**Meeting Summary
Hydrographic Services Review Panel
April 18 - 20, 2017
Seattle, WA**

*Tuesday, April 18, 2017*

On the call of the Designated Federal Official (DFO), Rear Admiral Shepard M. Smith, NOAA, the Hydrographic Services Review Panel (HSRP) meeting was convened on April 18-20, 2017, at the Kimpton Hotel Monaco, Paris Ballroom, 1101 4th Avenue, Seattle, WA. The following report summarizes the deliberations of this meeting. The agenda, presentations, and documents are available for public inspection online at

<http://www.nauticalcharts.noaa.gov/ocs/hsrp/meetings.htm>

Copies can be requested by writing to the Director, Office of Coast Survey (OCS), 1315 East West Highway, SSMC3, N/CS, Silver Spring, Maryland 20910.

 **Welcome and Meeting Overview**

**Bill Hanson, HSRP Chair**

The meeting was called to order at 8:32 a.m. Chair Hanson welcomed the attendees and called for introductions of those present. RADM Smith provided opening remarks and acknowledged the representatives of elected officials. He recognized the NOAA technical experts present and encouraged the Panel to take advantage of their expertise over the course of the meeting.

Russel Callender, Assistant Administrator, NOS, delivered the oath of office for HSRP member Lindsay Gee.

**Russell Callender, Assistant Administrator, National Ocean Service**

Dr. Callender discussed the current dynamics in federal government that are relevant to the HSRP and touched on some of his outreach to the broader community. NOAA leadership will continue to look to the HSRP for help improving and advancing its navigation-related programs and services. NOAA is working through the uncertainty and fluidity around funding and priorities that come with a new administration. The White House has released a preliminary budget proposal for FY2018 which emphasizes national defense, border security and immigration. This budget seeks to fund those priorities by moving money from the discretionary budgets of other agencies, including NOAA. Further details are expected to be released in late-May or June. Some of the language included in the “skinny budget” points to the value of the surveys and mapping work NOS does. This acknowledgement is a good window into the President’s priorities.

Wilbur Ross has been confirmed as the new Secretary of Commerce. He is focused on trade-related issues and has expressed an interest in streamlining offshore aquaculture. The Secretary and the two other new NOAA appointees have some understanding of the value of NOS’ products and services to commerce and the nation, but much work remains to get them up to speed on the HSRP’s issues.

Dr. Callender thanked the HSRP for their work on the issue papers, which have been extremely valuable during the transition. NOS has reviewed its top line priorities to find ways to better communicate the value of their work, particularly in economic terms. These priorities are:

* Safe and efficient transportation for commerce;
* Preparedness and risk reduction; and
* Stewardship, recreation and tourism.

Dr. Callender discussed his engagement efforts conveying these priorities and their value to constituents, stakeholders and partners, including significant outreach to members of Congress whose districts include major ports. The maritime commerce portfolio has resonated extremely well with majority members in Congress. NOS’ work will be very valuable as the country looks to invest in modernizing its infrastructure. NOS’ mandates remain unchanged, but the way they do business must continue to evolve.

**Guest Speakers**

**Joshua Berger, Governor’s Maritime Industry Sector Lead, Washington State Department of Commerce**

Mr. Berger, on behalf of Governor Jay Inslee, welcomed the HSRP to the State of Washington. The maritime industry plays a central role to the state’s diverse and strong economy. The working waterfronts are sources, not only of good jobs, but of technological innovation and resilience. The Industry Sector Lead Program is made up of representatives from the top seven economic sectors in Washington who serve as liaisons to the governor’s office, state legislature and state agencies, as well as to federal partners. Their mission is to grow and strengthen communities by promoting a strong business climate in the state through targeted, high demand industry sectors that focus on strategic economic development efforts. The maritime industry is the third largest economic driver in Washington, responsible for more than $37 billion in combined economic impact, 70,000 direct jobs and ultimately impacting approximately 190,000 jobs. The Washington Maritime Federation works to coordinate across the diverse and interdependent industry and to identify top priorities that can be communicated in a single voice. Washington State also plays an important role in the changing Arctic. While income inequality is growing across the state of Washington, the maritime industry offers important access to living wage jobs. In addition to training and educating Washingtonians for maritime careers and providing professional development, the state is working with the U.S. Department of Labor on the Military-to-Mariner transition program. Washington views itself as a global leader in maritime technology innovation and best management practices and has developed a long-term strategy for continuing their leadership role, particularly in regards to clean technologies.

**Captain Jason R. Hamilton, Commanding Officer, USCG Cutter *Healy*, U.S. Coast Guard**

CAPT Hamilton provided a user’s perspective on how NOAA’s tools and services have been a force multiplier for users in the Arctic. The USCG polar icebreaking fleet consists of two ships, CGC *Healy* and the heavy icebreaker *Polar Star*. The *Polar Star* is 40 years old, ten years beyond its intended service life. While the *Healy*’s primary mission focus is to support National Science Foundation objectives, at all times the USCG is conducting each of their 11 of their mission sets. NOAA’s charts are critical for the work the Coast Guard does in the Arctic. The ship’s multibeam echosounder does an exceptional job providing 3D maps and background information. This is essential given that only 3% of the Arctic marine corridors have been surveyed to modern standards. Data collected from the various kinds of equipment onboard are uploaded to national repositories and made available to the scientific community upon request. The *Healy* has conducted multiple bathymetric surveys of the proposed Bering Transit Corridor, collecting over 5,000 miles of data, looking to minimize risks to mariners in the seaway. USCG intends to present on the proposal to the IMO in 2018, though diplomatic and legal issues remain.

**Lieutenant Colonel Andrew L. Olson, Deputy Commander, Seattle District, U.S. Army Corps of Engineers**

Lt. Col. Olson discussed the USACE’s navigation mission in the Seattle area and its interdependence with NOAA. The Seattle District navigation program includes maintaining 23 active channels that support several ports and performing hydrographic surveys. Due to operating under a continuing resolution, the work the District is able to plan on performing in FY2017 is limited to routine dredging. The cost of dredging has gone up in recent years while the funding for it has not; other constraints also make dredging efforts more difficult, such as those regarding beneficial reuse of dredged material and protected species. Lt. Col. Olson proposed eHydro as a potential low-cost solution for providing valuable, timely and quantitative survey data. The data generated by USACE is limited to what is collected in support of federal channels, but is incorporated by NOAA in their chart development. Survey data from the last five years for high and moderate use ports have been posted; USACE is currently working on smaller ports and expects to post a complete collection of all their survey data in 2018. USACE’s navigation mission is becoming more critical as larger ships, such as the *Ben Franklin*, are entering Seattle’s ports. USACE Seattle sees a need to increase clearances and increase knowledge of bottoms to ensure safe and efficient navigation. Lt. Col Olson discussed the Seattle Harbor project that seeks to increase the authorized depth from its current 34’-51’ to 57’. A final feasibility report and environmental assessment are anticipated to be released in spring 2018. He also spoke about the successful collaboration of USACE, USCG and NOAA after a rock barge sank in the Hylebos Waterway in 2015. The effort highlighted the benefit of electronic management of navigation and charting information.

**HSRP Q&A**

Member Perkins asked CAPT Hamilton if he felt onboard unmanned aerial vehicles would be a solution to getting the remote sensing data necessary for navigating the ice more efficiently or if dependency on satellite remote sensing would be most cost effective. CAPT Hamilton said both are needed. Satellites are helpful in looking far ahead while helicopters have been used for a closer tactical view over the ice. The Coast Guard is currently looking at what unmanned aircraft systems to use, but shutting down satellites is probably not an option.

