

**Meeting of the NOAA Science Advisory Board  
June 11, 2021**

Location:      Webinar

**Advisory Board Members Present:**

**Mr. John Kreider**, President, Kreider Consulting LLC (Chair); **Dr. Robert L. Grossman**, Frederick H. Rawson Distinguished Service Professor in Medicine and Computer Science and Jim and Karen Frank Director, Center for Translational Data Science, University of Chicago; **Mr. M. Christopher Lenhardt**, Domain Scientist, Renaissance Computing Institution; **Dr. Ruth Perry**, Marine Scientist and Regulatory Policy Specialist, Shell Exploration and Production Company; **Dr. Denise Reed**, Professor Gratis, Pontchartrain Institute for Environmental Sciences, University of New Orleans; and **Dr. Elizabeth Weatherhead**, Senior Scientist and Fellow, Jupiter Intelligence.

**NOAA Representatives Present:**

**Mr. Benjamin Friedman**, Deputy Under Secretary for Operations, Performing the Duties of Under Secretary of Commerce for Oceans and Atmosphere, NOAA Administrator; **Mr. Craig McLean**, Assistant Administrator for Oceanic and Atmospheric Research, Performing the Duties of NOAA Chief Scientist; Dr. Karen Hyun, Chief of Staff; **Ms. Nicole LeBoeuf**, Acting Assistant Administrator, National Ocean Service; **Dr. Steve Volz**, Acting Assistant Secretary of Commerce for Environmental Observation & Prediction, Assistant Administrator for Satellite and Information Services; **Dr. Louis Uccellini**, Assistant Administrator for Weather Service and Director, National Weather Service (NWS); **Rear Admiral (RDML) Nancy Hann**, Deputy Director for Operations, NOAA Office of Marine and Aviation Operations (OMAO), and Deputy Director of the NOAA Commissioned Officer Corps; **Dr. Cisco Werner**, Director of Scientific Programs and Chief Science Advisor, National Marine Fisheries Service; **Ms. Mary Erickson**, Deputy Director, National Weather Service; **Dr. Mitch Goldberg**, Chief Program Scientist, Joint Polar-Orbiting Satellite System; and **Dr. Gary Matlock**, Deputy Assistant Administrator for Science, Oceanic, and Atmospheric Research.

**Working Group Co-Chairs:**

**Dr. Bradley R. Colman**, Director of Science – Weather Science – The Climate Corporation and Co-Chair, Environmental Information Services Working Group (EISWG); **Dr. Scott Glenn**, Professor, Department of Marine and Coastal Science, Rutgers University and Co-Chair, EISWG; **Dr. Molly Jahn**, Program Manager, Defense Advanced Research Projects Agency and Co-Chair, Data Archiving and Access Requirements Working Group

**Staff for the Science Advisory Board Present:**

**Dr. Cynthia J. Decker**, Executive Director and Designated Federal Officer; **Ms. Tiffany Atkinson**, Program Analyst; and **Ms. Courtney Edwards**, Program Analyst.

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**Opening Statement of the Chair**

John Kreider, Kreider Consulting and Chair, NOAA SAB

Mr. Kreider opened the meeting and thanked everyone for their attendance. He then moved directly into the first agenda item, which was the Environmental Information Services Working Group's (EISWG) revised statement on the National Weather Service (NWS) data dissemination challenges.

**Revisions to the EISWG Statement Concerning the Ongoing National Weather Service Data Dissemination Challenges**

Bradley R. Colman, Director of Science, Weather Science, The Climate Corporation and Co-Chair, EISWG

Scott Glenn, Professor, Department of Marine and Coastal Science, Rutgers University and Co-Chair, EISWG

Presentation

Dr. Colman thanked the SAB members and other attendees for their comments from the prior meeting (on April 30, 2021). Dr. Colman then deferred to Dr. Glenn to provide some quick context for the report, the areas of concern that were discussed last session, and how the EISWG addressed them.

Dr. Glenn spoke first about the ever-changing and growing demand by end users for the products and data provided by the NWS and the difficulties of building an infrastructure that could keep up with technology changes and growing access. He referenced the Integrated Dissemination Program (IDP) as a great starting point to meet this challenge and explained that there were two dissemination sites, one in College Park, Maryland, and one in Boulder, Colorado. He added that, previously, each site would act as a backup for the other when maintenance was necessary, but now both data centers are functioning as primary sites much of the time due to demand.

