20 correct NAD 83 position. Eventually the VORTACs
21 dried out and they returned to service. That's
22 what I have for you today. Good job NOAA.

1 MEMBER MAUNE: Our next speaker is
2 Susan Russell-Robinson, acting program
3 coordinator, Coastal and Marine Geology Programs,
4 US Geological Survey. She's -- well, I just
5 mentioned her name there. Working with science
6 centers in Santa Cruz, California, St.
7 Petersburg, Florida and Woods Hole,
8 Massachusetts. Susan has nearly 40 years of
9 experience with USGS from research on global
10 explosive volcanism and experimental earthquake
11 prediction, to communicating risk associated with
12 natural hazards.

13 She's got a bunch of different things
14 listed here. Chief Reston, Washington, D.C.
15 Earth Science Information Center, Acting Chief
16 Center for Integrated Natural Disaster
17 Information, Deputy Regional Executive for
18 Eastern Regional Geography, Staff Scientist for
19 Northeast Region and Chair of the New England
20 Disciplines Management Advisory Council. She's
21 an active member of the Department of the
22 Interior's Ocean, Coastal and Great Lakes

1 Coordination Team. She has served on several
2 committees involved with developing and
3 implementing the National Ocean Policy. Welcome,
4 Susan.

5 MS. RUSSELL-ROBINSON: Thank you.

6 We're going to have some talking about slides for
7 a few moments, but that's just fine. So I'm very
8 delighted to be here representing the US
9 Geological Survey. But I also did a little
10 surveying around the Department of Interior. So
11 I hope my examples give you a broader perspective
12 than just the USGS.

13 So thank George for your background
14 around NOAA, because US Geological Survey has
15 similar roots. We go back to the 19th Century.
16 Surveys of the United States in that early part
17 of our nation. We were formed in 1879 and our
18 mission has been for 136 years to map the lands
19 and characterize the resources of the nation.

20 Presently the USGS is about 1.1
21 billion dollars annually. We're one of the
22 smallest bureaus in the Department of Interior.

1 We have about 12,000 employees in more than 400
2 centers nationwide. And our focus is on geology,
3 geography, hydrology and biology and all the
4 other things that go along with that. I'm going
5 to talk today about our role from a USGS and from
6 a BOEM perspective.

7 So what I did is I sent out a call to
8 several dozen scientists, both at the USGS and
9 BOEM to give examples. And, yeah, next, second
10 slide.

11 And they all sent back lists of five
12 or eight or ten examples and the applications
13 they're using. So here's just one person's list.
14 At the USGS on the west coast they're using the
15 multi-beam and single beam bathymetry soundings.
16 Tsunami inundation maps. Looking at different
17 kinds of coastal relief models, gridded at the
18 100 meter resolution.

19 Focused in southern Alaska with a
20 relief model. Custom grid extraction. All kinds
21 of global topobathy data. Particularly looking
22 at high-resolution coastline work and looking at

1 the digital charts. And as Jeff mentioned in his
2 presentation, there is a lot of work that the
3 survey's doing also with tides and water level
4 data. So let's go to the next slide.

5 I want to talk about a few very
6 specific examples. So hydrographic survey data
7 is really underpins a lot of USGS modeling.
8 We've done a lot of work in hindcasting and
9 forecasting. Changes to, and evolution of the
10 coastal systems. A lot of our information and
11 products are distributed through digital coast.
12 And one of our major roles is characterizing
13 vulnerability of the coastlines, using a coastal
14 vulnerability index to storms. And today if it
15 makes the news, we just really -- this is a brand
16 new product that's served through the USGS
17 Coastal Hazards Change Portal, which links the 48
18 hour before a hurricane makes landfall data from
19 the National Weather Service Hurricane Center,
20 which is showing surge modeling information.

21 They have linked to a set of models we
22 have. And that forecast will in 100 foot

1 increments, show you the probability of erosion,
2 inundation and then over wash. And areas of
3 breach. And we're really excited with the
4 collaboration that we've had with NOAA on this.
5 It's going to be very, very valuable to coastal
6 managers.

7 Things that we've been involved in,
8 for example, trying to figure out after Deepwater
9 Horizon what happened to the tar balls? Some
10 things washed up. Some things sunk. And so
11 we've been able to use a lot of NOAA data to look
12 at the sea floor and do modeling for sea floor
13 stress.

14 This has also been very applicable to
15 work we've done looking at offshore wind energy
16 sites from a regional cumulative impact. How are
17 sediments and sands going to shift around those
18 structures? And how does that inform the process
19 of permitting. Also what are the impacts of
20 anthropogenic use? And the diagram on the bottom
21 left near Pensacola, one of the interesting
22 things we were able to use the data for looking

1 at the long term bathymetric change was we
2 realized a lot of tar balls were actually being
3 eroded out and they weren't from Deepwater
4 Horizon.

5 So we were able to bring in experts
6 that we have in California on tar ball providence
7 and a chemical footprint and merge that together.
8 And demonstrate that there is that recirculation
9 of tar balls. Next slide.

10 So let me give you a very specific
11 example. And I want to go into some of the
12 dollar figures you're looking at. So here are
13 two brand new products that the USGS put together
14 for the Delmarva Peninsula area. We have a
15 responsibility because they're our Park Service
16 and Fish and Wildlife's lands to help them with
17 assessment of what's going to go on with their
18 coastal insure processes.

19 And so one of our scientists based on
20 Woods Hole, Elizabeth Pendleton, went to some of
21 her NOAA colleagues and pulled up two data sets.
22 So they're from 2006 through 2011. Twenty-three

1 hydrographic surveys. They covered an area about
2 4,100 cubic kilometers and it's a portion on the
3 inner-shelf that you can see here on the map. So
4 she figured out that if we were to collect the
5 data today, it would take around 1,100 days to
6 collect the data, at a cost of ship time only of
7 \$14,000,000.

8 So if this was a new collect, it would
9 be \$14,000,000 just for the vessel, no less the
10 time. She also worked with people at the
11 National Geophysical Data Center and was able to
12 get some unpublished backscatter data. And so on
13 the right you see the backscatter information
14 that's seamed together.

15 And so this mosaic, which is greater
16 than five terabytes is underpinning work that the
17 USGS is doing to model what is happening along
18 the coastal part of the Delmarva Peninsula. And
19 so this is something the USGS, which I said we're
20 at 1.1 billion a year. The Coastal and Marine
21 Program is about 40,000,000 a year. Ship time is
22 something very difficult for us to afford. So

1 having the hydrographic survey information coming
2 from NOAA is of tremendous financial value for
3 us. And there are many ways we've been able to
4 leverage that. Next slide, please.

5 So I talked to some of my BOEM
6 colleagues and here's a very specific example for
7 the Virginia wind energy area. That's offshore
8 of southeastern Virginia. What you'll see is
9 there's NOAA data from 2011 and then we were able
10 to get other data from 2013 and then make a
11 comparison of how this dune crest has changed.
12 And then areas of erosion in that very short
13 period of time over that 1,100 meters cubed.
14 Next slide.

15 One of our major projects for the last
16 -- it's a ten year project. It's done in
17 collaboration with the state of California is to
18 do a series of sea floor maps for all California
19 coastal waters. The products come out in roughly
20 a one degree sheet size. And one of the first
21 approaches that was done with the California
22 Ocean Protection Council was to take a look at

1 what available existed -- what data was available
2 through NOAA.

3 What was the resolution of the
4 bathymetry data and then to set up a common
5 standard for the data. I believe it was
6 something like 45 percent of the data was current
7 enough and at the standard that was established
8 for the state of California. And then through
9 collection, the USGS, the CSUMBC Floor Mapping
10 Lab, that's California State University Monterey
11 Bay Lab and Fugro with a contract that they have
12 with NOAA has supplied all the current high
13 resolution bathymetry. And here's an example of
14 the shade of relief off of San Mateo coast. At
15 this point we've published 50 percent of the
16 state waters.

17 And then there are many geological
18 layers that go with it. Looking at sediment
19 thickness. Determination on different hazards
20 that would be associated with earthquakes and
21 things like that. And I put up the website where
22 you can go. And there are I think 70 map

1 products there right now. And there will be
2 about 150 when it's completed. And then some of
3 this, of course, was collected in the near shore,
4 with merged data. And that's available through
5 NOAA's digital atlas. Next slide.

6 One of our interests as the agency
7 responsible for issuing warnings for earthquakes,
8 volcanic eruptions, landslides, and other
9 geological catastrophes is what has happened
10 post-major earthquakes. So one of the largest
11 earthquakes in recent history of the United
12 States was the 1964 Great Alaska Earthquake and
13 there was significant tsunami, significant
14 collapse and slumping. And we knew that there
15 were landslides off the coast of Valdez or just
16 south of Valdez. So this shows where we were
17 able to use 1957 data and then several other data
18 sets that we've been able to collect in a recent
19 multi-beam collection that was done in 2013 and
20 start doing analyses of what's happening with the
21 slide paths of those soft, loose sediments.

22 And this will be important because

1 this is a region where just south of it the Queen
2 Charlotte fault. There's tremendous research
3 going on between Canada and the U.S. on that
4 fault potential which might produce an earthquake
5 more significant than the Alaska '64. Next slide
6 please.

7 So when I sent out the call for
8 information, one group misinterpreted, but they
9 sent back something that was really important.
10 They sent back how NOAA is using USGS data. And
11 I thought well that would be a good thing to
12 share because we have had this long history. And
13 one thing that NOAA is certainly doing is a lot
14 of deep-sea coral research. And there's the
15 program.

16 And so this is an example of something
17 called Piggy Banks seamount. I love the name.
18 And here is a product that was put together where
19 a lot of it's NOAA's bathymetry data, but the
20 USGS coral study data is put on top of that. And
21 then, sorry, and then with it there's a whole
22 geology underlain. And so you can see how

1 structures are changing at this seamount. So I
2 just thought, you know, hey, we're doing it both
3 ways. Next slide.

4 So future needs, future benefits. I
5 think we've heard a lot of needs that are very
6 common. And for Interior, where Park Service is
7 concerned about what they have to do with the
8 Antiquities Act for things like shipwrecks and
9 archeological sites that are in submerged lands
10 for the Fish and Wildlife Service that has many
11 coastal refuges where there are a lot of concerns
12 for bomb ware, particular in the Atlantic. We're
13 looking at new uses of the Atlantic that had been
14 sort of in a moratorium situation for decades.

15 It's really, really, really important
16 to have this modern high-resolution bathymetry
17 data. And we really want to look at being able
18 to model impacts to better position the United
19 States to be resilient and sustainable in the
20 changes that are coming and the impacts
21 associated with sea level rise. So I came up
22 with four real straight-forward things we need.

1 And I said I think you've heard it before. We
2 really need that seamless topographic bathymetric
3 data. We don't -- we have lots of different ways
4 we can get that, but most people need to be able
5 to get it as just a common set.

6 And I know that the inter-agency
7 working group on coastal mapping has been putting
8 this together. But I think it's something we
9 really need to pay a lot of attention to. We
10 need increased coordination in collecting data
11 and information and putting it out. Particularly
12 so many of us have interlink missions. And we
13 really need to leverage our limited resources,
14 avoid duplication.

15 And I must say USGS is really thankful
16 to NOAA when we get a ship of opportunity. We've
17 done a lot of ocean chemistry work. We've done a
18 lot of gas hydrates work, and things where we've
19 been able to go out when there's space on a
20 vessel. And it's really valuable. We need, and
21 I think we need this everywhere, increased
22 frequency of data collection. The landscape near

1 our shores changes rapidly, frequently. And we
2 really need to understand those changes.

3 During Hurricane Sandy when we were
4 looking at data just off of Fire Island, New
5 York, before the storm about three days we had
6 some bathymetric information and you could see a
7 large borrow pit. Three days after we could see
8 the borrow pit had been filled in about 50
9 percent. What kind of sediment is moving, is
10 going out on these big sand ridges towards the
11 Fire Island shore. That analysis of change
12 really helps us understand the conveyor belt
13 that's coming in there and why Fire Island on the
14 whole is such a stable barrier island, unlike
15 others.

16 And we need to really understand that
17 again for resilience of a nation. And I think I
18 heard this before when I was listening to Dr.
19 Leveson, we really need to anticipate new
20 technology and methods for collecting data that
21 we need to do that modeling, and be able to offer
22 different scenarios, alternate futures, as our

1 nation is trying to address the impacts we're
2 going to change.

3 I want to tell kind of a funny story.
4 In 1995 the USGS wanted to think about the future
5 of our maps. So they brought together some of us
6 that they thought were out-of-box thinkers. And
7 so we had to think what would we do different.
8 And since I was a field geologist I was asked to
9 join the group. And so I came up with I wanted
10 something that looked like an Etch-A-Sketch in
11 size. I could pull up an antenna so I could
12 transfer information. I wanted my map on there.
13 I wanted to be able to draw what I saw. If I was
14 in the field and mapping an outcrop, I wanted to
15 be able to mark where it was and have it exactly
16 geospatially located. I wanted to be able to
17 talk to it and say, "Okay, here's my notes about
18 today, October 17th, point 772" and just have it,
19 type it in there. So what was I told?
20 Preposterous.

21 So what should -- yeah, I know, pick
22 up, we have devices like that. So I would

1 encourage, particularly when you have bright
2 young people, out-of-the-box thinkers, don't
3 dismiss their ideas because they may be on to
4 something. And really look into that because in
5 our future is in all these electronic gadgets and
6 gadgets and things.

7 And there's going to be new ways to
8 present our information, that aren't just for
9 scientists, or mappers, or charters. But really
10 for the public who really wants to understand
11 what's going on and make informed decisions.

12 Thank you.

13 MEMBER MAUNE: By the way I have a
14 little bit of trivia here for you. Can you
15 imagine where there might be a case where the
16 USGS and National Geodetic Survey collaborated to
17 determine where's the last place in the United
18 States we need to worry about sea level rise?
19 The very last point where we have to worry about
20 sea level rise? Julianna knows the answer to
21 this question. You probably do, too.

22 The president renamed it, gave its

1 name back, Denali, just a couple weeks ago. And
2 USGS and NGS and Dewberry and the University of
3 Alaska Fairbanks collaborated. There's a new GPS
4 survey of Denali. Its elevation is 20,310 feet,
5 which is ten feet lower than the previously
6 accepted elevation.

7 President Obama did not want to
8 announce the new elevation when he was there
9 because -- I'm told. I don't know if this is
10 true or not, I'm told it was considered bad news
11 and he didn't want to be blamed for lowering the
12 elevation. Now that may be a joke, but it's also
13 -- there's probably some political truth to that.
14 He gets blamed for so many things, he doesn't
15 want to be blamed for lowering Denali. Anyway he
16 gave the rightful name back to it.