Member Brigham asked about having two charting agencies of the U.S. and how the release of eHydro data correlates with the NOS process. Kym Anderson, USACE Seattle District, said the nexus of multiple data sources is something USACE is addressing with NOAA and with its pilots. It is currently the user’s responsibility to look at the survey’s release date to ensure they have the most recent information. Travis Newman, OCS, added that USACE Districts each have their own processes for getting their data onto charts. Member Saade asked if industry or the public are able to access the data. Ms. Anderson said that the public and industry can pull information from eHydro, but not feed anything into it. Member Saade asked if there was any reason not to consider opening input capabilities beyond federal agencies. Member Perkins asked if eHydro has reached the point where it can be rolled out to further beneficial use. He also asked if its community of practice has expanded and if it can be applied to inland uses. Ms. Anderson said that the current focus is on getting the collected information into the system and once that milestone has been reached, USACE intends to address expanding the user base as well as other mechanisms that could be developed to advance its usefulness.

**Navigation Services Program Updates**

**Rich Edwing, Director, Center for Operational Oceanographic Products and Services**

Mr. Edwing provided updates on the CO-OPS program and discussed progress on their strategic plan, which has been in place since FY2014. The four primary goals of the strategic plan are:

* Demonstrate a customer-centered operating model that responds to emerging customer requirements and feedback;
* Develop one cohesive observing system with integrated products and services that are responsive to evolving customer needs;
* Continually improve and evolve CO-OPS products and services to meet customer needs and keep pace with rapid changes in requirements, technologies and media; and
* Align the organization’s workforce, resources and infrastructure to consistently deliver high-quality and cost effective products and services.

CO-OPS has expanded its customer base and developed an engagement strategy guide for future efforts. CO-OPS has begun extensive outreach to users in the Gulf of Mexico, including a successful modeling workshop. Closing the gap between NOAA models and USACE river models has been identified as an unmet need in the region. CO-OPS has established a technical assistance and training capability with a dedicated staff member responsible for training and developing training materials. Online surveys show 77-79% customer satisfaction over the last three years. GIS capabilities have been added to the website and a new homepage has been rolled out to improve navigation of the site. Website updates will continue to improve product integration and functionality.

CO-OPS has been working with partners on NWLON enhancement and filling gaps. Working with NGS, they have co-located CORS at some of the NWLON stations to help tease out the land motion for sea level rise information. They have also completed a low-cost tide gauge study. Future priorities include local-to-national integration of networks, implementing their tiered data policy and assessing commercial interest in low-cost tide gauges. CO-OPS has put a pause on PORTS expansion because they are out of capacity to take on more; they will still make improvements to existing PORTS. CO-OPS hopes to get PORTS data integrated into AIS soon and develop a sustainable business model for the system, as well as monetize its value for the new administration.

CO-OPS is revising their 5-year plan for tidal current surveys due to budget considerations. They have made good progress on the microwave water level transition, and iridium Aids to Navigation have reduced the cost of the AtoN system dramatically while increasing reliability. CO-OPS is looking to apply regional sea level rise trends and scenarios to their products and continue Dashboard enhancements. They are enhancing their system to be able to process Tier B and Tier C standard data. Mr. Edwing also discussed human capital efforts within CO-OPS to improve diversity and inclusion, training, recognition, onboarding and communications.

CO-OPS has received an exponential increase in demands for water level information. In some cases, these requests open opportunities for partnerships that could contribute to filling gaps in the NWLON system. Partnerships continue to present challenges due to different kinds of hardware, software, formats and levels of understanding. Mr. Edwing presented CO-OPS’ partnerships for data collection, product development and distribution, which lead to the societal benefits of safe and efficient ports and coastal preparedness. Of CO-OPS’ appropriated funding, 30% goes to contracts, 5% is used to buy equipment and 65% goes to salaries, rents, telecommunications, etc. Of CO-OPS’ reimbursable funding, 80% goes to contracts, 18% is used to buy equipment and 2% to other purposes.

**Juliana Blackwell, Director, National Geodetic Survey**

Ms. Blackwell reported on NGS’ recent activities and collaborations with other sectors. NGS is about midway through their ten-year strategic plan. The main objectives of the plan are

* To support users of National Spatial Reference System (NSRS);
* To modernize and improve the system; and
* To expand the stakeholder base.

To date in FY 2017, NGS has delivered over 1.6 million survey mark datasheets, over 19 million CORS datasets downloaded for a variety of uses and 1.4 million online geoid computations. In FY2016, NGS compiled 9,107 miles of shoreline data, updated 37 ports for new shoreline and analyzed 35 ports for change. 700 square nautical miles of airborne LIDAR bathymetry were collected in FY16 and 400 square nautical miles were delivered. The new shoreline data has revealed many changes. Ms. Blackwell discussed some of NGS’ topobathy projects, particularly in Southern Florida and Puerto Rico. The Gravity for the Redefinition of the American Vertical Datum (GRAV-D) project is 59.6% complete as of March 31, 2017. This dataset will be the foundation of the updated geopotential datums. The Geoid Slope Validation Survey to be performed this year will be the last of three scheduled, to ensure the processes NGS is using for its airborne gravity data collection and processing meet their goals of 1-2 cm accuracy.

NGS is attempting to make datums easier to use by both the scientific community and surveyors. This involves defining the new datums and building the right toolkits so people can smoothly move from the old to the new reference frames. A beta version of a geodetic toolkit is available on NGS’ website and they are seeking feedback on it. NGS also has three beta mapping applications to improve the way they display information. The VDatum tool, which integrates America’s elevation data, is now available as an online web service version.

Geospatial Summits have been good opportunities for outreach and hearing from stakeholders on how they are preparing for the changing datums and questions they have about NGS’ work. NGS has completed the rollout of the Regional Advisor Program so that every state is represented by a geodetic advisor. NGS has been conducting collaborative research with Oregon State University; opportunities exist to work with other universities to help with the modernization effort. The NGS Coastal Mapping Program information that NGS collects and OCS uses for its charts is publicly available on the NGS website.

**Rear Admiral Shepard M. Smith, Director, Office of Coast Survey**

RADM Smith discussed OCS’ four areas of focus for the coming years: the National Charting Plan (NCP), External Source Data Policy, a 20-year hydrographic survey plan, and the Autonomous Roadmap. The NCP seeks to improve NOAA’s nautical chart coverage, products, and distribution. ENCs are now the heart of OCS’ charts and printed charts are a branch of the production line. The plan incorporates user feedback requesting more detailed charts. End-state chart descriptions in the plan were made without regard to how difficult or expensive they will be to realize. OCS is requesting a consolidated set of comments from the HSRP. A detailed chart scheme will be prepared over the course of this year.

RADM Smith discussed OCS’ External Source Data Policy. It is OCS’ policy to always use the best available data to update the nautical charts. This requires incorporating data from many sources and OCS will actively seek out data for areas where the charts are inadequate. Getting all of the data collected into the archive and accessible will require significant effort. OCS needs to honor the use constraints or conditions associated with a candidate dataset but does not want the information to go into a shoebox forever. OCS will prioritize the incorporation of data that will make the most difference to the accuracy of the charts. OCS welcomes comments from the HSRP on the policy.

OCS’ main hydrographic survey priority remains maintenance of critical under-keel clearance areas. The technology and procedures that have been built around that priority, however, are not flexible enough to broaden the focus into other areas. HSRP’s guidance would be helpful in addressing this. OCS’ other hydrographic priorities include addressing reported or observed chart discrepancies and systematic interdisciplinary seafloor mapping. Ocean mapping is not just about charts; it is relevant to fisheries management, exploration, extended continental shelf, and many other applications. OCS has the largest pool of expertise in this area and should be the core of a NOAA-wide or perhaps nationwide mapping effort to complement the international effort, Seabed 2030. RADM Smith asked for the HSRP’s feedback on how to think about the scope of the problem, how to place a value on resolving issues, whether these are the correct priorities to have, and comments on the general approach.

