Aviation Weather Service Program

Providing weather service to aviation is a joint effort of the National Weather Service (NWS), the Federal Aviation Administration (FAA), the Department of Defense (DOD), and other aviation-oriented groups and individuals. Below is some of the civilian agencies of the U.S. Government and how they service the aviation community.

National Oceanic and Atmpospheric Administration (NOAA)

The National Oceanic and Atmospheric Administration is an agency of the Department of Commerce. NOAA is one of the leading scientific agencies in the U.S. Government. Among its six major divisions are the National Environmental Satellite Data and Information Service (NESDIS) and the NWS.

National Enviornmental Satellite Data and Information Service (NESDIS)

The National Environmental Satellite Data and Information Service is located in Washington, D.C., and directs the weather satellite program. Geostationary Operational Environmental Satellite (GOES) images. These images are available to NWS meteorologists and a wide range of other users for operational use. The U.S. is covered by GOES East and GOES West. See the article on page 36 for more information on satellite imagery.

National Weather Service (NWS)

The National Weather Service collects and analyzes meteorological and hydrological data and subsequently prepares forecasts on a national, hemispheric, and global scale. The following is a description of the NWS facilities tasked with these duties.

National Centers for Environmental Prediction (NCEP)

There are nine separate national centers under National Centers for Environmental Prediction, each with its own specific mission. They are the Climate Prediction Center, Space Environment Center, Marine Prediction Center, Hydrometeorological Prediction Center, Environmental Modeling Center, NCEP Center Operations, Storm Prediction Center, Aviation Weather Center, and the Tropical Prediction Center.

National Center Operations (NCO)

Located in Washington, D.C., the National Center Operations is the focal point of the NWS's weather processing system. From worldwide weather reports, NCO prepares automated weather analysis charts and guidance forecasts for use by NWS offices and other users.

Some NCO products are specifically prepared for aviation, such as the winds and temperatures aloft forecast. NCO is part of VAAC, which runs an ash dispersion model. NCO works with SAB to fulfill the VAAC responsibilities to the aviation communities regarding potential volcanic ash hazards to aviation.

Storm Prediction Center (SPC)

The Storm Prediction Center is charged with monitoring and forecasting severe weather over the 48 continental United States. Its products include convective outlooks and forecasts, as well as severe weather watches. The center also develops severe weather forecasting techniques and conducts research. The SPC is located in Norman, Oklahoma, near the heart of the area most frequently affected by severe thunderstorms.

Hydrometeorological Prediction Center (HPC)

The Hydrometeorological Prediction Center prepares weather charts which include basic weather elements of temperature, fronts and pressure patterns.

Aviation Weather Center (AWC)

The Aviation Weather Center, located in Kansas City, Missouri, issues warnings, forecasts, and analyses of hazardous weather for aviation interests. The center identifies existing or imminent weather hazards to aircraft in flight and creates warn-

ings for transmission to the aviation community. It also produces operational forecasts of weather conditions expected during the next two days that will affect domestic and international aviation interests. As a Meteorological Watch Office (MWO) under regulations of the International Civil Aviation Organization (ICAO), meteorologists in this unit prepare and issue aviation area forecasts (FAs) and inflight weather advisories (Airman's Meteorological Information [AIRMET], Significant Meteorological Information [SIGMET], and Convective SIGMETs) for the contiguous 48 states.

Tropical Prediction Center (TPC)

The Tropical Prediction Center is located in Miami, Florida. The National Hurricane Center, as an integral part of TPC, issues hurricane advisories for the Atlantic, the Caribbean, the Gulf of Mexico, the eastern Pacific, and adjacent land areas. The center also develops hurricane forecasting techniques and conducts hurricane research. The Central Pacific Hurricane Center in Honolulu, Hawaii, issues advisories for the central Pacific Ocean. TPC prepares and distributes tropical weather, aviation and marine analyses, forecasts, and warnings. As an MWO, TPC meteorologists prepare and issue aviation forecasts, SIGMETs, and Convective SIGMETs for their tropical Flight Information Region (FIR).

Weather Forecast Office (WFO)

A Weather Forecast Office issues various public and aviation forecast and weather warnings for its area of responsibility. In support of aviation, WFOs issue terminal aviation forecasts (TAFs) and transcribed weather broadcasts (TWEBs). As MWOs, the Guam and Honolulu Hawaii WFOs issue aviation area forecasts and inflight advisories (AIRMETs, and international SIGMETs).

Federal Aviation Administration (FAA)

The Federal Aviation Administration is a part of the Department of Transportation. The FAA provides a wide range of services to the aviation community. The following is a description of some of those FAA facilities which are involved with aviation weather and pilot services.

Flight Services Stations (FSSs)

The FAA is in the process of modernizing its Flight Service Station (FSS) program. The older, manual (or nonautomated) FSS is being consolidated into the newer, automated FSS (AFSS). With about one per state and with lines of communications radiating out from it, these new AFSSs are referred to as "hub" facilities. Pilot services provided previously by the older FSSs have been consolidated into facilities with new technology to improve pilot weather briefing services.

The FSS or AFSS provides more aviation weather briefing service than any other U.S Government service outlet. The FSS or AFSS provides preflight and inflight briefings, transcribed weather briefings, scheduled and unscheduled weather broadcasts, and furnishes weather support to flights in its area.

As a starting point for a preflight weather briefing, a pilot may wish to listen to one of the recorded weather briefings provided by an FSS or AFSS. For a more detailed briefing, pilots can contact the FSS or AFSS directly.