17 Okay. Our next speaker is Paul
18 Rooney, who is an old friend from FEMA.
19 Geospatial information system specialist. Paul's
20 a mapping technology specialist in the risk
21 analysis division of the Federal Emergency
22 Management Agency. He's responsible for providing

1 technical leadership on mapping and GIS issues
2 for the National Flood Insurance Program.

3 Paul is responsible for the
4 development of FEMA's risk map standards and is a
5 technical expert for elevation data, basemaps and
6 digital flood data. He is also responsible for
7 the coordination of mapping activities with other
8 federal agencies to participation in the 3D
9 Elevation Program and the National Digital
10 Orthophoto Program. Welcome, Paul. The floor is
11 yours.

12 MR. ROONEY: Okay, thank you, Dave.
13 Can we go to the next slide?

14 The good news is the National Flood
15 Insurance Program was only founded in 1968 and
16 FEMA wasn't founded until 1979, so I have a lot
17 less history than the previous ones. But a quick
18 recap, the National Flood Insurance Program
19 insures about 1.3 billion in property. It's sort
20 of set up as a voluntary, you know, enforced
21 program where, you know, communities have to
22 agree to adopt minimum standards for flood plain

1 management in order to participate.

2 If they don't, however, there's
3 sanctions in terms of their eligibility for
4 certain types of disaster relief in other federal
5 assistance programs. And then the property owners
6 in those communities need to -- if they're in the
7 high risk area, they need to build to the minimum
8 standards. And we publish maps that define those
9 standards. We define the area of the high risk
10 and we define the expected flood elevation that
11 becomes the building requirement in those areas.
12 And so, obviously to do all this, we depend very
13 heavily on accurate elevation data. Next slide.

14 So often these maps are not perceived
15 as good news. Right, like we've lowered the
16 Denali ten feet. You know, we've found out the
17 flood plain extends further than we thought, and
18 you're in it, and now you have to buy insurance,
19 right? So we're trying to deliver this
20 information in a better context. And that's the
21 framework Risk MAP that we've defined.

22 So we have the data, which we believe

1 is accurate, quality data. But try to put it in
2 the context of what does it mean? How does it --
3 how does it help you understand what your risk is
4 and what sort of actions can you take to address
5 that risk? So that's the Risk MAP framework that
6 we try to put around this mapping endeavor. Go
7 to the next slide.

8 So primarily -- I mean it's still a
9 little bit fuzzy on the exact scope of this
10 panel. So clearly inland we use a lot of the
11 geodetic framework and other things. But I
12 focused on our coastal mapping for the purposes
13 of this talk. The coastal update process is a
14 four to six year process.

15 You know, it starts out with
16 development of an elevation of bathymetric
17 surface starting way offshore and then coming
18 onshore in the areas that are at risk from
19 coastal flooding. We've built these very large
20 area hydrodynamic storm surge models, so that it
21 might be two, three, 400, 500 miles of coastline
22 in one of these models.

1 And then there's a wave set-up
2 computation so it looks at how the water
3 accumulates over the course of a storm from the
4 waves breaking onshore. There's a primary frontal
5 dune stage, where, you know, sort of the
6 geomorphologic feature that over the long term
7 shows you where the ocean typically gets to,
8 right, it leaves the sand at the end of its
9 reach. They're not everywhere, but where they
10 exist they're a key definition as part of the
11 program.

12 And then the onshore analysis looks at
13 the probability of the storm-induced erosion and
14 then the detailed wave and mapping is done on top
15 of that eroded shoreline to produce the likely
16 inundation areas for the flood banks. And so we
17 build the high-risk flood zones and the -- and
18 the expected flood elevations from that final
19 product. So it's a very long process.

20 We are essentially in sort of the
21 third major cycle of doing it, since the
22 inception of the program. We did one cycle back

1 I think in the '70's. And then there was sort of
2 an update when some of this wave setup behavior
3 was a little bit better understood, so it was an
4 update to a lot of them. And then over the last
5 five years we've made like more than a
6 \$250,000,000 investment in getting everything
7 underway for the whole coastline.

8 Because it's a four to six year
9 process, most of those maps aren't done yet, but
10 they're all at various fairly advanced stages of
11 completion.

12 So what are the challenges in thinking about your
13 question of what's the benefit? Well, in our
14 current thinking, we're probably not doing
15 another one of these major updates for another 20
16 years. Right? There's a lot of, you know, site-
17 specific updates in areas where there's change
18 onshore and you can recompute the wave action
19 onshore. But those offshore storm surge analyses
20 don't need to be updated on a monthly basis to
21 keep up with the chain. However, it's a dynamic
22 time. We have an advisory committee of our own

1 that's giving us advice on how to update the
2 program. Juliana's a lucky member of that
3 committee.

4 And one of the things they're looking at is how
5 to address climate change and future flood risk
6 in our maps. And so we'll be getting some
7 recommendations next couple months on that. And
8 that may play into when we have additional needs
9 in the coastal area to do updates. In the big
10 picture that's what we do. So if you'll go to
11 the next slide I can talk specifically about some
12 of the data needs.

13 So, obviously we start off with elevation data
14 requirements. Really the biggest challenge for
15 us is coverage more than anything else. So the
16 places where there are data gaps create a lot of
17 difficulty and they have to, you know, somehow
18 interpolate or estimate depths in those areas in
19 order to build the models. The near-shore
20 bathymetric LIDAR is still doing a lot of that,
21 so the work that JALBTCX does is very helpful for
22 those near-shore areas. But there's still gaps

1 in some of the bays and inlets and also places
2 where it's shallow, offshore for a ways where the
3 survey ship can't get in there, but the swath of
4 coastal bathymetric LIDAR doesn't reach out
5 there.

6 Generally where there is data, it's adequate for
7 our needs. Offshore, like I said, those models
8 are over hundreds of square miles of ocean and so
9 the specific sounding here and there doesn't
10 really drive the results of the model. Where it
11 really starts to matter is when we come on shore
12 and we start computing the wave dynamics onshore
13 and so it's really the onshore LIDAR that --
14 elevations where the precision is really the
15 driver. Clearly newer, more dense, more accurate
16 is better, but it's not the thing that really
17 drives the difficulties with doing studies.

18 The other I think challenge that we run into with
19 it is the way the data is managed. It's, you
20 know, all separate surveys. So in order to build
21 one of these big basins for modeling, you have to
22 go out and get all the separate surveys and then

1 sort of integrate them together.

2 So some sort of full bottom coverage integrated
3 bathymetric data set would be the ideal product
4 that we could just sort of take and plug into our
5 models and start working from there. Would you
6 go to the next slide?

7 In terms of datums, you know, one of
8 the things we've encountered and I'm not sure,
9 this may be more of a legacy issue than a current
10 day issue is some of the surveys not having the
11 datum explicitly referenced on them. And so you
12 have to do some investigation to figure out how
13 to adjust that data. The VDatum tool is a real
14 boon for us in order to do the modeling.

15 What they do is bring everything into
16 a local mean sea level datum. Run the modeling
17 and then we convert the results back into a
18 geodetic datum so that we can publish those
19 elevations on a terrestrial framework so that
20 surveyors can then match them in the terrestrial
21 space.

22 So there's a lot of conversion back

1 and forth taking all the different surveys,
2 getting them all in a common datum, getting all
3 the land stuff into a local mean sea level and
4 then bringing it all back again at the end. The
5 biggest challenge on that for us currently is
6 that the VDatum data doesn't go far enough
7 inland.

8 So places where there's surge and run-
9 up that's going up rivers and other places where
10 it extends very far inland, we need our terrain
11 surface to go into those places and the VDatum
12 conversion as I understand it, doesn't go all the
13 way in in some of those cases. Can we go to the
14 next slide?

15 The tide and wave gauges are a
16 critical part of the analysis. In some cases
17 it's sort of like where the extratropical storms
18 dominate. Like in the northeast we do long term
19 frequency analysis on that and use that to
20 estimate the heights. In other places we're
21 doing model storms that we're running through
22 these models. And then they use the tide and

1 wave data to calibrate and validate the storms
2 that are going through.

3 In general there's not as many as the
4 modelers would like. Right? They would like
5 gauges that are closer to the places that they're
6 modeling, and particularly sort of near shore to
7 tide and wave gauges rather than ones that are --
8 that are far offshore. Because again the
9 dynamics that we're most interested in is where
10 the water is hitting the shoreline and then, you
11 know, running up and inundating the coast.

12 You know, there's a lot of temporary gauges. I
13 think the NGS does some for shoreline mapping and
14 that type of thing. But what we really need is
15 the longer records, both for that verification
16 process that has to capture some analogous events
17 that can be used, and also to do that long term
18 probability analysis.

19 We often have a need for the tide and wave data
20 to be synthesized with the meteorologic data.

21 You know, so what was the parameters of this
22 storm that produced this surge and this wave

1 action. And typically we've been buying that
2 from Ocean Weather, Inc. They're sort of the
3 industry leader. And when we need it now, that's
4 where we go. Can we go to the next slide?

5 The last thing I was going to touch on
6 was sort of post-storm stuff. This is a little
7 less in my space and more in the response side of
8 things. But clearly when there are big events,
9 there are then obstacles to navigation and FEMA
10 has -- one of the first things they typically are
11 doing is how do we get resources into this area
12 that's impacted? Can we use the ports? Can the
13 ferries operate if you have islands or what not?
14 And understanding those dynamics in the hours and
15 days immediately following the disaster is a
16 challenge.

17 So I think the post-storm imagery
18 serves that need and also sometimes there's a
19 need for, you know, sidescan sonar or other
20 underwater surveys in order to identify those
21 obstructions and then get them out of there. And
22 I'm not sure how that works between Coast Guard

1 and NOAA and who else does all that, but there
2 may be some Corps of Engineers for their place as
3 well, but it's certainly a need that we have. I
4 think some of the -- there were some of the other
5 data services mentioned like the long term change
6 in ocean heights.

7 I think we've been doing some pilot
8 tests on how to incorporate climate change into
9 the coastal flood settings and we've been using
10 that data in those projects. And as I mentioned
11 we're likely to be doing more of that in the
12 future. And that post-storm data, I think we use
13 sometimes in the -- for big flooding events we'll
14 do recovery maps. So if something like Sandy
15 happens, we say oh, our maps are clearly a little
16 bit dated in this area and we'd like to produce
17 an updated map, and also something that sort of
18 characterizes the event in a way that informs
19 people about rebuilding.

20 You know, it's one thing to say this
21 is the flood -- the probabilistic flood that
22 FEMA's computed, you know, using a bunch of

1 sciences. It's another thing to say this is how
2 high the water was here four weeks ago. You
3 know, when you rebuild your house, you should
4 think long and hard about how high and how far
5 back from the water.

6 So we'll use a lot of that post-storm
7 data collection to put onto those recovery maps,
8 both to inform the science of, you know, what
9 should the long term probability look like, but
10 also to inform people like what was -- to
11 characterize the event in a way that's meaningful
12 to the map users. So that's all I have. I
13 believe it's -- I'll turn it back to you, Dave.

14 MEMBER MAUNE: Thank you. Please give
15 a round of applause. I'm very pleased with the
16 input we received this morning. Thank you all.
17 It was a great job. We now have some time to
18 open the floor for questions for our speakers.
19 Please. Yes.

20 MEMBER BRIGHAM: Lawson Brigham,
21 University of Alaska, Fairbanks. Steve, I can
22 ask this question of Juliana, but I'd rather ask

1 you. Are there mechanisms, for Corps sharing for
2 Corps -- for the Corps stations around the
3 country? And specifically where there's -- in
4 some areas of Alaska that reach out into the
5 maritime world there's a need to have more
6 stations. So I wondered if there are mechanisms
7 available.

8 MR. MALYS: Well, I think that's
9 probably a question GS would be in a better
10 position to answer. But I can offer you one
11 piece of input. There are DOD facilities in
12 Alaska, a few military bases. So you know, it's
13 something that could be pursued as a possible, or
14 at least a host to some stations and maybe
15 provide some infrastructure to install some that
16 are in areas -- if those are areas where they're
17 needed.

18 That's one thing I would suggest. But
19 we, the DOD have not directly participated in
20 Corps, other than to temporarily deploy to
21 stations like that to other military theaters
22 where we would use them during a conflict.

1 MEMBER BRIGHAM: Yes, I think the
2 issue is co-locating with type gauges so we can
3 have some references for the offshore where we
4 already have the lease sites that are in the
5 offshore and the reference to that data for that
6 is incomplete.

7 MEMBER MAUNE: Yes.

8 MEMBER MILLER: Joyce Miller. I have
9 worked in multibeam data collection and I've
10 sailed NAVOCEANO ships. I was up in the Arctic
11 in 1982 collecting bathymetry data. And so my
12 question is to Steve, I've been trying for pretty
13 much my entire career to get NGA data and I know
14 where lots of it has been collected, as a matter
15 of fact, because I've been on NAVOCEANO ships.
16 Are you saying that you're declassifying the
17 Arctic data so that it can be used for bathymetry
18 charts in the Arctic?

19 MR. MALYS: The specific chart I think
20 you're thinking of was labeled the Arctic Gravity
21 Project so I'm specifically talking about gravity
22 data in the Arctic Region, which I believe is

1 sharable. I'll need to double-check that, but I
2 believe it's open for other uses and my
3 colleagues are shaking their head yes. So it's
4 not bathymetry data we're referring to there.
5 Okay.

6 Any bathymetry data we have in the
7 area -- Captain Connon may want to weigh in on
8 this. But, you know, we have to honor the
9 designation of the organizations the collected
10 it. And anything collected by the Navy, that's a
11 Navy decision. Okay, so we certainly would like
12 to make as much data available as possible, but
13 that specific graphic was about gravity data, and
14 that is available.

15 MEMBER MILLER: Also, I've been data
16 manager mostly for multibeam data out at the
17 University of Hawaii. I must have gotten at
18 least five inquiries about the South China Sea in
19 the last two years.

20 MR. MALYS: We understand.

21 MEMBER MAUNE: Okay. Juliana?

22 MS. BLACKWELL: Just one follow up

1 comment and question regarding gravity in Alaska
2 and the Arctic. Steven you mentioned that, you
3 know, NGS is interested in GRAV-D being completed
4 for Alaska and it is a priority for NGS to do
5 Alaska. We've got about 50 percent of the
6 mainland part of Alaska collected. We collected
7 the easy parts first. It's a challenging
8 environment. It's a costly endeavor. We are
9 looking at continuing to do additional data
10 collection, you know, in the next few years to
11 try to wrap up at least the mainland part, which
12 would enable us to produce a better interim-type
13 model. At least for that area that could be
14 shared, you know, in a test mode.

15 If there are opportunities to partner
16 on that, collaborate on that with either NGA or
17 others, we certainly continue to welcome that.
18 Obviously the west coast of Alaska, that whole
19 area, from fueling to aircraft to, you know, just
20 the weather challenges and the short seasons that
21 is available. Any way that we can focus our
22 attention in getting that done, we'd be happy to

1 talk to you and others about possibilities.