There is real potential for unmanned surface vessels in particular to be a force multiplier and to allow access to difficult areas. UNH is working on issues of control and optimization and operational use case scenarios are being tested out through contracted work. The most difficult element of autonomous vessel data collection is processing and analyzing the enormous amounts of information they collect. Investment in machine learning is needed for automated processing and analysis. OCS is optimistic but sober about the prospects and the challenges of what can be accomplished in the next few years.

*Public Comments and Discussion*

Rod Evans asked via webinar if the Autonomous Roadmap is publicly available. The Roadmap is available on the HSRP website.

**Opportunities and Challenges: Integrating NOAA’s Navigation Services Data**

**RADM Smith** introduced and moderated a panel focused on how value is delivered from the services NOS provides.

**Travis Newman, Marine Chart Division, Office of Coast Survey, NOS,** went into further detail on the NCP. The plan describes the actions needed to provide customers a more up-to-date and useful product. Improvements include reducing unwarranted alarms and isolated danger symbolization in the ECDIS system, conversion of depths and contours to metric system, providing timelier data to the mariner, improving RNC and paper chart coverage, creating a more orderly layout for ENCs, reducing uncertainties, improving chart update information, and increasing efficiency by strengthening partnerships with data providers. Mr. Newman presented some of the new features on the website, including weekly updates that display critical and non-critical chart changes. OCS is investigating the feasibility of converting all of its products to the metric system, including raster and paper charts; ECDIS systems will still be able to display information in whatever unit the mariner chooses. One thing NOS is doing now to reduce unwarranted alarms is estimating safe clearance depth values for all wrecks deeper than 66’ and populating the chart with non-dangerous and dangerous wrecks. The NCP explores general clean-up and possible ways to standardize the display of USACE data, as well as creating a gridded layout for ENCs that adopt the IHO standard scales. OCS and USCG have begun developing a process for extracting all of the USCG AtoN changes and applying them to OCS’ production database weekly. OCS will continue to practice an open data policy, offering free data in usable formats with the hope that it will be used for purposes other than navigation.

**Dr. Jan A. Newton, NANOOS Executive Director; Principal Oceanographer, Applied Physics Lab, University of Washington**, discussed NANOOS’ role in providing safe maritime applications to Pacific Northwest stakeholders. NANOOS (Northwest Association of Networked Ocean Observing Systems) is the Northwest Pacific IOOS Regional Association providing end-to-end observations and ensuring that the observing systems meet stakeholder needs. NANOOS engages with diverse local stakeholders and assures consistent national capability. NANOOS serves Washington and Oregon and has good collaborations with Canada through their ONC and other agencies. NANOOS regional user groups include maritime, fisheries, environmental management, shoreline, hazards, educators, and marine recreation. The Pacific Northwest maritime community needs real time data and accurate forecasts of waves, wind, tides and currents. NANOOS has developed a visualization system that allows various user groups to access information relevant to their needs. Dr. Newton demonstrated the capabilities of the system, including the Comparator tool that allows for critical comparisons of observations with forecasts. Each of the tools clearly states where its data originated. NOAA’s WaveWatch3 is very popular with users.

**Jeff Hummel, Director, Sales and Marketing, Rose Point Navigation Systems**, discussed NOAA’s history from paper to electronic charts and the importance of considering where the agency should go in the next 25 years. In 1993, NOAA commissioned the National Research Council (NRC) to assess national needs, trends, and opportunities in nautical charting information. Their report, “Charting a Course into the Digital Era,” was an extremely effective approach to governance and determining priorities within NOAA. A similar approach should be taken to guide NOAA’s vision for the next 25 years. Mr. Hummel discussed the lessons learned from international hydrographic standard setting being in the hands of private companies. Standards should develop from industry input, but setting standards is an important part of governance and leadership. NOAA should focus on open standards and not create non-competitive exclusive relationships with private industry. NOAA should also have a leadership role in the decisions being made around how electronic charts are supposed to be used in the U.S. rather than the Coast Guard. Vessels in nearly every other country in the world can legally navigate within their waters using electronic charts. The U.S. should establish a leadership role in electronic navigation and strive to lead, and not lag the rest of the world by 15+ years.

Rose Point has been collaborating with NOAA on a concept for displaying real time and predicted high resolution tidal current data for estuaries and coastal areas. Route optimization algorithms alter the route to save time and fuel. The system could massively reduce carbon dioxide emissions in the US and save industry billions of dollars. The system is based on information NOAA already has; what is needed is a mechanism for delivering it to vessels in real time.

**Jeffrey Siegel, President, ActiveCaptain,** discussed crowdsourcing as a revolutionary way people share information. Crowdsourcing requires getting a community of like-minded people together to collect data, process it, and feed it back to the community. Studies have repeatedly shown that the averaged inputs of 100 or more participants yield an average error rate of only 3%. Crowdsourcing is a business model where open databases are required, as is providing the source of the data. By analyzing users’ speed and depth, a database is capable of doing hydrography pretty well. In order to do crowdsourcing right, a database needs to track the data to a particular boat and this creates a privacy issue.

By connecting ENCs to the internet, charts will change dramatically and crowd data will play a major role. Mr. Siegel recommended that NOAA telegraph to the recreational boating community that they are going to get out of ENC production for recreational boating. This will spark developers to start figuring out how to get to the next generation of recreational charts. Much more tide information is needed in order to do crowdsourcing properly. Historical tide data against GPS and depth data collected will allow a database to correct for tide. ActiveCaptain users want NOAA to incorporate crowdsourced data into their products. This information would also give the recreational boating community more confidence in where they are going.

**HSRP Q&A with Panel**

RADM Smith asked what purpose Local Notice to Mariners would serve if the proposed enhancements were implemented. Mr. Newman said they would be necessary for the mariner correcting his paper charts and that Local Notices to Mariners result in a large drain on resources within the Marine Charting Division. Mr. Siegel added that they also notify boaters of when a bridge isn’t opening on demand. ActiveCaptain incorporates the notices every week when they are released and he thinks they will be around for a long time.

Vice Chair Miller asked Mr. Siegel how many ActiveCaptain users he believed are aware of data sources or USACE districts. He believed the vast majority had no idea where the data comes from and assume it is accurate. Ms. Shingledecker agreed and emphasized the importance of the coordination between NOAA and USACE through eHydro.

Member Shingledecker asked the average age of ActiveCaptain’s users. Mr. Siegel said that the average age is over 65, but the 65 year old of today is much more adept with technology than the 65 year old of ten years ago. One interesting note is that 98% of contributions to boating forums across the internet are from males while more than 50% of ActiveCaptain’s users are women. There may be a female side of boating that is not being addressed by typical navigation systems.

Mr. Hummel said that NOAA should consider monetizing the recreational boating market and assign the appropriate resources; generally it has been ignored. Mr. Siegel said that crowdsourcing can take care of the ICW and rivers really well and NOAA should focus on ports. Vice Chair Miller said most of the ICW is USACE data not NOAA.

Member Gee asked if ActiveCaptain tracks boaters or takes inputs of isolated hazards. Mr. Siegel said some users allow ActiveCaptain to track them but tracking all users creates a privacy issue. Depth, speed, and other measurements could be collected and put into the database and no one in the U.S. is better positioned than NOAA to compile this information and make it useful. Member Gee said this could be applicable to other areas, such as precision navigation. Mr. Hummel said there are commercial customers addressing this issue.

Mr. Hummel said boats get more and more internet connectivity every year and new satellites will soon allow inexpensive internet worldwide. The chart of the future has to anticipate this.

