AC 00-45H
Change 1

AVIATION WEATHER SERVICES

U.S. Department
of Transportation
**Federal Aviation
Administration**

U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject: Aviation Weather Services | **Date:** 1/8/18 | **AC No:** 00-45H
Initiated by: AFS-400 | **Change:** 1

1 PURPOSE OF THIS ADVISORY CIRCULAR (AC). This AC explains U.S. aviation weather products and services. It provides details when necessary for interpretation and to aid usage. This publication supplements its companion manual, AC 00-6, Aviation Weather, which documents weather theory and its application to aviation. The objective of this AC is to bring the pilot and operator up-to-date on new and evolving weather information and capabilities to help plan a safe and efficient flight, while also describing the traditional weather products that remain.

2 PRINCIPAL CHANGES. This change adds guidance and information on Graphical Forecast for Aviation (GFA), Localized Aviation Model Output Statistics (MOS) Program (LAMP), Terminal Convective Forecast (TCF), Polar Orbiting Environment Satellites (POES), Low-Level Wind Shear Alerting System (LLWAS), and Flight Path Tool graphics. It also updates guidance and information on Direct User Access Terminal Service (DUATS II), Telephone Information Briefing Service (TIBS), and Terminal Doppler Weather Radar (TDWR). This change removes information regarding Area Forecasts (FA) for the Continental United States (CONUS).

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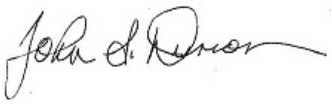

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U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject: Aviation Weather Services **Date:** 11/14/16 **AC No:** 00-45H
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The Federal Aviation Administration (FAA) publishes Advisory Circular (AC) 00-45, Aviation Weather Services. This publication supplements its companion manual, AC 00-6, Aviation Weather, which documents weather theory and its application to aviation.

Revision H of AC 00-45 (AC 00-45H) provides an improved organization of aviation weather information. The document is organized using the FAA's three distinct types of weather information: observations, analyses, and forecasts. Within this construct, AC 00-45H explains U.S. aviation weather products and services. It provides details when necessary for interpretation and to aid usage.

In the past decade, access to aviation weather products has greatly improved with the increase of flight planning services and weather websites. The experience of listening to a weather briefing over a phone while trying to write down pertinent weather information becomes less tolerable when the reports are easily obtainable on a home computer, tablet computer, or even a smart phone. To see weather along your route using a graphic of plotted weather reports combined with radar and satellite is preferable to trying to mentally visualize a picture from verbalized reports.

Although most of the traditional weather products, which rolled off the teletype and facsimile machines decades ago, are still available, some are being phased out by the National Weather Service (NWS) in favor of new, Web-based weather information.

It is the objective of AC 00-45H to bring the pilot and operator up to date on new and evolving weather information and capabilities to help plan a safe and efficient flight, while also describing the traditional weather products that remain.

Online aviation weather information is easy to access, and so are references explaining the information. That is why AC 00-45H contains fewer illustrations and less detail for products available online. This AC will give an overview and direct the pilot where to find more weather information and explanatory details. Product examples and explanations are taken primarily from the National Oceanic and Atmospheric Administration (NOAA) NWS Aviation Weather Center's (AWC) website (http://www.aviationweather.gov) and other pertinent NWS websites. Due to the fluid nature of Web addresses, this AC minimizes the inclusion of website links. Instead, it provides the name of the website which can be easily found using Internet search tools.

An online version of this document (including digital images) can be found at http://rgl.faa.gov/.

AC 00-45H cancels AC 00-45G, Change 2, published October 2014.

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback Form at the end of this AC.

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CHAPTER 1. AVIATION WEATHER SERVICE PROGRAM

The aviation weather service program 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. This chapter discusses the civilian agencies of the U.S. Government and their observation, communication, and forecast services to the aviation community.

1.1 National Oceanic and Atmospheric Administration (NOAA).
NOAA is an agency of the Department of Commerce (DOC). NOAA conducts research and gathers data about the global oceans, atmosphere, space, and sun, and applies this knowledge to science and service, which touches the lives of all Americans. Among its six major divisions are the National Environmental Satellite, Data, and Information Service (NESDIS) and the NWS.

1.1.1 National Environmental Satellite, Data, and Information Service (NESDIS).
The NESDIS manages the U.S. civil operational remote-sensing satellite systems, as well as other global information for meteorology, oceanography, solid-earth geophysics, and solar-terrestrial sciences. NESDIS provides this data to NWS meteorologists and a wide range of other users for operational weather forecasting.

1.1.1.1 Satellite Analysis Branch (SAB).
NESDIS' SAB serves as the operational focal point for real-time imagery products and multi-disciplinary environmental analyses. The SAB's primary mission is to support disaster mitigation and warning services for U.S. Federal agencies and the international community. Routine environmental analyses are provided to forecasters and other environmental users, and are used in the numerical models of the NWS. The SAB schedules and distributes real-time satellite imagery products from global geostationary and polar orbiting satellites to environmental users. The SAB coordinates the satellite and other information for the NOAA Volcanic Hazards Alert Program, under an agreement with the FAA, and works with the NWS as part of the Washington, D.C. Volcanic Ash Advisory Center (VAAC). The Washington, D.C. VAAC Area of Responsibility (AOR) includes the continental United States (CONUS), the Gulf of Mexico, the Oakland Flight Information Region (FIR), and the New York FIR.

