UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

OFFICE OF OCEANIC AND ATMOSPHERIC RESEARCH

National Severe Storms Laboratory
120 David L. Boren Blvd.
Norman, OK 73072

January 29, 2021

Hazardous Weather Testbed Activities

The NOAA Hazardous Weather Testbed (HWT) at the National Weather Center (NWC) in Norman, Oklahoma, is seeking participants for several virtual experiments in 2021. The testbed is a joint project of the National Weather Service Storm Prediction Center and the National Severe Storms Laboratory that provides a conceptual framework and physical space to foster collaboration between research and operations to test and evaluate emerging technologies and science. This year, we will be conducting the 2021 HWT activities ***virtually*** for ***20 weeks*** in total.

There will be ***six*** primary projects in the HWT during 2020. The details of the Radar Convective Applications Experiment, PHI Prototype Experiment, Satellite Convective Applications Experiment, and Spring Forecasting Experiment are listed in the attachments.

Probabilistic Hazard Information (PHI) Prototype	Apr 26-30, May 10-14, May 24-28 **Application Deadline: March 1**
Radar Convective Applications	Apr 19-23, May 3-7, May 17-21 **Application Deadline: March 1**
Satellite Convective Applications	Jun 1-4, Jun 7-11, Jun 14-18 **Application Deadline: March 1**
Spring Forecasting Experiment	May 3-7, May 10-14, May 17-21, May 24-28, Jun 1-4 **Application Deadline: March 1**
Hazard Services - Probabilistic Hazard Information (HS-PHI)*	Summer/Fall TBD
Brief Vulnerability Overview Tool*	Jul 11-16, Jul 26-30

*Application will be announced in Spring 2021

Details about HWT 2021 will become available over the next several weeks at: **http://hwt.nssl.noaa.gov/**

Due to the ongoing COVID-19 pandemic, all 2021 HWT activities will take place virtually using online resources such as Google Meet and AWIPS in the Cloud. Each project-

specific application form (found in the project details selection below) will require from each candidate:

a. Name and organization (WFO, region HQ, etc.)
b. Forecaster position
c. Prior HWT experience
d. Interest statement (one paragraph, 200 words max)
e. Weeks available

The interest statements should include your motivation for evaluating future warning and/or forecast systems in the HWT and demonstrate why you would be a good fit for a particular experiment. Participants may include WFO, CWSU, or Region HQ staff, and participants are not required to have had prior HWT experience. We are seeking diversity among regions, warning and forecast experience, and HWT experience.

Note that the HWT organizational structure has two primary programs: the Experimental Warning Program (EWP) and the Experimental Forecast Program (EFP). The EFP conducts the Spring Forecasting Experiment and any questions about this experiment should be directed to the EFP coordinator, **Israel Jirak (Israel.Jirak@noaa.gov)**. The EWP conducts the remaining HWT experiments and any questions about these experiments should be directed to the EWP coordinator, **Kodi Berry (kodi.berry@noaa.gov)**.

The deadline for the first round of applications is March 1, 2021. Candidates will be selected shortly thereafter. Any questions or concerns about the application process should be directed to **Alan Gerard (alan.e.gerard@noaa.gov)**.

We desire enthusiastic people who are interested in improving NWS warning and/or forecast decision-making technology, products, and services. We would be happy to provide more information about the HWT activities if requested.

Sincerely,
Alan Gerard
Hazardous Weather Testbed, National Severe Storms Laboratory

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We are pleased to announce the 2021 virtual **Spring Forecasting Experiment** (SFE), part of the Experimental Forecast Program (EFP) of the NOAA Hazardous Weather Testbed (HWT), hosted by the Storm Prediction Center (SPC) and the National Severe Storms Laboratory (NSSL). We invite you to participate in the experimental online activities that are planned for this spring during the five-week period of **May 3-June 4**. Information about the overall goals of the HWT can be found here: https://hwt.nssl.noaa.gov/.

NWS forecaster participation in the HWT SFE is essential to facilitate meaningful interactions between the development and operational communities that will accelerate research-to-operations transitions. In particular, this provides opportunities for forecasters to provide feedback to ensure that new guidance products and visualization approaches meet their needs. This is a unique opportunity to see and influence the future of NWS forecasting tools for high impact weather. Here is more information about the 2021 SFE:

- The focus of the experiment is directly aligned with NWS FACETs and Warn-on Forecast (WoF) programs, including examination of real-time forecasts from a prototype WoF ensemble system.
- Activities are formulated to provide evidence-based information on how best to design convection-allowing models and ensemble systems (the operational HREF evolved from these efforts), and to explore innovative ways to extract relevant information and create calibrated probabilistic hazard guidance for high-impact weather events.
- These efforts also directly support the evolution toward a probabilistic NBM to better represent and account for forecast uncertainty.
- To accomplish these goals, the SFE brings together major model development organizations in the US (EMC, GSL, NSSL, GFDL, and NCAR) to work collaboratively in improving community modeling for future implementation into NWS operations.
- The SFE efforts support NOAA plans to develop a simplified, unified forecast system (UFS) centered on the FV3 dynamic core. Multiple versions of the FV3 run at 3-km will be tested to assess the ability of the FV3 to provide storm-scale guidance.

For those who want to be on the cutting-edge of NWS science developments, please consider participating virtually in the innovative, exciting SFE activities for one week during the May 3-June 4 period by filling out the 2021 HWT SFE Google Form by **March 1**.

