

Arctic Testbed & Proving Ground

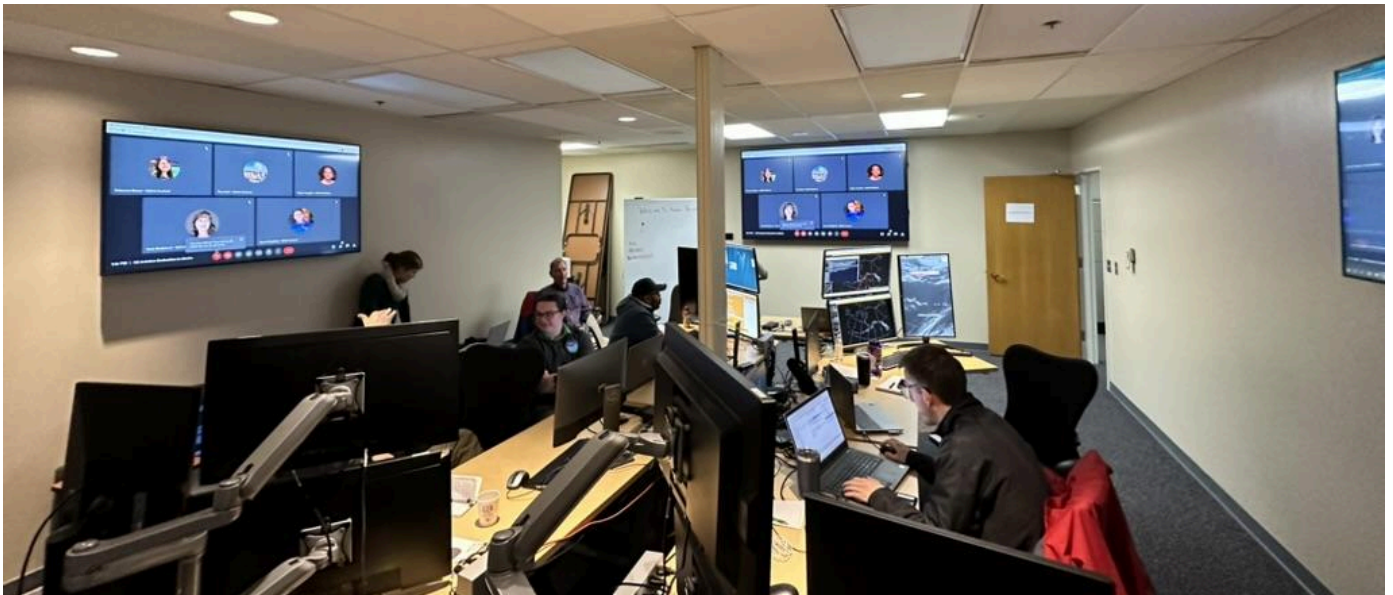


Aviation Weather Testbed

Hazard Services Aviation Forecaster Acceptance Test #2 Evaluation Summary

**NWS Arctic Testbed and Proving Ground, Alaska Region
Anchorage, AK**

Collaboration between Arctic Testbed and Proving Ground and the Aviation
Weather Testbed



Overview

The Arctic Testbed and Proving Ground (ATPG) hosted a Forecaster Acceptance Test (FAT) for the Hazard Services - Aviation (hereafter, HS Aviation) hazard product generation application from November 13-17, 2023. This FAT was the second iteration of focused testing of HS Aviation, and was accomplished using both the Alaska Region Headquarters AWIPS (VRH) and the Global Systems Lab's (GSL) AWIPS in the Cloud. Note that this was the first test of HS Aviation on a full, quasi-operational AWIPS system with an active registry.

