National Weather Service Summer 2019 Partners Meeting Summary

On August 15, 2019, the National Weather Service (NWS) conducted a half-day Partners Meeting following the American Meteorological Society's Annual Summer Community Meeting. This meeting was held in Albany, NY. The final agenda is available here.

The meeting provided a means for Partners to identify and drive the topics for discussion and to engage with the future generation of researchers from graduate programs located in the Northeast region of the U.S.

The overall objectives for the meeting were as follows:

- Collaborate with the Weather Enterprise to achieve the NWS mission to protect life and property and grow the U.S. economy.
- Identify emerging issues and future opportunities for collaboration
- Clarify and leverage the unique roles and capabilities of Enterprise partners to respond to the increasing demand for actionable weather, water, and climate information.
- Expand public-private partnerships that fast-track private Enterprise innovations, strengthen relationships, eliminate barriers, and share best practices to focus on continuous improvements.
- Discuss key timely and topical issues of interest to the Weather Enterprise and afford the opportunity for face to face interaction and discussion.

The participants who attended this meeting represented a broad range of expertise from across the weather, water and climate enterprise from industry, government and academic sectors.

Summary of Meeting Sessions and Activities

Opening Remarks - Mary Erickson, NWS Deputy Director

Mary Erickson kicked off the NWS Partners Meeting by recalling the valuable spring Partners Meeting and the recent rollout of the new NWS Strategic Plan. She also discussed some key advances that the NWS made this past year, including the rollout of version 2.0 of the National Water model, the continued efforts to include Partners in the NWS Hazards Simplification Project and noted some successes of key forecasts, including the spring flood outlook and tornado outbreaks. Mary then reflected on some themes she heard out of the AMS Summer Community Meeting, including communication challenges, innovations in observing, understanding decision making and research to operations and operations to research (R2O and O2R). Mary welcomed graduate student participants and encouraged the Partners to engage, drive the agenda and have fun!

Graduate Student Round-Table Consultation and Discussions

Andrea Bleistein welcomed the graduate students attending the Partners Meeting and outlined the purpose for session for graduate students to consult with Partners and Partners to learn

from future generations of researchers. Andrea then shared the following relevent statistics about the atmospheric sciences field:

- According to a recent article in USA Today from June, the major with the lowest unemployment rate are Atmospheric Sciences And Meteorology.
- According to the Department of Labor:
    - Employment of atmospheric scientists, including meteorologists, is projected to grow 12 percent from 2016 to 2026, faster than the average for all occupations.
    - The best job prospects for atmospheric scientists will be in private industry.

Each graduate student was then afforded time to introduce themselves and their area of research and use the time allotted to discuss the future of forecasting, research, dissemination or other topics related to the NWS Strategic Plan goals and objectives.

Some takeaway themes from the table conversations included:

- Lack of observations around the globe and particularly in the polar regions. We will fill these gaps with unmanned aerial vehicles and gliders, for example.
- Need for coupled modeling and air-sea interactions
- Need for improved data assimilation and diagnostics and need for data to be scalable.
- Changing climate will drive the future of forecasting in ways we have not seen before and our disciplines will need to adapt.
- Future will be automated and technology will rapidly change.
- Impact-Based Decision Support Services (DSS) will still be important, regardless of automation. It will vary by population need.
- There will be observations everywhere! In clothes, phones, cars, etc…
- Mesonets will become even smaller and could be described as micronets.
- Probabilistic information will lead to action.
- Need to know how people will receive their weather information.
- Need to consider how machine learning and data will be used by industry and ensure data integrity across the enterprise.
- The future will be interdisciplinary and multidisciplinary.
- Rapid changes in society - demand and use of information.
- People are critical to weather forecasting and roles will shift over time.
- Sectors of the weather enterprise will likely shift and continue to mature.
- 5G technology will be an advantage and a challenge.
- Emergency Management community will be fully integrated.