1.1.2 National Weather Service (NWS).
NWS provides weather data, forecasts, and warnings for the United States, its territories, adjacent waters, and ocean areas for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure that can be used by other government agencies, the private sector, the public, and the global community. The following is a description of NWS offices associated with aviation weather:

1.1.2.1 National Centers for Environmental Prediction (NCEP).
NCEP is where virtually all global meteorological data is collected and

analyzed. NCEP then provides a wide variety of national and international weather guidance products to NWS field offices, government agencies, emergency managers, private sector meteorologists, and meteorological organizations and societies throughout the world. NCEP is a critical resource in national and global weather prediction and is the starting point for nearly all weather forecasts in the United States.

NCEP is comprised of nine distinct centers and the Office of the Director. Each center has its own specific mission. The following NCEP centers provide aviation weather products and services:

1.1.2.1.1 NCEP Central Operations (NCO).
The NCO in College Park, MD, sustains and executes the operational suite of the numerical analysis and forecast models and prepares NCEP products for dissemination. It also links all nine of the national centers together via computer and communications-related services.

1.1.2.1.2 Aviation Weather Center (AWC).
The AWC in Kansas City, MO, issues a suite of aviation weather forecasts in support of the National Aerospace System (NAS) including: Airman's Meteorological Information (AIRMET), significant meteorological information (SIGMET), Convective SIGMETs, Area Forecasts (FA), Significant Weather Prognostic Charts (low, middle, and high), National Convective Weather Forecast (NCWF), Current Icing Product (CIP), Forecast Icing Product (FIP), Graphical Turbulence Guidance (GTG), and Ceiling and Visibility Analysis (CVA) product. The AWC is a Meteorological Watch Office (MWO) for the International Civil Aviation Organization (ICAO).

The website for the AWC is http://www.aviationweather.gov. The AWC's website provides the aviation community with textual, digital, and graphical forecasts, analyses, and observations of aviation-related weather variables. Additionally, the website provides information for international flights through the World Area Forecast System (WAFS) Internet File Service (WIFS).

The AWC's website also provides a flight path tool that allows the user to view data along a specific route of flight. Using the flight path tool, a user can view icing, turbulence, temperature, winds, humidity, AIRMETs/SIGMETs, Aviation Routine Weather Report (METAR)/Special Weather Report (SPECI), Terminal Aerodrome Forecast (TAF), etc. both horizontally and vertically. The flight path tool also allows many overlay options, including Air Route Traffic Control Center (ARTCC) boundaries, counties, highways, and rivers. Product animation is also possible on the AWC JavaScript image.

1.1.2.1.3 Weather Prediction Center (WPC).
The WPC in College Park, MD, provides analysis and forecast products specializing in multi-day, quantitative precipitation forecasts and weather

forecast guidance, weather model diagnostics discussions, and surface pressure and frontal analyses.

1.1.2.1.4 Storm Prediction Center (SPC).
The SPC in Norman, OK, provides tornado and severe weather watches for the CONUS along with a suite of hazardous weather forecasts.

1.1.2.1.5 National Hurricane Center (NHC).
The NHC in Miami, FL, provides official NWS forecasts of the movement and strength of tropical weather systems and issues the appropriate watches and warnings for the CONUS and surrounding areas. It also issues a suite of marine products covering the tropical Atlantic, Caribbean, Gulf of Mexico, and tropical eastern Pacific. In support of ICAO/World Meteorological Organization (WMO), the NHC is also referred to as the Tropical Cyclone Advisory Center (TCAC).

1.1.2.1.6 Space Weather Prediction Center (SWPC).
The SWPC in Boulder, CO, provides space weather information (e.g., current activity and forecasts) to a wide variety of users. SWPC issues alerts, watches, and warnings for space weather events affecting, or expected to affect, Earth's environment.

1.1.2.2 Alaska Aviation Weather Unit (AAWU).
The AAWU, located in Anchorage, AK, is an MWO for ICAO. The AAWU is responsible for the entire Anchorage FIR. They issue a suite of aviation weather products for the airspace over Alaska and adjacent coastal waters, including: AIRMETs, SIGMETs, FAs, Graphic FAs, and Significant Weather Prognostic Charts.

The AAWU is also designated as the Anchorage VAAC. The VAAC AOR includes the Anchorage FIR and Far Eastern Russia and is responsible for the issuance of Volcanic Ash Advisories (VAA).

1.1.2.3 Center Weather Service Unit (CWSU).
CWSUs are units of NWS meteorologists under contract with the FAA that are stationed at, and support, the FAA's ARTCC.

CWSUs provide timely weather consultation, forecasts, and advice to managers within ARTCCs and to other supported FAA facilities. This information is based on monitoring, analysis, and interpretation of real-time weather data at the ARTCC through the use of all available data sources including radar, satellite, Pilot Weather Reports (PIREP), and various NWS products, such as TAFs and inflight advisories.

Special emphasis is given to those weather conditions that are hazardous to aviation or which could impede the flow of air traffic within the NAS. CWSU meteorologists issue the following products in support of their respective

ARTCC: Center Weather Advisories (CWA) and Meteorological Impact Statements (MIS).

1.1.2.4 Weather Forecast Office (WFO).
An NWS WFO is a multi-purpose, local weather forecast center that produces, among its suite of services, aviation-related products. In support of aviation, WFOs issue TAFs, with some offices issuing Airport Weather Warnings and Soaring Forecasts.