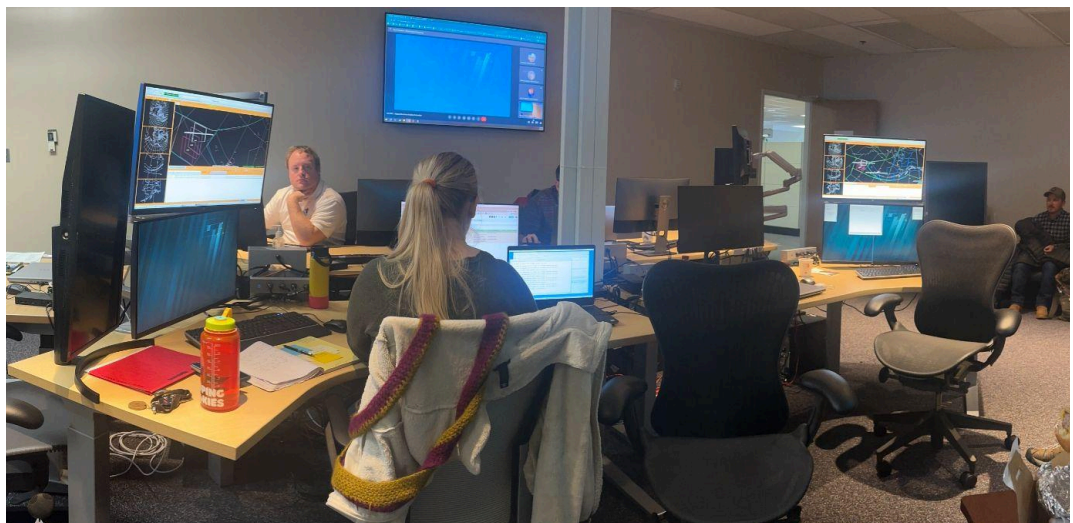
The goal of this FAT was to conduct a code review of updated and/or new functionality in HS Aviation resulting from the first FAT at the Aviation Weather Testbed (AWT) in May 2023, in addition to local testing at the ATPG. This included improvements to the content and functionality of Hazard Services, and the resultant text product generated by the text formatters. A secondary goal was to test HS Aviation on a full scale AWIPS with interaction between multiple users.

Participants

Participants included forecasters from the Met Watch Offices (MWO) at the Alaska Aviation Weather Unit (AAWU), the aviation forecast desk from the Honolulu Forecast Office (HFO), and the AWT. Participants from the AAWU also evaluated product generation for volcanic ash hazards since the AAWU also serves as the Anchorage Volcanic Ash Advisory Center (VAAC).

The participants had a mix of experience using Hazard Services coming into the FAT. Some learned the framework of HS from HS Hydrology, others learned during the FAT at the AWT, a few have been working with HS Aviation from its inception, and some had not used HS at all. This gave developers a diverse experience level from which to gather feedback. In addition, those that have used HS Aviation prior to this FAT were able to provide feedback on the progression of development.

Developers from GSL had direct interaction with the participants to fix issues and/or brainstorm with the forecaster on improvements/changes to align with their workflow. The developers translated these discussions into ticket format using Google Sheets for tracking purposes. At times, code was written on the spot and demonstrated to the group for immediate feedback. An RPM was cut each night to be installed at VRH and GSL Cloud for immediate testing by the participants.



Test Procedures

VRH (AWIPS) was pointed to the Test NCF gateway to be isolated from the operational registry used by operational Hazard Services at the NWS Weather Forecast Offices. This was done as a precautionary measure even though the likelihood of aviation events impacting the issuance of real hazards by WFOs across the NWS was minimal. As a secondary measure, CAVE was also opened in practice mode to protect against errant product issuance outside of the test environment.

For the test procedures, jobsheets were designed to step a forecaster through the product generation of two International SIGMET products; one for an areal hazard such as severe turbulence or icing, and one point SIGMET for a hazard such as a volcanic eruption. The VAAC forecasters also worked through jobsheets to produce two Volcanic Ash Advisories; one for an ash cloud and one for a Near-VAA product. After completing the jobsheets, forecasters were encouraged to explore the capability of the HS Aviation by mimicking their operational workflow and testing out all aspects of generating hazard events.