Dr. Glenn added that the IDP encompasses four different phases. The first two are in progress, phase 3 is not yet funded, and phase 4 has started in an experimental phase of the movement of data to the cloud, which will enable it to be used for data dissemination. Access to foundational data sets is critical and the delivery infrastructure has to grow to match demand, but there has recently been downtime. A Public Information Statement was published, which imposed a strict 60 connections per minute limit on many of the NOAA websites, including NOMADS. After public input, these restrictions were changed to a 120-connections-per-minute limit applied to five websites, still including NOMADS. With this statement, EISWG hoped to show they wanted to work with the NWS to resolve these issues. They incorporated the feedback received at the last meeting on its revised statement.

Dr. Colman went through the SAB's previous concerns and the changes that were made in response. The first was the SAB's concern that the statement was too prescriptive about the use of funding or resources. In response, EISWG rephrased this recommendation to urge that NOAA find a solution rather than to prescribe a particular solution.

The second concern was about EISWG's specific recommendation of implementing content delivery networks (CDNs) and implementing phase 4 of the IDP. Based on feedback from the SAB, they recognized these are specific components of the architecture and did not want to discount the expertise of NOAA, the NWS, and the broader enterprise. The recommendation was changed to suggest collaborative developing the best architecture to address short- and long-term needs, with CDNs and IDP Phase 4 as potential components.

Dr. Colman addressed Concern 3, which was whether or not EISWG supported the IDP plan. He noted that the EISWG felt the IDP plan moved NOAA in the right direction, but it had not moved rapidly enough to meet the demand for weather data, which led to a continual usage of the data centers and regular, multi-day outages. The EISWG decided to strengthen the IDP endorsement language but also emphasize that some additional resources and plan deviation may be needed in the interim to resolve the issues raised in the short-term.

Lastly, Dr. Colman highlighted that in response to concerns expressed about the inclusion of newspaper articles, the EISWG had removed all of them from the report. Mr. Kreider then opened the floor to discussion.

### Discussion

Dr. Weatherhead appreciated the edits made and mentioned that she was particularly excited to see more done on Recommendation 2 to strengthen engagement on this project. Dr. Reed felt that the report, with its updates, was now clearer and more appropriate for the SAB to transmit. Dr. Uccellini complimented the EISWG's efforts and explained why they were forced to restrict access but that they too were concerned about what would happen when fires and hurricanes started to occur simultaneously, which would case the demand for their weather product to grow and stress test the system. He noted the timeliness of this report to emphasize the importance of improvements to the system would be helpful for NOAA. Dr. Uccellini also added that the budget required for phase 3 had been included in the President's budget. He said they are testing NOMADS in the commercial cloud now and exercising contracts under the big data project, including a contract with Slack.

Dr. Jahn noted the relevance of Recommendation 3 to the work of the Data Archiving and Access Requirements Working Group (DAARWG) and encouraged EISWG to leverage DAARWG's expertise. She took the opportunity to announce that her co-chair, Jeff de La Beaujardiere, had taken over as full chair since her move to the Defense Advanced Research Projects Agency (DARPA) as a program manager. She expressed her agreement with the priority of Recommendation 1 in the report, noting that these compound situations will become the rule and not the exception. Dr. Uccellini explained that NOAA received a \$1.5 million

emergency appropriation in the 2021 budget, which is being used for improvements of the existing system's bandwidth. He noted that NWS would look into design function to determine whether there were better ways to move forward.

Dr. Colman responded to Dr. Uccellini that while that money was important and did help, it was only a start and that NOAA needed to look at possible creative, short-term solutions that would allow NWS to achieve the technology needed in a matter of months rather than years, which may be the case if they stayed solely with the IDP. Dr. Jahn also suggested that, as they continue to build the system, they keep national security in mind so that at no point in the middle of a natural disaster could a foreign adversary attempt to bring down the NWS.

Mr. McLean thanked Dr. Jahn for her perspective, especially given the difficulty NOAA has in obtaining funding, because he believes in the intrinsic importance of what the NWS does for the country, and to incorporate this perspective and highlight it for people who control the budget, may help convince them that this should be a fiscal priority. Ms. LeBoeuf added that her team at the National Ocean Service has worked with the Department of Defense (DoD) around sea-level rise and coastal inundation events that could have a direct impact on coastal military installations and open them up to potential security risks, emphasizing that the work the NWS does has far-reaching impacts on the country's defense.

Dr. Reed then moved to accept the EISWG report. Mr. Lenhardt seconded the motion. Absent further discussion or dissent, the EISWG statement, as written, was approved unanimously for transmission from the SAB to NOAA.

### **Update on the Priority for Weather Research Report**

Bradley R. Colman, Director of Science, Weather Science, The Climate Corporation and Co-Chair, EISWG

Scott Glenn, Professor, Department of Marine and Coastal Science, Rutgers University and Co-Chair, EISWG

### Presentation

Dr. Glenn gave a brief reminder that this charge had been given from Congress to the Science Advisory Board to produce a report within a year, that the audience was policymakers, and the goal was to provide information necessary to prioritize investments, as well as some evaluation of potential future investments in the Weather Service.