The Honolulu WFO is unique among NWS WFOs in that it provides multiple services beyond the typical WFO. WFO Honolulu is also designated as an MWO for ICAO. As a result of this unique designation, WFO Honolulu is the only WFO to issue the following text products: AIRMETs, SIGMETs, and Route Forecasts (ROFOR). WFO Honolulu is co-located with the Central Pacific Hurricane Center (CPHC). CPHC provides official NWS forecast of the movement and strength of tropical weather systems and issues the appropriate watches and warnings for the central Pacific, including the state of Hawaii. WFO Honolulu also issues a suite of marine products covering a large portion of the Pacific Ocean. In support of ICAO/WMO, the NHC is also referred to as the TCAC.

1.2 Federal Aviation Administration (FAA).

The FAA, a part of the Department of Transportation (DOT), provides a safe, secure, and efficient airspace system that contributes to national security and the promotion of U.S. aerospace safety. As the leading authority in the international aerospace community, the FAA is responsive to the dynamic nature of user needs, economic conditions, and environmental concerns.

The FAA provides a wide range of services to the aviation community. The following is a description of those FAA facilities that are involved with aviation weather and pilot services:

1.2.1 Air Traffic Control Systems Command Center (ATCSCC).
The ATCSCC is located in Vint Hill, VA. The ATCSCC has the mission of balancing air traffic demand with system capacity. This ensures maximum safety and efficiency for the NAS, while minimizing delays. The ATCSCC utilizes the Traffic Management System (TMS), aircraft situation display, monitor alert, the follow on functions, and direct contact with ARTCC, and Terminal Radar Approach Control (TRACON) facility Traffic Management Units (TMU) to manage flow on a national level.

Because weather is the most common reason for air traffic delays and re-routings, NWS meteorologists support the ATCSCC. These meteorologists, called National Aviation Meteorologists (NAM), coordinate NWS operations in support of traffic flow management within the NAS.

1.2.2 Air Route Traffic Control Center (ARTCC).
An ARTCC is a facility established to provide air traffic control (ATC) service to aircraft

operating on instrument flight rules (IFR) flight plans within controlled airspace, principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to visual flight rules (VFR) aircraft.

En route controllers become familiar with pertinent weather information and stay aware of current weather information needed to perform ATC duties. En route controllers advise pilots of hazardous weather that may impact operations within 150 nautical miles (NM) of the controller's assigned sector(s), and may solicit PIREPs from pilots.

1.2.3 Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON).
An ATCT is a terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area.

Terminal controllers become familiar with pertinent weather information and stay aware of current weather information needed to perform ATC duties. Terminal controllers advise pilots of hazardous weather that may impact operations within 150 NM of the controller's assigned sector or area of jurisdiction and may solicit PIREPs from pilots. ATCTs and TRACONs may opt to broadcast hazardous weather information alerts only when any part of the area described is within 50 NM of the airspace under the ATCT's jurisdiction.

The tower controllers are also properly certified and act as official weather observers, as required.

An automated terminal information service (ATIS) is a continuous broadcast of recorded information in selected terminal areas. Its purpose is to improve controller effectiveness and to relieve frequency congestion by automating the repetitive transmission of non-controlled airport/terminal area and meteorological information.

1.2.4 Flight Service Station (FSS).
FSSs provide pilot weather briefings, en route weather, receive and process IFR and VFR flight plans, solicit and disseminate pilot reports and urgent pilot reports, relay ATC clearances, and issue Notices to Airmen (NOTAM). They also provide assistance to lost aircraft and aircraft in emergency situations, as well as conduct VFR search and rescue services.

1.3 Dissemination of Aviation Weather Products.

The ultimate users of aviation weather services are pilots, aircraft dispatchers, and air traffic management (ATM) and air traffic controllers. Maintenance personnel may use the service to keep informed of weather that could cause possible damage to unprotected aircraft.

Pilots contribute to and use aviation weather services. PIREPs help other pilots, dispatchers, briefers, and forecasters as an observation of current conditions.

In the interest of safety and in compliance with Title 14 of the Code of Federal Regulations (14 CFR), all pilots should get a complete weather briefing before each flight. The pilot is responsible for ensuring he or she has all information needed to make a safe flight.

1.3.1 Weather Briefings.

Prior to every flight, pilots should gather all information vital to the nature of the flight. This includes a weather briefing obtained by the pilot from an approved weather source, via the Internet, and/or from an FSS specialist.

The FSS' purpose is to serve the aviation community. Pilots should not hesitate to ask questions and discuss factors they do not fully understand. The briefing should be considered complete only when the pilot has a clear picture of what weather to expect. Pilots should also make a final weather check immediately before departure, when possible.

To provide an appropriate weather briefing, specialists need to know which of the three types of briefings is needed—standard, abbreviated, or outlook. Other necessary information includes whether the flight will be conducted with VFR or IFR, aircraft identification and type, departure point, estimated time of departure, flight altitude, route of flight, destination, and estimated time en route. If the briefing updates previously received information, the time of the last briefing is also important. This allows the briefer to provide only pertinent data.

The briefer enters this information into the FAA's flight plan system. The briefer also notes the type of weather briefing provided. If necessary, the information can be referenced later to file or amend a flight plan. It is also used when an aircraft is overdue or is reported missing. Internet data is time-stamped and archived for 15 days. Voice recordings are retained for 45 days.