Partners Open Space Format

Partners were asked to volunteer topics for conversations pulling from AMS Summer Meeting, past Partners Meetings or anything else relevant for this interaction among weather enterprise Partners. The following topics were identified by the participants for open space discussion:

Topic	Host
Impact-Based Decision Support Services (IDSS)	Erica Grow
Corporate awareness of weather services	Chris Martin
Dissemination issues and standards, including NWR and polygons	Valerie Sanders
Meeting challenges of maintaining and developing Enterprise workforce and STEM and University curriculum needs	Eirik Cooper
Fire weather risks and technologies	Pam Emch
Industry engagement for R2O	Nick Powell
Advancing Unified Forecast System and R2O and O2R	Dana Carlis
Community engagement and local understanding	Bill Hooke
NWS legacy products and services	Kevin Cooley

Participants then broke up into self-selected groups to discuss the topic they were interested in. It was emphasized to the participants as they traveled around to one more topics that they try to identify a key next step or outcome.

A key next step or outcome from the nine topics listed above included the following:

- Impact-Based Decision Support Services (IDSS).
    - Outcomes: There is a continued need for consistency and development of best practices.
- Corporate awareness of weather services
    - Outcomes: There is a need for outreach across all business verticals and more corporate executive engagement is needed.
- Dissemination issues and standards, including NWR and polygons
    - Outcomes: NWS should continue to improve communications on non-IDP applications and keep partners apprised of the planned FY20 partial county polygon warning testing. A more focused workshop was proposed to further the discussion and develop concrete next steps on warning standards.
- Meeting challenges of maintaining and developing Enterprise workforce and STEM and University curriculum needs
    - Outcomes: Increasing engagement at elementary and high school level is needed. Increased skills in communications, leadership and collaboration is desired. The weather enterprise workforce should be developed throughout their entire careers.
- Fire weather risks and technologies
    - Outcome: Ad Hoc committee is being formed under the AMS Commission on the

Weather, Water and Climate Enterprise (CWWCE) and they will engage with the Office of the Federal Coordination for Meteorology (OFCM) on a fire weather initiative as well as consider developing recommendations for improving public communication on fire weather.

- Industry engagement for Research to Operations (R2O)
    - Outcomes: There is a need for an Enterprise ecosystem picture/network analysis. Industry should explore mechanisms for industry partnerships with academia and government.
- Advancing Unified Forecast System and R2O and Operations to Research (O2R)
    - Outcomes: NOAA should express the grand challenge and the low-hanging fruit. NOAA should develop a living strategic implementation plan. There is a need for agile development operations.
- Community engagement and local understanding
    - Outcomes: Taking advantage of pre-existing local networks (e.g. AMS Local chapters, broadcasters, WFOs, K-12 teachers) will allow this community to be more strategic. Research!America micro-grants targeted at students to engage with local officials is an upcoming opportunity.
- NWS legacy products and services
    - Outcomes: NWS should provide longer lead times to stakeholders/users and improve the public notification process (forum at AMS?). NWS should support other programs that are creating new products. NWS should identify opportunities for 'displacement' as opposed to elimination. NWS should consider a value assessment to understand the value of its products and services.

Andrea concluded the activity by reflecting on the wealth of collaboration and ideas that were developed. She also suggested that those who hosted each of the chosen topics could serve as a great resource to develop future Partner meeting agenda topics or workshops to build on the momentum from this meeting.

Reflection and Closing Remarks - Louis Uccellini, NWS Director

Louis Uccellini closed out the NWS Partners Meeting reflecting on the dialogue from the day as well as from the previous two days at the AMS Summer Community Meeting. He noted the newest Weather-Ready Nation partnership opportunity which will benefit the weather enterprise with the co-location of the SUNY Albany Atmospheric Science Department, Albany Weather Forecast Office and the NY State Emergency Operations Center in a new building being constructed near the SUNY Albany campus. Louis also thanked and expressed his appreciation for the contributions from the graduate student participants in the conversations and future perspectives they provided.

