

**U.S. IOOS Advisory Committee
Public Meeting
Meeting Minutes
February 11-12, 2020**

Notification and Availability of Meeting Materials

The Integrated Ocean Observing System Advisory Committee (IOOS AC) was announced to the public by [Federal Register Notification](#) and on the [IOOS Advisory Committee Website](#).

Meeting presentations and background material are posted on the IOOS website.

All virtual attendees participated by WebEx video conferencing.

IOOS Advisory Committee Members Present:

Scott Rayder, University Corporation for Atmospheric Research (Chair)

Thomas B. Curtin, University of Washington

Sara Graves, Ph.D, The University of Alabama Huntsville

Molly McCammon Alaska Ocean Observing System (AOOS)

Ruth Perry Ph.D., Shell Exploration & Production Company

Doug Vandemark, Ph.D., University of New Hampshire

Jyotika Virmani, Ph.D., XPRIZE and Schmidt Ocean Institute

Dick West, Consultant

Bob Winokur, Consultant

Daniel Rudnick, Scripps Institution of Oceanography, UC San Diego

Jennifer Hagen, Quileute Indian Tribe

J. Quintrell Quitrell, IOOS Regional Association (ex officio)

Laura Lorenzoni, NASA (ex officio)

John Haines, USGS (ex officio)

Member in Attendance Virtually:

Jennifer Read, Ph.D., Univ of Michigan Water Center Graham Sustainability Institute

Members Absent:

Oscar Schofield, Ph.D., Rutgers University Center for Ocean Observing Leadership

IOOS Leadership and Staff in Attendance:

Carl Gouldman, IOOS

Krisa Arzayus (DFO), IOOS

Becca Derex (Alternate DFO), IOOS

Marnie Brown (Executive Secretariat), IOOS Affiliate

Laura Gewain, IOOS Affiliate

Jessica Snowden, IOOS

Derrick Snowden, IOOS

Dave Easter, IOOS

Kate Culpepper, IOOS Affiliate

Micah Wengren, IOOS

Bill Woodward, IOOS Affiliate

Michelle Harris, IOOS Sea Grant Fellow

Michael Jarvis, NOS

Speakers (non-FAC Member) Present:

Fern Gibbons, Senate Commerce Committee Staff

RDML Tim Gallaudet, NOAA

David Legler, NOAA/OAR

Deerin Babb-Brott, OSTP

Nicole LeBoeuf, NOAA/NOS
Martin Yapur, NOAA/NESDIS

Public Observers:
none recorded

Meeting Summary February 11, 2020 - Day 1

1. Call to Order. K. Arzayus called to order the Winter Public Meeting of the U.S. IOOS Advisory Committee 9:00 EST February 11, 2020. K. Arzayus notes that the meeting is public and previews the agenda for the two-day meeting. The new ex-officio members are welcomed: J. Quintrell Quintrell, Hoyt Beatty, Jen Hales, John Hailes, Laura Lorenzoni, and Brian Zelenske

2. Opening remarks. S. Rayder and K. Arzayus offered opening remarks and reminded the committee of its responsibilities. S. Rayder reminds the committee that it advises the NOAA administrator and the IOOC, separately. The group should consider the four priorities identified during the last public meeting.

- The FAC is Congressionally-mandated. Committee members discuss the committee's relationship with Congress. D. West requests to let NOAA know the committee's recommendations and then take to Capitol Hill. The Committee agrees to formulate a broad statement to sign and provide to both NOAA administrators and legislators.

3. Brief IOOS Overview. C. Gouldman reminded the committee of the history of IOOS and gave a brief update of the current status of the IOOS Program Office in NOAA (slides available on the [IOOS FAC website](#)). He reviewed foundational IOOS documents that created a system of requirements, plans, and cost analyses that structure both the Program Office and the broader IOOS Enterprise, which includes interagency partners in the IOOC and the IOOS Regional Associations. More funding is needed to accomplish all IOOS Enterprise goals and meet the Grand Challenges. FY19 highlights include:

- CENOTE passing, new initiatives (UxS, NOAA Water), Weather Research and Forecasting Innovation Act, EPIC implementation, R&D initiatives
- Integrating IOOS into the UN Decade of Ocean Science for Sustainable Development (hereafter, "UN Decade")
- Building on Ocean Obs '19 momentum, building communities of practice
- IOOS Grand Challenges and Actions

M. McCammon noted that many of the FY20 IOOS activities in C. Gouldman's slides reflect actions spurred by Administration priorities, and noted that while those priorities are good to leverage, we should also analyze our own program priorities and ensure those move forward as well. The committee should assess gaps to ensure they are included moving forward.

S. Rayder added the importance of ensuring priorities also align with the administration's.

R. Perry suggested that IOOS can take on a more central role in NOAA's participation in the UN Decade. S. Rayder commented that this is the exact type of thing that should be considered in the letter to NOAA, noting that a splintered approach makes it really difficult to collaborate meaningfully and include everyone. Members agree that IOOS may be the right vehicle to

convene people within NOAA and will consider how to accomplish integration with Decade activities. C. Gouldman states that IOOS is working on collecting the major actions and resources that will be funneled into the decade activities and including input from regional workshops to create a plan.

4. Legislative Perspectives. J. Quintrell provided remarks about engaging with Congress from the IOOS Association perspective. Ocean and coastal interests are fortunate to have bipartisan support. The Association has facilitated references to IOOS in new legislation, including CENOTE, Blue Globe Act, and continues to work into other existing draft bills. The Association's main priority is to collect resources (funding) to implement IOOS activities. By tying observation gaps to societal impacts (ex. HABs), they have incrementally increased IOOS funding over the past several years. However, It is also important to balance maintenance of the existing system with growth and expansion, and this has continued to be a challenge. J. Quintrell requested FAC input on striking the right balance between growth and maintenance.

F. Gibbons offered perspective as a staffer for the Senate Commerce Committee. ICOOS legislation has a good chance of being reauthorized. The language will be very similar, but will include a greater emphasis on the importance of IOOS. The structure and regional priorities format is relatively effective, so the goal is to convince legislators that the program is worth keeping. Regional IOOS success stories are helpful to persuading people of the importance of IOOS and ocean observations in general. It is also important to articulate the value of observations beyond contributions to weather forecasting. For example, how do observations fit into Ocean Exploration? F. Gibbons noted that as NOAA thinks more broadly about its observing portfolio, it is important for this FAC to provide insights on communicating the value of IOOS to NOAA in ways beyond numerical weather forecasting. IOOS needs to find better ways to communicate the value of their entire portfolio.