1.3.1.1 Standard Briefing.

A standard briefing provides a complete weather picture and is the most detailed of all briefings. This type of briefing should be obtained prior to the departure of any flight and should be used during flight planning. A standard briefing provides the following information (if applicable to the route of flight) in sequential order:

- **Adverse Conditions.** This includes information about adverse conditions that may influence a decision to cancel or alter the route of flight. Adverse conditions include significant weather (e.g., thunderstorms, aircraft icing, turbulence, windshear, mountain obscuration, and areas of current and forecasted IFR conditions) and other important items, such as airport/runway closings, air traffic delays, and temporary flight restrictions (TFR).
- **VFR Flight NOT RECOMMENDED (VNR).** If the weather for the route of flight is below VFR minimums, or if it is doubtful the flight can be made under VFR conditions due to the forecasted weather, the briefer

may state that VFR is not recommended. The pilot can then decide whether or not to continue the flight under VFR, but this advisory should be weighed carefully. This advisory is not provided via the Internet.

- **Synopsis.** The synopsis is an overview of the larger weather picture. Fronts and major weather systems along or near the route of flight and weather that may affect the flight are provided.
- **Current Conditions.** This portion of the briefing contains the current surface weather observations, PIREPs, and satellite and radar data along the route of flight. If the departure time is more than 2 hours away, current conditions will not be included in the briefing.
- **En Route Forecast.** The en route forecast is a summary of the weather forecast for the proposed route of flight.
- **Destination Forecast.** The destination forecast is a summary of the expected weather for the destination airport at the estimated time of arrival (ETA).
- **Winds and Temperatures Aloft.** Winds and temperatures aloft is a forecast of the winds at specific altitudes along the route of flight. However, the temperature information is provided only on request.
- **NOTAMs.** This portion supplies NOTAM information that has not been published in the NOTAM publication, but is pertinent to the route of flight. Published NOTAM information is provided during the briefing only on request.
- **Prohibited Areas and Special Flight Rules Areas (SFRA).** Information on Prohibited Areas P-40 and P-56, and the SFRA for Washington, D.C. are given when appropriate to the route of flight.
- **ATC Delays.** This is an advisory of any known ATC delays that may affect the flight.
- **Other Information.** Any additional information requested is also provided at this time.

1.3.1.2 Abbreviated Briefing.

An abbreviated briefing is a shortened version of the standard briefing. It should be requested when a departure has been delayed or when specific weather information is needed to update a previous standard briefing. When this is the case, the weather specialist needs to know the time and source of the previous briefing so he or she does not inadvertently omit the necessary weather information.

1.3.1.3 Outlook Briefing.

An outlook briefing should be requested when a planned departure is 6 or more hours away. It provides initial forecast information that is limited in scope due to the timeframe of the planned flight. This type of briefing is a

good source of flight planning information that can influence decisions regarding route of flight, altitude, and ultimately the "go, no-go" decision. A follow-up standard briefing prior to departure is advisable, since an outlook briefing generally only contains information based on weather trends and existing weather in geographical areas at or near the departure airport.

1.3.2 Pilot Briefing via the Internet.

1.3.2.1 Direct User Access Terminal Service (DUATS II).
DUATS II, an approved FAA preflight briefing source, allows any pilot to access NWS weather information and to file a flight plan online. Airmen can access DUATS II at http://www.duats.com, http://www.duatsii.com, or http://www.1800wxbrief.com. The current vendors of DUATS II service and the associated phone numbers are listed in the Aeronautical Information Manual (AIM), Chapter 7, Safety of Flight.

1.3.2.2 Aviation Digital Data Service (ADDS).
ADDS is a joint effort of the FAA, NOAA, and the National Center for Atmospheric Research (NCAR). ADDS provides text, digital, and graphical forecasts, analyses, and observations of aviation-related weather variables.

1.3.3 Telephone Information Briefing Service (TIBS).
TIBS is a service prepared and disseminated by Flight Service. It provides continuous telephone recordings of meteorological and aeronautical information. Specifically, TIBS provides area and route briefings, as well as airspace procedures and special announcements, if applicable. It is designed to be a preliminary briefing tool and is not intended to replace a standard briefing. The TIBS service is available 24 hours a day and is updated when conditions change. The order and content of the TIBS recording is as follows:

1. Introduction. Includes the preparation time and the route and/or the area of coverage. The service area may be configured to meet the individual facility's needs.
2. Weather Advisories. A summary of in-flight advisories and any other available information that may adversely affect flight in the route/area.

TIBS services may be reduced during the hours of 1800 to 0600, local time only. Resumption of full broadcast service is adjusted seasonally to coincide with daylight hours. During the period of reduced broadcast, a recorded statement may indicate when the broadcast will be resumed and to contact Flight Service via the Internet or by telephone for weather briefing and other services.

For those pilots already in flight and needing weather information and assistance, the following services are provided by FSSs.

1.3.4 Hazardous In-flight Weather Advisory Service (HIWAS).
HIWAS is a national program for broadcasting hazardous weather information

continuously over selected Navigational Aids (NAVAID). The broadcasts include advisories such as AIRMETs, SIGMETS, Convective SIGMETs, and urgent PIREPs. These broadcasts are only a summary of the information, and pilots should contact an FSS for detailed information.

The HIWAS broadcast area is defined as the area within 150 NM of HIWAS outlets.

HIWAS broadcasts are not interrupted or delayed, except for emergency situations, when an aircraft requires immediate attention, or for reasonable use of the voice override capability on specific HIWAS outlets in order to use the limited remote communications outlet (RCO) to maintain en route communications. The service is provided 24 hours a day. An announcement is made for no hazardous weather advisories.