Louis then provided some key NWS programmatic updates. He discussed challenges around prediction and automation. He highlighted the uptime performance of the NWS Integrated Dissemination Program (IDP) and the latest functionality in place on IDP. Louis celebrated the GFS upgrade noting that NOAA's work with NCAR to build a common infrastructure will help advance the GFS. In addition, Louis provided specific recent examples for how the NWS focus on IDSS is improving readiness, responsiveness and resilience. And finally, Louis provided his

first hand experience with the current Administration's interest and focus on developing a National Resilience Strategy and highlighted that the National Weather Service is fully integrated into the development of this resilience strategy.

Conclusion

Peyton Robertson, OOE Director, concluded the meeting by thanking all of the participants for their high energy and contributions. He also announced that the next Partners Meeting will be held in Boston, MA during the American Meteorological Society Annual Meeting on January 16, 2020.

Attendees

First Name	Last Name	Affiliation
Keith	Anderson	Verizon
Audrey	Anderson	Midland Radio Corporation
Richard	Bandy	NOAA NWS
Shubha	Barriga	ERT, Inc.
Sam	Bartlett	Plymouth State University
Massey	Bartolini	University at Albany
Brianna	Bealo	Plymouth State University
Kevin	Biernat	University at Albany
Kristen	Borowski	Verizon
Kandis	Boyd	NOAA OAR
Monica	Bozeman	NOAA NWS
DaNa	Carlis	NOAA OAR
Meghan	Conway	TruWeather Solutions
Kevin	Cooley	NOAA NWS
Eirik	Cooper	IBSS Corporation
Kristen	Corbosiero	University at Albany
Thomas	Cuff	NOAA NWS
Frank	DeFina	Vaisala
Daniel	DePodwin	AccuWeather
Steve	DiRienzo	NOAA NWS
Michael	Ek	NCAR
Pamela	Emch	Northrop Grumman

Mary	Erickson	NOAA NWS
Tom	Fahy	Capitol Meteorologics
William	Flamholtz	University at Albany
Michael	Fowler	Vaisala Inc
Bill	Gail	Global Weather Corporation
Alex	Gallagher	University at Albany
Bob	Goldhammer	WeatherCall Services LLC
Erica	Grow	NBC
Paul	Higgins	American Meteorological Society
William	Hooke	American Meteorological Society
Neil	Jacobs	NOAA
Carmen	Jenkins	IBSS Corp
Bruce	Jones	Midland Radio Corporation
Alexandra	Keclik	NOAA NWS
Renata	Lana	NOAA NESDIS
Conrad	Lautenbacher	GeoOptics
Renee	Leduc	Founder & Principal
Michelle	Mainelli	NOAA NWS
Chris	Martin	Cisco
Robert (Bob)	McCormick	Verizon
David	Michaud	NOAA NWS
Andy	Miller	AMS
Alex	Mitchell	University at Albany
John	Murphy	NOAA NWS
Brad	Nelson	DTN
Michele	Olson	NOAA OAR
Carolyn	Pasti	RedLine Performance Solutions
Kevin	Petty	The Weather Company/IBM
Jon	Porter	AccuWeather
Nicolas	Powell	Raytheon Company

Peyton	Robertson	NOAA NWS
Richard	Rosen	American Meteorological Society
Valerie	Sanders	WeatherCall Services
Mary Jean	Schmitt	NetApp
Ian	Sears	NOAA NWS
Keith	Seitter	American Meteorological Society
Matthew	Seymour	University at Albany
John	Sokich	NOAA NWS
Brennan	Stutsrim	University at Albany
Alex	Tomoff	SUNY Albany
Louis	Uccellini	NOAA NWS
M. Christian	Wallisch	The Aerospace Corporation
Valerie	Were	NOAA Center For Earth System Sciences and Remote Sensing Technologies
Maya	Werner	Earth Resources Technology, Inc. (ERT)
Elizabeth	Wilson	Synoptic Data PBC
Stephen	Woll	Synoptic Data PBC
Neil	Wyse	The Aerospace Corporation
Mark	Wysocki	Cornell University
Bruce	Arband	IBSS
Scott	Whittier	NOAA NWS (Burlington)
David	Novak	NOAA NWS
Charles	Bell	NOAA NWS
Jacquelyn	Putnam	NOAA
Kate	Brogan	NOAA