Sincerely,
Israel Jirak (SPC) and Adam Clark (NSSL)

Radar Convective Applications Experiment
Project Descriptions & Details

https://forms.gle/Bmv5WGKBp1sSUjBW6

The deadline for applications is March 1, 2021. Candidates will be selected shortly thereafter.

WHEN – April 19-23, May 3-7, May 17-21

WHAT – Selected candidates will participate in a virtual testbed where they will issue experimental short-term forecast discussions and convective warnings for a given County Warning Area using a cloud-based AWIPS-II version during live weather cases. Participants will also work select archived cases in displaced real-time. Experimental single-radar products being evaluated by the participants include, but are not limited to:

- New Tornado Detection Algorithm (NTDA). A single-radar based product that displays icons on automated high-rotation detections with a probability of a tornado being present.
- New Mesocyclone Detection Algorithm (NMDA). A single-radar based product that displays icons on mesocyclones that it detects and tracks.

In addition to these experimental products, standard observational and forecast products, including the currently operational TDA and MDA will also be available to participants. The NTDA will be the main focus of evaluation during this experiment, with the NMDA only being evaluated over weeks 1 and 2. In addition, this experiment will combine efforts with the Satellite Convective Applications experiment for weeks 3 and 4. During the evaluation, forecasters will compose blog posts regarding their use of the operational and experimental radar products in the warning decision-making process, along with any other thoughts and feedback.

WHY – This virtual HWT experiment provides an avenue to obtain forecaster feedback for new applications developed for the WSR-88D network. This evaluation will focus on two single-radar products, NTDA and NMDA. These products will be examined to gauge their effectiveness in detecting mesocyclones and tornadoes during the warning-decision making process. Feedback will be used to drive algorithm improvements and assess their operational feasibility in replacing the current versions of the TDA and MDA.

WHO – All forecasters are welcome to apply for this experiment. We would like geographic, experiential, and gender diversity in our forecaster pool. Completion of the Warning Decision Training Division's Radar Applications Course and some operational severe weather warning experience is required.

Probabilistic Hazard Information (PHI) Prototype
Project Descriptions & Details

https://forms.gle/KLWmjJeyh8qgpcNa7

The deadline for applications is March 1, 2021. Candidates will be selected shortly thereafter.

WHEN – April 26-30, May 10-14, May 24-28

WHAT – Participants will issue Probabilistic Hazard Information (PHI) in lieu of warnings using a cloud-based web platform. The focus for the 2021 spring experiment will be integrating tornado probabilities from PHItor, an algorithm utilizing machine learning to derive probabilities based on 8 years of tornado data, and evaluation of the automated tornado objects. We will also be exploring different workload approaches to handling PHI for tornado, severe, and lightning simultaneously. Forecasters will also be able to choose between multiple tracked objects and test the manipulation speed and motion uncertainty relative to each PHI threat-in-motion. In addition to automated guidance available within the PHI-prototype system, forecasters will have access to real-time and archived data within the AWIPS-II cloud platform for storm interrogation and analysis.

WHY – This HWT experiment provides an pre-operational evaluation of cloud-based PHI-design and workload. Feedback from this evaluation will be used for configuration of PHI within Hazard Services and provide guidance for an operational implementation of PHI at NWS offices nationwide.

WHO – All forecasters are welcome to apply for this experiment. We would like geographic, experiential, and general diversity in our forecaster pool. Completion of the Warning Decision Training Division's Radar Applications Course and some operational severe weather warning experience is desired.

Satellite Convective Applications Experiment
Project Descriptions & Details

https://forms.gle/BtczYDARrFrDfDU6A

The deadline for applications is March 1, 2021. Candidates will be selected shortly thereafter.

WHEN – June 1-4, June 7-11, June 14-18

WHAT – Participants will issue experimental short-term forecast discussions and convective warnings for a given County Warning Area using the cloud-based AWIPS-II platform during live weather cases. Forecasters will compose blog posts during realtime operations regarding their use of the operational and experimental satellite products in the warning decision-making process, along with any other thoughts and feedback. Experimental and operational satellite products most likely to be available include, but are not limited to:

- Geostationary Lightning Mapper (GLM) total lightning data.
- ProbSevere Hazard Model: Fuses GOES cloud products, multi-radar/multi-sensor (MRMS) data, lightning data, and RAP-derived environmental fields through object-based tracking on both GOES and radar imagery to produce a probability of specific hazards (e.g., hail, wind, tornado) for individual storms.
- NUCAPS Temperature and Moisture Profiles, gridded plan views and cross sections, and experimental boundary layer modified profiles: Profiles are generated using data collected from polar-orbiting satellites, including Suomi NPP and possibly newly launched NOAA-20.
- Blended Total Precipitable Water Product. This product fuses multiple satellite observations and model input for a global total precipitable water product.
- Combined LEO and GEO Thermodynamic Sounding Forecast Applications

WHY – This HWT experiment provides an operational demonstration of products and capabilities associated with the recently-launched GOES-16 and NOAA-20 series of satellites. The additional demonstration of JPSS products introduces and familiarizes users with newly developed products associated with the next generation polar-orbiting satellite system. This evaluation will focus on gauging the effectiveness of the GOES training, test forecaster understanding of GOES and JPSS data, understand the usability and effectiveness of the visualizations in AWIPS, and identify best practices for integrating the new data into operations. Feedback received during GOES and JPSS product demonstrations will be integrated into training initiatives in coordination with the Warning Decision Training Division and with the GOES and JPSS programs and researchers for future product development and visualizations.

WHO – All forecasters are welcome to apply for this experiment. We would like geographic, experiential, and gender diversity in our forecaster pool. Training with IDSS concepts is preferred.