Hazardous weather information is recorded if it is occurring within the HIWAS broadcast area. The broadcast includes the following elements:

- A statement of introduction including the appropriate area(s) and a recording time.
- A summary of Convective SIGMETs, SIGMETs, AIRMETs, Urgent PIREPs, Aviation Watch Notification Messages (SAW), Center Weather Advisories, and any other weather, such as isolated thunderstorms that are rapidly developing and increasing in intensity, or low ceilings and visibilities that are becoming widespread, which are considered significant and are not included in a current hazardous weather advisory.
- A request for PIREPs, if applicable.
- A recommendation to contact FSS for additional details concerning hazardous weather.

Once the HIWAS broadcast is updated, an announcement will be made once on all communications/NAVAID frequencies, except emergency and navigational frequencies already dedicated to continuous broadcast services. In the event a HIWAS broadcast area is out of service, an announcement is made on all communications/NAVAID frequencies, except on emergency and navigational frequencies already dedicated to continuous broadcast services.

1.3.5 Flight Information Service-Broadcast (FIS-B).

FIS-B is a ground-based broadcast service provided through the FAA's Automatic Dependent Surveillance-Broadcast (ADS-B) Services Universal Access Transmitter (UAT) network. The service provides users with a 978 megahertz (MHz)F data link capability when operating within range and line of sight of a transmitting ground station. FIS-B enables users of properly-equipped aircraft to receive and display a suite of broadcast weather and aeronautical information products.

The following list represents the initial suite of textual and graphical products available through FIS-B and provided free-of-charge. This advisory circular (AC) and AC 00-63, Use of Cockpit Displays of Digital Weather and Aeronautical Information, contain detailed information concerning FIS-B meteorological products. AIM Chapter 3,

Airspace; Chapter 4, Air Traffic Control; and Chapter 5, Air Traffic Procedures contain information on Special Use Airspace (SUA), TFR, and NOTAM products.

- Text: METAR and SPECI;
- Text: PIREP;
- Text: Winds and Temperatures Aloft;
- Text: TAF;
- Text: NOTAM Distant and Flight Data Center;
- Text/Graphic: AIRMET;
- Text/Graphic: SIGMET;
- Text/Graphic: Convective SIGMET;
- Text/Graphic: SUA;
- Text/Graphic: TFR NOTAM; and
- Graphic: Next generation weather radar (NEXRAD) Composite Reflectivity Products (Regional and National).

Users of FIS-B should familiarize themselves with the operational characteristics and limitations of the system, including: system architecture, service environment, product lifecycles, modes of operation, and indications of system failure.

Update intervals are defined as the rate at which the product data is available from the source for transmission. Transmission intervals are defined as the amount of time within which a new or updated product transmission must be completed and/or the rate or repetition interval at which the product is rebroadcast. Table 1-1, FIS-B Over UAT Product Update and Transmission Intervals, provides update and transmission intervals for each product.

Where applicable, FIS-B products include a look-ahead range expressed in nautical miles for three service domains: Airport Surface, Terminal Airspace, and En route/Gulf of Mexico. Table 1-2, Product Parameters for Low/Medium/High Altitude Tier Radios, provides service domain availability and look-ahead ranging for each FIS-B product.

Prior to using this capability, users should familiarize themselves with the operation of FIS-B avionics by referencing the applicable user's guides. Users should obtain guidance concerning the interpretation of information displayed from the appropriate avionics manufacturer.

Users should report FIS-B malfunctions not attributed to aircraft system failures or covered by active NOTAM via the ADS-B/Traffic Information Services-Broadcast (TIS-B)/FIS-B Problem Report on the following website: http://www.faa.gov/exit/?pageName=this%20form&pgLnk=http%3A%2F%2Fgoo%2Egl%2Fforms%2FisWDKYpYYv. Users may also report malfunctions by submitting

FAA Form 8740-5, Safety Improvement Report, via mail, fax, or email to your local Flight District Standards Office (FSDO) Safety Program Manager (SPM).

Table 1-1. FIS-B Over UAT Product Update and Transmission Intervals

Product	FIS-B Over UAT Service Update Interval[1]	FIS-B Service Transmission Interval[2]
AIRMET	As available	5 minutes
Convective SIGMET	As available	5 minutes
METARs/SPECIs	1 minute/as available	5 minutes
NEXRAD Composite Reflectivity (CONUS)	15 minutes	15 minutes
NEXRAD Composite Reflectivity (Regional)	5 minutes	2.5 minutes
NOTAMs–D/FDC/TFR	As available	10 minutes
PIREP	As available	10 minutes
SIGMET	As available	5 minutes
Special Use Airspace Status	As available	10 minutes
TAF/AMEND	8 hours/as available	10 minutes
Temperature Aloft	12 hours	10 minutes
Winds Aloft	12 hours	10 minutes

1. The Update Interval is the rate at which the product data is available from the source.

2. The Transmission Interval is the amount of time within which a new or updated product transmission must be completed and the rate or repetition interval at which the product is rebroadcast.