2 Thanks.

3 MEMBER MAUNE: Yes, Frank.

4 MEMBER KUDRNA: Frank Kudrna and I'm
5 a member of the HSRP and this question is for
6 Jeff. I come from the Great Lakes and Lake
7 Michigan is up three feet, so drudging is not a
8 huge issue other than our CDF in Chicago is
9 pretty full. But the big issue is ANS and Asian
10 and bighead carp moving up the waterway and the
11 Corps did the preliminary study and now is
12 looking at some other options for barriers and
13 lock modification and all of that. And I sit on
14 an advisory committee with the government
15 entities and the NGOs. The Corps commonly
16 mentions USGS and Fish and Wildlife, but there's
17 probably data sources from NOAA that are
18 important in that process. Is the Corps
19 discussing in those other environmental areas
20 that they might be looking at for data NOAA use?

21 MR. LILLYCROP: Yes. I know that we've
22 got quite a few folks working with some of the

1 Habitat people across our research domains. I'm
2 sure that there's a lot of interaction with NOAA
3 through our district offices as well. I'm not
4 familiar with specifics. But you know, the Asian
5 carp issue has been such a national issue that I
6 would presume that everybody's talking to each
7 other. I can't say who, but I know that one of
8 my leads in the R and D community has attended
9 numerous meetings with as many federal agencies
10 as they can get together because it really isn't
11 just a Corps problem, it's a national problem.

12 MEMBER MAUNE: Joyce?

13 MS. BLACKWELL: Another question for
14 Jeff. You mentioned Army Corps' need for access
15 to the raw bathymetry data rather than just the
16 charts or the -- my impression over the last
17 several years on this panel has been that NOAA is
18 very active in getting their data to, I can't
19 remember the new name, NGDC, National Center for
20 Environmental Information so does Army Corps
21 regularly visit and cull that data?

22 MR. LILLYCROP: We would in the

1 progress of a study. We don't have a mechanism
2 really for dissemination, you know, to pull that
3 data and then disseminate it to where it needs to
4 go in the Corps. It's usually driven by the need
5 of a study. And I know that we're familiar with
6 NGDC.

7 And the -- I know our coastal mapping
8 data goes to them as well as to Digital Coast and
9 some other national archives. The Corps isn't a
10 national archive, so we don't want to become one.
11 We want to push our data to them -- to those who
12 are. And make sure that it's available that way.
13 Digital Coast is a community -- coastal community
14 best practice, I guess for lack of a better term.
15 Because it not only allows access to the data,
16 but it connects tools and provides some of the
17 knowledge and guidance on using tools and looking
18 at coastal issues. So it's more than just a data
19 distribution center. It's really a knowledge
20 distribution capability. And that's what we see
21 being of such value is not just the data
22 distribution piece of it.

1 MEMBER MAUNE: Admiral Barbor.

2 MEMBER BARBOR: I will assume, and I'm
3 pretty sure most all of you are part of the IOCM
4 effort. Is that something that you are seeing
5 working well, working, or needs more emphasis?

6 MR. LILLYCROP: I'd like to see more
7 emphasis. I know they just came out with a
8 report. It's at our headquarters to take a look
9 at. I received it, I think this week. And it's
10 what I plan to do this afternoon is actually go
11 review it. But you know, for us collecting data
12 in the coastal zone is so expensive and is so
13 valuable, that anything we can do to bring
14 attention to the coastal mapping is I think
15 important. You know, it's almost understated the
16 amount that we need it. But the amount of
17 visibility it gets is so low. And it's such a
18 dynamic zone that it's not something that you can
19 map once every 20 years and be able to really
20 base decisions on that are -- that are, you know,
21 annual decisions. Our requirements that our
22 coastal working group gave us was that they'd

1 like us to do the entire U.S. once a year. And
2 that's -- you know, we're just not able to do
3 that ourselves. But a coalition through the IOCM
4 I think is a way to improve that capability and
5 yes, I think greater visibility nationally would
6 be great.

7 MEMBER MAUNE: I have a question
8 myself, Dave Maune, for Paul Rooney. Paul, from
9 my experience, historically, senators and
10 congressman have often argued with FEMA when new
11 flood maps come along and say more people have to
12 buy flood insurance. And they say oh, I've been
13 here for so many years and we've never been
14 flooded. And why do you say I need flood
15 insurance and that sort of thing. How has the
16 political climate changed since Hurricane Sandy
17 came along?

18 MR. ROONEY: I don't think that basic
19 dynamic has changed much at all, you know.
20 There's still that mindset that, you know, Sandy
21 was an unprecedented once in a lifetime event,
22 you know, as opposed to this is what a low

1 frequency big event looks like. You know, but
2 people's brains just don't understand the
3 probability stuff all that well, I think.

4 So, you know, the biggest impacts
5 there have been there were some scandals around
6 the insurance claims adjusting process, and
7 there's a lot of scrutiny on that in the New York
8 area. You know, so I think it's more or less --

9 MEMBER MAUNE: Aren't some governors
10 now encouraging free board above the BFE that
11 used to not do that?

12 MR. ROONEY: I don't know. When we
13 did some of the Sandy recovery stuff, I think it
14 was largely driven by Shaun Donovan when he was
15 at HUD that for a lot of the recovery grants you
16 had to adopt -- yeah, they adopted free board as
17 part of the recovery construction.

18 So there was some of that in the Sandy
19 area, yeah, but I don't think -- I didn't see it
20 as a national phenomenon.

21 MEMBER MAUNE: Right.

22 MR. ROONEY: But more of the impacted

1 area. And that's typical, right? The area that
2 gets impacted, there's a short window where
3 they're willing to be more proactive about risk
4 reduction. And then that sort of fades as time
5 goes on.

6 MEMBER MAUNE: Okay. And how about
7 mapping future conditions? How is that changing?

8 MR. ROONEY: Well, we're really
9 waiting on the recommendations from the Technical
10 Mapping Advisory Council. I think it looks like
11 they're heading towards recommendations to
12 produce coastal, you know, sort of climate change
13 influence, sea level rise influence, flood
14 estimates that wouldn't be the basis for the
15 insurance or any of the building requirements,
16 but would be an additional piece of information
17 that people could use.

18 And then inland it's more of a future
19 development and river and erosion sort of thing
20 as opposed to climate driven because the science
21 inland isn't there to be more specific about
22 where it's going to go up and down. That type of

1 thing.

2 MEMBER MAUNE: Okay. Thank you. Did
3 you want to say something?

4 MR. ROONEY: He actually would like
5 the answer on the IOCM from everybody I think.
6 And, you know, we participate on the inter-agency
7 working group on ocean and coastal mapping but
8 our main focus is on the terrestrial elevation
9 which we really have coordinated primarily
10 through originally the National Digital Elevation
11 Program now the 3D Elevation Program. But over
12 the last couple of years, I think that we've been
13 able to bring those two things together.

14 You know, we sort of share mechanisms
15 now for tracking and disseminating information
16 about planned projects. And so I think that's
17 been a real nice benefit out of participating in
18 that and bringing those two things together, so I
19 think that's worked well.

20 MS. RUSSELL-ROBINSON: I would say
21 from the USGS perspective, I have already
22 reviewed the plan. I got it earlier this week

1 also. That one of the features of the 3DEP is
2 something called the Coastal National Elevation
3 Data Set. And the Gulf of Mexico portion was
4 released in December, Mid-Atlantic and New
5 England will be released that that model of
6 trying to have that seamless topobathy data set
7 and then recollected at least every five years is
8 a goal. And I think that will be really
9 important if it can be achieved. And it requires
10 resources from all the agencies that are out
11 collecting.

12 And so it's that balance between the
13 opportunity collectings before and after say a
14 Hurricane Sandy, or Superstorm Sandy, or areas
15 that because development and growth are issues
16 need to be collected more frequently. So I think
17 you will see a lot of vision and dream there.
18 And then some ideas of how to accomplish it.

19 MEMBER MAUNE: Anybody else want to
20 comment on Ken's question?

21 MR. MALYS: I'll just comment, from
22 the DOD I'm not aware of us being a participant

1 in that working group. I don't think we are, but
2 since it's U.S. waters.

3 MR. SEMPELES: I'm not sure if the FAA
4 is on that, Steve.

5 MEMBER MAUNE: Yes.

6 MEMBER BRIGHAM: Just back to Steve on
7 U.S. waters versus international -- of course,
8 most of the Arctic in the United States Maritime
9 Arctic is both because the Bering Strait is an
10 international waterway, so I wonder how you tease
11 out that distinction when related to the Arctic.

12 MR. MALYS: I think that's a very good
13 question for our Capt. Cannon in the back to
14 perhaps address if he can. How do we make that
15 distinction or how do we treat that issue?

16 MEMBER MAUNE: There's a microphone
17 back there.

18 CAPT. CONNON: Good afternoon. So I
19 think the distinction where there is joint kind
20 of waters there, within our agencies we defer to
21 NOAA for the charting responsibility there, so
22 that charting responsibility. And as far as

1 collection of things there, if there is data
2 collected as there may have been previously
3 again. Just to reiterate what Steve was saying
4 that it depends on how it was collected for what
5 purpose.

6 But generally anything that NAVOCEANO
7 collected that is in public domain has already
8 been sent to what was NGDC and is available
9 there. So if it was available it was already
10 shipped there.

11 MEMBER MAUNE: Go ahead.

12 MS. RUSSELL-ROBINSON: Since Joyce --
13 you know, back to your question about the Arctic
14 and bathymetry I do want to share there is a
15 joint Department of State, NOAA and USGS effort
16 to map the Arctic for the extended continental
17 shelf. And so for that purpose, to characterize
18 the foot of the slope and determine where the
19 extension might be of the EEZ, there's been work
20 completed for the Arctic and it's in line for
21 publishing. And part of that we collected it
22 jointly with the Canadians.

1 So there was really what I call the
2 leap frog. The Canadian icebreaker would go
3 first and the U.S. one would go behind with
4 multibeam and then we'd flip it around. So there
5 will be newer information coming out. The
6 highest resolution information may have to wait
7 until or if, the U.S. signs the law, the Sea
8 Treaty. So we'll -- but I can put you in touch
9 with people if you would like some more
10 information.

11 MEMBER MILLER: Yes, I'm already quite
12 well aware of that. I track a lot of different
13 synthesis efforts. And it's just -- we've been
14 told to be edgy. It has always frustrated me
15 that there is so -- I know personally there is so
16 much bathymetry data that is just not available
17 to the general public.

18 And I understand the security reasons in some
19 cases, in other cases, but you know I wonder,
20 especially given our very limited mapping
21 resources. You know, if there's already
22 bathymetry data, can we re-inspect it and see if

1 perhaps it could be reclassified. That's just my
2 thoughts.

3 MEMBER MAUNE: Do we have any
4 questions from the public in back? Gary?

5 MR. MAGNUSON: Gary Magnuson, NOAA
6 CMTS. It's more a statement than a question.
7 Jeff Lillycrop I need to commend him and bring to
8 your attention his degree of collaboration on
9 behalf of the Corps of Engineers with NOAA
10 through the CMTS. And Jeff, Dr. Holly Bamford
11 met with the panel earlier this morning and she
12 talked about the R and D conference coming up in
13 June. I think some panel members were
14 interested. Would you take a minute to explain
15 those conferences, please?

16 MR. LILLYCROP: Yes, thanks, Gary. We
17 have a biennial conference that's co-sponsored by
18 the Committee on the Marine Transportation System
19 and the Transportation Research Board. It's a
20 biennial R and D conference to look at whatever.
21 Each conference has had a theme. We're going to
22 have the fourth conference in June of this coming

1 year. June 16. The focus is going to be to look
2 at what are the research needs to support the new
3 CMTS National Strategic Plan and our first
4 conference five years ago was on the same theme,
5 but we ended up actually addressing most of the
6 items that were identified.

7 So now that there's a new strategy,
8 we'll take another look at what the national R
9 and D needs are and assemble teams and address as
10 many of them as we can. And NOAA's been a strong
11 participant in the IAT, the R and D IAT as well
12 as many other IATs through the CMTS. So I
13 appreciate your long term support on it and look
14 forward to your participation in the next one in
15 June.

16 MEMBER MAUNE: Thank you. Yes, Frank.

17 MEMBER KUDRNA: This is a comment for
18 Paul. David you mentioned earlier that the
19 reaction to the changes in FEMA mapping and we're
20 in the same business. Over the years mayors and
21 county boards have gone ballistic many, many
22 times because generally the elevations go up and

1 the areas get broader in terms of areas covered.
2 And they're in shock over these kind of things.

3 One thing we found is that after you
4 do your technical data it ends up in the process
5 of buying insurance, and any insurance agent has
6 a computer program they go to with FEMA. And
7 what happens is that system takes a floor
8 elevation from a survey and it rounds it up or
9 down. So that a tenth of a foot determines
10 whether you're up to the higher foot elevation or
11 lower to the lower foot elevation.

12 And we've seen a couple of examples where the
13 exact same home built in the same year, with
14 maybe the concrete pour being a tenth of a foot
15 different doubles the insurance rate. And I
16 think the granularity of that is a real
17 disadvantage to FEMA. And I think if that
18 allowed a more accurate reflection of that
19 elevation at risk, it would help alleviate some
20 of that reaction that happens, particularly when
21 you do remapping.

22 MR. ROONEY: Yeah, I think you're

1 right. I think, you know the -- instead of two
2 sciences both operating in parallel, right, the
3 actuarial science and the flood risk science.
4 The easy solution is you don't build right at the
5 flood elevation you build a couple of feet above,
6 and then there's not that much variation. But
7 when you get down to at the flood elevation, a
8 little bit above versus a little bit below is a
9 huge price difference. And so that's exactly
10 what happens.

11 MEMBER MAUNE: Scott?

12 CHAIR PERKINS: Thank you, Dave.

13 Great presentation. Each of you did a nice job
14 of conveying the mapping program that you're
15 responsible for. I think it's safe to say that
16 none of you have adequate budget to do everything
17 that you need to do.

18 One of the challenges the Hydrographic
19 Services Review Panel has been asked to look at
20 is coming up with criteria for how we can
21 prioritize where surveys should be conducted. So
22 I just would like to take this opportunity to ask

1 each of you, and whether you can speak to it now,
2 or whether you can provide us input, you know,
3 later on, what criteria are you using within your
4 organization to help prioritize where you do your
5 mission?

6 Knowing that you don't have enough
7 budget to do your full mission, geographically
8 everywhere. Do you have some best practices or
9 criteria that have been effective for your
10 organization and how you prioritize? Because
11 that's a task that this panel has been asked to
12 undertake by Dr. Callender. So if you have any
13 input on how -- or anything you can share on how
14 you're prioritizing and when you don't have
15 adequate budget to address all of the need.

