U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject: Use of Cockpit Displays of Digital Weather and Aeronautical Information

Date: 4/7/14 **AC No:** 00-63A

Initiated by: AFS-400 **Change:**

1. PURPOSE. This advisory circular (AC) provides guidance to flightcrew members and other airmen on the use of data link to access Flight Information Services (FIS). This AC addresses both the Federal Aviation Administration (FAA) FIS Broadcast (FIS-B) provided through the Automatic Dependent Surveillance – Broadcast (ADS-B) Universal Access Transceiver (UAT) network and non-FAA FIS systems provided through commercial data link services.

a. Flight Information Services (FIS). FIS is a service that provides Meteorological Information (METI) and Aeronautical Information (AI) to enhance pilot awareness of weather and/or airspace constraints while providing information for decision support tools and improving safety. METI and AI data link services enable flightcrews to support the Next Generation Air Transportation System (NextGen) concepts of information sharing and provide airmen with a common operating picture necessary to support the evolving global Air Traffic Management (ATM) concepts.

b. Advantages of FIS METI and AI. FIS of METI and AI can augment pilot voice communications with Flight Service Stations (FSS), other air traffic control (ATC) facilities, airline dispatch centers, flight following facilities or other Operation Control Centers (OCC), typically referred to as System Operations Control (SOC). In addition, Internet connectivity provides the capability for Baseline Synchronization Services (BSS) to be utilized to update the aircraft's navigational and other databases prior to flight.

2. APPLICABILITY. The guidance contained in this AC applies to all certificate holders, program managers, and operators using FAA and non-FAA FIS systems.

3. CANCELLATION. AC 00-63, Use of Cockpit Displays of Digital Weather and Operational Information, dated September 24, 2004, is canceled.

4. RELATED REGULATIONS AND DOCUMENTS.

a. Title 14 of the Code of Federal Regulations (14 CFR). Specific portions of 14 CFR to which this guidance applies include:

- Part 1, § 1.1.
- Part 43, § 43.3(k).
- Part 61, §§ 61.65(b)(6), (8), (9), and (10); 61.93(e)(3), (f)(3), (g)(3), (i)(3), and (k)(3) and (12).

- Part 61, §§ 61.97(b)(5) and (11); 61.105(b)(6) and (12); 61.125(b)(4), (11) and (15); and 61.155(c)(2), (3), (5) and (12).
- Part 63, § 63.53(a)(3) and (8); appendix A (e)(46); appendix B (a)(2)(iii); and appendix C (a)(2)(iii).
- Part 65, § 65.55(a)(2) and appendix A (b).
- Part 91, §§ 91.21 and 91.103.
- Part 121, §§ 121.101(a), (b), (c), and (d); 121.119(a) and (b); 121.655; and 121.711.
- Part 125, §§ 125.287(a)(6), (7), and (8); and 125.353.
- Part 135, §§ 135.213(a); 135.225(a), (b), and (c); 135.293(a)(7); and 135.345(b)(6).
- Part 141, appendix A (3)(e) and (k); appendix B (3)(b)(6) and (12); appendix C (3)(b)(6) and (8); appendix D (3)(b)(4) and (11); appendix E (3)(b)(4), (5), (6), (12), and (13).

b. Related Reading Materials (current editions).

- AC 00-6, Aviation Weather.
- AC 00-45, Aviation Weather Services.
- AC 20-173, Installation of Electronic Flight Bag Components.
- AC 20-149, Installation Guidelines for Domestic Flight Information Services-Broadcast.
- AC 91-63, Temporary Flight Restrictions (TFRs/TFR).
- AC 120-76, Guidelines for the Certification, Airworthiness, and Operational Approval of Electronic Flight Bags.
- Aeronautical Information Manual (AIM), Chapter 4, section 5.
- AIM, Chapter 7, section 1.
- FAA Order JO 7110.10, Flight Services.
- FAA Order JO 7930.2, Notices to Airmen (NOTAM).
- International Civil Aviation Organization (ICAO) Annex 14.
- ICAO Annex 15, Chapter 2.
- RTCA DO-200.
- RTCA DO-201.
- RTCA DO-267A.
- RTCA DO-308/EUROCAE ED-151.
- RTCA DO-324/EUROCAE ED-175.
- RTCA DO-340.
- SAE ARP 5621.

