NextGEN WEATHER

Improving Safety and Efficiency in the National Airspace System

REDUCE WEATHER IMPACT

NextGen Weather is a critical part of the NextGen Air Transportation System, designed to transform the management and operation of how we fly. It helps reduce weather impact, resulting in safer, more efficient and predictable day-to-day NAS operations.

NextGen Weather harnesses massive computing power, unprecedented advances in numerical weather forecasting, translation of weather information into airspace constraints, and modernized information management services.

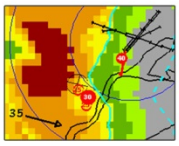
With this powerful combination, NextGen Weather can provide tailored aviation weather products within the NAS, helping controllers and operators develop reliable flight plans, make better decisions, and improve on-time performance.

NextGen Weather is accomplished through collaboration between FAA, NOAA, and NASA.

NWP

NEXTGEN WEATHER PROCESSOR

The fully-automated NextGen Weather Processor identifies terminal and enroute safety hazards, and provides translated weather information needed to predict route blockage and airspace capacity constraints up to eight hours in advance.



Far left: Example of a micro-burst as viewed by photographer, near left: as detected by automated algorithms running at key FAA terminals.

NWP combines weather radar, environmental satellite, lightning, meteorological observations (from surface stations and aircraft), and NOAA numerical forecast model output to generate improved products for all FAA users, while maintaining today's stellar terminal aviation safety products.

Improvements with NWP

Provides enhanced weather products

- Rapidly updating radar mosaics
- Radar-forward predictive products
- Products tailored to meet aviation requirements, summer and winter

Translates weather picture into reliable airspace constraints

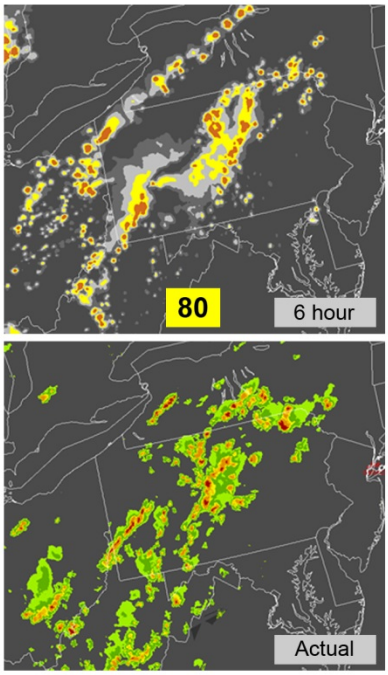
- Suitable for integration into air traffic decision-making
- Improves collaborative planning

Enables safe, timely, efficient operation of the National Airspace System (NAS)

- Reduces congestion and delays
- Increases flight schedule reliability

Consolidates FAA weather programs

- Replaces legacy weather processors (WARP, ITWS, CIWS)



NWP 6-hour storm cell intensity, pattern, placement, and timing shown here with a confidence of 80%.

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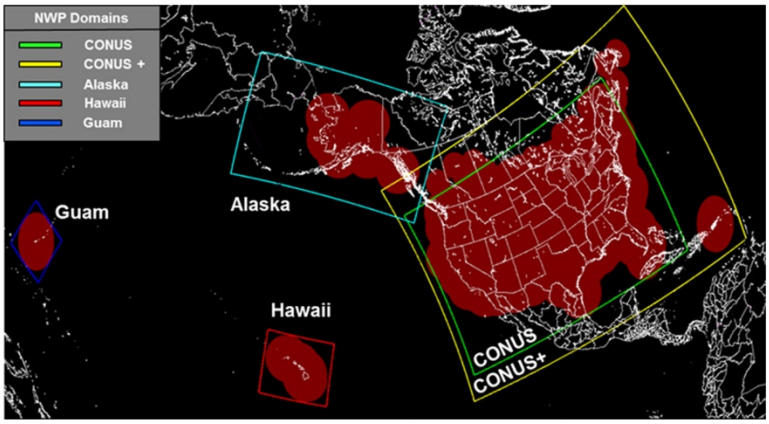
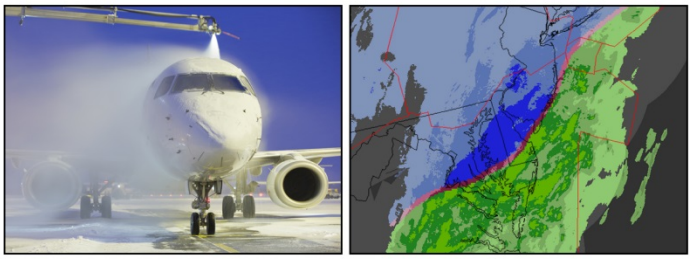
NWP
NEXTGEN WEATHER PROCESSOR

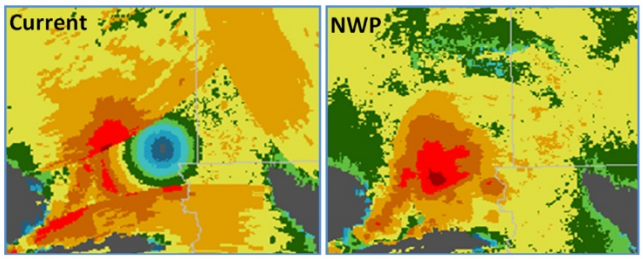


Map showing NWP domains in colored outlines, and NEXRAD and Canadian radar coverage in red. NWP also uses TDWR and ASR radars where available.

Photo of cloud tops along a line of thunderstorms taken from the cockpit window.



NWP provides up to 8-hour look ahead of the rain-snow boundary relative to the major airports, important for airport capacity planning.



Example of NWP improvement in Echo Tops, an important product for determining enroute airspace availability.

NWP PRODUCTS

MOSAIC PRODUCTS

NEXRAD, TDWR and Canadian Radars
- Precipitation
- Composite Reflectivity (Flexible 1000 ft layers)
- Base Reflectivity
- Echo Tops (Levels 1-6)

Air Surveillance Radars
- Each terminal mosaic includes 1-9 radars

GOES Satellite
- Combined East/West and Visible/Infrared

ANALYSIS PRODUCTS

Storm Information
- Motion Vectors
- Storm Extrapolated Position
- Growth Trends
- Echo Top Tags, Hail
- Lightning, Mesocyclone

Wind Shear Safety
- Microbursts, Gust Fronts
- Tornado Detections
- Terminal Alerts

Terminal Winds
- Wind Profiles and 3-D Grids

PREDICTIVE PRODUCTS

0-8 hour
- Precipitation
- Precipitation Phase (snow-mix-rain)
- Echo Tops
- Confidence

0-2 hour
- Accuracy scores
- Fronts (time-aligned)

TRANSLATION PRODUCTS

0-8 hour
- Convective Weather Avoidance Fields (CWAF)
- Convective Weather Avoidance Polygons

0-2 hour
- CWAF for Route Availability Planning Tool (RAPT) and Arrival Route Status and Impact (ARSI)

NWP products are high resolution and update rapidly. For example, Base Reflectivity is 0.25 km and other mosaics are 1 km. The enroute controllers' mosaics update every 25 sec, ASR mosaics every 30 sec, other radar mosaics every 2.5 min, and translation and predictive products every 5 min.

FAA | CSS-WX
FAA | NWP
FAA | AWD

NOAA | RAP
NOAA | HRRR
NOAA | LAPS

NOAA | CCFP
NOAA | CIP/FIP
NOAA | GTG

NASA | CWAM
NASA | SATCAST
NASA | DWR