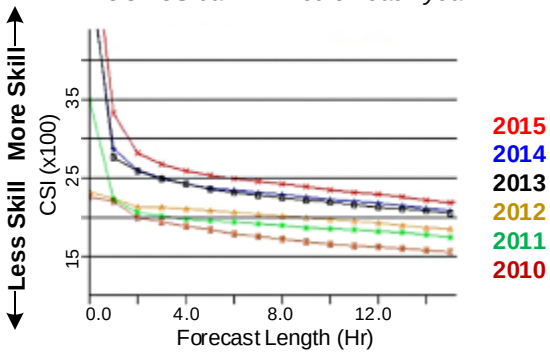
MDE GOALS (CONTD.)

HRRR Reflectivity Verification by year

CONUS Jan 1 – Dec 31 each year



HRRR precipitation location skill improved by 50% over past 5 years

However to further build upon these gains and to effectively use high resolution models, more timely and precise forecast of aviation-specific weather hazards are needed. This will require the use of new observation sources, better representation of clouds, and more physically realistic methods of determining winds, temperatures, and moisture parameters that are critical to forecasting aviation weather hazards.

PLANNED ACCOMPLISHMENTS

*RAP v5** - Develop and prepare code for 3Q FY20 implementation into NCEP operations resulting in improvements over the Northern Hemisphere.

*HRRR v4** - Develop and prepare code for 3Q FY20 implementation into NCEP operations resulting in improvements over the CONUS and Alaska.

*RRFS v1** - Develop and prepare code to subsume RAP and HRRR capabilities for a FY23 implementation into NCEP operations using the UFS common framework.

**Operational implementation is NOAA NCEP decision*

MD&E RESEARCH SUPPORT TEAM

NOAA Earth System Research Laboratory (ESRL), Boulder CO

NCEP Environmental Modeling Center (EMC), College Park, MD

National Center for Atmospheric Research (NCAR), Boulder CO

REFERENCE DOCUMENTS

AWRP MDE Project Plan, April 2019 – March 2020, Version 1.0, 09 April 2019

NOAA NCEP EMC; Strategic Implementation Plan for Evolution of NGGPS to a National Unified Modeling System, November 29, 2018

FAA; NAS Segment Implementation Plan (NSIP)

BROCHURE PROVIDED BY

Federal Aviation Administration
Aviation Weather Division, ANG-C6
Orville Wright Building (FOB10A)
800 Independence Ave., SW
Washington DC 20591
(202) 267-2703

https://www.faa.gov/nextgen/programs/weather/awrp/

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Date edited: March 2020

Federal Aviation Administration

WEATHER MODEL DEVELOPMENT & ENHANCEMENT

NextGEN

AVIATION WEATHER RESEARCH PROGRAM

The Federal Aviation Administration (FAA) Aviation Weather Research Program (AWRP) conducts applied weather research to enhance the safety and efficiency of the National Airspace System (NAS). The goal of the research is to transition new or improved weather capabilities into evolving air traffic management decision support tools and/or incorporation by the National Weather Service (NWS) to improve delivery of FAA-required services and enhance aviation safety and efficiency.

AWRP RESEARCH AREAS

- Inflight Icing
- Turbulence
- Convective Weather
- Ceiling and Visibility
- Weather Radar Techniques
- Weather Prediction Model Development

MODEL DEVELOPMENT & ENHANCEMENT (MDE)

