

U.S. IOOS Advisory Committee
Public Virtual Meeting
Meeting Minutes
August 21, 2019

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 website at ioos.noaa.gov/community/u-s-ioos-advisory-committee. Background material and presentations prepared for this meeting are posted on the IOOS website. All 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)
Ru Morrison, Ph.D., Northeastern Regional Association of Coastal Ocean Observing Systems (NERACCOOS)
Ruth Perry Ph.D., Shell Exploration & Production Company
Jennifer Read, Ph.D., Univ of Michigan Water Center Graham Sustainability Institute
Oscar Schofield, Ph.D., Rutgers University Center for Ocean Observing Leadership
Doug Vandemark, Ph.D., University of New Hampshire
Jyotika Virmani, Ph.D., XPRIZE
Dick West, Consultant
Bob Winokur Consultant
David Legler (ex officio) National Oceanic Atmospheric Administration (NOAA)
Brian Melzian (ex officio) U.S. Environmental Protection Agency (EPA)

Members Absent:

Jennifer Hagen, Quileute Indian Tribe
Alfred Hanson, SubChem Sensor Systems, Inc.
Daniel Rudnick, Scripps Institution of Oceanography, UC San Diego

IOOS Leadership and Staff in Attendance:

Carl Gouldman, IOOS
Krisa Arzayus (DFO), IOOS
Becca Derex (Alternate DFO), IOOS
Marnie Brown (Executive Secretariat), IOOS
Jessica Snowden, IOOS

Speakers Present:

David Martin, Former Director, Strategy & Special Programs, APL-UW

Public Observers:

Josie Quitrell, IOOS Regional Association
Jan Newton, Northwest Association of Networked Ocean Observing Systems (NANOOS)

Meeting Summary

1. Call to order. K Arzayus called to order the Virtual Fall Public Meeting of the U.S. IOOS Advisory Committee 11:00 AM EST on August 21, 2019.

2. Opening Remarks. Krisa Arzayus and Scott Rayder provided opening remarks to the committee, and led an around-the-room icebreaker asking each participant, “What does IOOS mean to you?”. Then, they reviewed the following goals for the meeting:

- IOOS FAC understands IOOS history, scope of the IOOS Enterprise, the IOOC, and Regional Association organization and operations
- Identify key areas where the IOOS Office and IOOC need help or advice from the FAC
- IOOS FAC members communicate how they want the FAC to be effective and make a meaningful, positive impact on IOOS Enterprise
- Begin development of priorities and a work plan for the FAC

3. Setting the Stage: A History of IOOS. David Martin provided an overview of the historical milestones that led to the development of today’s IOOS Enterprise, which are summarized on the [IOOS website](#). His remarks highlighted the long-standing partnerships and rich expertise that allowed the Enterprise to successfully grow into what it is today. Carl Gouldman followed with a brief [powerpoint presentation](#) that provided a more current snapshot of the status of the Enterprise, and included a history of budget appropriations from 2004 to the present. Carl ended by presenting the IOOS AC with several recommended topics to consider for discussion:

1. Consider issues, challenges, and opportunities in feedback from the IOOS Enterprise Questionnaire
2. Advise us (NOAA) on how to strengthen the federal partnerships between agencies, and foster deeper engagement across agencies
3. We (IOOS Enterprise) have a huge mandate and limited resources: What does the Committee see as the biggest future priorities for ocean observing?

Following the presentations, Scott Rayder discussed the attractiveness of the RICE (Regional Information Coordination Entity) business model to private sector entities, for example those in the Weather Enterprise that may wish to execute data buys. He noted that private sector companies *need* this service and that it can facilitate a successful private sector testbed for innovation to meet federal mission requirements. Bob Winokur made comments regarding interagency relationships: it is unclear from the background information provided for this meeting what the relationship is between the core agency

(NOAA) and the other agencies in the Enterprise, and what the expectations are regarding reporting to the IOOC.