CAPT Brennan asked if NANOOS has a process for feeding the data they collect back to the creators/gatherers of the data. Dr. Newman said they focus on integrating sustained datasets into useful products but they do provide feedback to CO-OPS and NDBC on what NANOOS users want. NANOOS’ website also seeks to maximize discovery by providing links to other resources.

Sam Debow asked for comments on a passage from the NCP concerning the likely reduction or elimination of all raster charts. Mr. Siegel said that he wouldn’t mind RNCs going away as they are essentially paper charts since they do not allow the overlay of data. He would like to see ENCs have more data layers than he believes are being planned, including a crowdsourced layer. Mr. Hummel said that Rose Point users would love to be able to contribute data to the charts. Rose Point and ActiveCaptain are currently providing data to NOAA on a project in a very early stage. Mr. Hummel said that in order for this project to be successful it needs to address general chart plotters and apps.

Member Lockhart asked why contours and sounding are all that is being displayed when so much more information is available, and whether 3D charts would be useful. Mr. Hummel said that studies have shown that the available data is not accurate enough to depict the bottom in 3D in a useful way. Multibeam might appeal to certain users, but 3D has no place in navigation. He acknowledged that if the chart of the future is intended to be used for a wide variety of purposes beyond navigation, than it should include a 3D option.

**Update on Charting Channels, Harbors, and “Underlap”**

**RADM Smith** provided an update on the issue of “underlap” of responsibilities between USACE and NOAA. Many areas with critical under-keel clearance for large ships are not being surveyed to objective detection standards regularly. High-profile accidents have cost the federal government large sums of money, in addition to environmental damage and economic disruption. Alisions, bottom touches, and near misses are common and underreported. NOAA’s surveys are typically not done in channels because they fall under USACE’s responsibility. USACE’s surveys vary widely and are processed in a number of ways, sometimes failing to preserve the knowledge of small features, such as an anchor. RADM Smith has spoken with USACE leadership who have been clear that their survey program is to support dredging and maintenance of the channel, not object detection. It is important to be clear that USACE is not doing a bad job, simply a different job. In the last six months, NOAA has engaged with ports, pilots, and shipping concerns in public and private venues. NOAA will continue surveying for under-keel clearance areas, including channels, anchorages, and some approaches. CATZOC codes are becoming more widely used to create expectations of surveys. ENCs have carried over the practice of showing channel depth information in channel tabulations but OCS would like to move forward with eliminating these. RADM Smith will be meeting with Major General Ed Jackson in May to talk through clarifying standards, roles and responsibilities between the two agencies, and improving discoverability. The two agencies are also working to develop public input for the next generation of methods to chart the channels, leveraging the NCP framework.

Vice Chair Miller asked for clarification on why soundings would not be plotted in a channel. RADM Smith said that NOAA has access to soundings in every channel but it is a matter of fitting them onto charts.

Vice Chair Miller asked what NOAA would do if USACE sticks to its practices. RADM Smith said there may be USACE districts that would want to do surveys to NOAA’s standards because they recognize the value and want the competitive advantage for their ports. There is probably room for a joint approach to this issue in which NOAA supplements with its own surveys.

Member Gee asked if there is a plan for prioritizing certain areas. RADM Smith said they’ve been talking internally about defining any port with a dredged channel of 35’ or deeper as being a candidate for prioritization. Other deficiencies would be addressed when the risk becomes too large.

Mr. Saade asked, as to chart discrepancies discussed earlier, if NOAA would consider releasing a list of discrepancies that industry may wish to resolve. RADM Smith said NOAA has been trying to figure out how to frame this issue but may be able to put out a list of discrepancies they wish they had more information on.

Member Perkins asked what the limiting factor is in addressing the backlog of processing the collected bathymetric LIDAR. Ms. Blackwell said the delay in getting it in, processed, and compiled is mostly human resources and timing/workflow.

**Public Comment**

Jon Dasler of David Evans and Associates said that one thing that is overlooked (especially in eHydro) is that USACE’s mission is monitoring what they have to dredge. Their single-beam surveys are a generalization of the seafloor. Tabular data that may show soundings get replaced once a new Corps survey is done which can displace obstructions. This is an area where 3D data could be valuable.

**Adjournment**

Chair Hanson opened the floor for reflections on the first day’s sessions. Ms. Hall said that it was very helpful to have RADM Smith outline what he wanted from the HSRP. Vice Chair Miller encouraged NOS to offer suggestions on areas for the next issue papers. The Panel stood in recess at 5:06 p.m.

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*Wednesday, April 19, 2017*

The meeting was called to order at 8:30 a.m.

Chair Hanson welcomed everyone to day two of the meeting and Vice Chair Miller briefly reviewed the activities and discussions from day one. She said the Panel should address the three priorities that Dr. Callender covered in what they produce as well as consider an infrastructure paper highlighting the benefits of the NOS offices to the nation’s infrastructure. The HSRP needs to look at papers closely to ensure alignment with the National Charting Plan, External Source Policy, and hydrographic priorities. Public-private partnerships and simplified communications may also be effective tools during the new administration.

**Discussion of Four Issue Papers**

**HSRP Planning and Engagement Working Group**

Member Maune led the discussion on the four papers being developed by the HSRP and sought NOAA’s feedback on the issues identified and their recommended actions. The four papers are: (1) Improving Data Access for U.S. Nautical Charts; (2) Surveying and Charting in U.S. Harbors and Channels; (3) Precision Navigation; and (4) Recreational Boating. Member Brigham wanted citations for all of the numbers used in the new papers and to adjust the earlier papers as well. Vice Chair Miller said that the Panel spends too much time editing the papers during the meetings and that comments should have been made between meetings. Member Hall asked for feedback on the process of producing the papers and how can they best benefit NOAA. She also said the HSRP needs to determine the audience for the papers and noted that the papers could hinder NOAA’s efforts if they are not aligned with what the agency needs to address. Chair Hanson said he felt the papers are valuable for the Panel to get its thoughts together.

RADM Smith said the underlap paper gave him confidence in being more assertive about the issue. The precision navigation paper does not call on NOAA to do anything differently in order to support port optimization. If it is the Panel’s intention to recommend improvements in this area, a less detailed version may be a better tool. Member Perkins said that part of the value of the issue papers is in filling the gaps in the recoverable prior work of the FACA and they need to keep moving forward writing these types of papers. Vice Chair Miller suggested reviewing the first six papers and making any necessary updates. Member Brigham felt it would be a mistake not to have a recreational boating issue paper available on the website, which may send a message that NOAA doesn’t care about this sector. Dr. Callender said that the dialogue stimulated on the Panel and with NOAA in the course of preparing the papers is the most valuable piece of the process. The papers are and should be living documents that should be modified as circumstances changes. Member Kelly said that the papers put a topic on the wall that will stay there until it moves toward some resolution. They can be used in many ways by a variety of parties and have a tremendous value, though the HSRP needs to be careful not to set the bar too high. Member Shingeldecker said that a benefit of the papers has been increased engagement of Panel members between meetings. The Panel’s current priority should be reviewing and providing feedback on the four documents NOAA has presented to them.

Member Shingledecker accepted most of the comments she received on the recreational boating paper and made the recommended changes to the document. Pictures and citations will be added. The Panel agreed unanimously to endorse the paper.

Vice Chair Miller suggested delaying the precision navigation paper to account for RADM Smith’s comments. Member Hall said the group working on the paper needs to refocus its efforts and would benefit by hearing from CAPT Brennan on what is needed. She will take the lead going forward with the paper. Member Perkins expressed his frustration that the Panel has not been able to bring the topic to closure after two years.