The Committee went into a Q&A session and discussed legislative strategies. S. Rayder asked F. Gibbons to discuss the draft LEGEND Act, which she described as a tag-along to NOAA's new Environmental Prediction and Innovation Center (EPIC). The overall goal of the LEGEND Act is to get NOAA to think more broadly and holistically about collaborating and creating models. While EPIC is going to be a prescriptive public-private partnership, the LEGEND Act encourages NOAA to be more open about the models they have, more open to community input, and better at making data usable and accessible.

S. Rayder then noted IOOS may be a bridge between ocean and atmospheric sides of NOAA. F. Gibbons suggests a focus on data management and cloud integration. This is an issue of interest to NOAA leadership, including Neil Jacobs, and IOOS leadership in this area can really push the ocean observing community forward. Improving data management and data access for existing datasets allows other communities to use these data in new ways that were not possible before. There is a lot more value we can squeeze from existing data, regardless of our capacity to collect more data. Regarding the cloud, S. Rayder noted that NOAA is no longer allowed to spend all of their HPC appropriations without first providing a mechanism for moving data onto the cloud. F. Gibbons responded that it is a cost-effective way to address ageing (computer) infrastructure.

R. Perry asked if there are partnerships that the Senate tends to gravitate towards. F. Gibbons noted there is a lot of interest in partnership mechanisms, and specifically NOPP, as potential

vehicles for capitalizing on funding opportunities. There is, however, an issue with making NOPP work for all scenarios, including the prohibition on NOPP accepting or leveraging private funding. This is a tough problem. An example of where we may see enhanced effectiveness of public-private partnerships is with NSF; the new Director elect had a track record during his time at Arizona State University of making these partnerships work extraordinarily well. This is something NOAA should watch for, and potentially leverage in the future.

T. Curtin notes that in terms of data assimilation, models run on a schedule. One difference between atmospheric and ocean observations is the ability to assimilate data into models. Often, it is a time issue impacted by the efficiency of partnerships. Working outside of Federal Acquisition Regulation (FAR) via the use of alternative funding vehicles helps to make data more accessible to modelers, faster.

D. Rudnick asked about the future of the “Fill the Gaps” Campaign. J. Quintrell answered that the RAs and the Program Office have all been thinking a lot about this, and the challenge is in filling existing gaps (i.e., growing the system) while balancing the increased maintenance and operations of both the older and newer components of the system. S. Rayder notes that funding long term observations is notably difficult. For this, diversification of funding lines is ideal.

S. Rayder asked what the ocean obs community does right and wrong, regarding Hill engagement. F. Gibbons and J. Quintrell both highlighted the regional perspectives and stories as big strengths. F. Gibbons encouraged IOOS to be more forward leaning, and J. Quintrell discussed the need to enhance recognition of our highly effective (national-regional) structure.

The committee agrees to provide support needed to help ICOOS reauthorization pass.

5. [NOAA S&T Focus Areas](#) RADM Tim Gallaudet surveyed NOAA’s four new strategy focus areas.

1. Unmanned Systems: FY20 budget includes a boost for UxS. The Office of Marine and Aviation Operations will be the centralized acquisition authority. NOAA is evaluating whether the Buoy Center or Enterprise Program is the best place.
2. Artificial Intelligence: The new strategy will address growing AI capabilities at NOAA by installing a central oversight body and office. It will provide an opportunity for tech advances in using drone data, marine mapping, fire and hazard monitoring, oil spill prediction and monitoring.
3. ‘Omics (broad term for microbiological data): Next generation gene sequencing using eDNA. This technology will be used for seafood inspection, aquaculture science, species abundance and distribution for stock assessments.
4. Cloud Services: The challenge is assimilating data from all observations, models, etc. NOAA is working with Amazon, Google, and Microsoft to pick a cloud, which will process, compute, and archive all data (including IOOS).

RADM Gallaudet reminded the committee that Citizen Science and prize programs incentivize valuable data collection that can provide partners and more effective methods to improve

priority areas—which at NOAA are currently weather modeling and the blue economy. These four strategies are undergoing public comment and will be finishing in the coming weeks.

S. Rayder pointed out that IOOS has been at the forefront of incorporating modeling and asks if there will be specific PPAs tied to these strategies that will have requested increases for FY21 budget requests? RADM Gallaudet responds that the FY21 budget does have UxS plus-up, but otherwise no. AI may be the best candidate for a PPA in FY22. S. Rayder added that the leadership should consider using IOOS as a demo to other programs about how to integrate in cloud. The sooner it can be applied to broader NOAA the better. He asked RADM Gallaudet to comment on what IOOS means to him and how that perspective has evolved since his Navy days. RADM Gallaudet responded that IOOS is the pilot demonstration for partnerships. This is important to OSTP for facilitating the “innovation era”. He also highlighted the new NOAA partnership with Ray Dalio/OceanX that gives NOAA ship time. S. Graves asked how we make the case for the value of partnerships with philanthropists and large companies? RADM Gallaudet responded that it can be helpful to leverage their desire to be seen as environmentally friendly and work with them to figure out what specific initiatives appeal to them. They benefit from the public recognition that comes with being a “NOAA Partner.”

M. McCammon noted that the four new strategies are nationally-focused. What are the regional aspects of these strategies and how can they integrate with broader national ones? RADM Gallaudet indicated he is directing that IOOS and regional capabilities are considered.

R. Perry relayed the question she posed to F. Gibbons about partnerships, transparency and co-mingling funds. If NOAA is having issues of transparency here, how will these be addressed? Whether revitalizing NOPP or other things, how do we address this barrier, especially in the context of an integrated IOOS FAC? S. Rayder added that sometimes with high barriers to entry, good work is foregone. There are few programs of mass at NOAA that can bring weight to problems the community is trying to address. How do we build bridges, remove barriers, leverage partners? C. Gouldman noted that funding matched using NOPP is already being leveraged. Also, the IOOS Ocean Technology Transition (OTT) Program asks companies to come work with RAs who have unmet needs that could be met with new technologies, in order to transition emerging technological capabilities to operations in the regions. This is a good model because it identifies real users with needs to the company. IOOS has a non-federal structure that allows this. D. West pointed out NOPP was created to address this exact thing. Some NOPP projects were significant in getting IOOS built. He stated that NOPP is a wonderful mechanism and should be used more.

RADM Gallaudet asked the committee for thoughts on how to better organize within NOAA and lead the community, noting that the White House has expressed keen interest in ocean work? S. Rayder expresses support for these questions but noted it can be difficult because Congress has jurisdiction over the program structure. R. Perry referred back to her earlier point about understanding barriers and stressed the need to acknowledge them. S. Rayder suggested paying attention to sole-sourcing mechanisms such as Other Transactional Authority (OTA), which allows partnerships to work more efficiently outside of Federal Acquisition Requirements (FAR), which is bureaucratic and often slower than what is needed to quickly acquire new technology based on mission requirements.