4. IOOS Enterprise Questionnaire. Becca Derex walked the committee through the survey purpose, methodology, results and summary conclusions-- all available to the public on the [IOOS website](#). This questionnaire was intended to provide the IOOS Advisory Committee with insights and personal perspectives from partners and key stakeholders across the IOOS Enterprise. Survey recipients had been advised that their responses would remain anonymous to allow for open, candid input-- Jyotika Virmani said that it would be useful to know relatively what sector the comments had come from. Becca noted that she had done a quick check for biases and conflicts of interest in the responses and had found none (e.g., hypothetically, if there had been comments in support of expanding the Regional Association budgets coming from members of the Regional Associations). All present agreed that there were no major, unexpected surprises in the responses.

5. Establishing Expectations: Review of FAC Homework. Prior to this meeting, IOOS AC members were asked to identify, in 300 words or less, their expectations for their participation during the current term, specifically identifying what they thought they could contribute to the IOOS Enterprise. Their responses follow:

Doug Vandermark: In one year, it would be great if this FAC could develop clearly define working relationships, communications, and advisory missions with respect to the DC IOOS office, the regional associations, and the IOOC. Given the new and broad membership of the present FAC, it may be worthwhile to weigh if there is some particular critical mass of expertise that could be identified and put to work on related priority areas. In three years, this FAC should have established how to identify needs and provide useful deliverables to IOOS and the IOOC. It may also be useful to have the FAC better briefed on the workings of the main US IOOS program office, the last FAC visited and received quite a bit of information on the regional systems, but not so much on workings/issues at the main office.

As for things to work on... Regarding the IOOC, this would seem to be an entity to work with to target better and more formalized interagency 'connections' into IOOS in a 3-5 year timeframe both within NOAA and across at least 1-2 additional agencies. The 'integrated' part of IOOS may also need to be (re)considered by this group. The original vision of IOOS was quite broad and does not match the present reality. Can this FAC do anything to better identify any clear hurdles or issues (e.g. cross purposes with data, assets, missions) that can be addressed to clarify IOOS' place and also enhance integration across the US ocean observing system? While I agree with past chair warning against micromanagement, I do think that it could be valuable to solicit and consider if there are any IOOS infrastructure

issues that the program could use any advice on. One area that I would discourage work on is overall ocean data management – at least without having a broader multi-agency view.

Bob Winokur: The IOOS Advisory Committee needs to develop a clear understanding of the current state of IOOS, issues and opportunities for the future. Year one should focus on past problems and understanding the current goals and strategic plan. In addition, an outcome for year should be the development of an Advisory Committee work plan in conjunction with the IOOS program. Year two and three should be focused on implementation of the IOOS Advisory Committee work plan with a clear set of deliverables. The work plan should be modified as funding, opportunities and issues dictate. The work plan should be meaningful and provide strategic advice to the IOOS program. In short, the IOOS Advisory Committee work plan should assist the program in developing a framework for the future building on successes and problems of the past.

The IOOS Advisory Committee needs to understand gaps and requirements which should inform future investments. The Committee could assist in developing recommendations for increases in funding and informing Congress of the importance of IOOS with recommendations for future opportunities, without overstepping its approved charter and ensuring that it is not lobbying. Also, interagency relationships are not clear in some instances and the Committee could assist in providing clarity on IOOS as an Enterprise, much like the Weather Enterprise has become well understood. IOOS components include the government, industry, academia and state and local governments. The Committee could focus on issues involved in ensuring a strong IOOS Enterprise. The Committee can assist in developing the IOOS message. On the technical side the Committee can assist in identifying opportunities using AI and deep machine learning as applied to IOOS.

The Committee needs to be focused on key issues and not take on a universe of problems. The Committee should avoid trying to solve “world hunger” so to speak. The Committee cannot resolve funding issues, so it needs to be careful not to get bogged down on resources, but does need to understand resource constraints. I reserve judgment on this question until I have a better understanding of the issues IOOS has faced and is currently dealing with.