Table 1-2. Product Parameters for Low/Medium/High Altitude Tier Radios

Product	Surface Radios	Low Altitude Tier	Medium Altitude Tier	High Altitude Tier
CONUS NEXRAD	N/A	CONUS NEXRAD not provided	CONUS NEXRAD imagery	CONUS NEXRAD imagery
Winds & Temps Aloft	500 NM look-ahead range	500 NM look-ahead range	750 NM look-ahead range	1,000 NM look-ahead range
METAR	100 NM look-ahead range	250 NM look-ahead range	375 NM look-ahead range	CONUS: CONUS Class B & C airport METARs and 500 NM look-ahead range Outside of CONUS: 500 NM look-ahead range
TAF	100 NM look-ahead range	250 NM look-ahead range	375 NM look-ahead range	CONUS: CONUS Class B & C airport TAFs and 500 NM look-ahead range Outside of CONUS: 500 NM look-ahead range
AIRMET, SIGMET, PIREP and Special Use Airspace/SAA	100 NM look-ahead range. PIREP/SUA is N/A	250 NM look-ahead Range	375 NM look-ahead range	500 NM look-ahead range
Regional NEXRAD	150 NM look-ahead range	150 NM look-ahead range	200 NM look-ahead range	250 NM look-ahead range
NOTAMs–D/FDC/TFR	100 NM look-ahead range	100 NM look-ahead range	100 NM look-ahead range	100 NM look-ahead range

Users should obtain guidance concerning the content, format, and symbology of individual FIS-B products from the manufacturer of the avionics equipment used to receive and display them.

1.3.6 Operational Use of FIS-B Products.

FIS-B information may be used by the pilot for the safe conduct of flight and aircraft movement. However, FIS-B does not replace a preflight briefing from an FSS via the phone, a Lockheed Martin Flight Services or DUATS II via the Internet, or dispatch/System Operations Control (SOC) (if applicable). A pilot should be particularly alert and understand the limitations and quality assurance issues associated with individual products. This includes graphical representation of NEXRAD imagery and NOTAMs/TFR.

CHAPTER 4. ANALYSIS

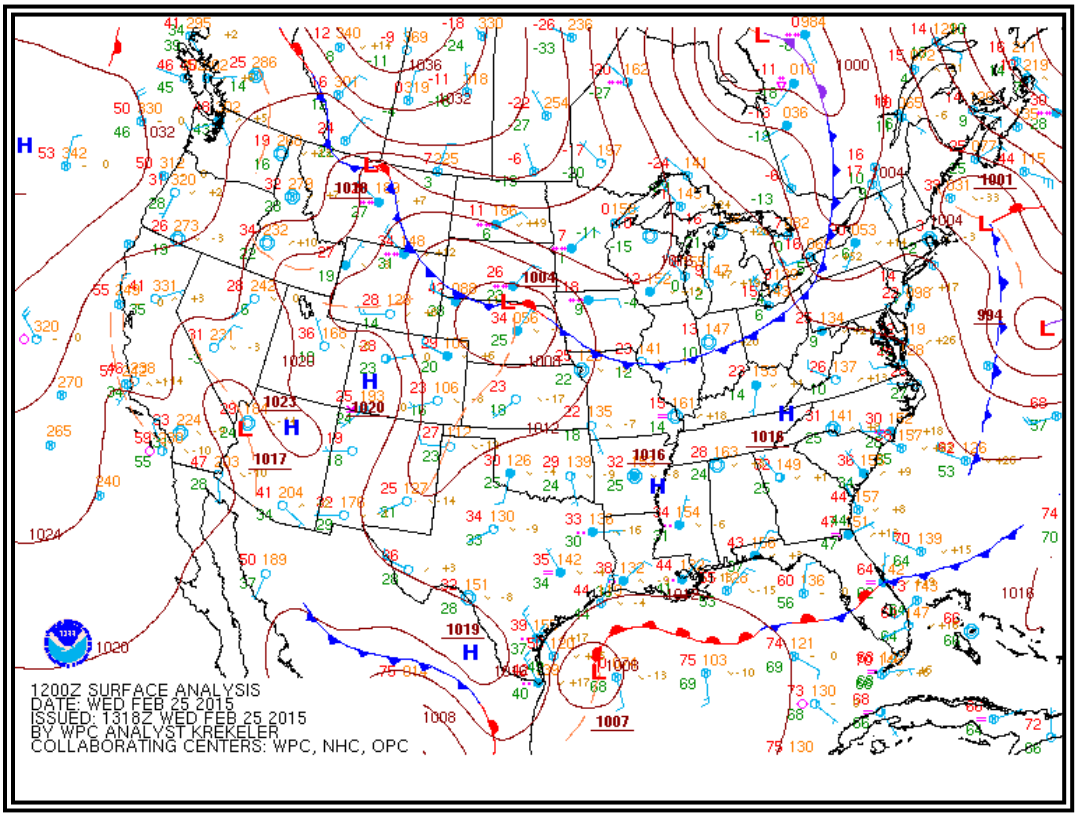
The second of three distinct types of weather (meteorological) information are analyses. Analyses of weather information are an enhanced depiction and/or interpretation of observed weather data. Prior to the 1990s, most analysis charts were hand drawn by forecasters. Today's analyses are automated, and depending on the weather information provider (i.e., NWS, commercial weather services, and flight planning services), the appearance and content of these analyses will vary.

Chapter 4 will only focus on those analyses produced by the NWS and made available on various websites, including the Aviation Weather Center (AWC), the Weather Prediction Center (WPC), the Ocean Prediction Center (OPC), and the Alaska Aviation Weather Unit (AAWU).