The team brought together to create the report members of the EISWG, SAB, and NOAA, and they focused their efforts on three main pillars, which were observations and data assimilation, forecasts, and information delivery.

Dr. Glenn added that these pillars were supported by foundational elements: weather enterprise; development of a new and more diverse workforce; better computing technology, such as cloud and HPC; and the best science that could be collected for Earth system prediction, from physical

to social sciences. The report will also contain an overarching, external context chapter to address issues like environmental justice and equity.

Dr. Glenn then identified the team members and summarized the organizational makeup, which began with the SAB on top as the steering team and below them the Executive PWR Study Team, where the work was organized and divided based on the three aforementioned pillars. Then each pillar had two co-leads to improve efficiency and get people involved.

He then explained that the program had two phases, the information-gathering phase, conducted separately by each pillar, and then the integration phase, where the information gathered was integrated with NOAA's baseline to establish a plan to move forward. Dr. Glenn then went through the remaining slides to further explain the structure, who else was involved, and the dedication and effort everyone had brought to this work.

Dr. Colman emphasized the need to divide and conquer so that the report could be completed in time. He added that they were in the exploration phase, which would result in three mini-symposia, one for each of the pillars. He also noted that the dedication of the NOAA line offices had allowed the team to move much faster than if they had been forced to identify their own NOAA-centric perspectives and strategies around the three pillars. Dr. Colman said that the mini-symposia would serve to incorporate non-NOAA perspectives from external subject matter experts in an effort to complement the perspectives from NOAA.

He then explained the integration phase in more detail as a time to bring all the information together, integrate it, work with the wording, incorporate the prioritization process, and then finally present a report that would be sharply focused, impactful, and actionable. He added that they started with all the topics and tools available to them and that they would use the different subject matter experts to narrow down priorities so that the report would be more impactful, with the goal to have primary priorities identified by the time of the symposia.

Dr. Colman gave a final review of the schedule and the goals to accomplish before the next SAB meeting and then touched on the report outline and how they wanted to format it to make it the most meaningful.

### Discussion

Mr. Kreider congratulated Dr. Colman and Dr. Glenn on what they have accomplished already in such a short amount of time. Dr. Uccellini noted it would be interesting to see how the priorities chosen through this exercise will align with the Weather Act. He also mentioned that NOAA had prioritized through the Weather, Water & Climate Board a Precipitation Prediction Grand Challenge in the forecast arena. He said that this priority had been briefed to the SAB and the U.S. Global Change Research Program (USGCRP), which had created some interagency interest and has influenced the FY22 budget. In response, Dr. Colman mentioned that their aim was to arrange a NOAA briefing on the Precipitation Grand Challenge document and strategy to the task teams.

Dr. Weatherhead complimented the effort, but commented that she felt the structure of the report was a bit boring and difficult to consume and suggested they identify new, exciting, and potentially impactful breakthroughs that would come from the effort. She was concerned that there was not enough diversity on the list of participants in spite of the high percentage of meteorological PhDs that had gone to women. She encouraged the team to branch out beyond the usual names and strive for more diversity. Dr. Colman thanked her for the insight and mentioned that there was a 50/50 setup with the task team co-leads and overall team members to also reflect greater diversity. Dr. Weatherhead noted the Executive Study Team in particular was lacking in diversity, which could also include early career professionals in addition to gender diversity.

Dr. Matlock asked if there was any involvement or interaction with the Interagency Council for Advancing Meteorological Services (ICAMS), as well as where modeling would fit into this plan. Dr. Glenn responded that modeling was a part of the forecasting group. Dr. Colman clarified that they did not yet have a way of including ICAMS but that it was something they would consider for integration in the future.

Dr. Goldberg asked whether next-generation satellites would be a point of discussion in the symposium on observations and data assimilation, as recommendations in this area from the SAB would be critical at this moment. Dr. Colman stated that those topics would be included in the agendas for the symposia.

### **Public Comment Period**

Dr. Decker opened the meeting to public comment. David Grimes inquired about international development of models and how the SAB planned to integrate that into a trend towards unified modeling and whether they would address crossover between the weather and climate domains. Dr. Colman responded that they had discussed the international perspective and that while this report is NOAA-centric, NOAA has international responsibilities and involvement, including the unified modeling efforts, should be reflected in the final report.

### **Adjourn**

At 12:13 p.m., this meeting of the Science Advisory Board was adjourned.