16 MS. RUSSELL-ROBINSON: For the USGS in
17 the last seven years we've been cut from a \$48
18 million program to a \$40 million program, so our
19 prioritization for sea floor mapping activities
20 is do we have partners who can bring in funds to
21 help us do it. So for example, California and
22 Massachusetts have been two areas where we've

1 done major work the last five years and that's
2 why they are a priority.

3 CHAIR PERKINS: So you're following
4 the money?

5 MS. RUSSELL-ROBINSON: It's a
6 combination of the science and the money. There
7 are -- in addition to sea floor mapping we would
8 look at the other things we're trying to do so
9 are we doing part of our 150-year shoreline
10 change assessment which is part of -- so is that
11 an area that is ready for the next repeat? So
12 California is. It was first published 12 years
13 ago so we're on our repeat cycle. In the case of
14 Massachusetts, the Department of Interior was
15 concerned about the cumulative regional impact of
16 our shore wind energy, Cape Wind was one of the
17 first proposals and so that nailed the science
18 need and the partnership brought it together.

19 CHAIR PERKINS: Great, great. That's
20 helpful, if you could share with us, you know,
21 offline criteria that you would use and if you
22 could put your wish list forward for where NOAA

1 should go next that would help support your
2 mission, I think that would be beneficial.

3 MEMBER MAUNE: Excellent question.

4 Paul, you have criteria too, don't you,
5 prioritized by risk?

6 MR. ROONEY: Yes, Steve looked like he
7 had an answer to this too.

8 MR. MALYS: Go ahead.

9 MEMBER MAUNE: Okay.

10 MR. ROONEY: Yes, our primary system
11 is looking at the level of risk, right, so we
12 have a bunch of sort of natural data looking at,
13 you know, flood losses and density population and
14 things like that, right, so where's the exposure
15 to flood losses and then the need for updates.
16 So what is our inventory management say about how
17 old the maps are, and that type of thing. But
18 there is an overlay of follow the money, right,
19 so where there are active partners who have
20 resources that they want to bring that biases the
21 process of little bit towards them.

22 The net outcome of this, though, is

1 that there's parts of the country that have
2 pretty low risk, they have pretty big needs but
3 they have very low risk and they still haven't
4 seen a new map in 20 years and so there's a real
5 tension there in the Technical Mapping Advisory
6 Council is struggling with the same question,
7 right, how do we prioritize those areas that have
8 the oldest, least up-to-date information but also
9 have very low populations and relatively low risk
10 and then very little building going on and that
11 kind of thing.

12 The one caveat to that or sort of
13 exception is the coastal area, right, so I
14 mentioned the cycles are very long and the
15 products are very expensive in the coastal space
16 so we sort of decided we need to do it all,
17 right. We've done it 20 years ago, everything
18 had changed, the science had changed, the date of
19 availability had changed, you know, the
20 accumulation of more climate data so we just said
21 we need to do everything on the coast and we just
22 did the whole thing all at once and now it will

1 probably be pretty stable for a number of years
2 except for the new direction we get from the
3 Congress and stakeholders.

4 MR. MALYS: So for the Defense
5 Department it's really straightforward, we are
6 constantly struggling for resources like everyone
7 else but it's a fairly periodic process where we
8 get priorities from the combatant commands,
9 NORTHCOM, CENTCOM, EUCOM, right. No one can
10 predict where a conflict will break out but
11 there's always an anticipation of where we're
12 going to need to update products and hydrographic
13 products of course are used primarily by the Navy
14 but not just the Navy and we take their inputs as
15 to where things are needed most. I'd ask Capt.
16 Connon, if you want to elaborate?

17 CAPT. CONNON: So I think what we do
18 is we get the priority around the world for where
19 the Navy's going to go and we kind of focus our
20 efforts there. What we have done in the past few
21 years is collaboration with NOAA so that we are
22 no longer producing charts for home waters, we

1 can rely on NOAA to do that. So that's been able
2 to save us some money there and some personnel to
3 work on other priority ports.

4 For us the hardest part is getting
5 source for those ports around the world. Someone
6 had mentioned not everybody wants to give us
7 data, that's true but we do have great agreements
8 with a lot of people and we're working more
9 towards we collaborate every day with NOAA on how
10 we can continue to utilize more of the NOAA
11 products in the US waters. We have a lot of
12 ships who have not gone to electronic navigation
13 yet so we still have to use paper charts for them
14 but we're trying to get everybody into that
15 electronic navigation world.

16 We do not use the ENC, we use DNC
17 which is different and in fact I will tell you
18 that very few of Navy ships can display an ENC.
19 So that's another thing we're going to undertake
20 to come into the ENC world down the road but for
21 the Navy that's a big undertaking as well because
22 that's a change out of their equipment. So that's

1 how we're doing it to try and best utilize the
2 funds that we request.

3 MEMBER MAUNE: Okay, Josh.

4 MR. SEMPELES: This is my first time
5 at this particular activity and I'm perceiving
6 that this is not an airspace kind of crowd so I'm
7 not quite sure what anything I have to say would
8 be of benefit to you. The data that we have NOAA
9 collect is so highly specific I don't really
10 think it's terribly germane to all the subject
11 matters that you're doing here and most of the
12 things that we draw from would be United States
13 Geological Survey for the topography, the
14 obstructions that we have collected so I'm not
15 quite sure that anything I say can help you in
16 this case.

17 MEMBER MAUNE: Jeff.

18 MR. LILLYCROP: For the Corps our
19 coastal mapping is tied to our dredging program
20 really trying to understand where the sediment is
21 coming from and where it's going to and so we're
22 trying to quantify change and rates of change.

1 So what we've determined is that we will do about
2 20 percent of the US coast measuring the dynamic
3 zone along the coast and get about 20 percent per
4 year.

5 When we go to plan a survey we work
6 through the IWG-OCM and talk to the other federal
7 agencies about our plans, sometimes some of the
8 agencies want to add to that. We also work with
9 our district offices and their local stakeholders
10 and sometimes additional areas get added that
11 way. So we generally work it around the US and
12 let as many organizations and agencies add to the
13 requirements with additional funding in order to
14 maximize the use of that capital asset and we've
15 been doing this now since 2004 and it seems to be
16 going pretty well. I think there is a lot of
17 good communication through the IOCM and the
18 ability to leverage each other I think is the way
19 it's going to -- you know, we're going to have to
20 work that way in order to get as much surveying
21 as we can do as opposed to everybody duplicating.

22 MEMBER MAUNE: Do we have any

1 questions from people that call in by telephone?
2 Is that open to them? Okay. Do you have
3 something?

4 MR. EDWING: Yes, I do.

5 MEMBER MAUNE: Okay.

6 MR. EDWING: Rich Edwing, I have a
7 question for Paul. Paul, my program runs the --
8 or operates the long-term tide gauge you were
9 talking about that you said you needed some more
10 of, have you -- has FEMA sat down and kind of
11 figured out where they need more long-term
12 stations or could provide us with some
13 methodology requirements where we could look at
14 that issue?

15 MR. ROONEY: You know, you probably
16 have to follow that up with the people who do the
17 coastal work. You know, we had a discussion last
18 week to sort of get all this stuff together and I
19 think that was the general observation but I
20 don't believe that there's been anything
21 systematic like that but it seems like it could
22 be worthwhile. I think again it's that challenge

1 of we're probably not doing another big analysis
2 for a number of years and so -- but we can start
3 building up the data now.

4 MR. EDWING: Okay, thank you.

5 MEMBER MAUNE: Yes, sir.

6 RADM GLANG: Thanks, Dave. Gary Glang
7 from Coast Survey and the DFO for this panel. I
8 have lots of questions but I'll be brief. Paul,
9 yesterday I don't know if you had the chance to
10 listen in, we had our non-federal panel and asked
11 them the same questions and one of the speakers
12 was Steve Bowen from AON Benfield and they're a
13 reinsurance -- they do catastrophe modeling for
14 the reinsurance industry so not unlike I would
15 imagine the kind of modeling that you all are
16 doing at FEMA. But he had the same thing on his
17 wish list for higher resolution LIDAR so I'm
18 assuming elevation data and bathymetry data and
19 my question to him was so what are your
20 requirements for that because you had the same
21 thing on your list for more bathymetry or better
22 bathymetry, I'm not exactly sure what was on your

1 slide.

2 And then -- and you mention that the
3 bathymetry you do get, the data sets are small,
4 they don't cover large enough areas and I'm
5 wondering if you're able to take advantage of the
6 tsunami digital elevation models that the
7 organization formally known as NGDC now NCEI puts
8 out, if you're able to use those and is the
9 resolution of the bathymetry that you need driven
10 by the models that you're running and then -- you
11 don't have to answer all this now I'm happy to
12 take this off-line and continue the conversation,
13 and I'm also curious about the models you run and
14 how you coordinate your modeling effort with the
15 rest of the modeling communities like what NOAA
16 has in our remodeling group? There's lots in
17 there, you don't have to answer it all, you can
18 say I'll get back.

19 MR. ROONEY: Yes, I mean there is a
20 lot of good questions I think on the coordination
21 part, you know, I think there's a lot of informal
22 coordination that goes on, we've had a lot of

1 discussions about how do we share, you know, some
2 of the data that we've built with other modelers,
3 you know, and we're working on solutions for
4 that. I think a lot of that goes to the folks at
5 the Coastal Services Center is -- you know, but
6 we also often have scientific sort of advisory
7 panels on some of this stuff that brings in a lot
8 of other agency folks as well.

9 But I think those are probably better
10 discussions, there were too many pieces to retain
11 them all but we could talk about more. But the
12 high level messages for us that it's not really
13 the precision of the density of the bathymetry
14 that drives our needs, it's more of the onshore
15 stuff so the places where we really have issues
16 is just where there's a gap where there's no data
17 available at all.

18 RADM GLANG: Thanks, Paul. Can I
19 follow up with a question to the panel, is that
20 all right, Dave? Or we can think about this, is
21 that okay?

22 MEMBER MAUNE: Yes.

1 RADM GLANG: So my question to the
2 panel is you've heard from a variety of federal
3 agencies that do mapping work for their mission-
4 specific purposes and you know a little bit more
5 perhaps about NOAA's mapping missions. So my
6 question, the panel can reflect on this, we can
7 talk about it tomorrow in our sessions but do you
8 see gray space between the different
9 organizations? Do you understand why these
10 different organizations map and how what they do
11 is different than what we do or are you still
12 concerned it sounds like duplication? Because
13 this is really important that we have federal
14 agencies that do mapping for their own purposes
15 and when we tried to explain our story for
16 instance on the Hill oftentimes -- and you know,
17 this is where we run into trouble and oftentimes
18 there are legislative attempts to stitch us all
19 together and say well, we only need one kitchen
20 for everybody to cook in so everybody get in the
21 same kitchen.

22 So this is one of my areas of concern

1 in messaging and I have you all here as
2 representatives from these federal agencies, this
3 is a hard story for us to tell, IOCM is one way
4 to do that. We can't do IOCM by ourselves, we
5 absolutely need the other agencies to participate
6 so -- but I think it would be good for the panel
7 to reflect on this, is it still gray between the
8 different agencies that do mapping work or are
9 you starting to see a bright line and understand
10 that there are differences. So that's kind of an
11 open question, you don't have to think about it
12 but one of the things that I worry about.

13 MEMBER MAUNE: Yes.

14 MEMBER BRIGHAM: Lawson Brigham, just
15 to add to what the Admiral said. For the Arctic
16 where one percent of the United States Maritime
17 Arctic is charted to modern standards but charted
18 to a higher percentage across the other
19 standards, but we have economic security issues,
20 environmental, human security issues, climate
21 change security issues and national security
22 issues and when we have the President of the

1 United States talking actually about charting
2 hydrography the Arctic I think the whole
3 government approach is what it's supposed to be
4 that in this case all available bathymetric data
5 be contributed to the whole range of securities
6 for the United States and the Arctic. And our
7 panel will be working on that issue and hopefully
8 winding its way up to the top, and it deals with
9 the Defense Department, intelligence agencies and
10 obviously the sensitivity of the technical means
11 and how all of that is -- but there is data. I
12 mean, I know it from my days in the Arctic
13 Research Commission and sailing on the Polar Sea,
14 there is data available it just hasn't been
15 released but it needs to be released now for a
16 variety of security interests of the United
17 States.

18 MEMBER MAUNE: In response to your
19 question, Admiral, I know that USGS, NOAA, and
20 FEMA, and probably the Corps of Engineers too,
21 are interested in the merger of bathymetric data
22 with topographic data along that shoreline area

1 and so that's an area in which I know that NOAA
2 is doing that, you said that USGS is doing it,
3 FEMA needs that data.

4 MS. RUSSELL-ROBINSON: Well, I want to
5 give you an example and these might be the things
6 that you want to ponder so -- I'm getting old so
7 I think it was 2009 but it might have been 2010
8 we had a workshop in New England, so Maine to
9 actually New York, New Jersey Harbor to look at
10 the need for topographic and bathymetric data in
11 the coastal zone, for the coastal zone.

12 So the Department of Interior had our
13 money, we had the workshop, we brought in Jen
14 Wozencraft, we brought in a quite a number of
15 people from NOAA, we had people there from EPA,
16 we had a large federal community that does
17 collect LIDAR data. We also had all the states
18 and the states were part of the effort and so
19 what we see together was a total data collect
20 from Maine to the New York, New Jersey Harbor
21 area to a common standard and then there was the
22 ability to buy up the standard. So some states,

1 some federal agencies had other money and so we
2 did the entire swath.

3 So one big collect because we all
4 realized we have to do that leveraging and that
5 we had different objectives for the data and so
6 that's where we came up with the common data
7 standard that met the minimum for everyone, but
8 then we also tried to maximize it and it's very
9 wonderful data set, and it will be coming out in
10 December as part of what's called the COMET.

11 CHAIR PERKINS: Dr. Maune, I gave you
12 extra time and you used all of it and a little
13 bit more so --

14 MEMBER MAUNE: Well, I will shut up.

15 CHAIR PERKINS: Well, I thank you, an
16 excellent panel but Admiral Lopez is here so I
17 would like to try and maintain some schedule
18 control. So the public is excused, the panel
19 will convene in the Discovery Room across the
20 hall and we will reconvene back here at 1:30.

21 (Whereupon, the above-entitled matter
22 went off the record at 12:37 p.m. and resumed at

1 1:41 p.m.)

2 CHAIR PERKINS: All right. I
3 apologize for our tardiness but we had a very
4 nice lunchtime presentation from Adm. Lopez on
5 the situation with the NOAA fleet, so.

6 A couple of housekeeping orders,
7 anyone who has parked here at the Doubletree, if
8 you'll see Lynne, she may be able to facilitate
9 getting you were parking voucher. For the panel
10 members, you should find at your seat here at the
11 table your required paperwork that you need to
12 complete and sign and return to Tiffany, you
13 know, so we can all be processed accordingly.