4.1 Surface Analysis Charts.

Surface analysis charts are analyzed charts of surface weather observations. The chart depicts the distribution of several items, including sea-level pressure; the positions of highs, lows, ridges, and troughs; the location and type of fronts; and the various boundaries such as drylines. Pressure is referred to in mean sea level (MSL) on the surface analysis chart while all other elements are presented as they occur at the surface point of observation.

Figure 4-1. NWS Surface Analysis Chart Example

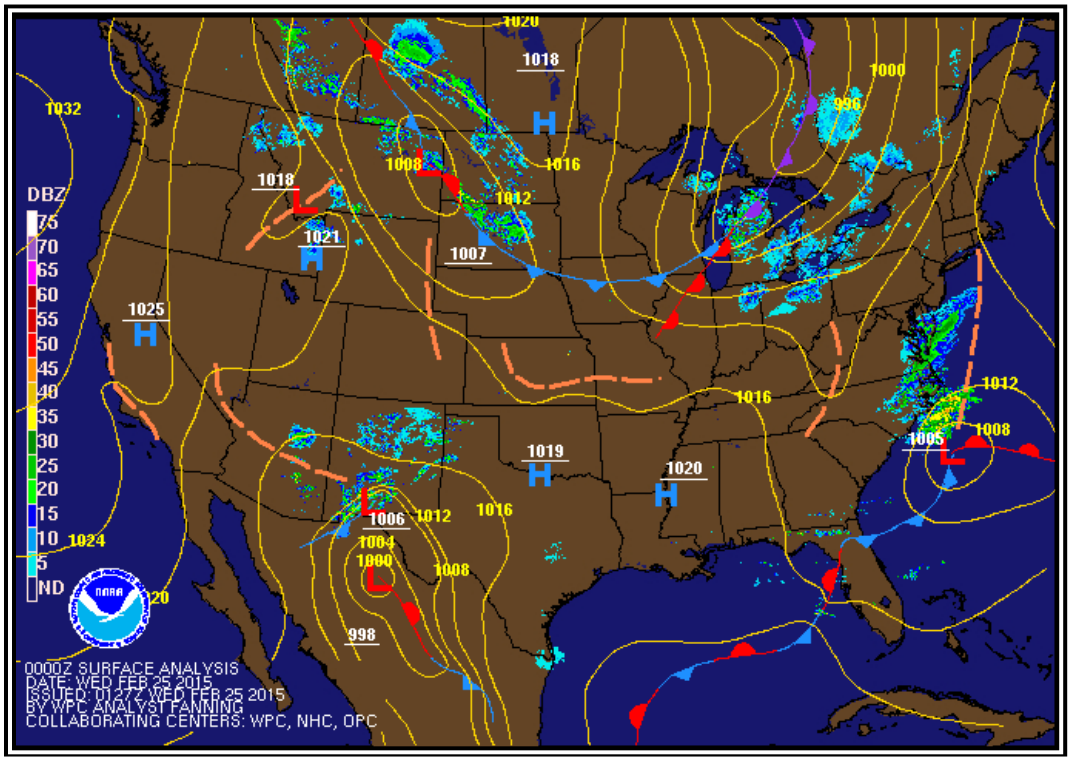


4.1.1 WPC Surface Analysis Charts.

The WPC in College Park, MD, produces a variety of surface analysis charts for North America that are available on their website. Figure 4-1, NWS Surface Analysis Chart Example, is one example of several surface analysis products available on their website. WPC's surface analysis is also available at http://www.aviationweather.gov.

Some of WPC's surface analysis charts are combined with radar or satellite imagery (Figure 4-2, NWS Surface Analysis and Radar Composite Example) as well as have different background features (e.g., terrain).

Figure 4-2. NWS Surface Analysis and Radar Composite Example



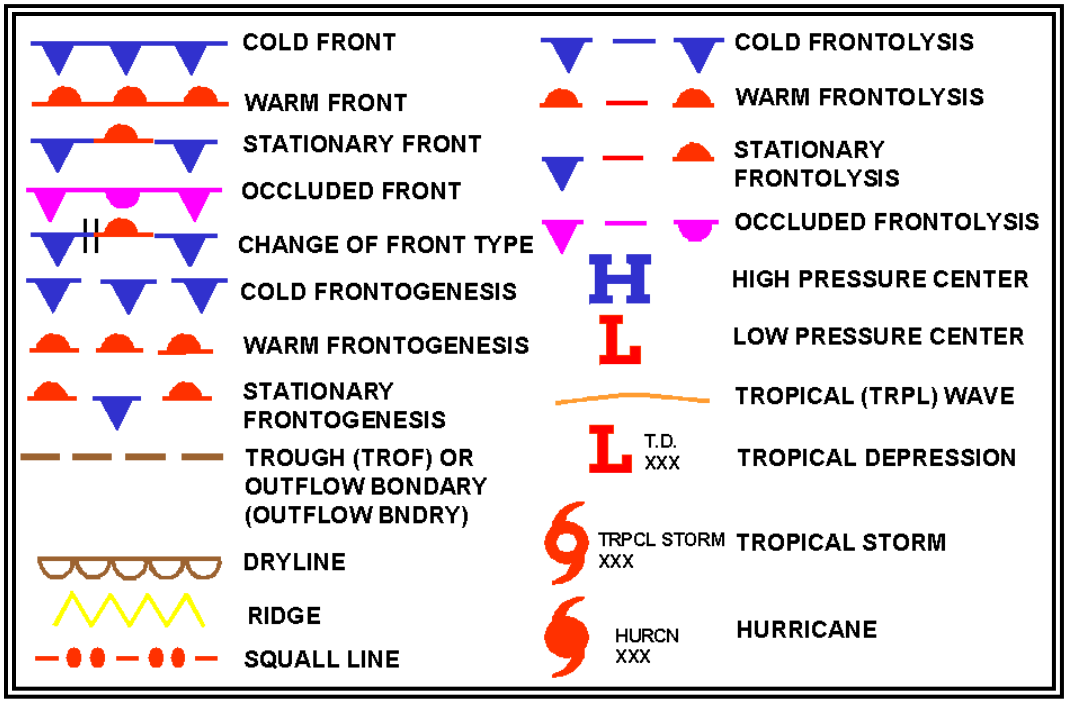
4.1.1.1 Issuance.