J. Hagen noted the need for STEM programs that reach rural communities. RADM Gallaudet agreed on the importance of this outreach and cited a few programs that work to this effect.

J. Vermani asked if there is anyone looking at the tech sector outside of government? And if so, how can this be transitioned to the ocean? Is there a place within NOAA (besides prizes) to include this kind of exponential tech development? RADM Gallaudet noted that there is an office responsible for this, though it is understaffed. He welcomed ideas the committee may provide. J. Quintrell added that she is excited about new technologies. RA stakeholders are anticipating rapid changes and want the tech sector to help. The major challenges include keeping sustained observations and updating infrastructure. How do we help facilitate this at NOAA? RADM Gallaudet suggested the approach is to seize opportunities. For example, there is a big initiative on aquaculture coming out of the White House. The administration is keen on infrastructure investment, and so NOAA should look for ways to leverage this. They are also open to suggestions about whom they should engage.

S. Graves commented that whether it's the cloud or a different data management system, partnerships are needed as well as communication with end users. Building a bridge is very important so the larger community can benefit from observations. RADM Gallaudet agrees and points out that the workforce is an important piece of this effort. The more people that are ocean literate, the more data will be used.

T. Curtain noted that an objective is to make people aware of technological advances. If technical NOAA scientists were encouraged to publish results more, there might be more awareness. This is a cultural issue. The strategies presented are just science and technology; they lack references to the need to use literature. This mechanism should be reinvigorated. RADM Gallaudet agreed on the necessity to justify these activities.

M. McCammon commented on the nature of IOOS as an interagency program. It was always meant to be interagency, even though it is housed within NOAA (as directed by ICOOS legislation). How can we better integrate at global and national levels? RADM Gallaudet agreed the system is not fully integrated within US agencies. Agencies must share a vision and together have the power to accomplish it. The White House is interested in supporting this. D. West added that ocean investments are often in partnership with the federal government. Partnerships are a key mechanism in alleviating this competition. The committee will prepare suggestions for Gallaudet on how to address this.

6. Global Observing (David Legler, IOOC Co-Chair). David Legler walked the committee through the Global Ocean Observing System (GOOS) structure and vision and [presented](#) the recently released 2030 Strategy. The GOOS 2030 Strategy identifies a vision for a truly integrated global ocean observing system that delivers the essential information needed for our sustainable development, safety, wellbeing and prosperity.

The GOOS Strategy plans to deliver information across three key application areas: operational services, climate, and ocean health. The mission of the GOOS office is to implement actions and build partnerships to move the system ahead in three strategic objectives: *Building for the future, System integration and delivery, and Deepening engagement and impact*. Each strategic objective has tangible actions which feed into them; 11 total.

Currently, GOOS has four key components: 1) expert panels for physics, biogeochemistry, and biology and ecosystems that synthesize across requirements and provide guidance on observing system design; 2) the Observations Coordination Group and the GOOS Regional Alliances that implement observing systems and ensure the flow of observations across the global networks and regional observing structures; 3) GOOS Projects that advance innovation and expand into new areas for the observing system; and 4) core coordination through the GOOS Steering Committee and a distributed GOOS Office. Through these components GOOS supports a community encompassing all those playing a role in the observing system: international, regional, and national observing programs, governments, UN agencies, research organizations, and individual scientists. NOAA leadership footprint within the GOOS system touches on the GOOS Steering Committee, Projects, and Observations. The IOOS leadership footprint closes in on the Expert Panels, Observations, and AtlantOS Project. The main in situ element map of GOOS, which can be seen as a complement to satellites and in the JCOMMOPS report card, provides insight into the operational function of the system and its different community of practices. The major elements of the system include Argo, Data Buoys, Timeseries, Repeated Hydrography, Sea Level, Ship-based measurements, HF Radars, and Animal Bourne Sensors.

After discussing the GOOS structure and activities, D. Legler highlighted other aspects of international coordination through NOAA, successful partnering in the IOOS enterprise, and opportunities for future engagement.

The OceanObs'19 conference brought the global observation community together and sieved out the vital needs for the community: 1) Planning for impact: codesign of the observing system, end-to-end, with stakeholders and users; 2) Core system integration: Democratization of data, best practice, integration of biological and ecological observations, and a growing emphasis on the coast; 3) Embracing innovation in technology and governance, and looking to the Ocean Decade as a vehicle for transformation. Other major coordination activities in implementing GOOS in NOAA OAR Global Ocean Monitoring and Observing (GOMO) can be seen through: 1) Observations beyond US EEZ carried out across every line office of NOAA; 2) Purposefully designed global scale sustained ocean observing programs are a subset (largely NESDIS and OAR); 3) Many programs contribute time/energy towards the global ocean observing enterprise (e.g. IOOS engagement with other GOOS Regional Alliances, ATN..) The mission of Ocean Observing and Monitoring Division (OOMD) is to provide high-quality long-term global observations, climate information, and products to researchers, forecasters, and other users to inform and prepare society for environmental challenges. Examples of successful systems include Argo, surface drifters, RAMA, PIRATA, Oceansites, GLOSS Tide gauges (int'l and US), SOOP/XBT, gliders, SOCONET, GO-SHIP, DBO, Sea Ice Buoys, and Saildrone. Opportunities for additional coordination with GOOS, NOAA, and IOOS include: Expansion of biogeochemical measurements, Global-coastal ocean connections (e.g. boundary currents), Regional/basin-scale observing/prediction, Extremes – hurricanes, heat waves, etc., Deep Ocean, and Improving NOAA modeling enterprise (data accountability, ODA).

D. Legler concluded his briefing with three ways NOAA can help IOOS: 1) Communicating value of IOOS enterprise; 2) Connecting diverse stakeholders; 3) Embracing predictability in ocean enterprise.

S. Rayder asked what the GOMO budget was within NOAA. D. Legler noted that the GOMO budget, including global and arctic activities, is estimated at about \$45 million.

D. West asked if GOMO has a breakdown of the national investments in GOOS. D. Legler clarified that they do not, but the estimate of the US (NOAA) investment is approximately 50%. D. West and S. Rayder asked for a portfolio of the ocean observing investments across NOAA.

M. McCammon asked about the relationship between ocean exploration and global ocean observing and how they relate to one another. D. Legler pointed out that the connection is not very robust, but they could evolve with numerous prize competitions and efforts in place.