**Partnerships for Pacific Northwest – On and Off the Chart**

**Captain John Veentjer (U.S. Coast Guard, Ret.) Executive Director, Marine Exchange of Puget Sound**, introduced and moderated the panel. He discussed the services provided by the Marine Exchange, which monitors vessels arriving and departing U.S. ports. Marine Exchanges around the country have the best and most accessible vessel traffic information, with data going back to 1992. He discussed the kinds of vessel traffic moving through the Puget Sound and the Cooperative Vessel Traffic Systems, a partnership between the U.S. and Canadian Coast Guards which makes management of vessel traffic in the shared waterways extremely efficient and secure. The Harbor Safety Committee is another successful partnership which helps make improvements to the VTS. It exemplifies stakeholder diversity with representatives from 15 different private sector interest groups and 6 agency advisors. All of these efforts have given the Puget Sound an excellent safety record.

**Gavin Schrock, PLS, Administrator, Washington State Reference Network**, discussed cooperative geodetic activities and National Spatial Reference Framework modernization planning in Washington State. The reference framework is of particular interest in the State of Washington, where their mission is synchronizing their realizations of NGS’ reference framework and how the state uses it on the ground. 2022 is the target for many of the state’s initiatives towards achieving a certain level of geodetic independence. Mr. Schrock discussed the importance of the transition from using passive to active controls. Active realizations are tied to the center of the earth within a centimeter and their locations are updated every second. Passive realizations are not affordable to keep maintained and updated by the states. He discussed some examples of the cost of geodetic uncertainty that we live with every day, driven by geodetic ambiguity. The Washington Geodetic Survey (WGS) is trying to get the hydro community involved and provide all end users with a better understanding of the progression of reference frameworks. The education services provided by NGS are extremely valuable.

The Washington State Reference Network is a self-funded public-private cooperative that consists of 10 NGS CORS and 8 Earthscope PBO stations, in addition to 112 other stations, with data processed by the Seattle Public Utility. The CORS values are not updated as frequently as they could be for practical reasons, so the OPUS data is lacking in some areas of the state. The network’s goals for 2022 include: multi-constellation; new receivers and antennas; additional stations; communications upgrades; online post-processing; and velocity-centric procedures.

**Dorrell Dickson, Geospatial Survey Analyst, GIS Department, Tulalip Tribes of Washington**, discussed using tidal benchmarks to measure legal and regulatory boundaries in the State of Washington. Several tribes, counties and cities have tied many of their rules and regulations to tidal elevations. This presents some challenges because they change continuously. A tidal epoch lasts 18.6 years and determining the line of the mean high tide over that time is difficult. The problem is exacerbated by the tides being amplified by the geography of Puget Sound. The tribe was willing to finance the establishment of tidal benchmarks and finally got connected with the people within NOAA that could get them installed for $60,000. These included temporary tide gauges and passive monuments which provided tidal elevations on the benchmarks. Many other tribes have similar issues with their properties. Many stakeholders can benefit from tidal benchmarks, including architects, engineers, and emergency planners. People building bulkheads also need to know the height of high tides in order to hold back storm surges.

**Dr. Parker MacCready, Professor of Oceanography, University of Washington**, discussed data needs for realistic circulation modeling of the inland and coastal waters of the Pacific Northwest. The Regional Ocean Modeling System displays realistic tides, winds, rivers, and open ocean conditions and is available on the NANOOS website. Data used by the model include information from NDBC buoys, Olympic Coast National Marine Sanctuaries moorings, sea level from tide stations, and casts from NOAA cruises. As models expand to high-resolution nested models, the need for precise bathymetry, vertical datums, and sea levels become essential. In order to validate and improve the model, much longer data records are necessary. While NDBC buoys are the best source for this, Dr. MacCready suggested improving data delivery by using a more robust and reliable format, such as XML, and adding more variables and subsurface instrument. Going back in the record and making NDBC heading formats uniform would make the data more discoverable. Dr. MacCready’s models also use data from tide stations to try to reproduce tidal amplitude throughout the system. He suggested automating the download process and including the longer time series that are available. NOAA’s Tides & Currents website is becoming an outstanding source of tide information that is especially suited for teaching.

**Linda Stryk, Executive Director, Puget Sound Pilots,** discussed how pilots rely on NOAA’s navigation products to augment their own skills and the other tools they utilize. The Puget Sound Pilots use every tool available to prevent loss of lives and damage to vessels, property, or the marine environment in Washington State. Ms. Stryk discussed their partnership with the ports and the diversity of stakeholders that fall under the Port of Seattle. The Port partners with NOAA and USACE to give pilots the information they need to navigate safely and efficiently. Tide and current data and real-time information are critical to pilots, as well as the forecasting information that NOAA provides. In addition to the ship’s navigation systems, pilots use personal pilot units and phone apps to display this data. Ms. Stryk suggested correcting tide levels for barometric pressure and making the best information available in one place. If any of the NOAA tools currently being used were to diminish, it would be very challenging for pilots to maintain their strong safety record.

**HSRP Q&A with Panel**

Dr. Atkinson asked Dr. MacCready if there is connectivity between tide gauge readings and his model so that a mariner could use it directly, or if translation is required. Dr. MacCready said that as the model exists now, that connection is a little imprecise due to inconsistencies between datums. The models currently use mean sea level as zero and then he coordinates his use of the datums to be consistent; this becomes much more important as you get into inland waters.

Member Thompson felt the panel made clear the need for NGS to continue their education efforts concerning the datum changes in 2022.

Mr. Edwing provided further information on some of the points of Mr. Dickson’s presentation and noted the many uses of NWLON stations.

Vice Chair Miller asked what emergency management strategies are in place in the event of a large earthquake. CAPT Veentjer said that there is very little in place to protect marine infrastructure, and the Harbor Safety Committee is looking to get more engaged in earthquake planning. Ms. Stryk said the Port of Seattle has some past experience with where the risk areas are and they coordinate with academics and engineers that have developed models. The port is trying to find the right balance of how much of their resources to spend relative to the return on value as they plan for risk mitigation. There are also exercises conducted throughout the area by multiple agencies. Dr. Mayer asked if there was a U.S. equivalent to Canada’s tsunami early warning system. CAPT Veentjer was not aware of any. Mr. Edwing said that the tide gauge network validates forecasts as part of a tsunami detection system.

Member Perkins asked about the physical and cyber security needed to protect critical positioning infrastructure. Mr. Schrock said that GNSS infrastructure is not viewed as critical in the U.S. and so they do not receive funding for it. All of the sites do have fences around them and there has only been one instance of vandalism. If they could operate something similar to the State Highway Patrol’s independent radio network they would be able to meet continuity of operations needs following an event like an earthquake. The nature of the GPS observations would require extremely complex hacking that would initiate a denial of service.

Member Maune asked how Washington State plans to address the challenges with the transition to new datums. Mr. Schrock said they will follow NGS’ lead. Ms. Blackwell said having an easy-to-use datum transformation tool should make the transition much easier than the previous one, but educating people that the change is happening and that the tool is available will be critical. Experimental geoid models are being used to show the magnitude of changes that can be expected for the height component in 2022. NGS hope to have the coastal component of GRAV-D collected and available soon. Mr. Schrock added that surveying and mapping software currently provide great tools for localization.

Member Rassello asked if the PPUs used by Puget Sound Pilots override the official navigation system on the ships. Ms. Stryk said the ship’s navigation equipment is a primary source of information; PPUs augment what is available and provide 100% redundancy and continuity. If there is an investigation of an incident, all of the tools available to the pilot are reviewed.

Member Gee asked if Dr. MacCready makes his data available and usable to other systems. Dr. MacCready said his data is pushed to the Azure cloud and users can download the files.

**Public Comment**

Rolin Meyer, CO-OPS, asked if Dr. MacCready was using any of the currents data CO-OPS has been collecting in the San Juan area to validate his circulation models. Dr. MacCready said he plans to but has not yet. He expects it to be extremely valuable.