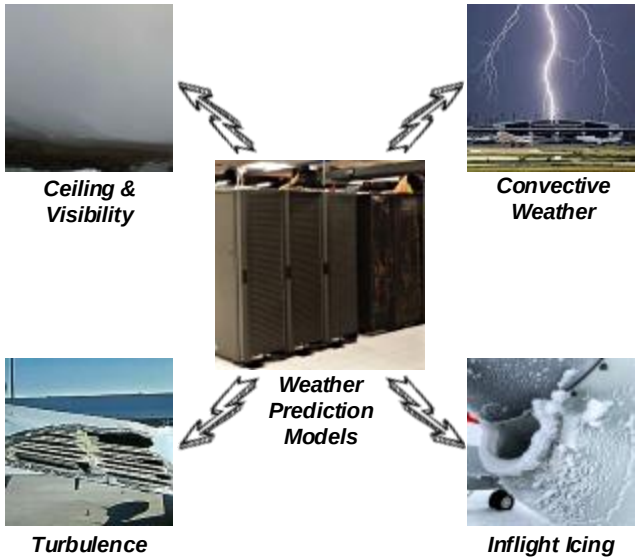
Weather prediction models are the basis for all aviation weather hazard forecasts beyond 2 hours either through the direct use of model output or through post-processing and translation of model output into relevant aviation parameters. The research conducted under MDE is designed to improve these models to enhance the safety and efficiency of the NAS. These enhanced models will be available for:

- Incorporation into new and emerging decision support processes;
- More accurate human-generated and automated NWS forecasts;
- Automated outputs to support NextGen Weather Operational Improvements.

AWRP MDE RESEARCH

AWRP MDE research and development will improve aviation weather hazard forecasts for:

- In-Flight Icing
- Convective Weather
- Turbulence
- Ceiling and Visibility

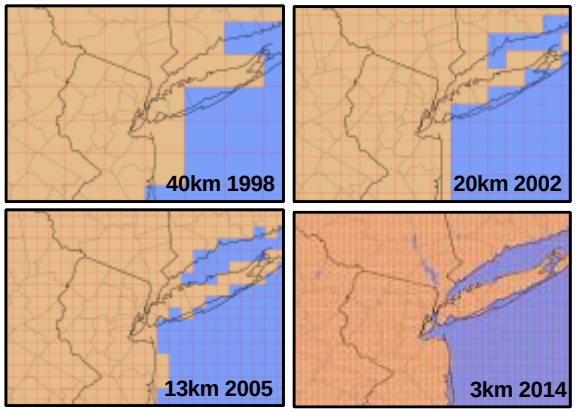


It is not practical for the FAA to run their own weather prediction models so they collaborate with the National Oceanic and Atmospheric Administration (NOAA) NWS National Centers for Environmental Prediction (NCEP) to operate and maintain a suite of weather prediction models for aviation use. The Rapid Refresh (RAP) model and the High Resolution Rapid Refresh (HRRR) are the two primary models used for aviation applications. NCEP is currently in the process of developing a Unified Forecast System (UFS) which will be centered around a common framework reducing their overall suite of multiple, disparate models. The RAP and HRRR nomenclature will be subsumed by a new Rapid Refresh Forecast System (RRFS).

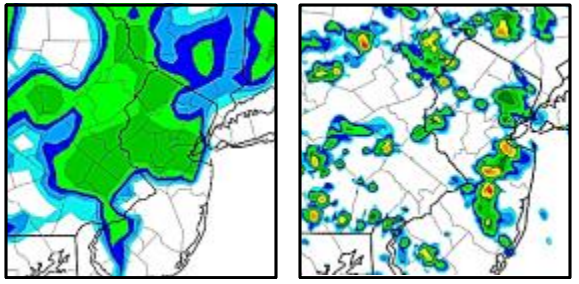
MDE GOALS

AWRP has achieved great success over the last two decades in developing and enhancing models, improving the resolution to more realistic terrain. This has resulted in graphical weather forecasts that also look more realistic.

HIGHER RESOLUTION SUCCESS
(Picture Courtesy: NOAA ESRL)



More realistic terrain as a result of model improvements.



13km 6 hr Reflectivity Forecast | **3km 6 hr Reflectivity Forecast**

More realistic-looking weather predictions

But looking more realistic and being more accurate are not necessarily the same. However, statistical verification has shown constant improvement in the accuracy of model weather forecasts and a reduction in over-forecasting to go along with the appearance.