7. OceanObs'19 (Laura Lorenzoni, IOOC Ex-Officio Member). L. Lorenzoni provided conference [outcomes](#). The conference had five overarching themes: Information, Integration, Innovation, Interoperability, and Governance which brought together an estimated 1500 participants from 74 countries. Community input was fed into the conference planning via Community White Papers (CWPs) and session proposals. High-level recommendations from CWP authors and Breakout/Special Sessions leaders were collected to guide the development of the Living Action Plan. The major recommendations heard at the conference were summed up as: 1) Planning for impact: codesign of the observing system, end-to-end, with stakeholders and users; 2) Core system integration: Democratization of data, best practice, integration of biological and ecological observations, and a growing emphasis on the coast; 3) Embracing innovation in technology and governance, and looking to the Ocean Decade as a vehicle for transformation.

L. Lorenzoni emphasized the major priorities which IOOS could help with over the next decade:

- Stakeholder connection and Data/product development
 - Co-design obs. systems with modelling communities and stakeholders.
 - Expand observing capacity to link physics, biogeochemistry, and biological observations to measurement of societal/human impact.
 - Partner with indigenous communities in the expansion of global observing systems.
- Integrating system of open ocean-coastal observations, augmenting biological/biogeochemical
- Data Management
- Communication
 - Increase partnerships and communication with public, stakeholders, and policy makers.
- Embrace Innovation
 - Integrate high-tech innovations in observing sensors, platforms, data managements, and visualization
- The role of the UN Decade of Ocean Science for Sustainable Development in moving forward national interests relevant to OceanObs19.

S. Rayder asked how the community plans to take the specific recommendations from the conference and turn them into an executable, funded plan. D. Legler clarified that the responsibility does not lay with the observing community, but with GOOS and other international enterprises. D. Legler pointed out that the CWPs can serve as initial plans for the community

and have a depth of information for potential funders. L. Lorenzoni noted that the IOOC and other interagency groups can act as a vehicle to coordinate recommendations and community efforts. A similar bottom up mechanism has been utilized to map the [IOOS Grand Challenges to the UN Decade priorities](#).

M. McCammon asked how to best integrate regional observing gaps (Arctic, Indian Ocean) and new emerging systems (OA, HABs) into the global system. D. Legler stated that the community is still struggling with this. S. Rayder asked why. D. Legler noted that there is no regimented process for integration and that we have to move past top down and look from a bottom-up perspective. An organization like GOOS could help with the appropriate approach and take into consideration the different cultures and communities.

J. Hagan asked for a clarification on “embrace predictability” of the ocean. D. Legler expanded on the value of offering prediction of future events. The contribution of the ocean in predicting events is underutilized or over-looked. We, as a community, must be better at engaging and supporting other systems to do that. S. Rayder asked if GOMO and IOOS have any stories to communicate the value of the ocean data and predictability. T. Curtin asked if the International Arctic Buoy program was a part of GOOS and if the National Ice Center (NIC) could be a poster child of interagency efforts. Most of the commodities and futures markets are now the stakeholders to work with (other than farmers). D. Legler noted that the buoy system is part of GOOS and the NIC could be a model for future interagency success stories.

D. Rudnick asked about the interface between OOMD and IOOS. Together, he noted the budget estimate around \$90 million, and wanted to know where those programs interface, where could they interface in the future, and how can the IOOS FAC advise on that progress? D. Legler pointed out several efforts on which OOMD and IOOS work together (i.e. Coast to coast biogeochemistry observing system) and noted that the offices engage with each other regularly to find points for collaboration. C. Gouldman noted that a little bit of funding can make a big impact in partnerships. For example, regional ocean partnerships within hurricane (supplemental) glider work has helped fund new technologies in surface observations. D. Rudnick asked if there are any specific areas ready to move forward which the committee could formally recommend. S. Rayder noted that common activities are low hanging fruit for investments and that we should integrate better with each other. B. Winokur emphasized the importance of examining both programs to identify common interests and priorities. Common management can be easily achieved with willingness and partnerships, as long as any policy issues can be tackled. Under a Memorandum of Agreement (MOA), both programs could work under a single management structure. B. Winokur asked D. Legler what the committee can do to help this integration. D. Legler noted that the IOOC could be utilized in this activity as this discussion can be applied to efforts outside of NOAA and OAR.

8.. Federal Support for IOOS: Executive Branches Perspective. The following panelists delivered brief remarks before opening up the floor for Q&A with the committee.

Deerin Babb-Brott, OSTP: New ocean policy from the current administration can be found on the [CEQ webpage](#). In 2018, the new Executive Order on Ocean Policy was released and focused on broad community goals such as ocean science and technology, data, regional

areas, and partnerships (NOPP). Following the EO, the SOST released *Science and Technology For America's Oceans: A Decadal Vision* which focused on immediate opportunities such as Big Data, modeling, data integration, ocean exploration, and partnerships. These documents were highlighted and integrated at the White House Summit on Partnerships in Ocean Science and Technology. The summit brought together a cross section of the community from different sectors to collaborate on the common goals. To follow on that, there will be an RFI in the Federal Register soon from NSF seeking public comment on what works, and what doesn't work, regarding partnerships in ocean sciences. The final major activity from the EOP is the Presidential Memorandum (PM) on Ocean Mapping and Characterization. The PM puts out a mission and a task on all the prior work that was done, and asks for a strategy report from NOAA in 180 days.

Nicole LeBoeuf, NOAA: IOOS is a model for partnerships. IOOS is setting the standard in many ways, I hear wherever I go. The IOOS FAC works well and is engaged. As the pace of change is increasing—we need to be forward-thinking in our approach. We have entered an era of accelerated change, and as we work together to leverage our strengths, we need to make sure that the hand-offs between federal agencies, or with our non-federal partners, are efficient and crisp. At NOS, the demand signal for our products and services is going through the roof; managing that is a challenge, but I consider our superpower to be our partnerships. Tackling the changes we're seeing today in the coastal zone is a bigger task than any one agency can take on, and NOS is actively considering what the federal vs. private sector roles of the future look like.

John Haines, USGS: I coordinate coastal and marine hazard programs for USGS. The main goal is to provide tools to enable coastal communities to anticipate and mitigate coastal hazards. How do we embrace the complexity of coastal systems and provide useful tools? Through past decades, we have demonstrated failures, and I am interested in exploring how we improve and deliver useful tools at large scales? Coastal communities are entitled to useful tools. Programmatic efforts need to be established to sustain the delivery of usable products. Additionally, we must evaluate the performance of the tools we deliver and invest in improvements. Large scale systems need partnerships. We need to partner to allow USGS and NOS to do what each are best at and leverage expertise to serve common stakeholders. All of this comes back to observations. How we incorporate everything to characterize our coasts is the biggest challenge we face. We need satellites, aircraft, unmanned systems, etc. to do great science and make it useful for observational systems that will enable us to deliver at a national scale.

To begin the discussion, S. Rayder asked about white papers that highlight his “scaling up products and services” comments. J. Haines noted that there is a NOAA-USGS bilateral that began two years ago that helped identify strong connections between USGS/NWS/NOS that greatly improve end-to-end data collection to stakeholder engagement-- there is a white paper in progress. S. Rayder requested to see that paper once it's completed.