Jon Dasler said that resolution on geoid models are not up to the level needed to support operations in certain areas with extreme topography. He added that Mr. Dickson’s presentation emphasizes the importance of referencing tidal benchmarks to the NSRS and understanding that relationship. Collocating CORS sites on tidal stations will be extremely important as we move towards 2022. Ms. Blackwell said NGS is in the process of establishing foundation CORS that would be collocated with other geodetic measurement, but not necessarily tidal stations, to be the cornerstones of the larger CORS network. NGS is looking for local partners to help with creating and monitoring CORS connected to tidal stations, but they do not have the capacity to do it on their own. Member Thompson said that North Carolina is interested in installing CORS on their tide stations but requests more flexibility from NGS for certain situations. Ms. Blackwell said NGS is reconsidering some of their requirements and those will be brought to the HSRP once a draft is developed. Mr. Schrock said the reference stations put on tide gauges do not have to be CORS. If the data were available other entities could use it. Many private firms have old equipment that could be put on tide stations at minimal costs; it is an issue of coordination more than anything else.

Jim Rice said PMEL has an ocean noise strategy that includes hydroacoustic monitoring that could pick up earthquakes. Chris Sabine will be able to provide further information on this.

Jennifer Hennessy, Washington State Coastal Program, noted the importance of leveraging NOAA’s survey assets to assist with data and products in order to meet the shared priorities established by state, federal and tribal partners. This is critical baseline data to support a range of ocean planning issues.

**Review of Day Two and Adjournment**

Chair Hanson reviewed the proceedings of day two. The Panel stood in recess at 12:05 p.m.

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*Thursday, April 20, 2017*

The meeting was called to order at 8:31 a.m.

Vice Chair Miller provided an overview of the previous day’s sessions. Member Perkins noted that the group set a goal to have the precision navigation paper rewritten in advance of the next HSRP meeting. Vice Chair Miller relayed a comment from a Commanding Officer at the USCG base commending NOAA for the value of their Navigation Response Teams. Members of the Panel requested a presentation on datums at the next HSRP meeting.

**Technology Working Group Session and Presentations**

**Lindsay Gee, HSRP Technology Working Group Co-Chair,** introduced and moderated the panel and stressed that IT infrastructure needs to be included as part of the discussion about the country’s infrastructure.

**Dr. Larry Mayer, Co-Director, NOAA/University of New Hampshire Joint Hydrographic Center, Center for Coastal and Ocean Mapping,** presented on visualization research and development at the Joint Hydrographic Center/Center for Coastal and Ocean Mapping. JHC/CCOM’s visualizations are based on fundamental principles of human-computer interactions coupled with numerous user studies. The Visualization Lab studies optimal ways for displaying information, especially concerning vectors, current information, and wind barbs, as well as methods for representing bathymetric uncertainty. The lab emphasizes being able to make visualizations fit individual users’ needs. For years, the Visualization Lab’s efforts have been on bathymetry and backscatter of the seafloor. This work is now moving from 3D to 4D for a full analysis of temporal changes in both the seafloor and the water column. They have been able to apply these to depicting the behavior of gas seeps, including the Deepwater Horizon spill. Hydrographic applications of water column visualizations include a much more robust tracking of least depth for wrecks. Depicting flow in four dimensions makes this technology useful for coastal planning and many other applications.

CCOM is working on a project to turn NOAA’s Coast Pilot into an interactive 3D map environment called GeoCoastPilot. The Marine Chart Division has made additional progress on JHC/CCOM’s Local Notice to Mariners web-based Google Maps mash-up and now uses this approach for their website’s weekly chart updates. Making charts tide-aware and providing go-no go cautions in real time would be possible for the Chart of the Future. Utilizing the small, inexpensive and extremely flexible virtual/augmented reality simulators developed at JHC/CCOM could be very useful for training purposes.

**Marten Hogeweg, Senior Project Manager, Esri, Inc.,** discussed using data as the 5th modality for 21st century ports, in addition to water, road, pipeline, and rail. The Port of Rotterdam has long been the largest port in Europe, with about 3,000 ship movements a day. The port cannot physically grow any more but they have set an ambitious goal of doubling their throughput over the next 15 years, meaning they have to operate smarter. Mr. Hogeweg discussed Esri’s involvement in conceiving a plan for this. The effort involves more efficient decision making by using common data, more effective communication, attracting/retaining business, better asset management and utilization, and improving awareness across the enterprise. The port has established GIS as an enterprise system of record and is using spatial analysis to inform decisions of optimal design. The port provides their own surveying vessels and dredging operations, which are done very regularly, getting AIS feeds to automate the process of determining where to dredge and do just-in-time dredging. This same data is being used in the navigational charts. The port has automated the process of updating the bathymetry and navigational charts multiple times a day.

Esri took a very different approach in the Port of Long Beach, working with their port security program bringing together disaster response agencies with local, state, and federal law enforcement to share information on significant events. Information has to be seen as a core aspect of how a port operates. Big data opens a lot of possibilities. In order for big data to be useful it requires real-time data integration, with continuous processing and analysis and the ability to integrate many types of data. Data-driven organizations are able to uncover new opportunities and make better, faster decisions, as well as being able to make proactive decisions and improve efficiency.

**Carol Lockhart, President, Geomatics Data Solutions, LLC,** provided an introduction to bathymetric LIDAR. Bathymetric LIDAR provides a consistent and predictable swath width making it a much more efficient technology to survey large expanses of water less than 15 meters in depth. Using airborne LIDAR eliminates safety concerns around operating vessels in shallow waters or in sensitive areas such as reefs. Member Lockhart discussed the evolution of sensors since the 1970s. While high-power current sensors are able to reach twice as deep, low-power sensors collect denser and more accurate data. As the plane is moving along, a laser fires a scanning mirror or circular palmer scanner to create a swath of points. She described some of the complex interactions taking place as the beam hits the water surface then travels through the water column and compared the scan pattern of different sensors. The CZMIL hybrid approach that JALBTCX operates uses a conical scanning that provides seven different returns per pulse to increase their data density. The errors the new LIDAR systems get stem from the source datums; LIDAR uncertainty is still well below what is allowable under the IHO Special Order.

LIDAR will not always be a suitable tool. Water clarity, seabed reflectivity, weather, and expected terrain/expected depths all have to be considered in determining whether or not to use LIDAR. Data from NGS and CO-OPS provide foundational data that allows surveyors to easily translate their data to any tidal datum. Member Lockhart presented several recent data collections, including seamless topobathy data collected on a single pass. Because LIDAR recognizes the intensity of the return, users can see the reflectance of the seabed and analyze the characteristics of the bottom.

**HSRP Q&A**

Member Kelly asked about the scalability of using CCOM tools for a full coastal range. Dr. Mayer said the scalability is tied to the availability of high-resolution data. LIDAR collects at an appropriate resolution and is being collected at an ever-increasing rate. It is not difficult to input the data once it exists.

Member Hall asked about protecting against misuse of the technology, such as overfishing. Mr. Armstrong said that all of NOAA’s surveys go through screenings by a State Historic Preservation Officer or Sanctuary managers. He did not believe all of the ramifications have been worked out but NOAA is sensitive to it. Dr. Mayer added that this information is valuable to fishery managers in order to set appropriate catch limits.

Member Brigham said the GeoCoastPilot would be a great tool for enhancing marine safety and environmental protection in the Arctic. Member Shingledecker said it would be interesting to see how it could be used for educating recreational boaters. She asked if anyone is looking at how these tools contribute to distracted boating. Dr. Mayer said that is a major concern for developers.