5. DEFINITIONS.

a. Advisory. Specific and defined advice and information provided to assist pilots in the safe conduct of flight and aircraft movement.

b. Advisory-Use Information. Information delivered to the cockpit to assist pilots in the safe conduct of flight and aircraft movement. However, that delivery method may subject the

information to alteration, corruption, latency, or other impairments, as well as disruptions in data link service. Users may not solely rely upon this information for making operational decisions.

c. Aeronautical Data. A representation of aeronautical facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing.

d. Aeronautical Information (AI). Information resulting from the assembly, analysis, and formatting of aeronautical data.

e. Aeronautical Information Management. The dynamic, integrated management of aeronautical information services—safely, economically, and efficiently—through the provision and exchange of quality-assured digital aeronautical data in collaboration with all parties.

f. Aeronautical Information Service (AIS). A service established within the defined area of coverage responsible for the provision of aeronautical information/data necessary for the safety, regularity, and efficiency of air navigation.

g. Aircraft Communications Addressing and Reporting System (ACARS). A non-FAA data link system using two-way Very High Frequency (VHF) data link air/ground communications for Airline Operational Control (AOC), Airline Administrative Control (AAC), and ATC messages. FIS request/reply and contract messages can be sent over the ACARS network.

h. Air Traffic Service (ATS). A generic term for (1) ATC service; (2) air traffic advisory service; (3) FIS; and (4) alerting service.

i. Aircraft Meteorological Data Relay (**AMDAR).** World Meteorological Organization (WMO) program for automatically collecting and reporting meteorological reports from aircraft.

j. Baseline Synchronization Service (BSS). Synchronization of a system database with current aeronautical data in effect for a prescribed period.

k. Broadcast Message. A message that is transmitted via a broadcast mode and does not depend on a request message sent from a user (e.g., an aircraft).

l. Broadcast Mode. A one-way interaction in which AI and/or METI updates or changes applicable to a designated geographic area are continuously transmitted (or transmitted at repeated periodic intervals) to all aircraft capable of receiving the broadcast within the service volume defined by the system network architecture.

m. Contract/Demand Mode. A two-way interaction in which AI and/or METI are transmitted to an aircraft in response to a specific request.

n. Contract/Update Mode. A two-way interaction that is an extension of the Demand Mode. Initial AI and/or METI report(s) are sent to an aircraft and subsequent updates or changes to the AI and/or METI that meet the contract criteria are automatically or manually sent to an aircraft.

o. Crosslink. Communication link from one aircraft to another aircraft, either directly or through downlink data interception (such as ADS-B).

p. Data Link. A wireless telecommunication between two or more locations for the purpose of transmitting or receiving data.

q. Data Link Application. Implementation of data link technology to achieve specific air traffic management (ATM) operational functionalities. Within each application, there may be several (sub) services.

r. Data Link Service. (Sub) service under a data link application that describes a particular service from an operational point of view. Within each service, there may be several data link report types.

s. Database. One or more files of data so structured that appropriate applications may draw from the files and update them.

t. Downlink. Communication link from the aircraft to the ground.

u. Exclusive Use Information. Information that has been delivered to the cockpit in such a manner that it is accurate, reliable, complete, safe, and fit for use in aviation. Users may solely use this information for making preflight and in-flight decisions.

v. FAA's FIS-B Service Provider. A commercial vendor that provides FAA FIS-B on the ADS-B 978 megahertz (MHz) UAT data link under an agreement with the FAA.

w. Flight Information Service (FIS). A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.

x. Graphical Product. A FIS product composed of graphics with associated supporting text.

y. In-Flight. Occurring, carried out, or present during flight (e.g., in-flight icing).

z. Information. Data that (1) has been verified to be accurate and timely, (2) is specific and organized for a purpose, (3) is presented within a context that gives it meaning and relevance, and which (4) leads to an increase in understanding and decrease in uncertainty. The value of information lies solely in its ability to affect a behavior, decision, or outcome.

aa. Meteorological Data. A representation of meteorological observations and environmental model output in a formalized manner suitable for communication, interpretation or processing.

bb. Meteorological Information (METI). Information resulting from the assembly, analysis, and formatting of weather data.

cc. Near-Real-Time. Current or immediate information; responding to events or inputs as fast as possible, or as they happen.

dd. Non-FAA FIS. A commercial data link service providing aviation weather and operational information to customers.

ee. Non-FAA FIS Provider. An organization that operates a commercial data link service providing aviation weather and operational information independent of a vendor service agreement with the FAA.

ff. Product. Data set or data set series of METI/AI produced and displayed in accordance with a published or defined format in a manner usable and interpretable to a pilot.