D. West asked what the biggest impediment was to working together. J. Haines elaborated that the successes were built from the bottom up (i.e. by people who don't have to deal with budget).

Culture is a part of the problem, but attributions to contributing partners can help. It is also an issue to get programs within a single agency to work together, but shared goals make up for other shortcomings.

T. Curtin asked how the Army Corp of Engineers fits into this effort. J. Haines clarified they are an important player in the coastal zone; efforts across agencies ensure the existence of resources and requirements driven research. There is currently an RFP requiring applicants to partner with other federal agencies.

S. Rayder asked if USGS is NOPP eligible. J. Haines noted that they are. D. West emphasized that all agencies are a part of NOPP. N. LeBoeuf noted that breaking down barriers, building trust, and giving attributions is critical in partnerships. The demand for information is present; science and service delivery requests for our work has led to a mission driven focus during lean budget times. J. Haines elaborated that partnerships enabled through NOPP make a lot more sense when there are common programmatic goals. D. Rudnick asked if attributions are a major problem when working between federal agencies, and how do we overcome it? N. LeBoeuf noted that they prioritized how they would attribute early on in the NOAA-USGS bilateral, which allowed a building of trust. J. Haines clarified that the attribution issue is not the biggest problem. There is a greater need to increase the dependency on each other which is vital during appropriations, to deliver sustainable information to the coastal communities.

S. Graves asked how each of the representatives on the panel dealt with overlap of federal responsibilities in addressing coastal resilience. N. LeBoeuf said she always addresses that by first asking, "Is it NOS's lane to really address or provide that?" As an example, consider inundation mapping-- what does NOS need to contribute vs. what do stakeholders need to pick up and tailor. The problem is the required on-the-ground resources and expertise to do this-- some municipalities can't as well as others, or at all. Then it becomes an issue of life and property protection, and we need to re-examine the federal role. ALL federal agencies have equity in the coastal zone/ interest in coastal hazards.

J. Quintrell asked D. Babb-Brott to expand on the mapping and characterizing the EEZ and if there is a role for real-time observations for changing conditions. D. Babb-Brott explained that the PM says to map and explore priority areas in the EEZ; characterization will take into account the changing environment. We are going to look at overlapping congressional mandates in that space and the next step is TBD, but we need a complete package of intent and a comprehensive program to address each piece. J. Haines noted that it is not a static system and processes are included in mandates. T. Curtin noted that there is a lot hidden in the word "map". Mapping could be a common thread to integrate all the pieces. D. Babb-Brott agreed and noted that developing common language is the first step.

S. Rayder commented that the committee can aid in the credit aspect of partnerships. Creating cross-cuts in ocean observing activities, as previously done, should be a recommendation by the committee. M. McCammon noted the difference between knowing how much money is used for ocean and coastal observing by agency and coordinating and understanding what each party is doing. Often, there are blinders on programs and no cross-government coordination on similar missions. We need to not only look for a cross-cut, but also for mechanisms for ensuring there is coordination and collaboration. D. Babb-Brott commented that simplifying the OPC

mission can allow for agencies to provide recommendations on better coordination points across the government at large. S. Rayder noted the OPC comment and acknowledged that historical interagency structures have looked good in hindsight, but effort is needed to get work done.

9. NOAA's Approach to Observing System Requirements Management Systems Requirements (Martin Yapur, NOAA/NESDIS Technology, Planning, and Integration for Observation). Martin Yapur [presented](#) NOAA's requirements for governance, portfolio management capabilities, current requirements for marine observations/services, and opportunities for support.

The Technology, Planning and Integration for Observation (TPIO) is the division that provides direct analytical, technical and decision support to the NOAA Observing Systems Council (NOSC). TPIO helps provide the actionable business intelligence so NOAA leadership can make more informed decisions on how to better:

- Manage observing system investments through an integrated architecture.
- Maximize impact for investments in observing capabilities across NOAA's missions while minimizing costs.
- Minimize impacts to mission-services from budget reductions.

NOAA has a complex and large portfolio—190+ systems owned, operated or leveraged by 6 Line Offices, \$2.7B of \$5B Annual budget, and 1525 user observation requirements with 1200+ products and services. NOAA's Mission Services Areas (MSAs) are independent of the line offices and form the sub-components of each of NOAA's four Goals: Weather Ready Nation, Healthy Oceans, Resilient Coasts, and Climate. NOAA's vision is to achieve and sustain an observing system portfolio that is mission-effective, integrated, adaptable, and affordable. NOAA has developed a suite of tools needed to effectively manage its observing systems. To assist with managing NOAA's Observing System Portfolio, TPIO maintains 3 different types of foundational datasets: 1) User observational requirements; 2) Observation capabilities; 3) NOAA Value Tree. TPIO maintains information on NOAA-wide user needs that are essential for generating the specific products and services that NOAA needs to fulfill its mission objectives. These needs are known as user observation requirements. These requirements are observing system-agnostic which means: 1) system-independent, validated user needs of environmental variables, with their associated attributes, required to produce specific products and services to meet mission objectives; 2) formally reviewed and validated through a process managed by TPIO; 3) provide a foundation for selecting, designing, developing, and acquiring observing technologies, systems and architectures.

The evolution of Observation Requirements (now at 1526 requirements) has changed with integration and collaboration with line offices and users. As NOAA moves forward with efforts to refresh requirements (efforts which TPIO will help lead), we expect that the number of requirements & environmental variables defined will continue to grow. In order to elicit requirements, a standardized template and process is used.

The NOAA Value Tree Model dataset is made up of information about NOAA's mission, core functions or Mission Service Areas, products, services, and observing systems. Used to inform analyses within the NOAA Observing Systems Integrated Analysis (NOSIA) framework, the

NOAA Value Tree Model is designed to represent the impact of observing systems and/or their products and services on NOAA's mission and goals. It is a detailed representation of the relationships, complexities, dependencies, and impacts that exist among NOAA's observing systems, service outcomes, and products. NOSIA provides objective guidance for the contribution of NOAA products and observing capabilities to the Agency, its goals, and its mission service areas (MSAs).

M. Yapur concluded his briefing with opportunities with IOOS. IOOS is an important source of requirements, especially for the regional associations. IOOS is on the "front lines" of ocean observing. Identifying new user needs and ensuring that they are captured and considered is critical. Of the 1219 products and services we maintain, 223 identify IOOS Regional Buoys as a source needed to create the product or service. IOOS could be instrumental in developing a requirements-based acquisition strategy for UxS capabilities. Recently refreshed, the "integrated water and prediction" end user requirements which represented a cross-NOAA assessment of needs to support a variety of products and services. Working with the NOAA Water Initiative Observations Team to perform a series of gap analysis assessments to help identify high priority requirements. IOOS has an opportunity to show how they are meeting NOAA's needs. We want to make sure that IOOS and their partners capabilities, services, and products are accurately represented. NOAA's portfolio management approach can show you: 1) Where IOOS assets are used; 2) What the needs are for marine data; 3) Answers for business questions.