Dan Rudnick: I hope the IOOS Advisory Committee will be providing useful advice on national priorities for IOOS. The IOOS Advisory Committee should focus on helping IOOS to set national priorities. To the extent that IOOS is willing to take further advice, the AC might also suggest the means by which to achieve those priorities, as by focusing the use of resources. In general, I think of IOOS primarily as an observing system, as the name implies. From making high quality observations through solid data services, and to the creation of useful products, this seems to me the purpose of IOOS. In general, I would discourage the AC from asking IOOS to take on more responsibilities. Sustaining a coastal ocean observing system is a difficult task that requires all the IOOS resources, and then some.

Oscar Schofield: Year 1, working with IOOS to develop specific tangible priorities for national system and help develop strategies to achieve the goals. I expect that the committee would like to collect and iterate on cross-cuts for the priorities for a national system, so as to ensure the system is not a regional collection of disparate systems. I picture years 2 and 3 working with IOOS office to strategize on the marketing plan and bench marks required for success.

Work with IOOS office to develop a compelling narrative why full IOOS system should be built out. This includes developing the strategy for the looming threat that is the aging infrastructure. What is the plan, and more the timeline to reset the system before it begins to degrade. I think another thing to be considered is reviewing the effectiveness of council of regional associations. Given the governing system has been in place for a while (decade), a review of effectiveness in advocacy, strategic initiative, and self-assessments might be warranted.

While funding gaps is a driving challenge for IOOS to achieve its ambitions, this strikes me as out of the purview of the committee.

Jyotika Virmani: Year 1 ends in about 2 months, so in that timeframe understanding IOOS and the broader Enterprise is critical for us in order to work on a strategic plan for the next two years.

Year 2 and 3: Work on a strategic plan. I really like the idea of focusing on 3-4 areas and tackling those well. Four tentative topic areas: **1. Resources:** this came up a lot in the responses. Can we take a look at what has been successful and what hasn't worked so well in the last 20 years. For example, if I recollect correctly, years ago the focus was on trying to make the IOOS budget case around capabilities and stakeholder needs, and that worked to a certain degree. But recently, the Filling the Gaps effort has resulted in some success. Why was that so effective? Was it because Congress could understand the plan around technologies (and hence, their capabilities) as tangible? Or is it something else? **2. Integration across Agencies:** interagency relationships and making that stronger and generally improve integration – IOOS is complimentary to other work going on. **3. The Future:** Look at the bigger picture – these next three years feed into a number of larger global efforts – UN Decade of Ocean Sciences, SDGs for 2030, mapping the entire US EEZ by 2030 etc. Can we strategically position IOOS to feed into that and conversely leverage that? This includes looking at technology that is coming on-line that is cheaper, that may be perfect for filling in gaps and capabilities, but also can assist in tackling aging infrastructure. **4. Awareness:** how can we raise awareness – look at the Economics, but also how do we communicate about IOOS. Things we shouldn't focus on lobbying or getting into the weeds of the organizational structure. Let's be strategic and set IOOS up for the next decade.

Thomas Curtin: On a 3 year time scale, the strategic plan will be revised. I expect the Committee to contribute substantively to a multi-year investment strategy and provide advice on the many trade-offs and balances required.

The Strategic Plan lists 23 Objectives. These Objectives are not prioritized, nor is a quantitative investment plan provided based on realistic IOOS budget projections. For example, the stated

objectives include: balance maintenance and operation of mature observing systems while expanding the systems to tackle emerging societal issues; leverage investment to ... provide common platforms to execute various missions; fill critical gaps in the nation's observing networks to address high priority national and regional needs; transition proven technologies to operational use or other applications; assess model skill and advance data assimilation to improve model accuracy.

Maintaining and expanding a system, standardizing on common platforms, identifying and filling critical gaps, transitioning technology, and determining and improving model skill are all well-known major challenges that are not easily met on limited budgets.

Identification of sentinel data sets used to detect risks to humans would be more desirable than expanding coverage per se. How adaptive should the measurement systems be? How many Coastal and Ocean Modeling Testbeds (COMT) should there be and how will they be supported?

NDBC Strategic Goals (below) overlap significantly with those of IOOS. How will these two NOAA organizations evolve in a coordinated way?

