

Testimony of Dr. David Evans
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Thank you very much, Mr. Chairman. And thank you, first of all, for the invitation to appear before the Commission to talk about Ocean.US and what we offer. My apologies for the confusion in my schedule that prohibited my being a party to the panel yesterday afternoon. I really do appreciate your accommodation of allowing me to come and speak to you today.

Ocean.US is the ocean agencies' effort to begin the implementation of an integrated and sustained ocean observing system. So I want to give you a little status report on where the agencies are right now. I know this is an area that is of great importance to your Commission.

I'm going to talk a little bit about the history. It's not very long, but I'll bring you up to date on where we are. I'll tell you the sorts of things — the activities that the Ocean.US office has participated in. And I'm going to talk about two challenges to the future. One has to do with what we actually mean by "integration" because that's really at the heart of what the office is about. And I'm also going to talk a little bit about the future governance of the office because I think that will be very important and maybe an area where this group will make a meaningful contribution in terms of how the agencies work together in the future.

So relative to the history, let me just recall that in April of 2000, the National Ocean Partnership Program's decision to form the office was ratified. And I think Dr. Colwell mentioned that to you yesterday in her testimony. And what I'd like to do is read a couple of sections of the Memorandum of Agreement among the agencies that established the Ocean.US office because that is the mechanism that we used to establish it. And it captures a little bit of the history. And I think it captures the flavor of what we intend to do. I'll follow that by telling you what we've done so far and where we're heading.

So by way of background: "The statutory authority for the National Ocean Partnership Program with representatives from twelve federal agencies, its National Ocean Research Leadership Council and the Ocean Research Advisory Panel is contained in 10 USC 7901 and so on — and I'll provide that information to you. In response to a Congressional request for a plan to achieve a truly integrated ocean observing system, the report, *Toward a U.S. Plan for an Integrated, Sustained Ocean Observing System*, was prepared by a joint federal/non-federal task team. This led to a set of implementing recommendations in the report, *An Integrated Ocean Observing System: A Strategy for Implementing the First Steps of a U.S. Plan*, that was delivered in December of 1999. On May 22 of 2000, based on the ORAP report implementation recommendations, the NORLC approved the establishment of an

office having the charter to develop the national capacity for integrating and sustaining ocean observations and predictions. The formation of this Ocean.US office was jointly announced by the Chief of Naval Research, the administrator of NOAA and the president of the Consortium for Ocean Research and Education in May 2000 of that year at a joint hearing of the House Resources Subcommittee on Fisheries, Conservation, Wildlife and Oceans and the Armed Services Subcommittee on Military Research and Development to examine the status of implementing the recommendations of the ORAP report.

The interagency Ocean.US office has as its overall goal over the next decade to integrate existing and planned elements to establish a sustained ocean observing system to meet the common research and operational agency needs in the following areas: detecting and forecasting ocean components of climate variability; facilitating safe and efficient marine operations; ensuring national security; managing resources for sustainable use; preserving and restoring healthy marine ecosystems; mitigating natural hazards; and ensuring public health.”

The Ocean.US office was established with that purpose. And what I just read to you was the beginning part of the Memorandum of Understanding signed onto by the agencies. There's one other piece of it that I'd like to read. And that is under the "Definition" section, where we state what an "observation and prediction system" is. And I think that by going through that, you'll have a notion of what the agencies think it is that they're working towards.

"The integrated ocean observing system will be a heterogeneous, distributed system of linked elements, with organizational structures and interfaces developed where common good is identified, that is to say a federation, in the manner described in the reports cited above. Ocean.US. will be the focal point for relating U.S. ocean observing system elements to the international Global Ocean Observing System. The primary purpose is to enhance broad user access to ocean knowledge, data, tools and products. In appropriate cases, the Ocean.US office will establish, fund, and provide for the operation of components of the observing system whose functionality cuts across the roles and interests of the individual participating agencies. Examples might include network links, master databases and indexes or collaborative tools and services. The system, therefore, will be a virtual system consisting of the physical links, servers and other elements that contribute to the mission, regardless of their ownership or operational responsibility.

The system will comprise four main activities: operational and routine observations; long-term research observations, observatories; technology development to support the Ocean.US objectives, tools; and a web-based 'commons' for access to models, algorithms, numerical techniques and so forth to foster improved productions by the users."

That, generally stated, is what the Ocean.US office is about. The Memorandum of Agreement went into effect after four agencies signed. The first four agencies to sign were the United States Navy, The Department of Commercial, National Science Foundation and NASA. Other agencies have subsequently joined. And the Ocean.US office functions under that framework.

The office was actually occupied, that is physically established, in September 2001, that is to say slightly less than a year ago right now. It's staffed by personnel assigned by the signatory agencies, presently Navy, NOAA and NSF. And NASA is assuming the responsibility of providing a leader from the office no later than September. We've had conversations with the new leader for some overlap time right now.