Following the briefing, B. Winokur asked how the system showed that IOOS is fulfilling about 223 of NOAA's requirements, but shouldn't the outlook show how NOAA is meeting IOOS's requirements? M. Yapur clarified that that is correct. The information here shows how observing systems are used in creating products which are derived from the value tree (NOSIA).

M. McCammon asked if this briefing has been done before. It seems that this is important for RAs to know while evaluating systems portfolios for funding. She also asked how they deal with requirements that overlap across line offices and modeling systems. M. Yapur noted that the system architecture portfolio management examines what is missing and what already exists to avoid overlap.; it is not completely developed to examine partnerships and overlapping missions but is primed to do so in the future.

J. Virmani asked if there was a statistic for what the RAs contribute to the whole value tree (i.e., what are the 233 products in the value tree as a percentage). Martin Yapur noted that they are trying to better communicate the requirements work, but can do an analysis and provide the requested data.

D. West asked how the requirements are phrased as they move up and down, and noted there is an external audit being conducted on the requirements process used for OMAO's Fleet Recapitalization Plan. TPIO is currently underway with an external assessment will be completed after April 1. S. Rayder asked that the committee be sent the results of the TPIO assessment.

S. Graves asked if partnerships could play a role to fulfill requirements. M. Yapur noted that of the 190 systems, 112 are NOAA owned and the remainder are products of partnerships. S. Rayder asked how we can assess partnerships using requirements management. He asked M. Yapur if TPIO has been asked to assess the requirements laid out in the ICOOS

Reauthorization and map them to the system requirements. M. Yapur said they have not. C. Gouldman noted that this system was built for NOAA's observing system at large. IOOS is bottom up due to the RAs, but the system needs to be refreshed with work with TPIO.

10. Carrying forward the IOOS Advisory Committee Work Plan (Scott Rayder, University Corporation for Atmospheric Research (Chair)). S. Rayder asked for the draft actions and recommendations lists to be presented for discussion.

D. West commented on FAC operations stating that electronic meetings are 33.3% as effective as in person meetings. He also requested an official swearing in ceremony, in addition to the official paperwork FAC members completed to achieve Special Government Employee status. He also requested that in the future, the committee consider having closed portions of public meetings.

J. Hagan asked about the roles and structure of the committee. A vice chair role and executive committee of the FAC should be considered if doable. D. West noted that a Terms of Reference needs to be established and it and the committee by-laws should be examined by general counsel. Note for the record: The FAC does currently have a charter that has been reviewed by general counsel.

D. Rudnick asked what falls within the scope of IOOS FAC advice. S. Rayder confirmed that it includes both NOAA and the IOOC. D. Rudnick asked if people would follow advice from the committee. S. Rayder noted that advice from a committee, which seeks input from OSTP, USGS, and NOAA leaderships is needed and should be well-received.

S. Rayder asked for a write up to be sent out within two weeks of the meeting stating the initial outcomes. He also noted other items to be addressed: two committee seats need to be filled and the next meeting needs to be bookmarked, with closed session time. It was suggested that the meeting be held in early August on the west coast (potentially a joint meeting with the IOOS Association). J. Quintrell noted that one of the west coast RAs could host. S. Rayder welcomed the invitation and acknowledged that hearing regional updates and stakeholder information would be vital to the committee.

J. Virmani brought up the valuation of the IOOS observing system as an area that the committee could consider examining. Conducting an assessment of the age of the infrastructure and replacement costs vs general upkeep over lifetime could be beneficial for the system. J. Quintrell noted that a new report on the economic value of the IOOS enterprise is being drafted. M. McCammon noted that planning for the second phase of the NAS Ocean Studies Board Sustaining Ocean Observations task (phase 1 was a 2017 report) is underway and will focus on a fall 2020 workshop.

**U.S. IOOS AC Meeting Minutes
February 12, 2020 - Day 2**

1. Swearing-in Ceremony. K. Arzayus swore in new committee members. Swearing in is a mandatory process for special government employees/members of the Federal Advisory Committee.

2. C. Gouldman presented the IOOS FY19-FY20 Budget. Key highlights of his presentation include:.

- Budget has seen a \$500K increase from last year's total.
- FY19 Sources of funding to IOOS regions totals \$41 million.
 - o Includes \$5.3M External, \$1M 'National', \$34.7M 'Regional'
- FY19 Line Office/Agency funding totals \$6.3M to IOOS

R. Perry made the point that IOOS should focus on proactive priorities as opposed to reactive ones. Being able to shift priorities quickly is a good strategy. Key programs, such as ATN, need to be prioritized to be sustained (because they are more vulnerable if one funding agency drops out).

3. Executing FAC Priorities: Part 1 (Scott Rayder, University Corporation for Atmospheric Research (Chair))

S. Rayder opened the floor to the Preparatory Work Groups (PWGs) which were established by the committee to provide an update on their activities.

Partnerships (Sarah Graves, Jennifer Reed, and Dick West)

D. West provided a brief summary of the US Ocean Commission. This 2004 report is the most relevant and comprehensive review of our ocean to ever be compiled. IOOS was established as part of those deliberations, after Ocean.us was in place. It highlighted the issue surrounding partnerships and led to the creation of GCOOS, which was among the first of the Regional Associations to form. The committee can still help define and evaluate partners.

S. Graves defined the group's goals and identified its activities. The purpose of this Partnerships Preparatory Work Group (PWG) is to

1. investigate the relationships across federal agencies, as well as with non-federal partners, and provide recommendations to strengthen and enhance those relationships;
2. initiate outreach activities (by IOOS AC members) to provide informational briefings about the Enterprise and explore ways to tighten collaborative efforts;
3. determine where the Enterprise might forge strategic alignments with new, unfamiliar communities (e.g., the insurance and reinsurance industries) and provide those recommendations to NOAA and the IOOC.