- Maintain US leadership in global ocean observations to support forecasts & warnings and seasonal forecast services with workforce & organizational excellence and innovation
- Provide dependable and affordable 24/7 real-time in-situ ocean observations to support NWS forecasts & warnings and seasonal forecast services ("government backbone")
- Foster and expand government partnerships with other agencies, private sector, industry, and academia to strengthen the robust broad coverage of ocean observations

The RA's expend considerable effort lobbying and securing critical congressional support. The Committee should not be overtly involved in these activities.

Ru Morrison: I expect the IOOS AC to be fully briefed and knowledgeable about the structure of the IOOS Enterprise writ large. I also expect we will come up with a workplan for years two and three that we can execute and make real during the last two years.

I'd encourage the committee to focus on how to better foster collaborations within IOOS to build a more comprehensive and unified system. This is between the IOOS Program Office, the Regional Associations, the IOOC, the IOOS FAC, other parts of NOAA, other federal agencies, other non-governmental organizations, and for-profit companies. Questions to be addressed could include what level of engagement should the various parties involved have with IOOS and how do we make sure that we are all saying the same messages, to what level of common ways of handling and sharing data?

I would discourage them from looking too much at the internal structure of the IOOS regions, rather focus on the functions that they are wanted to undertake.

Sara Graves: I hope that IOOS FAC can continue to be valuable in providing advice and guidance to the IOOS program.

Encourage IOOS FAC to work on topics and issues that the IOOS program, RAs, etc. brings to our attention, as well as ones the FAC feels would be of value to the program

Discourage IOOS FAC to focus on topics and issues that are not of interest or value to the IOOS program, RAs, etc. since assume the focus should be at the programmatic level.

Jennifer Read: The IOOS FAC is in good position to advise the ocean observing enterprise on two related issues that affect the overall success and perception of the IOOS program. In three years I envision us having scoped and addressed the following two issues:

First, the challenge that everyone, both within NOAA as well as other members of the IOOC agencies, seek to work with the same coastal end-users but are not integrating that work very well. This leads to stakeholder fatigue; multiple, federally-funded products and tools that purport to address the same or similar issues; and unseemly conflict with multiple claims of “success.” The IOOS FAC should encourage participating agencies/units to define roles/responsibilities and develop processes that support each other working together in order to improve one, or a smaller number, products for end-users.

The second issue relates to the current IOOS strategy, which over-focuses on filling gaps in specific technologies, such as HF radar. This impacts IOOS ability to be nimble (integrate newer technologies as they are proven); efficient/effective (we are tied to specific technologies/networks which might be expensive or clunky); and inclusive (some technologies on which we’ve focused do not work as effectively in freshwater systems). The FAC should help the IOOS enterprise develop and advance a strategy that emphasizes capabilities and meeting information needs as expressed by end-users with best available technologies/techniques, and develop the compelling metrics/stories to communicate this value add.

The IOOS FAC should be focused at the higher, strategic level, not in the “technological weeds.” While getting into details may be comfortable for those of us with technical backgrounds, this approach helps perpetuate, rather than break, the historic emphasis on specific technologies over capabilities and information development. It also limits the impact we can have – it is strategies and processes that support progress, not technology assessment.

Molly McCammon: In 1 year I expect all IOOS AC members to be fully aware of the scope and activities of the entire IOOS Enterprise: the IOOC, the IOOS PO, and the IOOS RAS, and partners. In years 2-3 I expect the FAC to have identified 3-4 top priorities and be working to execute them.

I think the IOOC and the IOOS PO still lack a strategic vision of how to bring together the global, national and regional (federal and IOOS RA) observing components. I’d like to see an actual strategic plan developed for each of these components, and then one for the overall ENTERPRISE that is developed jointly. The RAs have their individual strategic plans based on their 5 year proposals and buildout plans, but how do these scale up to a national plan for the regions? IOOS is very technology dependent (HF radars, gliders, etc.), but is this the way to go in the future?

I know the FAC is not supposed to lobby or work on budget issues, but... other parts of NOAA have been designated as the lead on certain big NOAA issues (i.e., Sea Grant for aquaculture),

we need to identify a key NOAA priority that IOOS is an obvious lead partner and strategize how best to support that initiative short of lobbying/budget, etc.