So that's sort of where we were. It's an organization that was called for by a number of joint reports. It's established under the National Ocean Partnership Act. The governance of the office is provided for by an executive committee consisting of the members of the NORLC or their designees. I'm the designee from NOAA and currently serve as the chair of the executive committee that provides oversight for the office. That's how I happen to be here today.

Let me tell you about some of the activities that take place at the office right now. First off, in assigning personnel to the office, we decided that to the extent possible, we would like to have personnel from the agencies who are actually managing some of the ocean observing programs do their work at the Ocean.US office. You'll hear a theme in my comments about trying to define what "integration" actually means. There's been a lot of discussion about it. Some people speak about the network aspects. But from a practical point of view, a number of us are focusing on the notion of trying to figure out how you actually do a better job with the resources that are already defined, and how you make a case for the additional resources that are required to serve overlapping missions.

One way to do that is to engage the people who are actually working on managing some of those observing programs at the outset. So, for example, NOAA presently has the bulk of the funding for the so-called ARGO program, a program that I'm sure the Commission has heard about for autonomous floats that make measurements of upper ocean density content and currents globally. The program manager for the ARGO program at NOAA is our detailee to the Ocean.US office. So, the program management functions that he accomplishes in one program are done out of the Ocean.US office. It's a program that was originated in its initial funding through the program. And so it's a logical connection from the interagency historical point of view to continue the management of that program out of Ocean.US. It's a program that's executed in the academic community, but surely has an operational target or goal in an agency like NOAA with respect to our climate forecasting mission.

Similarly, the Navy program manager and current director of the office, Captain

Martin, has management responsibilities for the virtual ocean data hub that has been established to integrate regional, national and international data systems for oceanography and has also been the program manager for the advanced telecommunications activities supported with DOD funding to take advantage of the radiant satellite system and to explore data communications through satellite systems.

Both programs were implemented largely by ONR with response to the needs for oceans observation expressed by the community, a variety of NOAA and Navy operational forecasting activities are beginning to benefit from those. We expect that they'll allow full utilization of the capabilities of the observing system through command and control, that is to say two-way communication with ocean instruments, relatively novel for autonomous instruments in the ocean. And in all likelihood, utilization of those technologies for ocean applications would not have taken place had not Dave Martin been working at the Ocean.US with other people who were managing ocean observing systems.

So that leads to sort of the next point that comes from the existence of the office, and that is the essential coordination function. By putting people together who are actually running the programs, you have an opportunity to take a look for those opportunities to take advantage of each others' program, if you will, so that the iridium data units are being used on some of the ARGO floats. They're being used on gliders. They're being developed as part of the same program, and similarly, with the Orb.com communications.

That coordination function, then, expands to the sort of larger context of trying to take the next steps beyond the two reports issued through the NOPP process on how to build an integrated, interesting ocean observing system. So this coordination led to the development of a forum, a community forum this past spring held at the Airlie Center. I believe that Dr. Colwell gave you commissioners yesterday that short form of the executive summary of the report from that activity. That office was organized, managed and the report prepared by the Ocean.US office. And it's an important next step in developing an implementation plan for what the sustained system would evolve into.

I think most importantly in that regard, it really served to delineate the difference in the stages of development between the open-ocean observing system, which has been posited largely by the climate community over the last decade and the less-well-developed notions about coastal observing systems for an integrated ocean observing systems. And there are separate sections in that report that deal with each of those two activities and I think will point to a way forward in both cases.

In both cases, however, I think that the office has helped to identify the need for "customers," in simple terms. If we're to have an integrated ocean observing system, we have to know who the measurements are being made for. And the

range of customers is actually rather large. NOAA is surely a customer. The United States Navy is surely a customer. And there are a wide variety of local and private-sector customers. Identifying those customers, I think, was one of the things that we'll look forward to as one of the real accomplishments from that workshop. Because building an observing system really makes sense only if you're delivering product to people who actually want the products.

And I think that that sort of gets me to my final point in terms of activities that the Center is involved in right now. And that is to come up with what I would call an appropriate definition for the word "integration" in the sense of what the integrated and sustained ocean observing system is. Let me give you a simple example. A challenge which I offered to the Ocean.US Office staff as one of their first tasks nearly a year ago, and which they're still working on. NOAA makes routine operational measurements of upper-ocean temperature using XBTs and drifters. The United States Navy makes routine operational measurements of upper-ocean temperatures using XBTs and drifters. There has been varying degree of coordination — sometimes loose, sometimes sort of tighter over the years in those programs. But I don't think there's anyone who would say that those measurements are actually integrated, that both sets of customer needs are being addressed in a unified way to the economic, scientific and operational benefit of both agencies. These are existing programs with existing streams of funding for satisfying or partially satisfying existing, well-articulated requirements. Even under those circumstances, we don't have a very good definition of what an "integrated" system would be. We know what it is in terms of a general shape. We know we should save money. We should make a better product. We should make more widely available data for other users. But in terms of what that means operationally, nuts and bolts, how do you actually do it, the Office is working on that issue right now. And I think that if we could articulate it for something that easy, that we'll have a huge step forward towards beginning to articulate it for what it means for a much more complicated and much more sophisticated system that's envisioned by the research community, for example, and for that matter, one which is now being called for by a number of operational users.