The Partnerships PWG has compiled a draft comprehensive list of national partners for committee review. Additional considerations need to be given for these items:

- Assess successful relationships before determining an outreach strategy
- Partnership approach should be shaped by the IOOS Vision & Strategy / Messaging subgroup activities
- Recommend examining partnerships in three categories: Existing, Emerging, and Future

- AC needs to assess how we prioritize maintaining vs. growing these three categories

The next steps include:

- Review initial template, Provide feedback (IOOS AC)
- Collect and maintain IOOS-Wide partnerships & stakeholders list (IOOS PO, RAs)
- Determine strategy to strengthen and enhance those relationships (IOOS AC, IOOC, RAs)
- Anticipate important future partnerships and cultivate (IOOS PO)

S. Rayder noted that partnerships need to be beneficial to both parties. Time and effort put into partnerships should be profitable to everyone. He asked what capacity and resources are needed at the IOOS PO level to establish connections, make new partners, and maintain relationships. D. West agreed, invited any new partners to come brief the committee, and suggested developing a list of partnership priorities in the RAs and on the Hill (during closed session).

J. Quintrell noted that IOOS Hill partnerships are well established, but an assessment of regional partners would help. M. McCammon noted that the committee should look at this bottom up and identify and sustain relationships with partners. Successful relationships take time and commitment; the committee recommendations should be strategic.

S. Graves suggested the addition of more categories for the partners: good-will, funding, regional, etc.

D. Vandemark noted that someone quoted IOOS as the model for partnerships and acknowledged that we shouldn't fix what isn't broken, but we would like advice on the parts that need work. S. Rayder agreed that engagement is a piece that the committee can definitely work with. An enterprise (like the weather) should include government, academic, and private sector. We should work to build this for the ocean enterprise. Research (peer-review) leads to discoveries and needs to be utilized. NOAA's a place where science gains value.

S. Rayer asked C. Gouldman to name the three best partnerships that IOOS has. Carl Gouldman answered: Shellfish growers (all coasts), DoE (OTT), and other parts of NOAA (mission aligned--OA). J. Quintrell also noted that MBON should be added to that list.

S. Rayder noted that relationships take time and asked how the committee can leverage them back. Letters from shellfish growers? Letters of support are needed, especially on the Hill. J. Quintrell Quintrell commented that each RA has many constituent letters and will share them with the committee.

J. Hagan noted that tribal partnerships are missing and should be added. Nationally, there are tribal partnerships all around the coast. The National Congress of American Indians could be a strong partnership.

S. Rayder then asked about the best regional partnerships on the ground, from the committee members who are on the Executive Boards of RAs.

S. Graves provided a GCOOS perspective which indicated the education community (K-12 and universities—broader than Sea Grant), Harbor pilots (utilized GCOOS data). R. Perry agreed that Sea Grant is not the only education and outreach area.

M. McCammon noted that her best partners include: Coast Guard (bottom up and top down), BOEM, DOE, USGS, Army Corps, shipping/ports, fishermen (shellfish), but need to work the general public partnerships.

D. Vandemark acknowledged that the work done over the last 15 years is starting to pay dividends. They want to see the transition path (i.e. NOPP). The infrastructure is important to make logical, healthy, and nimble partnerships (especially in regions, education area).

R. Perry noted the benefits of having private industry partners. Those partnerships haven't been framed really well, and we should find out what makes them successful. We need to frame the list, identify the secret sauce to amplify them, and communicate the success stories better. S. Rayder closed the discussion by asking the committee to review the template list and provide feedback for N. Rome.

Requirements (Scott Rayder, Tom Curtain, and Bob Winokur)

S. Rayder asked the committee: Do resources meet requirements? We have a lot more requirements than resources. We need to have this laid out, and demonstrate that there are only two paths forward: cut requirements, or increase capacity (funding). We need to be able to articulate the needs of each agency and each region into a “rack and stack” against the overall Enterprise budget.

The goals of the PWG include:

- Examine “rack and stack” of IOOS Enterprise requirements against the current budget, while considering how IOOS will evolve into the future.
- Assess what the IOOS Enterprise has been tasked to complete vs. what it can afford, and identify key gaps. This can be valuable for budget formulation requests and communications with Congress, as well as OMB.
- Develop a transparent process for evaluating requirements across the Enterprise in the future.

The initial and planned activities include:

- Examine legal requirements for authorization
- Gain a better understanding of how IOOS partners determine/define requirements, prioritize, and make decisions
- Discuss what an interagency requirements process might look like for the IOOS Enterprise

B. Winokur clarified the requirements point--IOOS is satisfying 223 requirements. The requirements are driving the system. Requirements need to be articulated in a broad way--NOAA has over 1500 requirements and that means they are far too specified. What is the

impact of not funding a requirement? Which requirements are most important, what is the interface process? What are the requirements of the IOOC and how do they set them?

T. Curtin asked how will the unfunded requirements, through the PO approach, become a high priority during reappropriation? J. Virmani noted that the proof of concept has been established for the last 20 years. What is the succession? What is the next phase, and can it involve new technologies and mechanisms? Pick a space and transition to a nationwide operational system. S. Rayder asked to develop a list of unfunded requirements.

J. Quintrell noted the independent cost estimate (ICE) and 10 year build-out plans completed by the RAs. The plans are out of date but can share requirements. S. Rayder asked RAs to submit those and 5 year proposals to IOOS FAC.

J. Virmani asked if the plans could be updated with the replacement costs of new technology. J. Quintrell noted that anticipatory plans are ready which could help. S. Rayder asked if the current bids could be shared once released (Dec 2020) (ACTION).

M. McCammon acknowledged a tension between the RAs and PO regarding requirements. Because regions are able to set their own priorities, there is unevenness in capacity in specific topic areas by region. She has gotten feedback from some partners who do not want to use IOOS as a national resource because of that unevenness in regional capacity (e.g., in data management or HABs).

J. Quintrell noted that IOOS is fulfilling most of the ICOOS Act requirements.

D. Vandemark asked what the next 10 years look like. We have a different approach; we highlight the vital areas and show new areas. What is the process that the RAs use to come up with their 5 year budgets? Do the RFPs have guidelines to best do that? Has the process changed?

T. Curtin commented that the requirements should be defined from the bottom up. The function of the federal requirements is to look at the economy of scale and look at the large picture. D. Rudnick asked to flush out this idea. The regions need to decide on a few broad things to have a national footprint (i.e., HF radar). J. Virmani noted that whatever is picked, should be approached from by taking in the cost and benefits. T. Curtin agreed that IOOS should take advantage of the scale. For example, PMEL has over 200 moorings in the ocean at any given moment. They buy in bulk and modify the moorings based on specific requirements after receiving them. S. Rayder agreed that this approach is valuable to get the purchase power by federal agencies.