14 Next on the agenda is a report from
15 our Emerging Arctic Priorities Working Group by
16 Dr. Lawson Brigham.

17 MEMBER BRIGHAM: This on and working,
18 good. Good afternoon everyone, let me explain
19 what we're trying to do today. This is a report
20 of one of the working groups, this is mostly for
21 the audience, public audience. This is a report
22 of a working group, EAP, Emerging Arctic

1 Priorities within the HSRP. The HSRP has a draft
2 of our comments, narrative and what some of this
3 that you will see and the HSRP, the entire group
4 still has to reach consensus on our
5 recommendations. So it's really a draft, it's
6 not yet ready to pass up to Dr. Sullivan but
7 that's where it's headed.

8 And then of course when we get a
9 consensus document it will be on the website and
10 transparent and we'll ship it around everywhere
11 and everyone can download it. We have, I think,
12 some strong recommendations.

13 Before a show you my slides I wanted
14 to quote a few things from a document from the
15 White House on 1st of September just to remind us
16 what we're talking about. And it is the fact
17 sheet and it says, issued by the White House
18 Office of the Press Secretary, President Obama
19 announces new investments to enhance safety and
20 security in the changing Arctic. He says a lot
21 here of course as you know, NGA knows, NOAA knows
22 and the Coast Guard knows, but let me quote, NOAA

1 and the Coast Guard will take action to promote
2 safe marine operations and transportation, a
3 pretty big job, in the Arctic through mapping and
4 charting efforts in the Bering, Chukchi, Beaufort
5 Seas, regions with newly open waters for which
6 existing maps and charts are non-existing or
7 outdated. I'm sorry that the hydrography of the
8 United States is not here right this moment but
9 I'm sure he's read this.

10 Additionally north of Dutch Harbor
11 located on the Aleutian chain, of course there
12 are no deep water harbors in the United States
13 Arctic capable of providing shelter to vessels,
14 operating in or transiting through the US Arctic
15 region and the Corps is evaluating the
16 feasibility of deepening and extending Nome's
17 Harbor capabilities.

18 To that end he also, the President,
19 says or his fact sheet says to that end the
20 administration with DOI in the lead will continue
21 to consult with the Alaska native communities
22 with respect to shipping issues and climate

1 induced impacts. And then finally in the near
2 future NOAA will modernize and install additional
3 instrumentation on the Arctic coast to monitor
4 the effects of climate change and enable safe
5 marine operations and transportation.

6 All of these issues including
7 icebreaker issues are relevant to the HSRP.
8 Relevancy of icebreakers are whatever icebreakers
9 built in the United States in the future has to
10 be a hydrographic ship. In other words, have the
11 appropriate multi-beam sensors, whatever the
12 gizmos are that might be in the next 10 years or
13 so must be on this ship as part of the federal
14 fleet to do in fact hydrography in the remote
15 areas of the United States Maritime Arctic. Next
16 slide.

17 Oh, go back, I'm sorry. The ship
18 there is the MV Arctic, you can't read it but it
19 is the MV Arctic and that ship although it's
20 icebreaking bulk carrier, Canadian flagged has
21 come Kivalina and picked up zinc ore and taken
22 that zinc ore to BC, British Columbia's smelters

1 there and around the Pacific so in fact this
2 ship, but when it comes to the United States
3 Maritime Arctic, it's not using any of its
4 icebreaking capabilities because we do not allow
5 any icebreaker ships to come to Kivalina.

6 Actually, I should say it a little
7 differently. The Kivalina operation with the
8 barges are incapable of operating in the ice and
9 so no ships like this, that can break a heck of a
10 lot of ice, come to the United States Maritime
11 Arctic in the wintertime. So there's no traffic,
12 no commercial traffic in the wintertime in the
13 United States Maritime Arctic. Next slide.

14 So again, NOS posed questions of us,
15 the HSRP in LA in April at our last meeting, so
16 we're going to put you through this torture test
17 of seeing the questions and a lot of bullets, I
18 apologize for all of the information on the
19 slides. The HSRP has a narrative and a report
20 and I'll try to summarize. But there's the first
21 question what criteria, it's not an easy one,
22 none of these questions are easy, but that's why

1 the Admiral and the team asked us these.

2 What criteria should NOAA consider to
3 prioritize its national mission for hydrography
4 and charting between the US Arctic and the rest
5 of the country? Well, the straightforward answer
6 is I think from HSRP there are no criteria, you
7 can't compare LA, New York, Charleston, Houston,
8 wherever with the frontier area, I think that
9 will be one of our approaches to the answer. So
10 we're not answering the question -- Well we are
11 answering the question, but we can't conceive of
12 any criteria that you can evaluate two different
13 places, why? Current economic activity that
14 supports domestic and international trade in all
15 the ports except for Anchorage outside of Alaska
16 there's just no criteria and so I think our
17 approach is no criteria, no easy criteria. This
18 linkage and the economic vitality is linked to
19 political capital, et cetera, so if we, NOS
20 reprograms money from surveying Houston, pick
21 your port, up to Alaska were quite convinced that
22 you'll hear about it in five seconds from the

1 Hill.

2 The third point here is this we know,
3 we don't have any information in HSRP of any
4 compelling national security requirements and yet
5 there are important economic security, human
6 security, you heard me ask the question I think
7 of Steve previously, and a whole range of broad
8 security issues that involve the United States
9 Maritime Arctic.

10 Of course you all know we have leasing
11 and I'll show you the these map in a second here,
12 so whenever that leasing took place, 15, 18 years
13 ago, obviously the United States government
14 assumes the responsibility of providing whatever
15 infrastructure there is to provide for the
16 security safety network. Of course we don't have
17 that infrastructure and we don't have the breath
18 of hydrography and charting that is necessary and
19 yet we have the leases and the lease wherever the
20 amount of money that would pay for the leases
21 wherever that went in the government none of that
22 that we know of was teased off to pay for the

1 attended an important infrastructure to protect
2 the place and protect the people.

3 So it is a huge issue, it should be in
4 the calculation of priorities but when DOI was
5 conducting the leases through MMS back then I
6 mean it would be fun, interesting to do an
7 analysis of who talked about the attended
8 infrastructure and the responsibilities of the
9 federal government to provide the safety net,
10 particularly our interest hydrography and
11 charting and geoid observations, who's going to
12 provide that to support the now lease areas where
13 we have operations out there without the attended
14 infrastructure. A reasonable question to ask.

15 So I mean, one of our recommendations
16 you'll see in a minute is that somewhere there
17 has to be some new funding to be provided so that
18 NOS doesn't have to keep re-prioritizing some of
19 the funds that might go to some other ports, up
20 to Alaska to give it a minimal amount of annual
21 surveying done. The key link in this topic and
22 one of the answers to this question on criteria

1 is that in the highest document we have or one of
2 the two most important documents, the National
3 Strategy for the Arctic Region, the only thing
4 mentioned there specifically is hardware or
5 infrastructure. Of course it charts the Arctic
6 region, it's spelled out specifically in that
7 document that is signed by the President and it's
8 Under the Line of Effort as we know pursue
9 responsible Arctic region stewardship. Next
10 slide.

11 The leases and the drilling of course
12 is taken place here but this gives a whole idea
13 of the Northwest coast of Alaska, Point Hope,
14 Wainwright you can't see, Barrow. Interesting
15 enough as an aside when we start talking about
16 places of refuge, harbors of refuge, safe
17 harbors, whatever you want to called them,
18 there's a part of a national wildlife refuge, the
19 Arctic Maritime National Wildlife Refuge is along
20 this coast. An area that is designated area for
21 specifically for the safety and protection of the
22 eiders, spectacled eiders and so there are some

1 regions here where. And of course you have
2 communities that are depended upon whaling,
3 hunting, walrus, seals or whatever so it's
4 unlikely that any of these places are available
5 for any safety reasons where you take a damage
6 tanker, damaged icebreaker that might be leaking
7 oil or whatever the situation is when the
8 government decides maybe through CMTS on what the
9 priority of the places of refuge. When we have
10 the priority list than Adm. Glang and his team
11 can go out and actually survey it so we don't
12 create a disaster in the place of refuge without
13 having charts.

14 So this practical safety issue which
15 is relevant to HSRP of where the places of refuge
16 in the United States Maritime Arctic is a big
17 issue, political, challenging, it has to be
18 sorted out so that again the hydrographers who
19 actually go and do the job and create a safe
20 haven with, and most of these areas of course as
21 you know or coastal, either for anchoring, most
22 of it would be for anchoring but there are a lot

1 of areas already closed off or presumably closed
2 off for such an area. Next slide.

3 So out of this question here are two
4 recommendations from HSRP draft, one is that we
5 really do need a line item in the budget for
6 hydrography and charting. I mean, I know already
7 I can hear all the chores that there's no new
8 money in the government for this, well, but that
9 doesn't stop us as a federal advisory body to
10 recommend that for this frontier area for a whole
11 host of security reasons that we have a line item
12 budget, whatever that amount might be we wouldn't
13 be able to tell you that. I mean, it may be
14 talking with the Adm. Glang that we could come up
15 with a number but I don't think it's necessary.
16 The issue is we do need a line item budget for
17 the most fundamental other than environmental
18 observations, the most fundamental piece of the
19 pie here in the maritime world is proper charting
20 and hydrography. And again just to reiterate
21 that only 1 percent of US Maritime Arctic is
22 charted to modern international standards so

1 there's a lot to go.

2 And the other one is deals with the
3 internal NOAA and then here there may be some
4 edginess that it's not that we at HSRP are always
5 aligned with the staff and all of NOAA, I mean
6 they'd like some recommendations that actually
7 aren't maybe countered to what they promote. And
8 I think as a body we don't see hydrography and
9 charting promoted internally in NOAA at an
10 appropriate level that matches our national
11 strategy. I mean, the strategy is clear, signed
12 by the President, chart the Arctic is highest.
13 If I was writing a strategic document for NOAA I
14 think I would put charting and hydrography at the
15 top of the list. So I think it's an important
16 recommendation for the external one, to the Hill,
17 to the administration about a line item and the
18 second one, look internal and make sure and you
19 hopefully expect that we on the HSRP would say
20 the second one. And we've had some briefings and
21 for me personally, I'll let the other members
22 speak. For me personally, I was underwhelmed by

1 the level and the attention of this particular
2 item which has a national importance. Next
3 slide.

4 This is to give a little background to
5 answer the next question that NOS has asked us.
6 This is 2013 data from the Alaska Marine Exchange
7 which is shore based AIS receivers. We have 100
8 and some odd, just for disclosure I'm a member of
9 the board of the Marine Exchange of Alaska, a
10 nonprofit, it's perfect example of a public-
11 private partnership. The Coast Guard puts money
12 in, the state and commercial industry.

13 So we have one of the most advance
14 systems, it's not satellite-based although
15 satellite information can be inputted into the
16 system but ours is land-based and we have very
17 precise, tremendous information about traffic
18 that Adm. Glang uses in some of his strategy
19 documents, where is the traffic. We have the
20 picture, we the United States through the Alaska
21 Marine Exchange. But it is telling where the
22 traffic is, on the United States side the

1 majority of the traffic during the year or in the
2 summertime is tug and barge operations, resupply
3 of coastal communities, resupply of the Beaufort
4 Sea operations and of the oil patch up on the
5 North Slope.

6 What we see in this data for 2013 is
7 tankers, bulk carriers, large ships around
8 Chukotka and headed in this case either eastbound
9 or westbound on the Northern Sea Route of the
10 Russian Arctic. A couple of tankers coming into
11 here, here's Nome, you can see traffic into Nome
12 and most of the traffic into Nome, a couple of
13 tankers, most of this traffic is tug and barge
14 traffic, along the coast, Point Hope here,
15 Wainwright, Barrow but all coastal barge traffic.

16 Plus 2013 we didn't have Shell out
17 here in the lease site and Shell brings roughly
18 20 vessels, maybe a few more, few less, attending
19 icebreaking support ships, oil spill response
20 vessels, et cetera, and a couple of rigs for
21 drilling and that small armada create hundreds of
22 transits in this area of the northwest coast of

1 Alaska. Next slide.

2 Note that this is 1 June to the end of
3 November, and here's the picture of the AIS
4 tracked ships in the wintertime. So we have to
5 all know and understand again this is seasonal,
6 the place is ice covered, ice may be thinner, it
7 may be all going to first year ice, the character
8 of the ice is changing, whatever, the place is
9 ice covered. And the regulators probably through
10 the rest of the century, if forever, are not
11 going to allow drilling in the ice, so this is a
12 seasonal operation.

13 The question is how many ships there
14 might be along the Northern Sea Route in the
15 wintertime, through the Northwest passage in the
16 wintertime, and the answer for most of us that
17 work on this subject there aren't going to be
18 many. The Russians may extend this season, the
19 navigation season to be in the ice at the end of
20 the season, but no one is really talking about a
21 longer navigation then six months on the Northern
22 Sea Route. No one in the maritime industry is

1 talking about any traffic from the Northwest
2 passage, at least through beyond mid-century if
3 ever. It's all economics.

4 What's driving across the global trade
5 routes or potential routes through the Arctic is
6 our natural resource development and global
7 commodities prices; it's not the retreat of sea
8 ice because the place is ice covered seven months
9 out of the year, partially or fully, through the
10 century and beyond. There's a lot of ice 3000
11 nautical miles across the top of the world from
12 just south of the Bering Strait all the way
13 across the North Pole to the Atlantic, and its
14 3000 miles of 2 meters of ice, it might be 1.5
15 meters of ice a decade from now, but it's a long
16 way in the ice, and the question is whether it's
17 economic or not. And I've given a couple of
18 briefs before to our group here. Next slide.

19 And just to remind us, these are
20 integrated passive microwave images for 2013 and
21 '14. I just put them together and merged them to
22 show that again the place is ice covered, and if

1 you look carefully up in our area that we're
2 talking about today it's all ice covered, and
3 this is six months so about seven and a half
4 months ice covered. And this doesn't tell us much
5 about thickness of the ice but you can infer that
6 it's one to 2.8 meters thick. But again the
7 place is ice covered which has the seasonality
8 impacts everything, of course the hydrography
9 actually doing the hydrography is one.

10 Next. Okay. So the criteria, the
11 question that's asked is related to the internal
12 use of the U.S. Maritime Arctic, and if you look
13 at the maps it is very clear that the lease sites
14 and the approaches to the lease sites are a one
15 use, huge use and lots of requirements.

16 The Kivalina Terminal, I didn't point
17 out but the largest ink mines in the planet, or
18 one of the two largest ink mines in the planet,
19 is located in the Chukchi Sea off Kivalina, the
20 Red Dog Mine, and you can see some lines of cargo
21 ships going into that port so that area has been
22 quite well surveyed I think. Why, because of

1 safety reasons, 300 meter, a 1000 foot ore
2 carriers come and they anchor off Kivalina, so we
3 do need to know and they need to know in
4 particular how much water they have under their
5 huge ship, some of the largest ships in the world
6 come in fact into the Arctic Ocean to northwest
7 coast of Alaska.