But I think the problems are difficult. I think that the agencies, in fact, have come together, have put good people in the office, have committed funds for the office, expect that it will be a mechanism to work on those difficult problems, expect that it will be a mechanism to solve those difficult problems and move us forward towards having an integrated system.

Let me comment finally on this notion of governance. Because right now we have a very informal system that constitutes the Ocean.US framework. We have a Memorandum of Understanding along with two, four, six, eight, nine agencies at present, nine of the 12 NOPP agencies, that basically says they'll participate to the extent that they have interest; that they'll contribute resources that are in some way proportional to what they think they're getting out of it. And they'll

donate some people. That's working. But I would say that the level of organization, the governance mechanism, is not much beyond a handshake. And so if we continue to make progress, I think agencies will continue to contribute resources. But it's probably the lowest level of organization that one might imagine for such an important activity.

One of the other jobs that the Ocean.US Office has in front of it right now, that I think Dr. Colwell mentioned yesterday, is to essentially staff the options for other mechanisms of governance of the Office. So one option is the present one. It's not much different from that which we've practiced for the last ten years under the U.S. Global Change Research Program. It's sort of a loose affiliation of agencies coming together to form a program office that satisfied some common needs.

I think we have good experience over the last year to demonstrate the shortcomings of that level of organization and go straight for the problem of climate in that case. There is need for a stronger, more rigorous kind of formal relationship among the agencies.

The Ocean.US arrangement is actually a little bit further along. And though we actually have a signed Memorandum of Agreement, we have common review of some proposals. We have some resources that are allocated to it. It's probably not as far along, but maybe the second model is one like UCAR, the University Corporation for Atmospheric Research, where there's federal support and a board of governors that supervises the activities. Maybe something like JOI, where there's a non-profit consortium of academic institutions that manages these activities. But basically, the Memorandum of Agreement resources allocated by individual agencies, if you will, would be sort of the second level.

The third level would be a stronger central management model. And examples of that might be the integrated Program Office that was constituted to manage the National Polar Orbiting Environmental Satellite System that converged polar satellites between DOC and the Department of Defense, largely weather satellites, now weather and climate satellites, in polar orbit to produce a single integrated system for making satellite observations of a particular class for a set of common problems.

That Office operates in a much more formal way. An executive order actually established it. It's a little different from the mechanisms that I mentioned before because, although dollars are appropriated to the home agencies, in fact, the framework for the office doesn't allow those agencies to spend the money except through the mechanism of the interagency Program Office, their contributed staff. And the Office actually manages the money. And in the case of the satellite system, is actually managing the procurement.

The National Ice Center would provide another interagency model, if you will.

That's a jointly run activity among agencies. There's a small amount of research. There is a product line. There is an observing system. There are very well-defined customers or products, if you will, in the joint agencies. And the facility is established and resources are put in that facility to produce the joint products.

And I would offer one final, sort of stronger one, more on the research side would be the Strategic Environmental Research and Development Program, SERD, where DOD and DOE jointly provide research money that's collectively managed for a common agenda. But, again, the program office is supported. And there's a pretty clear of what the outcome should be.

Those three broad options: the sort of, general coordination option; the strong handshake option, MOU; and the stronger central management option are all being worked on right now to develop a rational assent of pros and cons, if you will, as to which might be most appropriate with moving ahead with the ocean observing system. Recognizing that unlike most of those others, we have this interesting confluence of both research and operational activities that need to be satisfied. In the case of most of the strong partnerships that I identified, they have real operational activities with very well and clearly defined requirement processes driving them. The convergence of those requirements then provides the motivation and the means to set up an institutional structure to accomplish them.

In the case of the research community, the requirements are not as well defined, are expected to be a little more fluid and might argue for an organization like the National Ocean Partnership Program. On the other hand, we need quite practically to be able to bring that operational flavor on board. A lot of the ocean measurements being made now and a lot of the ones that we intend to make will be more operationally flavored. And so I think that the institution that we create will probably not be quite like any of these. And I await the results of the Office's recommendations and explications of the various options as regarding their own future, which I expect from them this fall, hopefully in time to provide information to this Commission for your further consideration. Because I believe that the way that we organize to do this work is certainly of interest to this Commission and maybe one where, quite frankly, the agencies could use your assistance on helping go to the next step towards that implementation.

I think that what I'd like to do at this point is stop my formal comments and try and entertain questions. I see that there seem to be a few flagged around the table. And it might be more productive for me to answer questions about how the Office is functioning.