Dr. Mayer asked if the Port of Rotterdam’s bathymetry is provided to the vessels or if it is just for internal use. Mr. Hogeweg said it is provided to the vessels through their ECDIS and to the pilot through their integrated PPU system. CAPT Brennan said that port has the charting responsibility and has to get the information to the mariners before they enter the port. Member Gee said the idea of going from a product-based organization to a data-driven organization creates a major paradigm shift in how organizations operate. Member Perkins asked how prevalent this model is internationally of having ports responsible for surveying, charting and distribution. CAPT Brennan said it is practically the de facto model for Northern European ports; American ports are much more focused on the shoreside infrastructure. With larger boats getting closer to the seafloor than ever before, more ports are beginning to take an interest in what they can do.

Vice Chair Miller asked about the status of LIDAR object detection. Member Lockhart said high-powered sensors can only do object detection in the right environments and cannot do object detection deeper than 15 meters of water. LIDAR sensors with denser data collection can do object detection but there are still issues with water clarity. It is very easy to see now where there is data missing.

Member Saade discussed Fugros’ efforts at LIDAR collection in the Arctic. They used LIDAR as a reconnaissance tool in complex areas to bring in boats in a safer and more confident manner.

Member Perkins asked if bathymetric LIDAR technology was anticipated to change in a manner similar to the terrestrial LIDAR developments. Member Lockhart said the biggest change has been in data density from lasers that can fire much faster. As you fly higher, the depths are not as accurate. It may be possible to gather accurate depth data from much higher in the future but there are other challenges to flying high along a coast line. Autonomous platforms may also become available in the future, but right now the systems are still too large. Unmanned systems do not reduce the number of people needed to operate them, so that model does not yet offer any economic benefit.

Panel members discussed technical specifications regarding uncertainty in the bathymetric LIDAR systems.

**Technology Working Group**

**Lindsay Gee, Technology Working Group Co-Chair,** discussed the activities of the Working Group over the last year. He reviewed the presentations that the Working Group received from JHC/CCOM, NOAA, and industry on data collection, quality control, OCS’s database, web mapping, and charting. There are still many tools that need to be developed to support internal quality control. It became apparent to the group that business decisions are the driver in how technology is moving forward. More automation is needed, especially as more big data becomes available.Themes the Working Group will be looking into in the future include automation and autonomous systems, future products and data, future ECDIS, and industry collaborations.

**Ed J. Saade, Technology Working Group Co-Chair,** discussed the Working Group’s draft technology transfer discussion paper. The point of the paper is to convey to Congress, the Executive Branch, and taxpayers that there is a tremendous amount of technology discovery and innovation that comes out of the hydrographic process from NOAA and JHC/CCOM. These technologies are easily transferred to private businesses applying the technologies in ways that have nothing to do with safe navigation or charting. The paper presents as a case study the JHC/CCOM’s development of water column detection capabilities for seep detection. The draft discussion paper recommends:

* Increasing R&D funding at JHC/CCOM for the clearly-defined goal of improving the safe, efficient pursuit of hydrographic and charting tasks;
* A cost benefit analysis of the contributions JHC/CCOM technology transfer makes to industry to better understand the return on investment;
* A process to ensure industry is fully aware of the R&D to maximize technology transfer; and
* Optimizing the process to enable the rapid transfer of technology in support of U.S. competitiveness and economic growth.

Vice Chair Miller said the Panel needs to be sensitive to the legislations for both IOCM and HSIA, and of seeming to endorse a specific research center. She also felt that the time may not yet be right for further developing a new issue paper. Member Hall thought this should be a white paper rather than an issue paper.

Vice Chair Miller asked if the presentations that the Technology Working Group received are available on the website. Member Gee said he will make sure they get put up. Member Hall said that she had not understood the breadth of what the Technology Working Group was looking at and felt some of the presentations should have been to the full Panel at a regular meeting or teleconference. Member Gee said that he hopes to have a presentation on autonomous technologies at the next Working Group meeting.

The Panel agreed that Technology Working Group meetings should be every other month. Member Shingledecker suggested alternating with the P&E meetings.

**Public Comment**

Sam Debow asked when the Chart of the Future advancements will be operationalized. CAPT Brennan said NOAA is able to make the charts exactly the way they want them. He is excited to see standards going into a process that is unconstrained by IHO guidelines. Data techniques can be tested through PPUs and the ECS systems, then take the results to the IHO to create an international standard. Dr. Mayer said JHC/CCOM has been following two tracks, one evolutionary and one revolutionary; now the two are starting to merge. CAPT Brennan said that standards are moving faster than ever and could move even faster. Right now, NOAA does not have production systems in place to provide gridded bathymetry processes to mariners.

Jon Dasler said the IHO Special Order doesn’t meet the needs that precision ports require. Everybody needs to be on the same page if we’re going to push the limits of the ports like Port of Rotterdam is doing. He said that the Hydrographic Surveys Specifications and Deliverables just released a seep and pipeline detection report. Surveys are picking up seeps even when they are not doing water column detection. Those are being reported and NOAA now has a process for getting that information to navigation managers. Getting this kind of information to private companies is a great use of surveys.

**Precision Navigation Update**

**Captain Rick Brennan, OCS Hydrographic Surveys Division**

CAPT Brennan provided the update on the precision navigation effort. He provided the background on the need for an under-keel clearance system for large ships. PROTIDE has been successful in allowing the Port of Long Beach to add additional draft since implementing the system, yielding significant economic benefits. NOAA has been in contact with the Ports of Los Angeles and Long Beach as they test out different data types being provided to pilots through their PPUs. The next stage is applying the LA/Long beach bathymetric database project to the Puget Sound area, taking the project up to the next largest scale to see what kind of scaling problems they encounter. NOAA has had some success in automating the extraction of contours and generalizing them for different scale bands. Once the combination bathymetric database is assembled and combination rules are in place, NOAA will run a comparison algorithm to compare the model against the currently charted soundings. Puget Sound test products should be sent to the Mapping and Charting Division for review and analysis by the end of the calendar year.

Member Maune asked whether NOAA is using a one-meter contour interval. CAPT Brennan said they have used a couple different intervals and are looking to find out what the optimal interval is. In Long Beach, they are producing 50 cm contour intervals. Member Rasselo said that the ECDIS already selects which contour is needed according to the size of your ship. He asked if all of the scales were necessary for safe navigation. CAPT Brennan said that the ECIDS doesn’t do the generalization and they want users to be able to zoom in and out of any area they are interested in and get appropriate data. The scales are in compliance with S-57 standards.

**Fleet Recapitalization Update**

**Captain Rick Brennan, OCS Hydrographic Surveys Division**

CAPT Brennan provided an update on fleet recapitalization. RADM Score, OMAO, commissioned a review team of industry experts along with a Tiger Team that came up with a fleet recapitalization plan. This plan was accepted and publicly released last October. Since then, Congress has disbursed the first $80 million to OMAO for the shipbuilding program and OMAO has released their spend plan. While waiting for the second installment, they are proceeding with the shipbuilding program and establishing the necessary MOUs.