8 That's the security law enforcement
9 requirements are in there somewhere, and we
10 haven't done enough research maybe in the HSRP to
11 find out what those are. Some from the Coast
12 Guard are related to this routing's system,
13 voluntary routing system, but are there other and
14 there are likely other national security reasons
15 and law enforcement reasons.

16 Our coastal community supply might not
17 get a lot of attention but it does when the you
18 read the President's document on his take on
19 indigenous people and climate change and their
20 survivability. So on the list of criteria
21 somewhere are the coaster communities of Alaska
22 and the ability of the resupply companies to

1 reach them and supply them for their yearly
2 sustainability. And then there's separate but
3 related the resupply of the North Slope which
4 happens every summer, again tugs and barge
5 operation, Foss and Crowley and others. The
6 Bering Sea fisheries has some requirements,
7 merging port, it was specifically asked in the
8 question, one of the questions coming up about
9 port, that port likely to be Nome, so one of the
10 approaches what hydrography needs we have to
11 support that port becoming America's Arctic port.
12 And then finally the question I've already raised
13 is identification of places of refuge. And I
14 don't think it's the part of the HSRP to
15 determine what the priorities of all of these
16 are. I mean, I probably would say while national
17 security is probably number one as it usually is,
18 but we don't know how that plays here. So were
19 not answering maybe completely what NOS has asked
20 in the question, but I think we might have
21 expanded the range of issues. Hugely important
22 is the traffic around the coast in many areas

1 that have very few charts of this tug and barge
2 traffic. And I'm not quite convinced that that
3 has been looked at carefully enough in the range
4 of uses, marine uses to be considered in the
5 priority scheme of what needs to be charted when.

6 Again, just again another point again
7 is the national security requirements are
8 unknown, will they be known, who knows but at
9 least in the equation that Adm. Glang uses that
10 they should probably be in that equation.

11 Protecting traffic is a very difficult
12 thing; there are some projections produced by a
13 study that my team of people at the university
14 worked on and others, that show if we did have
15 six to eight rigs out there drilling and in
16 production phase, which would probably be down on
17 the seabed, but in the exploratory phase the six
18 to eight rigs would require some hundred vessels
19 or more and then thousands of transits of ships
20 to the coast, back and forth to Nome, if this is
21 a support base, so in attempting to project what
22 the United States Maritime Arctic would be, the

1 driver is offshore development and how many
2 support ships are related to supporting the
3 drilling rigs in the exploration phase over the
4 next two decades. So next slide.

5 Three recommendations are general, I'm
6 sorry you probably can't read them, but what
7 again are the national security requirements and
8 how do we get them, is there a role for CMTS,
9 could CMTS be a facilitator to give it an
10 integrated look at all of the requirements so
11 that that can be passed and unless but we do see
12 a role, if not for the CMTS then for the new
13 Arctic Executive Steering Committee chaired at
14 the White House. Somewhere in this bureaucratic
15 structure someone should be able to tease out the
16 integrated hydrography requirements of the United
17 States.

18 The second bullet deals with the
19 specific analysis or looking at the tug and barge
20 community, talking to the commercial operators
21 and what are their needs, it's been a pretty safe
22 operation for many decades but they're expanding

1 their operation with deeper draft tugs and
2 barges, and what are the implication of doing
3 that. So I would think that the number one
4 priority might not be the voluntary highway that
5 the Coast Guard wants, but it might be in fact
6 the coastal highway of the traffic of tug and
7 barges; that's just my speculation, but it's a
8 huge element here in coastal trade in Alaska.

9 And then finally that third
10 recommendation that hopefully we'll have is we
11 need to have a better understanding of the
12 hydrographical requirements of the lease sites
13 and the approaches to the lease sites because we
14 have this amount of ships that operate inside and
15 outside of the lease sites so what do we know
16 about that and I think DOI might have some ideas
17 and of course talking with Shell would have some
18 pretty good ideas to. What does that entail?
19 What are their needs? Next slide.

20 And here is the question is again from
21 NOS how do we prioritize tides and currents and
22 positioning requirements, a huge issue so that we

1 actually do the hydrography. And a few points
2 here, I mean, I think as we review HSRP, this
3 issue that there were inadequate, I mean it's
4 quite clear inadequate geospatial and
5 oceanographic infrastructure to give us the
6 accurate positioning and hydrography information
7 we need in the Chukchi Sea, Beaufort Seas and
8 essentially the adjacent areas where the lease
9 sites are located.

10 Highest priority is likely, given the
11 appropriate resources, the highest priority would
12 be to collate the tide gauges and CORS stations
13 along the northwest coast of Alaska so we can
14 triangulate and do all of what's necessary to
15 provide adequate positioning to conduct the
16 hydrography. Tough and expensive to have insight
17 to measurements, Doppler current profiles, et
18 cetera, expensive but nonetheless our priority
19 required to get the current schemes, at least in
20 the coastal area in this part of remote Alaska.
21 The main constraint, of course, is NOS and NGS
22 would execute all of this if they had the

1 appropriate funding to do this. Next slide.

2 It's really just a general summary,
3 the recommendation is that -- oh, go back, I'm
4 sorry. Here's the location of I guess current
5 location I guess, maybe for -- let me just point
6 here -- for the tide gauges here in the Bering
7 Strait region I think, current or planned?

8 MR. EDWING: It's not current.

9 MEMBER BRIGHAM: The new ones. I
10 don't know, Gary, can you comment?

11 MR. EDWING: I can tell you that it's
12 not seven existing --

13 MEMBER BRIGHAM: Well, I mean whatever
14 how many we have they're likely not to be enough.

15 MR. EDWING: I think in the Arctic is
16 defined kind of by the Aleutian Islands North,
17 there's a total of I believe nine inland stations
18 but that's, you know, there should be some
19 triangles down there along the Aleutians.

20 MEMBER BRIGHAM: So you think these
21 are temporary?

22 MR. EDWING: Some of them are; there's

1 Nome and Red Dog Mine along there.

2 MEMBER BRIGHAM: Yes, there is one at
3 Red Dog Mine; I've seen it.

4 MR. EDWING: Yes, there's a permanent
5 stations but I think those are just two of those
6 triangles seen it, the other ones must be --

7 MEMBER BRIGHAM: This one is at Nome.

8 MR. EDWING: Yes.

9 MEMBER BRIGHAM: This is at Kivalina
10 and the other may be temporary.

11 MR. EDWING: Right. So the others may
12 be temporary, but there's just Nome and Red Dog
13 Mine and Prudhoe Bay is the other permanent one.

14 MEMBER BRIGHAM: And the CORS stations
15 are, I'm pretty convinced are there.

16 MR. EDWING: Yeah. I'll have to defer
17 to Juliana on that.

18 MEMBER BRIGHAM: But again in this
19 corner of Alaska where we actually have marine
20 activity and the lease sites there are none, I
21 mean that's the point in this, I think in our
22 recommendation that we need in particular maybe a

1 site in Barrow and maybe Point Hope down here.
2 But in any way but of course the issue is those
3 systems, whatever they are could be seasonal
4 maybe but it's harder to do, if they're fixed it
5 could be the ice on the coastal whatever. But
6 the question does that here is an opportunity for
7 the Coast Guard maybe to if in fact you would get
8 funding to put the sites in maybe the Coast Guard
9 buoy tender fleet could actually help you build
10 the things wherever they might go so I mean,
11 there's a degree of cooperation.

12 Would it be expensive? Most certainly,
13 because these sites are going to be reinforced to
14 withstand the winter ice in the Chukchi Sea. but
15 they're necessary. Co-locating CORS and so I
16 think a recommendation from us, HSRP, is that
17 girth of observations here needed in fact to give
18 us the right information for the current marine
19 use that we have when they're drilling out there.

20 Anyway that's the general point. We
21 didn't tell you in our recommendation how many,
22 it's for all you to figure out. I mean, but

1 there are some locations particularly in the
2 northwest coast of Alaska where they really need
3 to have tide information anyway. Next slide.

4 And this question from NOS is a good
5 one, it's hard to answer again with the realities
6 of shorter navigation season, meaning, you know,
7 it's only seven months, eight months of ice
8 cover, so really just a three month season of
9 surveying, and the mobilization cost to doing
10 that, what are the realistic annual targets and
11 percentage surveyed and charted over the next
12 five years in the Bering Strait, and then what's
13 the potential for deep draft ports and harbors of
14 refuge, and how does that play into this
15 question?

16 And we don't answer the question
17 because one thing we have to define is if you're
18 going to come up with the percentage what is the
19 United States Maritime Arctic, and many of us
20 would say well, it's the Aleutian chain all the
21 way to the Canadian/U.S. border and the Beaufort
22 Sea. But is that what we really mean? Likely

1 not, it's what's ice covered from maybe even the
2 Bering Strait to cover this northwest coast and
3 then the northern coast of Alaska, so in order to
4 get a percentage are we talking about the whole
5 of the United States Maritime Arctic, which is a
6 pretty large number, or are we just talking about
7 a small area, or in fact are we talking about
8 just the highway, the voluntary corridor, so
9 there are a lot of questions about what are we
10 talking about as far as the area to be defined,
11 and I think we need to maybe discussed that a
12 little bit -- HSRP -- to provide better guidance,
13 to you Admiral, on what are we talking about.

14 But anyway, talking with Andy and
15 others in the team we said well, here's a guess
16 at what we could do, and it's a little bit
17 similar to what we do now under the current
18 physical constraints we have so we do recommend
19 in the end this 500 square nautical mile annual
20 survey target, and if you look at, you know, a
21 ten year plan or so, it's roughly then you get a
22 little less than 6,000 square nautical miles,

1 that's a pretty good number but it takes ten
2 years to get and how do you split the number and
3 so we said well, some of it's the corridor and
4 the access route that the Coast Guard and
5 presumably the nation wants for voluntary, but
6 then some is for the approaches to the lease
7 sites, some approaches to Nome as the new Arctic
8 port, and then this approaches to the refuge
9 areas and the refuge area themselves, so this is
10 components.

11 Now, I didn't speak at all to the
12 issue I think is missing in this, is the corridor
13 around the coast in the shallow waters for all
14 the tug and barge traffic, but that could be in
15 there -- if it's a higher priority issue, that
16 could be in there as well. Next slide.

17 So our recommendation is pretty
18 straightforward, and maybe we should have
19 recommended twice as much or maybe three times as
20 much, but the realities are in the current
21 situation we thought maybe 500 nautical square
22 miles. And maybe were doing more this is season

1 than this number but over the long haul this is
2 at the current budget, even though you've re-
3 budgeted do to some of this, maybe this is
4 doable, but is it good enough for the whole of
5 the place? Likely not, but it's within the
6 budget constraints. And we also say that if in
7 fact there was new money then NOAA needs a plan
8 and OIS needs a plan to execute with this new
9 money to get a higher annual survey out of the
10 system. Next slide.

11 The question is a little bit lengthy
12 but it's looking at that NOS has asked us
13 alternative strategies to Arctic coverage other
14 than our current approach to full bottom coverage
15 what might be some recommended new and creative
16 approaches to partnerships, funding strategies to
17 increase gravity data, acquisition, develop
18 Alaskan geode models, install tide gauges and
19 survey for nautical charting.

20 Well, again this number of 1 percent
21 of the US Maritime Arctic is charted in modern
22 international standards, NOAA and NOS should

1 employ and explore all strategies. I mean most
2 of the Arctic we have no or minimal data, so we
3 ought to go after some information, recognizing
4 the inherent deficiencies of accuracy in all the
5 data, but we should have a strategy to get data
6 in places where there are actually no
7 information. But full bottom coverage is
8 absolutely necessary to the new Arctic port in
9 Nome, to the approaches to the lease sites and
10 other potential traffic, so there's this dilemma
11 of what's really has to be for bottom coverage
12 and I would think that the tug and barge traffic
13 might be one of those additional uses that
14 requires full bottom coverage because they go to
15 the coastline and they run some of the barges up
16 on the beach, they roll out a hose and they fill
17 up the tank, and that kind of operation in the
18 21st century is very interesting. I'll put it
19 that way.

20 Another issue related to this is the
21 use of new hydrographic survey tools of which NOS
22 is already -- we've heard about at this meeting

1 -- employing, ROVs and AUV's in shallow water and
2 coastal areas. I haven't heard too much about
3 satellite-derived bathymetry; it doesn't seem to
4 work too well. I know that NOS has had to
5 experiment I think Point Hope, somewhere trying
6 to use satellite information to look at a portion
7 of Alaska. Of course the clarity of the water is
8 all sediment-laden and not clear, so satellite-
9 derived bathymetry might not be the greatest tool
10 for Alaska, although some areas into the Arctic
11 Ocean even north of Barrow could be possible.

12 Crowd sourcing, we've heard about here
13 and the volunteer data collection, it would be
14 interesting if we could employ all that tug and
15 barge traffic, hundreds probably thousands now
16 are transits, hundreds of transits along the
17 coast if that sector of the industry could in
18 fact help us in crowd sourcing and getting that
19 information, it would be a huge information base
20 of which to have information in some areas where
21 there are minimal charting.

22 Certainly HSRP recognizes the great

1 work that both NOS and NGS has done GRAV-D all of
2 the coastal tide gauges and all the information,
3 and all that's driven and constrained all by the
4 funding limitations within NOS and within NOAA.

5 Next slide is the recommendations from
6 us to the administrator on this. One deals, the
7 first one with employing crowd sourced bathymetry
8 wherever, whenever, however, but at least
9 exploring the limitations -- understanding the
10 limitations and exploring how we can do that in
11 this very remote part of the United States
12 Arctic.

13 The second point relates to exploring
14 in more depth the relationship of the Sikuliaq,
15 the new ship that's operated by my university
16 owned by NSF, how is that part of the
17 hydrographic fleet and how can that be the United
18 States hydrographic fleet which it is, it has
19 multi-beam on it and a fine ship, can operate in
20 the ice, coastal areas, it can operate in places
21 where the Healy cannot, so how do we employ that
22 as a hydrographic ship of the United States? Part

1 of UNOLS is part of the government fleet, not all
2 by the science community, I'd like to think, you
3 know, the science community has this ship locked
4 up but there has to be time bought on that ship
5 as a hydrographic ship of the United States, so
6 more relationship with NSF on that and my
7 university. Coast Guard have integrated pretty
8 well, I think the Healy and the buoy tender fleet
9 up in Alaska into this system to capture some
10 data and any new polar icebreaker that's built in
11 the United States in the future that the
12 President talks about has to be a hydrographic
13 ship, hydrographic survey vessel of the United
14 States in some part because it, only that ship,
15 like the Healy will go places where no other
16 ships will go in the United States fleet.