gg. Product Latency. An element of data age. The total latency of METI/AI messages includes the total time between the actual occurrence of the phenomenon, the data collection, processing, transmittal, and the display or application of the information on the flight deck. The amount of total latency may limit the use or application of the information.

hh. Special Activity Airspace (SAA). Any airspace with defined dimensions within the National Airspace System (NAS) wherein limitations may be imposed upon aircraft operations. This airspace may be restricted areas, prohibited areas, military operations areas, ATC-assigned airspace, and any other designated airspace areas. The dimensions of this airspace are programmed into the User Request Evaluation Tool (URET) and can be designated as either active or inactive by screen entry. Aircraft trajectories are constantly tested against the dimensions of active areas and alerts issued to the applicable sectors when violations are predicted.

ii. Special Use Airspace (SUA). Airspace of defined dimensions identified by an area on the surface of the Earth wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Some types of SUA are Alert Area, Controlled Firing Area, Military Operations Area, Prohibited Area, Restricted Area, and Warning Area.

jj. Strategic. This term refers to the decisionmaking process by the pilot. Strategic decisionmaking addresses decisions related to flight planning, both preflight and in-flight.

kk. Tactical. This term refers to the decisionmaking process by the pilot. Tactical decisionmaking involves decisions of an operational nature that need to be applied immediately.

ll. Text Product. An FIS product that is composed of text only.

mm. Temporary Flight Restrictions (TFR). A TFR is a regulatory action issued by the FAA via the U.S. NOTAM System (USNS), under the authority of Title 49 of the United States Code (49 U.S.C.). The FAA issues TFRs within the sovereign airspace of the United States and its territories to restrict certain aircraft from operating within a defined area on a temporary basis to protect persons or property in the air or on the ground. While not all-inclusive, TFRs may be issued for disaster or hazard situations such as: toxic gas leaks or spills, fumes from flammable agents, aircraft accident/incident sites, aviation or ground resources engaged in wildlife suppression, or aircraft relief activities following a disaster. TFRs may also be issued in support of VIP movements; for reasons of national security; or when determined necessary for the management of air traffic in the vicinity of aerial demonstrations or major sporting events.

nn. Universal Access Transceiver (UAT). A U.S.-centric surveillance radio system providing other data link services that's intended to serve the majority of the General Aviation (GA) community. UAT transmits on 978 MHz and is approved per § 91.225 for use in all airspace below 18,000 ft. mean sea level (MSL). UAT supports ADS-B, FIS-B, and Traffic Information Service - Broadcast (TIS-B).

oo. Uplink. Communication link from the ground to the aircraft.

6. BACKGROUND. ACARS data link of textual METI and AI has been available for many years, primarily to transport category aircraft. Beginning in the mid-1990s, METI and AI textual and graphical data link services became available to GA aircraft. Additionally, the Internet was and is used to send aeronautical database revisions (BSSs) to users to update both certified as well as noncertified devices. The recent proliferation of less expensive receivers has made accessing data links, such as commercial satellite and the FAA's ADS-B UAT network, more feasible to a larger user population. Additionally, onboard broadband Internet connectivity, through ground or satellite systems, along with the advancement of portable electronic devices (PED) permitted for flight deck use, provides flightcrews of equipped aircraft increased access to METI and AI.

a. Data Link Service Providers (DLSP). DLSPs deploy and maintain airborne, ground-based, and, in some cases, space-based infrastructure that support the transmission of AI/METI over one or more data links. DLSPs may also transmit information other than METI and AI over these links, such as ATM information or specific company Airline Operational Control Center (AOCC) information. They also may provide a free of charge or for-fee service that permits end users to uplink and downlink AI/METI and other information. For example, the introduction of high bandwidth wireless data link to the aviation sector enables frequent transmission of graphic intensive content.

b. Examples of DLSPs.

(1) FAA FIS-B. A ground-based broadcast service provided through the UAT network. The service provides users with a 978 MHz 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 AI products. NAS-wide service availability is planned for 2014. You can find detailed information concerning FIS-B METI and AI products available using UAT FIS-B in the AIM and in Appendix 1.