Transcribed Weather Broadcast (TWEB)

The transcribed weather broadcast provides continuous aeronautical and meteorological information on low/medium frequency (L/MF) and very high frequency (VHF) omni-directional radio range (VOR) facilities. At TWEB equipment locations controlling two or more VORs, the one used least for ground-to-air communications, preferably the nearest VOR, may be used as a TWEB outlet simultaneously with the nondirectional radio beacon (NDB) facility.

Pilots' Automatic Telephone Weather Answering System (PATWAS)

Pilots' automatic telephone weather answering system provides a continuous telephone recording of meteorological information. At PATWAS facilities where the telephone is connected to the TWEB, the information contained in the broadcast shall be in accordance with the TWEB format. PATWAS messages are recorded and updated at a minimum of every 5 hours beginning at 0600 and ending at 2200 local time.

Telephone Information Briefing Service (TIBS)

Telephone information briefing service is provided by AFSSs and provides continuous telephone recordings of meteorological and/or aeronautical information. TIBS shall contain area and/or route briefings, airspace procedures, and special announcements, if applicable.

TIBS should also contain, but not limited to, METARs, aviation terminal forecasts (TAFs), and winds/temperatures aloft forecasts. Each AFSS shall provide at least four route and/or area

briefings. Area briefings should encompass a 50-NM radius. Each briefing should require the pilot to access no more than two channels which shall be route- and/or area-specific. Pilots shall have access to NOTAM data through an area or route briefing on a separate channel designated specifically for NOTAMs or by access to a briefer.

TIBS service is provided 24 hours a day. Recorded information shall be updated as conditions change. Area and route forecast channels shall be updated whenever material is updated.

Direct User Access Terminal Service (DUATS)

The direct user access terminal system provides current FAA weather and flight plan filing services to U.S. Coast Guard and certified civil pilots. The computer-based system receives and stores up-to-date weather and NOTAM data from the FAA's WMSC. Pilots using a personal computer, modem, and a telephone line can access the system and request specific types of weather briefings and other pertinent data for planned flights. The pilot can also file, amend, or cancel flight plans while dialed into the system. Further information about DUATS can be obtained from any AFSS or FAA Flight

Surface Aviation Weather Observations (METARs)

Surface aviation weather observations include weather elements pertinent to flying. A network of airport stations provides routine up-to-date surface weather information. See METARs article on page 22.

Upper-Air Observations

Upper-air weather data is received from sounding balloons (known as radiosonde observations) and pilot weather reports (PIREPs). Upper-air observations are taken twice daily at specified stations. These upper-air observations furnish temperature, humidity, pressure, and wind data, often to heights above 100,000 feet. In addition, pilots are a vital source of upper-air weather observations. In fact, aircraft in flight are the only means of directly observing turbulence, icing, and height of cloud tops. Recently some US and other international airlines have equipped their aircraft with instruments that automatically send weather observations via a satellite downlink. These are important observations which are used by NCEP in their production of forecasts.

Radar Observations

The weather radar provides detailed information about precipitation, winds, and weather systems. Doppler technology allows the radar to provide measurements of winds through a large vertical depth of the atmosphere, even within "clear air." This information helps support public and aviation warning and forecast programs. For more information see the article on page 36.

Satellite Imagery

Visible, infrared (IR), and other types of images (or pictures) of clouds are taken from weather satellites in orbit. These images are then made available on a near-real-time basis to NWS and FAA facilities. Satellite pictures are an important source of weather information.

Obtaining a Good Weather Briefing

When requesting a briefing, pilots should identify themselves as pilots and give clear and concise facts about their flight:

1. Type of flight (VFR or IFR)
2. Aircraft identification or pilot's name
3. Aircraft type
4. Departure point
5. Proposed time of departure
6. Flight altitude(s)
7. Route of flight
8. Destination
9. Estimated time en route (ETE)

With this background, the briefer can proceed directly with the briefing and concentrate on weather relevant to the flight. The weather information received depends on the type of briefing requested. A "standard" briefing should include:

1. Adverse conditions. Meteorological or aeronautical conditions reported or forecast that may influence a pilot to alter the proposed flight.
2. VFR flight not recommended (VNR). VFR flight is proposed and sky conditions or visibilities are present or forecast, surface or aloft, that, in the judgment of the AFSS/FSS briefer, would make flight under visual flight rules doubtful.
3. Synopsis. A brief statement describing the type, location, and movement of weather systems and/or air masses which might affect the proposed flight.
4. Current conditions. A summary from all available sources reporting weather conditions applicable to the flight.
5. En Route forecast. A summary from appropriate data forecast conditions applicable to the proposed flight.
6. Destination forecast. Destination forecast including significant changes expected within 1 hour before and after the ETA.
7. Winds aloft. Forecast winds aloft for the proposed route; temperature information on request.
8. NOTAMs. Provides NOTAMs pertinent to the flight.
9. ATC delays. Informs the pilot of any known ATC delays and/or flow control advisories that may affect the proposed flight.
10. Request for PIREPs. A request is made if a report of actual inflight conditions would be beneficial or when conditions meet the criteria for solicitation of PIREPs.
11. EFAS. Informs pilots of the availability of Flight Watch for weather updates.
12. Any other information the pilot requests; e.g., military training routes, etc.

An "abbreviated" briefing will be provided at the user's request:

1. To supplement mass disseminated data.
2. To update a previous briefing.
3. To request that the briefing be limited to specific information.

An "outlook" briefing will be provided when the proposed departure is 6 hours or more from the time of the briefing. Briefing will be limited to applicable forecast data needed for the proposed flight.