4. Executing FAC Priorities: Part 2 (Scott Rayder, University Corporation for Atmospheric Research (Chair))

IOOS Strategy and Vision/Communications (Molly McCammon, Dan Rudnick, Ruth Perry)

M. McCammon provided an overview of the Strategy and Vision PWG's goals and activities. The goals include:

- Define a roadmap of where the Enterprise will move in the future, how specifically it intends to develop and mature, or how the various components (local, regional, national) fit into a broader framework.
- Explore ways in which IOOS partners can align their messaging and advance simple, commonly-understood priorities; speak from a unified voice to help grow recognition for the achievements and capabilities the IOOS Enterprise offers; and galvanize support from OMB, the Hill, the White House, and other entities

The current activities include:

- High-level mapping of regional priorities
- Examine IOOS Grand Challenges
- Complete a baseline assessment of alignment of past messaging
- Evaluate IOOS Communications Plan

Additional considerations need to be given for these items:

- In order to frame IOOS vision and strategy, it would be useful to map regional IOOS priorities to visualize where the strengths and commonalities lie and identify where gaps and improvements can be made (staff can work this with J. Quintrell and the PO based on the regional cooperative agreements);
- Leverage a few of the IOOS Grand Challenges aimed at the UN Ocean Decade to identify areas that all regions, supported by US agencies, can implement together as a 'Program'. Regions can use these in their 5-year grants to align priorities

The next steps include:

- Determine how to expand the regional priorities – add federal and core IOOS priorities (IOOS AC, IOOC, IOOS PO)
- Develop strategy to advance IOOS Grand Challenges (IOOS AC, IOOS PO, IOOC, RAs)
- Provide recommendations to strengthen or prioritize communications plan (IOOS AC)

M. McCammon reviewed the regional priorities spreadsheet which is high-level and needs further input. The IOOS Grand Challenges list was reviewed which could turn into a 10-year action plan. Each Challenge was reviewed:

1. A workshop could help fulfill better integration
2. These should be Future looking
3. Big data was added by the IOOC—this was asked for by the WH research priorities
 - a. A Task Team is being developed on this.
4. Look at existing resources and where we can go.
5. Resilience based
6. The new aspect of this is the “forecasting” component
7. IOOC added
8. One that fell out—global mapping seabed initiative
 - a. RAs are concerned about lack of near shore mapping.
 - b. Would like to put this back in.

- c. Sea Bed 2030's goal to have all basins and lakes mapped.
- d. Ties into the WH priorities

M. McCammon noted that this is the stage of our information and that a vehicle for input into the larger system needs to be identified. S. Rayder noted that cloud computing is important. NOS needs a high computing budget line. M. McCammon asked how we reconcile national and regional DMAC and noted that IOOS needs more compute power. S. Graves agreed it's an efficient and effective data delivery system. Everyone is jumping on the bandwagon, but there are still computers on the ground even in scenarios when "the cloud" is used-- the cloud is rooted in infrastructure. D. Rudnick agreed and noted that it is about cost and efficacy. S. Rayder asked to see a "moving report"—analysis of what it will cost to go to the cloud for NWP. He noted that 25% of funds will be withheld without a specific plan for supercomputing. We need an interoperable data system. S. Graves noted that the real difference that a cloud concept brings is the engineering. It takes some backing off and finding out how we can collaborate better.

M. McCammon asked how we can move forward for the regional priorities and suggested we expand the spreadsheet and ask for recommendations for other categories from FAC. D. Rudnick noted that this is a starting point. It's the baseline. Can we find points of convergence? The vision is to get an idea of what you can do well and isn't going to be done by anyone else. S. Rayder agreed it's a core that can be built off of. Where can we contribute to GOOS since IOOS is a GOOS regional alliance.

Innovation Presentation (Jyotika Virmani)

J. Virmani gave a [presentation](#) on the Future of Ocean Technology to highlight examples from the private sector of the rapid rate of development and expansion of capabilities we are seeing in the present.

S. Rayder noted that he would like the committee to focus on emerging technology and asked Carl Gouldman if IOOS has access to the JTTI tech and development funding. C. Gouldman answered that the RAs can investigate it through the OTT program. There was language in 2018 to have workshops on unmanned systems and tech infusion with IOOS/OAR.

S. Rayder noted that innovation needs to be a big area along with partnerships for the committee. J. Virmani noted that NASA should be asked about future ocean technologies-- much of the new technology they develop is translational and can be applied to ocean sciences.

B. Winokur noted that it is challenging for the government to keep up with private sector innovation, and we need to focus on identifying which business models are the best when we look to efficiently transition technologies. Change agents can be found in industry.

S. Rayder noted that the committee needs to look at 5 year and 10 year technologies priorities with a 3 year sanity check along with new membership.

Alignment and Messaging (Jennifer Hagan and Becca Derex)

J. Hagan and B. Derex plan to roll this Messaging PWG into the Vision and Strategy PWG.

K. Culpepper (IOOS Communication Officer) presented on the IOOS Program Office communications strategy. The current strategy is focused more on the PO goals and strategies. The major goals include: Visibility, trust, transparency.

S. Rayder gave a shout out to Eyes On The Ocean (EOTO) and noted the importance of sending out updates to stakeholders.

M. McCammon noted that the IOOS elevator pitch needs to be refined but can be difficult due to its complex structure.

D. Vandemark noted that IOOS could better communicate IOOS/national needs and value to GOOS.

J. Virmani asked how GOOS and IOOS, etc., collaborate on general ocean literacy? IOOS is the avenue to the regions (for key messages). J. Virmani also asked what major barriers exist to making that happen and if we as a group can try to break down some of them. C. Gouldman responded that the major Challenges include: 1) loss of command and control risk; 2) branding and identity risk; 3) credit for work concern. S. Rayder noted that there should be a mandate that takes on these concerns. J. Virmani pointed out that there are 10 distinct differences on how the ocean vs space community discuss their frontier, and we should look there for messaging guidance.

5. NEXT STEPS:

- Consensus: Combine Alignment of Messaging.
- Consensus: Add stakeholder engagement to regional priorities spreadsheet. #12 Education and Outreach (with levels---community type).

S. Rayder asked if we could use a theme like HABs to show requirements /partnerships/ Vision. J. Quintrell agreed. J. Hagan commented that HABs does include regulation and the committee should be wary of that. S. Rayder clarified that it was more for process. M. McCammon commented that it also falls into the public health realm. There is overlap in other groups. S. Rayder noted that it's not the one size fits all.

S. Rayder asked that staff distribute meeting outcomes (7-10 days). [Will need to be reviewed, signed by the chair, and have consensus]. Each PWG will prioritize their goals. A follow-up action list is available to view on the IOOS Advisory Committee website.

NEXT MEETING: S. Rayder asked the next meeting to take place in the West potentially during the first week of August. TENTATIVELY: Santa Cruz/Monterey area with regional host and briefing.

M. McCammon asked for feedback from IOOS staff on capacity and priorities. K. Arzayus noted that the PO needs to prioritize all the actions with the new lense of HABS. C. Gouldman noted that the scope of actions aren't clear, but can clarify them on future admin calls.