17 And then finally maybe we should
18 explore -- NOS should explore this private sector
19 relationship with the tug and barge companies and
20 their hundreds of transits and the information
21 they might gain on those transits and be able to
22 crowd source it, whatever and have that database

1 in our own database for the whole area. Next
2 slide.

3 And then again, you probably can't
4 read all of the words, but how might NOAA think
5 about this region differently? Lots of marine
6 uses in the area and every one of those marine
7 uses needs base maps and geodetic information.
8 There is, interestingly enough, a lot of
9 attention and broad based interest -- private and
10 public -- in this region, so we should somehow
11 mobilize that interest. And this particular
12 recommendation is a good one, comes from Larry
13 May who is not with us from UNH -- he was out to
14 sea when he gave us this one - but it's a good
15 one that we really ought to maybe at the level of
16 the Arctic Executive Steering Committee have an
17 industry group that relates to the interagency
18 government group to address cost sharing, the
19 sharing of infrastructure and of course the
20 sharing of information and having a frank
21 exchange between the private sector and the
22 public sector at the highest level of the

1 strategic planners or thinkers on where the
2 United States is headed in this maritime arena.

3 And again the point of that the U.S.
4 Government again assume the responsibility for
5 the safety and environmental protection of the
6 northwest coast of Alaska when they applied the
7 map with all the leases on it, and yet the United
8 States Government has not provided the proper
9 funding for infrastructure; it's a reasonable
10 point. It shows you that the whole government
11 approach, which is the new kind of hallmark in
12 this town, doesn't necessarily work too well or
13 didn't the past. And so for infrastructure we
14 already have marine use well beyond the
15 proportional principal, and we have drilling
16 going on without the attendant safety net, which
17 of course Shell has to bring all of that
18 themselves which I guess is fine. Next slide.

19 By all recommendations expand
20 interagency private sector dialogue is one, and
21 then perhaps elevate the hydrography and charting
22 issue to the highest level of integration with

1 this Arctic Executive Steering Committee, I think
2 it's -- I would say when the President's
3 statement went out, we heard today that NGS --
4 the NGA director sent out a press release with
5 how they would respond, I know the Coast Guard
6 did when they saw the word icebreaker, the
7 Commandant put out his own press release on
8 explaining what the President said, what do we
9 want and I don't know -- have not seen a press
10 release from NOAA, and maybe there should be a
11 response.

12 Maybe there has been, but I'm not
13 aware of, and HSRP are not aware of that same
14 kind of response and maybe there needs to be an
15 action team within NOAA to actually respond to
16 the President's initiative here and talk right
17 now. Obviously you all gave information up the
18 chain and it made it to the top, but we do know
19 that two agencies have actually responded in kind
20 getting the ball rolling, and I think the
21 hydrography charting issues it's the time to
22 strike.

1 Last slide, and it's more of a summary
2 of things beyond hydrography and charting. I did
3 put hydrography and charting as number one here,
4 but all the other things, implementation of the
5 IMO public code, we all know a robust Arctic
6 Observing System, and that relates to what the
7 administrator told us yesterday, environmental
8 observations, environmental security, all of
9 that. Domain awareness, we've heard, SAR,
10 environmental response, obviously research and
11 exploration, and then this issue of the Alaskan
12 deep water port. So I'll finish there. We've
13 got a few minutes for discussion, I guess. Mr.
14 Chairman, Admiral.

15 CHAIR PERKINS: Thank you, Lawson.
16 Yes, and we have, you know -- to stay on schedule
17 we have about five minutes for questions.

18 VICE-CHAIR HANSON: Lawson, obviously
19 this is a very important issue to you. I
20 appreciate all the hard work on it. You brought
21 a lot of issues to the table, a lot of work to be
22 done from here on. And we talked about this

1 quite a bit, one of the things hearing you talk
2 about it, seeing your points, I think one of the
3 things that would be helpful because you do
4 mention inadequate funding about a dozen times in
5 there, is there a place to put in how much money
6 we need and maybe be more specific with it?

7 MEMBER BRIGHAM: Sure. I mean that we
8 would have to work with our colleagues in the
9 staff to come up with some rational numbers.
10 Sure, we could. I think our team when we were
11 doing this were kind of reluctant to put numbers
12 on it all.

13 VICE-CHAIR HANSON: Sure.

14 MEMBER BRIGHAM: Because we don't have
15 the background to do that, but if we wanted to in
16 our report, we could. But one serious issue,
17 that has to define what area of the United States
18 Maritime Arctic are you actually talking about?
19 Because that will drive -- I mean, putting two
20 tide gauges in ice-covered waters in the North
21 West Coast of Alaska would be millions, I think,
22 and then the operational cost for the Coast Guard

1 to do it, but maybe we could come up. I'm not
2 sure in our report whether that resolution is
3 necessary. We let the experts figure that out,
4 but you may be right.

5 VICE-CHAIR HANSON: No other
6 questions, but I know that Joyce has some,
7 though.

8 MEMBER MILLER: Lawson, I think about
9 half the panel that's here now was up in Alaska
10 when we were there last, and one of the things
11 that struck me was the rate of change in the
12 coasts. I mean, the tug and barge captains
13 talked about not knowing from one year to the
14 other what an approach would be. So, you know,
15 you were talking about what level of importance
16 charting for the tug and barge fleet would have,
17 and it just seems to me given the rapid change,
18 which was just amazing how quickly things
19 changed, is that something that's realistic in
20 terms of charting need? I mean, you'd have to
21 chart, re-chart every few years or every year. I
22 don't know.

1 MEMBER BRIGHAM: We can have them help
2 chart, right, and they would be there every
3 season and see the changes which are dramatic in
4 some areas, for sure. I mean, I think the crowd
5 sourcing is a start where we have no information.
6 You know, I don't know all the technical details,
7 but I know that that's information, and I am
8 always forgetting information where we have in
9 some areas none. We have some charts of course
10 along the coast for sure. What were the
11 standards when they were created? I mean I think
12 that there are some issues. Crowd sourcing is
13 not going to solve all of our problems in this
14 part of the world, but maybe there are some very
15 specific operations where it's routine, like the
16 tug and the barges. I think you could have a
17 relationship with Foss and Crowley and others.
18 It's a good point though, Joyce.

19 RADM GLANG: Gerd Glang, Coast Survey,
20 I'm wearing my coast survey hat, not my DFO hat.

21 Where do I start? We have quite a few
22 activities going on in the office, and so let me

1 just dive right in and describe them a little
2 bit. If you will recall what we heard from Vetus
3 Marine in particular during the Anchorage
4 meeting, they identified the issue with the
5 Western Alaska rivers, and they posed a challenge
6 for them because our charts were way out of date.
7 For instance, the Yukon River, the survey data is
8 from 1893, I think, and the reason we were going
9 up the Yukon to survey in the first place had to
10 do with the gold rush. So as I've said before in
11 public settings, the state of US charts in the US
12 Arctic, Western Alaska is a patchwork that
13 represents our national imperative, whether it
14 was economic or energy exploration-related or
15 some other natural resource.

16 Specific to the Western rivers in
17 Alaska we restarted the conversation with Vetus
18 Marine and several of the other operators. Well,
19 let me back up: after the Anchorage meeting,
20 there were several key places that were
21 identified including Kotzebue, Kuskokwim,
22 Nushagak, and Port Clarence survey and also, I

1 believe, Yukon. We did finally get Kotzebue
2 done. We did the Kuskokwim and Nushagak. I
3 don't live with got Port Clarence done, that was
4 scheduled for this year, but we didn't get there.

5 We had our navigation manager meet
6 with Vetus and with several of the other tug and
7 barge operators just several months ago, I think,
8 in mid-April, and we listened again and heard
9 their requirements. We also had our team that's
10 doing the research on satellite-derived
11 bathymetry take a look at what could we do with
12 the satellite-derived bathymetry as we now
13 produce it to generate a provisional product, and
14 since we know that the LANDSAT satellite imagery
15 is reflown, it's the same place on a rate of
16 about I think it's once every two weeks give or
17 take, not every pass over a particular place is
18 going to produce a useful image, but that's
19 pretty high-frequency. We also know there are a
20 lot of limitations for what you get out of the
21 satellite-derived bathymetry as far as accuracy,
22 are you actually able to see an interpretation of

1 the bottom, or is it an interpretation of
2 something in the water column?

3 So what we've done is we're preparing
4 to release an electronic navigational chart, so
5 this chart will only exist in ENC form, not in
6 paper, and that's part of our internal policy. I
7 believe it's a one to 90,000 scale chart for the
8 Yukon River, which we are going to call a
9 provisional chart, and it's going to be
10 bathymetry based on satellite-derived bathymetry,
11 and working with NGS, the remote sensing
12 division, will have the latest but best available
13 shorelines. It doesn't necessarily meet all of
14 our title control requirements.

15 We are going to produce a provisional
16 ENC here. We want to get that in the hands of
17 the tug operators this fall before the freeze up
18 so they can at least try it out. The ENC format
19 is compatible with the software they use. And
20 then building on that, we're starting to talk
21 about how do we operationalize this? How do we
22 grow some confidence in a provisional satellite-

1 derived chart? So we do want to do some real
2 hydrography to help validate what we're seeing.

3 I mentioned in my introduction
4 yesterday my update that we've done some of that
5 already up off of Barrow, and we already ran into
6 some limitations. The second point has to do
7 with the crowdsourcing and how we can empower,
8 for instance, the tug and barge operators or any
9 other near coastal operator who is interested in
10 logging depth data and sharing that data as a
11 volunteer spatial observation. So we had a demo,
12 a pilot project; one of our very smart people
13 demonstrated that a common software program
14 that's used by many of the small boats, small
15 vessel operators to navigate with, that it's
16 really easy to interface echosounders with that,
17 and so the next phase of that project, so we've
18 got the feasibility piece out of the way, the
19 next phase of it is to actually talk with the
20 software vendor and see if they would be willing
21 to incorporate some of these changes. And then
22 the hope is that we will have the source of data

1 from these volunteer observers.

2 I talked yesterday about the in
3 between piece that I'm really keen on getting
4 that database established so that there can be
5 some organization for what could potentially be a
6 great deal of data. So I think on several of
7 your points, we're already taking action. It's
8 unfortunate that the way we have to interact with
9 the panel is so limited. Otherwise, you may have
10 known some of these things, but I just wanted to
11 make you aware of specific to the Western Alaska
12 rivers, in this case the Yukon, we do have a
13 provisional product. It's going to demand some
14 policy changes on our part; that's why I'm using
15 the word provisional again. And again, and then
16 we're looking at how do we validate what we get
17 out of, for instance in this case, satellite-
18 derived bathymetry. So I thought I'd give you
19 that update in a public forum because I know many
20 of the folks do listen from that part of the
21 world. Thanks.

22 MEMBER BRIGHAM: Yes, before you came

1 in, Admiral, I mean I did say that were trying to
2 answer these questions, and it's not to denigrate
3 what everyone's doing or not doing; it was to
4 give kind of high-level recommendations, many
5 that are lower level ones maybe the NOS but
6 others to other elements of the government, to
7 the administrator, so you asked us these very
8 difficult questions to answer, and we didn't
9 answer many of them the way you might have
10 expected, but maybe there are no answers to some
11 of the questions or not good answers, but this is
12 our attempt.

13 But I hear you that there are lots of
14 things going on in our relationship, your
15 relationship with IHO in the US being in the lead
16 of some international efforts is quite far
17 advanced, so there's a lot going on that's
18 positive, but maybe not as much interagency,
19 whole of government approach from an HSRP view of
20 relationships to help in this particular area.
21 But the other issue is the President of the
22 United States has spoken on very specific issues,

1 which maybe FDR did, who knows? But we have an
2 opportunity here at this moment to strike when
3 the President wants to do something in his
4 budget. So hopefully he'll tell OMB to move
5 ahead on these initiatives.

6 RADM GLANG: So let me respond to that
7 real quick, Lawson. I think that's a great point
8 that coming off the White House's announcement on
9 some of these issues in the Arctic that you see
10 that NOAA has an opportunity, and I would
11 recommend that the panel provide that feedback in
12 the most immediate way, and we heard from Vice
13 Admiral Brown. He's happy to receive an email
14 from the panel when the panel regards it as
15 appropriate. So I would suggest if the iron is
16 still hot, we should strike at it, or the panel
17 should strike at it, and that's the kind of thing
18 that can be communicated more immediately to the
19 Vice Admiral through email rather than through
20 our very bureaucratic written letter process.

21 I do have one quick practical
22 question, and you can answer me later. On the

1 places of refuge, I'd like to know how these are
2 identified and who the authority on those are,
3 and we can maybe have the EAP come back to us at
4 a later time on that.

5 MEMBER BRIGHAM: Well, I am pretty
6 certain it's the US Coast Guard, but the
7 identification of them, even the Coast Guard
8 would need some help I think because of the
9 refuges and all of the other now complexity of
10 marine use and well, what you saw on the map
11 requires a lot of agencies to get involved in
12 this. Because if we're going to take that
13 leaking tanker to the wildlife refuge, I don't
14 think that's going to work.

15 I mean, I'm being a little cynical
16 here, but the practical issues are where are -- I
17 mean the Coast Guard is going to have a tough
18 time identifying places that you can then survey
19 to make them safe as this harbor of refuge, which
20 is a good question. We can explore it more.

21 RADM GLANG: Well, the converse is true
22 also. If there's an area that they don't

1 absolutely want anyone to go into with a leaking
2 tanker, do I have that information on my chart?
3 Am I showing the right kinds of limits?

4 MEMBER BRIGHAM: Exactly. I guess the
5 intent of our group is to get some consensus
6 among the HSRP members and draft this thing and
7 send it up the chain, but I would say for Admiral
8 Brown maybe, if I was him, I'd have an action
9 team at his level to respond to the President's
10 initiative here from the fact sheet that you
11 provided information to, and Dr. Sullivan should
12 respond with some sort of press release and an
13 action on it. That's what I personally would
14 recommend, but we can get that out of the maybe
15 consensus discussion among the HSRP as an
16 immediate thing to just send up an idea.

17 CHAIR PERKINS: Okay. I know Dr.
18 Kudrna is a question, and we do have a question
19 that's been submitted electronically online from
20 a virtual participant, so if we can get those two
21 questions and then finish with Dr. Jeffress, then
22 we could go on to the public comment period so we

1 don't keep the public waiting due to our
2 inability to stay on schedule.

3 MEMBER KUDRNA: Good. Well, a very
4 good report, and I agree with both you and the
5 Admiral that there's an opportunity with the
6 President's initiative on the Arctic. I guess
7 the concern I would have is that based on
8 everything we heard about budget and budget being
9 tight, if you look at everything in here, this is
10 a pretty massive amount -- a shopping list of
11 items to do. Do you think it would be of value
12 to have an initial step recommendation that might
13 mean practical to be adopted by the
14 administration to go forward, identifying what
15 first step at some more modest pricing level
16 could go forward?