Feedback was solicited in a few ways. The main mechanism was via open discussion throughout the test period. Forecasters were encouraged to vocalize any positive or negative experiences with the HS workflow vs their current operations, issues with functionality of the application, aspects of the application that they liked or didn't like, ideas for possible enhancements, and any other general comments. Notes were taken both in written form by evaluation coordinators and also via the ticket system designed by GSL using Google Sheets. A brief discussion occurred at the end of each forecaster's test period, and a survey was distributed to the forecasters as well.

Key Findings and Feedback

- 1) AAWU forecasters consider Hazard Services to be an improvement over IC4D in generating aviation hazard products. Direct comments include, "This already is way better than IC4D" in relation to managing event geometry, and "I would take this as is right now over IC4D all day everyday". The general sentiment from participants was positive and think that HS Aviation will be a viable replacement for IC4D in the hazard alerting portion of en route flight forecast operations.
- 2) The overall performance of Hazard Services Aviation on an active, but non-operational, AWIPS (VRH) was deemed satisfactory. While pointed to the test-NCF, and in practice mode, testers were able to simulate live operations using a pseudo-active registry (aka the test-NCF). Testers were able to produce full life cycles of International SIGMETs and VAAs, and were able to view and manipulate other tester's hazards, both issued and proposed hazards. Users did not experience any major crashes or freezes of the system, although issues of note will be explained in the next three bullet points.
- 3) Participants testing HS Aviation via an AWIPS in the Cloud instance had a satisfactory experience with the Hazard Services itself. However, challenges arose due to the nature of using AWIPS in the Cloud, which reduced the amount of time available to test the application.

- 4) One critical issue was experienced by all participants using VRH. On more than one occasion, a user who was not working on an event was somehow assigned the event by Hazard Services anyway, therefore locking the event for use by others. This is undesirable behavior and will need to be remedied before code check-in.
- 5) The rendering of geometry and resultant text product for events that cross the dateline is problematic. GSL was able to develop a temporary fix during the evaluation, and will work on a more permanent solution in future AWIPS builds.
- 6) After a thorough discussion between all MetWatch offices on the AIRMET product, it was agreed that MetWatch offices would improve services by leveraging the power of graphic-based hazards in Hazard Services. All agreed that it is imperative to standardize the workflow and product format for the AIRMET between all the MetWatch offices.
- 7) Forecasters requested more intuitive labeling of the hazard events specific to each aviation hazard type. The baseline event identification scheme in the Hazard Information Dialogue(HID) box and Spatial Display does not offer an easy way to ID specific hazards with a quick glance. For example, a label with series name and sequence number or hazard type (i.e. SIGMET INDIA 5 versus SIGMET JULIET 3) would be far more helpful to quickly identify specific events. Including hazard type in the label for SIGMET headers would be very useful for the occasions where multiple SIGMET types overlap by time or are issued in quick succession.
- 8) A forecaster mentioned that a couple of volcano-related products in HS Aviation seemed repetitive, with specific mention of the eruption SIGMET. Future testing will need to identify a simplified workflow for the volcano products.
- 9) Ideally, a recommender/tool should be created to easily render a volcano SIGMET using information directly from a VAA, including the same geometry. A similar tool needs to be developed to recommend/create a VA SIGMET from a neighboring VAAC's VAA. This is how MWOs who aren't also a VAAC should generate VA SIGMETs. This will make information sharing much easier between products and reduce the time for polygon generation.
- 10) A recommender/tool should be created to generate a Tropical Cyclone (TC) SIGMET using information directly from a Tropical Cyclone Advisory (TCA) that was issued by a Tropical Cyclone Advisory Center. This will make information sharing much easier between products and reduce the time for product generation.
- 11) Ensure that changes from the initial polygon are translated to the resultant text product. For example, after manually adjusting polygon vertices from the initial geometry, the text product should show the updated lat/lon. However, during the FAT, this was not the case and changes made to the vertices produced incorrect lat/lon. Other changes to the geometry include clipping polygons, moving vertices, removing excess vertices, etc.

