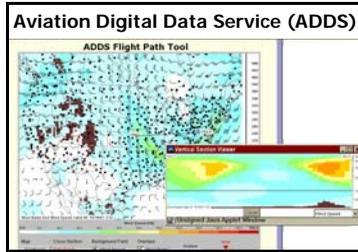


Technology Transfer

The Aviation Support Branch employs meteorologists, computer analysts and programmers to develop and maintain the systems that forecasters use to produce and disseminate warnings and forecasts. This includes technique development, scientific support and technological advances. They also support the operational workstations, computer equipment and communications for satellite, radar, lightning, pilot reports, conventional meteorological data, and maintain web pages.

To support daily operational forecasting, the AWC must be able to transfer technology from outside of the NWS. Aviation weather research is conducted at universities and federal laboratories, particularly in the areas of icing, turbulence, the development of thunderstorms and the forecasting of low ceilings and visibilities. The Center has developed



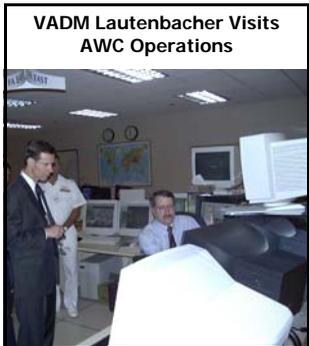
strong partnerships with the Research Applications Program at the National Center for Atmospheric Research in Boulder, CO; with NOAA's Forecast Systems Laboratory also in Boulder, CO; and with the Weather Sensing Group of Lincoln Laboratories at the Massachusetts Institute of Technology. Collaboration among these laboratories and agencies is coordinated through *Product Development Teams* supported by the FAA's Aviation Weather Research Program.

An important facility for technology transfer at the Aviation Weather Center is the FAA Testbed. Meteorologists adapt new ideas and the latest technical developments from both internal and external sources into operational practice.

Due to the increasing capability of the numerical models to describe the atmosphere with finer resolution, traditional AWC products are being

transformed: the objective is to create more compact digital and graphical output with better definition and the potential for more frequent updates. These products will enable individual users and private sector providers to tailor products specifically for different segments of the aviation community. Future aviation weather products will become accessible to the pilot in the cockpit, as well as at the console of flight controllers and dispatchers. All this should help to increase weather awareness and

economic efficiency in our national airspace, making the skies safer for the flying public.



A Long Tradition

The NWS has a long tradition of service to the aviation industry. Since 1918 airport terminal forecasts required for all commercial departures and arrivals were prepared by local NWS Forecast Offices. For many years en-route warnings and forecasts were the responsibility of regional offices across the country. In 1978, however, continuous monitoring and forecasting of thunderstorms became a new requirement. In 1982, partially as a result of this new requirement, and due to improvements in communications and satellite technology and plans for a national network of new Doppler radars (NEXRAD), many aviation-related responsibilities were consolidated at the National Aviation Weather Advisory Unit in Kansas City. In 1995 a dedicated facility for aviation weather was created—the national Aviation Weather Center. Today this Center serves as the primary resource for the National Aviation Weather System.

The Aviation Weather Center is part of NCEP, nine national centers dedicated to specific products and services including the *Storm Prediction Center* in Norman, OK; the *Tropical Prediction Center* in Miami, FL; *Central Operations*, the *Hydrometeorological Prediction Center*, the *Ocean Prediction Center*, the *Climate Prediction Center*, and the *Environmental Modeling Center* all located in Camp Springs, MD; and the *Space Environment Center* in Boulder, CO. The service centers are provided with numerical weather prediction guidance products through a Wide Area Network (WAN) from Central Operations in Camp Springs, MD. All of these centers—the *National Centers for Environmental Prediction*—are part of the National Weather Service, managed by the National Oceanic and Atmospheric Administration (NOAA) within the Department of Commerce.

Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Centers for Environmental Prediction
The Aviation Weather Center
7220 NW 101st Terrace, Room 101
Kansas City, MO 64153-2317
Tel: 816-584-7200
Fax: 816-880-0650
<http://aviationweather.gov>



Aviation Weather Center



National Weather Service
National Centers for Environmental Prediction

Aviation Weather Center
...America's Aviation Weather Experts



Aviation

Weather

Center

The Aviation Weather Center

Every day of the year, dangerous weather conditions can delay and cancel flights across the country, and severe weather can turn your flight from something you take for granted into a threatening experience. Each year more than one-quarter to one-half of all aviation accidents are weather related. Economic losses due to aviation delays caused by weather are estimated at more than \$1 billion per year. Timely and accurate warnings and forecasts are critical to the protection of life and property. That's the responsibility of the National Weather Service, National Centers for Environmental Prediction (NCEP) and the Aviation Weather Center.