17 MEMBER BRIGHAM: The President signed
18 the national strategy for the Arctic region. It
19 has one thing in it: it has chart the Arctic
20 region. I think that's it. It didn't say
21 environmental observation to do whatever,
22 security, whatever. It says chart the Arctic

1 region. The reason why it's in there is because
2 the National Security Council wrote that
3 document. It was a Coast Guard officer who
4 actually drafted it, and many of us said we need
5 some charts for this maritime region, and it got
6 in there, and I would say he needs to maybe
7 advise OMB to put a line in his budget: chart the
8 Arctic Ocean, chart the US Maritime Arctic in
9 some way, in some level in the budget, and then
10 the Hill can deal with it. I think they would go
11 along with it, but who knows. That would be my
12 way, but maybe the other members would have
13 another view.

14 CHAIR PERKINS: Great. Can we get the
15 questions submitted electronically online, on the
16 screen? Would you mind reading that, Lawson?

17 MEMBER BRIGHAM: Yes, in question
18 four, you discuss a survey season and using two
19 NOAA ships and a contracting vessel, I think for
20 Nome is what we had talked about. Have you been
21 able to conduct surveys through entire three
22 months or hampered by money to operate wholly?

1 Amy McElroy. Maybe the Admiral right. I am not
2 sure I have the background and information to
3 answer that, or Andy might have a thought about
4 it. Go ahead, Admiral, please.

5 RADM GLANG: Thanks. Gerd Glang from
6 Coast Surveys. So in question four, Lawson
7 Brigham identified that for the FY15 field
8 season, we were using two NOAA ships, the Rainier
9 and the Fairweather and a contractor, and that's
10 correct. That's what we planned to do, and that
11 is what we did in fact. Have you been able to
12 conduct surveys through the entire three months?
13 So we were not hampered by money per se; the sea
14 days were allocated for the Rainier and the
15 Fairweather to operate in the Arctic region.
16 Where we were hampered whereby unanticipated
17 breakdowns, repair issues and to a lesser extent
18 by staffing challenges. But mostly these were
19 maintenance related issues that forced the ships
20 to not be able to operate entirely the whole
21 time. But in general, we did okay, all things
22 considered. If you'll recall from yesterday's

1 presentation, of the planned 500 square nautical
2 miles, I think we accomplished over 800 in the US
3 Arctic. So not all that we wanted to get done
4 but pretty darn good.

5 MEMBER BRIGHAM: Would you anticipate
6 in the future longer seasons of survey? With the
7 retreating sea ice into the Arctic Ocean.

8 RADM GLANG: I think it depends on
9 where, so, you know, we planned to get the
10 Rainier and Fairweather up into Kotzebue Sound as
11 early as possible, and they were monitoring the
12 ice coverage, and in fact, the ice didn't clear
13 out of Kotzebue Sound until like mid-June, and
14 the ship showed up a week after that, something
15 like that. I mean, they were watching it week by
16 week. Fortunately, they were working a project
17 on the other side of the peninsula, and they were
18 pretty much able to duck over there as soon as
19 their schedule let them. So I wouldn't
20 anticipate it necessarily getting longer, but we
21 do have things, the information like what we get
22 from our ice, satellite ice imagery with analysis

1 on thickness and how it's moving, and that's
2 great intelligence to tell us how soon can we get
3 up there.

4 MEMBER BRIGHAM: I was just thinking
5 over the next ten years and a strategy for ten
6 year period of surveying that clearly in the
7 autumn, it would probably be ice-free into
8 November or the end of November, maybe December.
9 So the season operating --

10 RADM GLANG: As the season gets
11 longer, theoretically.

12 MEMBER BRIGHAM: Theoretically.

13 RADM GLANG: Then we can plan to be up
14 there longer. The planning of sending any of our
15 ships anywhere occurs two years in advance, and
16 when you actually get to that year, then there's
17 still the question of did you get the money
18 allocated for the days at sea? Sometimes yes,
19 oftentimes no. Is the ship repaired and ready to
20 go; is it available? And is it staffed and ready
21 to go? And all three of those things have to
22 align and often don't until, you know, right

1 about the time you're ready to leave.

2 And also I would caution that in ten
3 years, the likelihood of the Rainier and
4 Fairweather still being operational is extremely
5 slim, so we may be losing the capacity, the
6 internal NOAA capacity unless we recapitalize
7 those ships.

8 MEMBER BRIGHAM: It puts more onus on
9 the use of the Healy, use of the Sikuliaq, the
10 use of whatever new icebreaker we get.

11 RADM GLANG: I think we have to set
12 the expectation here though, Lawson, that while
13 equipping Coast Guard vessels with hydrographic-
14 capable systems seems like a prudent idea because
15 they can acquire, and they have proven that they
16 can acquire at least track line bathymetry
17 incidental to their other missions, hydrography
18 is not a primary Coast Guard mission, I believe.
19 And so we could be running afoul of their primary
20 purpose, so we really, you know -- while there's
21 capacity there, and we can figure out how to
22 leverage it, am I going to be able to ask a

1 smaller Coast Guard vessel to survey near shore
2 in Alaska? Right now I don't believe that's
3 possible. Certainly working in the margins of
4 their other missions when they're attending
5 navigation aids, we've proven that the data that
6 they acquire in a reconnaissance mode to place a
7 navigation aid, we can use that. The data they
8 acquire your during their transit to a particular
9 place for their primary mission, we can use that.
10 In the case of the Healy, using that as a primary
11 platform for surveying is certainly possible, but
12 we would also have to be prepared to pay for
13 those sea days.

14 MEMBER BRIGHAM: The buoy tender fleet
15 of course in Alaska there are no aids to
16 navigation to work. There are couple shore aids
17 at a couple hundred miles apart, so there aren't
18 any aids up there, so the buoy tender fleet is
19 really out there for law enforcement, whatever
20 search and rescue, operating around the lease
21 sites to support whatever. I would bet that you
22 could carve out time to do some coastal

1 surveying. I'm just suggesting --

2 RADM GLANG: Yes. And so we have to
3 work on leveraging whatever time is there
4 opportunistically, absolutely. They did a great
5 job running some reconnaissance for us in
6 Bechevin Bay, for instance, and that was actually
7 a contractor-assigned survey. We had
8 reconnaissance data from the Coast Guard in
9 Bechevin Bay as well as satellite-derived
10 bathymetry, and that fusion of information really
11 helped execute a survey very quickly and
12 efficiently.

13 MEMBER BRIGHAM: But if we build this
14 new icebreaker, whatever it is, and it's to
15 operate year round, what the President says in
16 the Arctic Ocean, then that kind of capability is
17 unusual and will allow -- the ship has to be a
18 hydrographic ship at the highest order as well as
19 an icebreaking ship.

20 RADM GLANG: One little wrinkle in
21 that then is it would be my understanding that
22 the Coast Guard would expect NOAA to help fund

1 the purchase of that equipment and potentially
2 staff it. So there is a little bit of resource,
3 something --

4 MEMBER BRIGHAM: Oh sure. Oh sure.
5 But if we're going to use the whole government
6 approach, it would seem that if we get this
7 billion dollar machine or more that can operate
8 year round in the Arctic Ocean, that it could do
9 -- I think we're saying the same thing.

10 RADM GLANG: But I think from a
11 policy point of view, I would really be concerned
12 about in a whole of government approach that NOAA
13 asks the Coast Guard to undertake a hydrographic
14 survey, which is a systematic and controlled
15 survey. We would have to come a long way on
16 understanding the implication of that, and I
17 believe the private sector would probably set up
18 a howl of protest on that as well.

19 MEMBER BRIGHAM: Sure, using the Aiviq
20 or another ship that could be a commercial
21 icebreaker, sure. A great opportunity.

22 CHAIR PERKINS: Dr. Jeffress, if you

1 could as the last question for this session
2 please. MEMBER JEFFRESS: It's more
3 of a comment rather than a question, but I'm just
4 following up on what Joyce said about the radical
5 change on the shoreline along the northern coast
6 of Alaska. Last week, The Economist newspaper,
7 which is in an international paper, picked up on
8 the President's visit to the Arctic and commented
9 on the human side is that there's a fair number
10 of villages up there on the coast that need to be
11 relocated as a result of the shoreline change,
12 and the estimates are that about \$400,000 to half
13 a million dollars per person to relocate those
14 villages. And neither the state of Alaska nor
15 the federal government has a budget to do that.

16 MEMBER BRIGHAM: Just one thing, could
17 the members of the EAP just raise their hands who
18 participated in all our discussions so the public
19 might know that there was -- and Larry you were
20 part of it. So we had a good team, thank you,
21 great. And then we had the information, of
22 course, Ashley helped us immensely with the

1 internal information, so a good team effort.

2 Thank you.

3 CHAIR PERKINS: Well done. This leads
4 us to the public comment period. We're about 15
5 minutes behind schedule on that, so I do
6 apologize to anyone either online electronically
7 wishing to participate in the public comment
8 session or anyone in attendance here in the room.

9 MR. PESCHEL: Good afternoon, Rudy
10 Peschel. I'm retired Coast Guard and an Arctic
11 groupie. While you people were in session
12 yesterday hard at work, CSIS, the Center for
13 Strategic and International Studies, hosted
14 another Arctic event where the audience was
15 thrilled to listen to Dr. John Holdren, the
16 President's science advisor, who presented an
17 awesome PowerPoint of the few weeks that the
18 President spent in Alaska, and the slides from
19 yesterday's presentation will be online through
20 both his website and CSIS's website, and it might
21 be good for all of us to absorb all the
22 information that that portrays before we go into

1 further consideration of what you've been
2 speaking about today. Thank you.

3 CHAIR PERKINS: Thank you, sir.

4 MR. FERRELL: Hello, I'm John Ferrell,
5 from the US Arctic Research Commission, and I
6 have a question about the report we just heard
7 from Lawson Brigham. Lawson, I had a question
8 for you about your committee's report, and I was
9 just wondering from a public perspective, I think
10 the public was pretty shocked when the Fennica,
11 being driven by an experienced pilot, right
12 outside of Dutch Harbor, major port in the
13 Aleutians hit the shoal, ripped a large hole in
14 an icebreaker hull, and yet we presume in the
15 general public that this is a well charted area.
16 Did that incident at all color the
17 recommendations that you put into your report?

18 MEMBER BRIGHAM: Well, just a timely
19 piece of information, I guess. I think the
20 Admiral might answer to the issue of how was that
21 surveyed, the area where they ran aground, but
22 sure it's an issue. If you can happen in Dutch

1 Harbor, it can happen off Point Hope, it can
2 happen in the area off of the lease sites where
3 there are very minimal information, so who knows
4 if there's some sort of sea mound or something
5 there. I mean, we don't really know. I mean,
6 maybe we do, but not 100 percent certainty that
7 we know in the area of the lease sites what's
8 there and the approaches. So it's a good example
9 of what can happen. Now, I would say from my
10 experience of being an icebreaker captain, that
11 any other ship might be at the bottom there. I
12 mean, you know, the thickness of the hull of the
13 Fennica is an inch and a half or 2 inches thick
14 and still had a 20 foot gash and had to go to the
15 shipyard. It's just remarkable for the kind of
16 ship that it is, so obviously doing whatever
17 speed, and it came to a quick halt, and anyway --
18 no, we took that into account. It's timely; it's
19 relevant.

20 MR. FERRELL: Thank you.

21 RADM GLANG: Gerd Glang from Coast
22 Survey. So the NOAA ship Fairweather surveyed

1 the area where the Fennica went aground, and
2 indeed we found several depths that were shoaler
3 than what the chart showed. The soundings that
4 the chart showed in that area were based on a
5 1935 lead line survey, visual control, so while
6 the point soundings from the lead line may have
7 been okay and certainly met the standards of the
8 day, it's what was it between those lead line
9 soundings. So that said, if you look at all of
10 Alaska in particular and the vintage of the
11 charts, the vintage of the hydrographic surveys
12 that underlie the charts, it is a patchwork that
13 represents 100 or 150 years of effort, and
14 certainly the technology has changed.

15 I think most important for the program
16 was our realization how much the usage of that
17 area has changed, and it's understanding that
18 change in usage that certainly needs to be
19 driving our survey requirement priorities. We
20 just had that Mayor of Unalaska come visit this
21 morning, and I haven't heard back how that went
22 but we're certainly concerned about where the

1 priority for Dutch Harbor is, and I'm pretty sure
2 we've moved that priority way up.

3 On the other hand, when you have
4 limited resources, you know, it's a little like
5 Whack-A-Mole, do I survey here or there? And how
6 do I decide? And that's partly one of the
7 questions that we put to the panel, and you heard
8 Lawson's group, how do I decide what criteria?
9 Do I survey here or there? So it's dynamic, the
10 input that we get, understanding change in use is
11 particularly important, and we're open to
12 receiving more input on maybe we should survey
13 here and not there.

14 CHAIR PERKINS: Were there any online
15 questions? Okay, great.

16 MR. MITCHELL: Todd Mitchell with
17 Fugro. So I know that what we're really talking
18 about here is trying to find a way to grow the
19 pie in the minds of OMB and Congress and Senate.
20 Does it make sense, is it within the realm of
21 possibility to subdivide what we are doing in the
22 Arctic as part of our charting mission away from

1 the backlog in order to demonstrate this is the
2 amount that's being allocated? This is a
3 rallying point for the House, the Senate and OMB
4 to say yes, we do believe in that as a priority,
5 and we see that it separate from what has been
6 traditionally dubbed backlog? I'm not sure if
7 that's one thing that we can create, if that
8 needs to be through the House or Senate to change
9 that as an appropriation, but maybe that's an
10 avenue.

11 CHAIR PERKINS: Thank you, Mr.
12 Mitchell. That's a good question, and I think
13 that's consistent with the discussion, part of
14 the discussion we had with subcommittee member
15 Jeremy Weirich from Senate appropriations
16 yesterday and Dr. Sullivan. So, you know, I
17 think that's a topic that the panel, you know, is
18 definitely going to take under consideration and
19 see whether we have consensus on how we formulate
20 a response, you know, of that nature. So thank
21 you.

22 If there are no further questions,

1 then we're at the point of adjourning the public
2 meeting. The panel has travel ahead of us, so we
3 have a trip northward to the Linthicum, Maryland
4 to the MITAGS Institute, so some practical
5 exposure and hands-on learning and fellowship is
6 ahead of the panel for this afternoon. I want to
7 thank everyone on staff, want to thank the
8 participants online, and those of you in the room
9 who attended in person. So we will conclude day
10 two.

11 (Whereupon, the above-entitled matter
12 went off the record at 2:57 p.m.)
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In the matter of: Hydrographic Services Panel

Before: NOAA

Date: 09-17-15

Place: Silver Spring, MD

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