12) Suggestions for Training Emphasis:

- Clipping flight information regions (FIRs) using the checkbox in the HID
- Naming conventions on the shapefile vs FIR choices in the HID due to the dateline
- Best practices for drawing polygons, or alternatively, when to use point geometries
- The workflow for ending/canceling an event. This differs for some aviation product types as there exists subtle differences in the “elapsing” and “ending” processes in HS (whether manual or auto)
- Tool/Recommender approaches in product generation/creation (once some tools are developed)

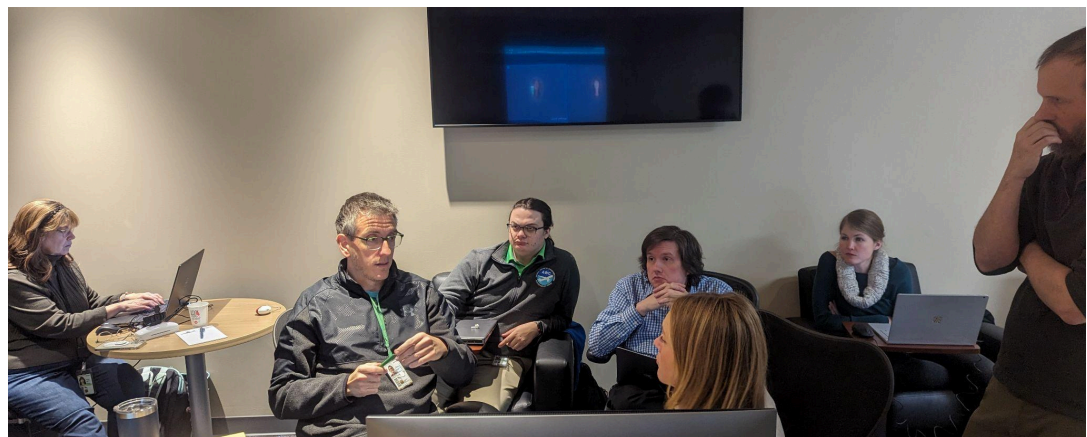
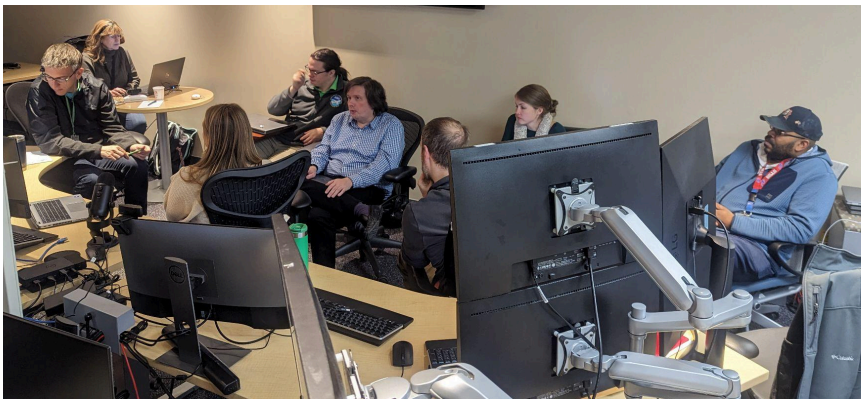
13) Additional Takeaways and the full list of tickets can be found here:

- a) [Tickets for HS Aviation \(Open, in review, resolved\)](#)

Future Plans and Work

Moving forward, the plan is to continue agile development with testing and evaluation of HS Aviation on both the Cloud and VRH. The goal is to check-in the code at the next check-in period to become part of the Hazard Services baseline in a future build of AWIPS. After that, an ATAN will be created for the AAWU to continue testing and development until the application is deemed ready for operational use.

Regarding the future of the AIRMET, the discussion mentioned previously resulted in a tentative path forward on how to standardize the workflow and product format between all the MetWatch offices. However, it was not established who will develop the necessary tools in HS Aviation to accomplish this goal, and the funding sources to complete the work. Further discussions between all MetWatch offices, HS developers, and the FAA will establish the optimal AIRMET solution.



Facilitators/testers

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