The National Aviation Weather System

With the mission of saving lives, protecting property and enhancing the economic productivity of the national airspace, the Aviation Weather Center (AWC) issues warnings, forecasts, and analyses of weather hazardous to aviation. These efforts support the Federal Aviation Administration Air Traffic Control (ATC) responsibility to safely and efficiently manage the national airspace. Located near the international airport in Kansas City, Missouri, the AWC operates 24 hours a day, 7 days per week, throughout the year. AWC forecasters identify imminent weather hazards to aircraft in flight and generate warnings that are immediately sent to the aviation community. In addition, forecasts are made for weather conditions that may impact domestic and international airspace during the next 24 hours.



The AWC is a source for domestic and international aviation forecasts and warnings. These products are an integral part of an overall aviation program of the National Weather Service that also includes terminal and enroute forecasts provided by local NWS Offices, and weather information for air traffic management is provided by Center Weather Service Units. The AWC also works in partnership with universities, federal research laboratories, and research centers of the Federal Aviation Administration (FAA) to investigate aviation weather hazards and develop new forecast techniques.

Products and Services

The AWC issues a suite of products for the aviation community to ensure safe and efficient operations.

Area Forecasts are issued for six geographical areas three times daily and contain a brief synopsis of the position and movement of fronts and surface pressure, as well as clouds and other weather conditions.

SIGMET Advisories are issued to notify pilots, dispatchers, and air traffic controllers of non-convective severe weather conditions of concern to all aircraft operating at or below 45,000 feet. SIGMETs are issued for severe turbulence, severe icing, intense sand or dust storms, or volcanic ash clouds, and are valid up to four hours.

AIRMET Advisories are issued for weather phenomena less severe but are still hazardous—especially to single engine and light twin engine aircraft. AIRMETs are issued for six geographical areas, four times per day.

The Collaborative Convective Forecast Product (CCFP) provides a single convective forecast for strategic planning of en route aircraft operations within the National Airspace System. A significant feature of the CCFP production process is the collaboration that occurs among meteorologists from the AWC, participating commercial airlines, Center Weather Service Units, and Meteorological Services Canada. The CCFP is issued every two hours and provides a two-, four-, and six-hour forecast of convection. The CCFP aids in air traffic flow management decisions including the reduction of traffic delays, rerouting, and cancellations due to convective weather.

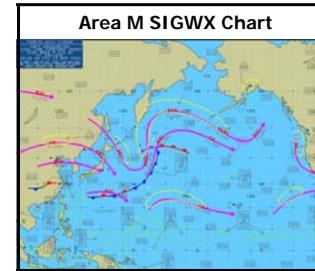


Convective SIGMETs are in-flight advisories for thunderstorms that are especially hazardous to aviation. These include thunderstorms in fast moving lines, or embedded in other clouds (not visible to the naked eye), or especially severe thunderstorms that produce tornadoes, hail or strong wind gusts. Convective SIGMETs are issued for three geographical areas each hour.

Low Level Significant Weather Charts cover the 48 contiguous states and southern Canada, extending from the surface to 24,000 feet. The charts depict low cloud ceilings and visibilities (IFR); marginal cloud ceilings and visibilities (MVFR); turbulence and freezing levels.

International Responsibilities

The AWC is a major component of the U.S. World Area Forecast Center (WAFC), and is an international Meteorological Watch Office. As such, the AWC incurs a mutual backup responsibility with the other WAFC Center in Bracknell, England. Each office covers an overlapping two thirds of the globe. The resulting products are furnished as an obligation of international treaties.



International SIGMETs are issued for the same phenomena as domestic SIGMETs, with the inclusion of thunderstorms. The AWC's area of responsibility covers large portions of the Northern Atlantic and Pacific oceans.

High Level Significant Weather Charts cover approximately two-thirds of the globe between the altitudes of 25,000 to 60,000 feet, and depict the location and speed of jet streams, areal and vertical extent of turbulence, intensity of turbulence, areal coverage and vertical extent of thunderstorms, tropopause heights, significant surface fronts, and the location of tropical cyclones. Additionally, the charts identify volcanic eruptions that are especially hazardous to aircraft flying above 25,000 feet.

Modern Technologies

In order to fulfill its responsibilities to the FAA and the Nation, the AWC requires access to a variety of data sources: the domestic Doppler radar network; satellite imagery from national and international satellites using a variety of bands to probe the atmosphere; and the national lightning detection network. In addition, atmospheric numerical model output is sent from NWS high performance computers in Maryland. All these data streams feed into the Kansas City site on a frequent update cycle—in some cases every five minutes.

Who provides weather information to the pilot?

The AWC is one part of the national aviation weather system that includes the FAA, commercial aviation, and business and general aviation interests. The FAA is responsible for delivery of flight information to the pilot, controllers and dispatchers. The NWS collects meteorological data, supports the FAA with forecasts and warnings, and cooperates in air commerce through the collection and dissemination of aircraft/pilot reports. Weather is part of the data stream that keeps the management of the airspace safe and efficient.