**HSRP Working Groups Discussion**

Chair Hanson led the Panel discussion on the issue papers. Vice Chair Miller said they incorporated comments from RADM Smith about the difference between data produced for channel and harbor charting between USACE and NOAA. She reviewed the content of the “Surveying and Charting in Channels and Harbors” and “Improving Data Access for US Nautical Charts Using Multiple Data Sources to Produce More Accurate and Detailed Charts” papers. Jeff Hummel’s recommendation to commission an NRC study was similar to the paper’s recommendation for an independent review team, but RADM Smith did not want two studies running simultaneously. Member Brigham said that NRC studies are the most authoritative and the costs should be borne by NOAA and multiple other agencies. Member Maune said something similar to 3DEP may be needed wherein multiple agencies get together to resolve policy and technical issues to ensure consistency. The Panel engaged in clarifying the issues. Dr. Mayer said the Ocean Studies Board and Marine Studies Board could take on the recommendation and provide a draft statement of task to the National Academies. Mr. Armstrong thought more time was needed to consider what the Panel wanted out of the study. Glenn Boledovich said the Panel’s comments on the External Source Data Policy would be more helpful than the pending issue paper. Vice Chair Miller said that what she’s read to date does not address the fact that data from a federal agency is going onto charts when it does not meet NOAA standards. CAPT Brennan said the combined responsibility for federally maintained channels puts them in a different category than other surveys and that jurisdictional issues need to be handled carefully. Member Lockhart said that the issue is not bringing in data from other sources, it’s that USACE surveys do not meet the needs for navigation. She suggested including a statement that there should be full-bottom coverage and object detection done in the critical channels that commercial vessels are navigating. Jon Dasler said that the issue is that NOAA is mandated to take USACE surveys as an authoritative source that go directly to the Marine Chart Division to be applied to the chart no matter what kind of surveys they are. There has to be better vetting of USACE surveys. CAPT Brennan said that the paper should be considered in the context of the ruling on the shared liability for the Athos grounding. A follow-up teleconference will be convened to approve the papers.

**Recommendation Letter**

Vice Chair Miller asked the Panel for recommendation on what should be included in the letter to the Acting Administrator. Suggestions included: recognition of the four reports from OCS; support for the new NOS priorities on which Dr. Callender presented; stakeholder recognition of the importance of NOAA data; NOAA’s need to strategize in order to take a leading position in shaping data standards, acquisition, and data usage; encourage the best data available approach; standardizing IHO Order 1A surveying in federally maintained channels; the value of technology transfer; how impressive the state of the art is at the Holland America Command Center; merit of the National Charting Plan; the challenge of integrating disparate datasets; the importance of NGS and tide data to the community and the amount of support that it provides for the nation’s infrastructure; requesting NOAA develop a roll-out strategy for a more visual chart. Vice Chair Miller will prepare a draft version and send it to Chair Hanson within a week for review by the Panel. It will be sent to the Acting Administrator within 30 days of the meeting.

**HSRP Discussion**

Member Hall felt that future panelists should be given an introduction as to who the Panel is and what their role is in advising NOAA; perhaps even provide them some topics the HSRP would like panelists to dive into.

Member Shingledecker will take the lead on preparing the HSRP’s responses on the National Charting Plan and the External Source Data Policy. Member Perkins will take the lead on the Panel’s response to the Autonomous Roadmap. Vice Chair Miller will take the lead on the response to the 20-year Hydrographic Survey Plan.

The next HSRP meeting will be in Portsmouth, New Hampshire, September 12-14. Suggestions for next meeting included: how to increase the visibility of the importance of NGS’ services in providing support for autonomous movement (land, air, or water); preparing for 2022; innovative charting presentations; an introduction to VDatum; the upcoming NEEA update; the Hydrography Requirements and Benefits Study; the Global Seabed Mapping Initiative; an Arctic panel; Seabed 2030; and the X-Prize. Members suggested making better use of working lunches by allowing time for Panel discussion. Dr. Mayer said the Panel may want to look at the status of hydrographic education at a future meeting. Member Brigham urged aggressive efforts to get a New England Congressman to attend.

There were no comments on the HSRP charter. A motion was unanimously approved to accept the charter as written.

**Closing Remarks and Adjournment**

Chair Hanson provided closing remarks. After the September meeting, Members Brigham and Perkins and Chair Hanson will be rotating off the Panel. The meeting was adjourned at 4:42 p.m.

**HSRP VOTING MEMBERS IN ATTENDANCE:**

Lawson W. Brigham, PhD Distinguished Fellow, Center for Arctic Policy Studies, University of Alaska Fairbanks

Lindsay Gee Consultant

Kim Hall Principal & Founder, Brizo Maritime Consulting, LLC

William Hanson, Chair Vice President of US Business Development, Great Lakes Dredge & Dock Company

Edward J. Kelly Executive Director, Maritime Association of the
 Port of NY/NJ

Carol Lockhart President, Geomatics Data Solutions, LLC

David Maune, PhD Associate Vice President and Senior Remote Sensing Project Manager, Dewberry Consultants

Joyce E. Miller, Vice Chair Director of Seafloor Data Services, Hawaii Mapping Research Group Research Group, University of Hawaii School of Ocean and Earth Science and Technology (retired)

Scott R. Perkins, HSRP Chair Director, Federal Programs, Surveying and Mapping, LLC

Captain Salvatore Rassello Director, Nautical Operations, Carnival Cruise Lines

Edward J. Saade President, Fugro (USA) Inc. & Regional Director Americas - Marine

Susan Shingledecker Vice President and Director, Environmental Programs, BoatU.S. Foundation for Boating Safety and Clean Water

Gary Thompson Chief, North Carolina Geodetic Survey

**HSRP NON-VOTING MEMBERS IN ATTENDANCE:**

Andy Armstrong Co-Director, Center for Coastal and Ocean Mapping,
 Joint Hydrographic Center, University of New
 Hampshire

Juliana Blackwell Director, National Geodetic Survey, NOAA

Richard Edwing Director, Center for Operational Oceanography Products
 & Services, NOAA

Larry Mayer, PhD Co-Director, Center for Coastal and Ocean Mapping, Joint Hydrographic Center, University of New Hampshire

 **DESIGNATED FEDERAL OFFICIAL:**

RADM Shephard M. Smith Director, Office of Coast Survey, NOAA

 **NOAA STAFF PRESENT:**

Mark Armstrong NOS/NGS

Mike Aslaksen Chief, Remote Sensing Division, NGS

Glenn Boledovich Policy Director and Chief of Policy, Planning and Analysis, NOS

Captain (sel) Rick Brennan Chief, Hydrographic Surveys Division

Todd Bridgeman NOAA

Russell Callender, Ph.D. Deputy Assistant Administrator, NOS

Captain Jim Crocker NOS/OCS

Gina Davenport NOS

Sam Debow NOS/OCS

Ben Evans Chief, Pacific Hydrographic Branch

Ruth Howell NOAA

Lynne Mersfelder-Lewis HSRP Program Coordinator

Rachel Medley NOS/OCS/NSD

Rolin Meyer NOS/CO-OPS

Crescent Moegling NOS/OCS

Travis Newman Marine Chart Division, NOS/OCS

Amanda Phelps NOS/OCS

Jim Rice Policy Analyst, NOS

Karen Swanson-Woolf NOS

Captain E.J. Van Den Ameele NOS/OCS

**SPEAKERS AND ATTENDEES:**

Kym Anderson U.S. Army Corps of Engineers

Joshua Berger Governor’s Maritime Industry Sector Lead, Washington State Department of Commerce

Aaron Berry Kongsberg

Matt Borbash U.S. Navy

Jonathan Crain U.S. Navy NAVFAC NW

Jon Dasler David Evans and Associates

Lauren Decker RPS

Dorrel Dickson Geospatial Survey Analyst, GIS Department, Tulalip Tribes of Washington

Martin Garthwaite Fishboat, Inc.

Captain Jason R. Hamilton Commanding Officer, USCG Cutter *Healy,* U.S. Coast Guard

Eric Hanson Port of Seattle

Kate Haseley U.S. Coast Guard

Marten Hogeweg Senior Project Manager, Esri, Inc.

Jeff Hummel Director, Sales and Marketing, Rose Point Navigation Systems

John Hutchinson No affiliation

Anne Johnson Alaska Department of Natural Resources

Harry Johnson Bellevue Sail and Power Squadron

Dan Jordan Columbia River Bar Pilots

Tim Kearns OceanAero

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