The WPC issues surface analysis charts for North America eight times daily, valid at 00, 03, 06, 09, 12, 15, 18, and 21 Coordinated Universal Time (UTC).

4.1.1.2 Analysis Symbols.

Figure 4-3, NWS Surface Analysis Chart Symbols, shows analysis symbols used on NWS surface analysis charts.

Figure 4-3. NWS Surface Analysis Chart Symbols



4.1.1.3 Station Plot Models.

Land, ship, buoy, and Coastal-Marine Automated Network (C-MAN) stations are plotted on the chart to aid in analyzing and interpreting the surface weather features. These plotted observations are referred to as station models. Some stations may not be plotted due to space limitations. However, all reporting stations are used in the analysis.

Figure 4-4, NWS Surface Analysis Chart Station Plot Model, and Figure 4-5, NWS Surface Analysis Chart Ship/Buoy Plot Model, contain the most commonly used station plot models used in surface analysis charts.

Table 5-13. AAWU Area Forecast (FA) Zones—Alaska

1	Arctic Coast Coastal	**14**	Southern Southeast Alaska
2	North Slopes of the Brooks Range	**15**	Coastal Southeast Alaska
3	Upper Yukon Valley	**16**	Eastern Gulf Coast
4	Koyukuk and Upper Kobuk Valley	**17**	Copper River Basin
5	Northern Seward Peninsula-Lower Kobuk Valley	**18**	Cook Inlet-Susitna Valley
6	Southern Seward Peninsula-Eastern Norton Sound	**19**	Central Gulf Coast
7	Tanana Valley	**20**	Kodiak Island
8	Lower Yukon Valley	**21**	Alaska Peninsula-Port Heiden to Unimak Pass
9	Kuskowim Valley	**22**	Unimak Pass to Adak
10	Yukon-Kuskowim Delta	**23**	St. Lawrence Island-Bering Sea Coast
11	Bristol Bay	**24**	Adak to Attu
12	Lynn Canal and Glacier Bay	**25**	Pribilof Islands and Southeast Bering Sea
13	Central Southeast Alaska		

5.11.1.2 FA Standardization.

All FAs follow these standards:

- All heights or altitudes are referenced to **MSL**, unless otherwise noted (i.e., prefaced by **AGL** or **CIG**), and annotated using the height in hundreds of feet, consisting of three digits (e.g., 040). For heights at or above 18,000 ft, the level is preceded by **FL** to represent FLs (e.g., FL180). Tops are always referenced to MSL.
- References to latitude and longitude are in whole degrees and minutes following the model: Nnn[nn] or Snn[nn], Wnnn[nn], or Ennn[nn] with a space between latitude and longitude and a hyphen between successive points. Example: N3106 W07118 – N3011 W7209.
- Messages are prepared in abbreviated plain language using contractions from Order 7340.2 for domestic products and ICAO Document 8400 for products issued for Oceanic FIRs. A limited number of non-abbreviated words, geographical names, and numerical values of a self-explanatory nature may also be used.
- Weather and obstructions to visibility are described using the weather abbreviations for surface weather observations (**METAR**/**SPECI**).

5.11.1.3 FA Issuance Schedule.

FAs are scheduled products issued at the following times (see Table 5-14, Area Forecast (FA) Issuance Schedule).

AVIATION WEATHER SERVICES

AC 00-45H
Change 1

U.S. Department of Transportation

Federal Aviation Administration

This FAA Advisory Circular (AC) 00-45H clearly lays out the many U.S. aviation weather products and services available to pilots. *Aviation Weather Services* organizes this weather information into the three distinct areas of observations, analyses, and forecasts. This handy guidance document provides current information on cutting-edge and evolving weather facilities and capabilities for planning a safe and efficient flight, along with descriptions of the traditional weather products also available.

Access to aviation weather products has greatly improved with the increase of flight planning services and weather websites. Readers will find full coverage of weather-related tools to assist every pilot's flight planning and in-flight decisions, and the examples and explanations are reinforced with website references for further weather resources, definitions, and additional related FAA publications.

Supported with full-color illustrations throughout, this book is the weather services resource to use when studying for pilot certification exams and should remain a part of every aviator's library. Subjects covered include METARs, Pilot Reports (PIREPs), Graphical Forecasts for Aviation (GFA), Doppler Weather Radar, Surface Analysis Charts, SIGMETs, AIRMETs, Terminal Aerodrome Forecasts (TAF), Significant Weather Charts, Winds and Temperatures Aloft, and much more. With weather station location tables, symbols and conversion charts, internet links and more, this book is key for all pilots seeking an understanding of the weather resources for preflight and inflight decision-making.

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