The Regional Data Assembly centers (DACs), now all certified, are a key IOOS asset. I'd like to see more focus on how to make them more useful/useable to NOAA and other federal agencies and increase the interoperability and sharing of data tools and products among all the RAs.

I don't think we should focus on personnel or organizational structures, but rather on goals and outcomes, and the best approaches to getting there.

Ruth Perry: Integration across agencies is a systemic issue. We can put a plan together to centralize data, bring in new data sources, and contribute more regarding the synthesis of data. That should be a big priority for NOAA. How do we transition from just a repository to a synthesis of central interagency coordination? Eliminate the federal data sources - drive all public needs to IOOS. Figure out how to bring in private industries. How are other sectors structured around ocean observing? Build the industry side up - typically once by sectors and crack the nut of the Blue Economy. All comes back to raising awareness for IOOS capabilities, services, and expertise, but once we get more recognition we can grow exponentially. The committee should focus on addressing major challenges and avoid getting too into the weeds.

Dick West: We need to address the government-wide underfunding of federal observation programs. We can now use the NOPP to bring partnerships together; we have dedicated NOPP funds for doing this and we need to leverage that. We need to ensure the NOPP Office has a good understanding of IOOS and all the Enterprise has to offer. We should invite key members to our next meeting or visit them to provide an IOOS 101.

6. Looking ahead: FAC Vision. Scott Rayder charged the committee with developing 3-4 high priorities to tackle during their current term. The committee unanimously agreed on the following four priorities:

1. **Requirements:** The committee should take a look at a "rack and stack" of IOOS Enterprise requirements against the current budget, while considering how IOOS will evolve into the future. This activity will allow the Enterprise to 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. Carl Goldman agreed that he would like the committee to help develop a transparent process for evaluating requirements across the Enterprise in the future.
2. **"Strategic Plan"/ Roadmap:** While the Enterprise has a current (2018-2021) Strategic Plan, the committee agrees that there is no defined 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. This is a topic on which the committee can contribute valuable insight and generate helpful recommendations.
3. **Partnerships:** The committee should investigate the relationships across federal agencies,

as well as with non-federal partners, and provide recommendations to strengthen and enhance those relationships. This may include outreach activities (by IOOS AC members) to provide informational briefings about the Enterprise and explore ways to tighten collaborative efforts. In addition to strengthening existing partnerships, the committee should investigate 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.

4. **Alignment of Messaging:** The committee acknowledges that the IOOS Enterprise has a messaging challenge, given its many distinct facets. The committee should 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 through a multi-pronged engagement approach.

During this discussion, Carl Gouldman and David Legler were asked about key issues that concern them regarding the IOOS Program and the IOOC, respectively. Carl stated that what “keeps him up at night” are internal organizational concerns at NOAA, NOS, and IOOS-- and successfully operating in that framework while also balancing the IOOS Enterprise, and that it is challenging because those identities/priorities sometimes don’t fully align. Additionally, he stated that he fears missing opportunities for success because of a lack of bandwidth to coordinate as well as we need to. David discussed the challenges associated with identifying agency mission spaces within the IOOC and missing opportunities to leverage to our full capabilities. He noted that the IOOC task teams had been a successful approach for establishing small work teams to tackle focused efforts. Finally, David asked the committee if there might be low-hanging fruit we could identify to go after together.

7. Public comment: Josie Quintrell spoke on behalf of the IOOS Association and welcomed all of the new committee members. She stressed the importance of visiting the Regional Associations and extended an open invitation to the group to consider having a meeting in a location where committee members could engage on-the-ground and learn about the local efforts and impacts of IOOS work. Josie expressed support for the idea of developing an overarching vision for the Enterprise, and particularly would love for the IOOS AC to help elevate the recognition and appreciation for the program. While the RAs take on a very intentional tactical approach to their work, having a broader vision/framework would be helpful and would help them become more synergized with national-level efforts.

8. Meeting adjourned at 3:00 p.m. EST

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