(2) Non-FAA FIS Systems. Several commercial vendors provide customers with FIS data over both the aeronautical spectrum and on other frequencies using a variety of data link protocols. Services available from these providers vary greatly and may include tier-based subscriptions. Advancements in bandwidth technology permits preflight as well as in-flight access to the same METI and AI available on the ground. Pilots and operators now routinely load their databases using such services. Pilots and operators using non-FAA FISs for METI and AI should be knowledgeable regarding the weather services the commercial vendors provide, as some commercial vendors may be repackaging National Weather Service (NWS)-sourced weather, while other commercial vendors may alter the weather information to produce vendor-tailored or vendor-specific weather reports and forecasts.

c. System Wide Information Management (SWIM). The NextGen Implementation Plan identifies seven transformational programs required to implement NextGen. One such transformational program is the SWIM program. SWIM provides enterprise messaging infrastructure to enable systems to request and receive information when they need it, subscribe for automatic receipt, and publish information and services as appropriate. This will provide for sharing of information among diverse systems. SWIM will allow a more cohesive and efficient decisionmaking process and also enable such new aviation concepts as trajectory-based operations and optimum profile descents. SWIM infrastructure is being designed to use a Service Oriented Architecture (SOA) to communicate aviation data and services without the restrictive, time-consuming, and expensive process of developing unique interfaces for systems used in the NAS.

(1) Publishing to SWIM. One publisher to SWIM will be the FAA's Common Support Services – Weather (CSS-Wx). CSS-Wx will publish aviation weather information to SWIM, provide for filtering of the information by user-specified criteria, provide for access to information via Web services, and over time replace the legacy weather dissemination systems.

(a) CSS-Wx will enhance the collection and dissemination of weather information and provide access to all users throughout the NAS. CSS-Wx will be the single source of aviation weather information to the FAA for ATM decisions. Standardization of weather information will provide for flexibility in the integration of weather information into ATM decisions. CSS-Wx provides all categories of weather users with improved access to timely and accurate weather observation and forecast information to support improved decisionmaking, while enhancing safety.

(b) In addition, as the CSS-Wx and NextGen Weather Processor (NWP) implementation evolves, new categories of aviation weather information and its impact on NAS operations will be available. This information will include projections of weather-constrained NAS airspace, which can be used to assess weather-related impacts on flows and individual trajectories, and to assist in development of mitigation strategies.

(c) Aircraft Access to SWIM (AAtS) is an effort to define how aircraft will connect to SWIM, enabling access to a common collection of aeronautical services provided from multiple official sources to create a globally interoperable and shared aviation information environment. This will facilitate common situational awareness so that flightcrews can be involved in the collaborative decisionmaking process. It is important to understand that the AAtS initiative will not implement a specific infrastructure to create the actual link to the aircraft. Rather, AAtS defines a set of operational and technical requirements and provides guidance that will be used to implement that infrastructure.

(2) Global Information Sharing. To facilitate global information sharing and interoperability, data exchange models are being developed based on Open Geospatial Consortium standards. The FAA and Eurocontrol are jointly developing the Weather Information Exchange Model (WXXM) and the Aeronautical Information Exchange Model (AIXM). WXXM will be utilized in the worldwide ground exchange of METI data and products. AIXM will be utilized in the worldwide ground exchange of AI. FIS data link systems will use more efficient (compressed) data formats for transmitting METI and AI data to aircraft.

d. Category 1 and 2 AI and METI Data Link Services. When establishing AI and METI Data Link Services, there needs to be a clear distinction between the information provided and the means to deliver that information. The characteristics that describe the minimum requirements of the data or information to be delivered are different from those criteria used to describe the delivery method. Data or information can be delivered over Category 1 or Category 2 services, as described below. The same data or information may be sent over either category, but the intended use of the data or information will drive the decision for which category of service is required.

(1) Category 1 AI and METI Data Link Services. A compilation of systems used as the primary means for communicating AI and METI services to and from aircraft to meet aviation regulatory requirements. Users may act on products and information delivered by Category 1 services without any need for confirming its validity. Data so received may be exclusively used to support decisions. Category 1 services are characterized as follows:

- Qualified through verification and validation as to the operational, safety, and performance requirements required for supporting the ATS function at the time the data is received in the aircraft.
- If the AI and METI data link service becomes inoperative, there must be procedures or mitigation methods established and in place on board the aircraft and on the ground to transition to an alternative means of communication of pertinent information without a degradation to safety.

(2) Category 2 AI and METI Data Link Services. A compilation of systems that can be useful for communications to and from aircraft (but must not be used as the *only* source of AI and METI to meet aviation regulatory requirements) on which to base operational decisions. Category 2 services are characterized as follows: AI and METI services used for situations where the delay or loss of data link messages is not essential for the safety of operations and does not significantly affect the performance of operations (e.g., effects of loss are within tolerable limits of pilot and controller workload to enable safe transition to alternative procedures since its use is not required for the ATS function it supports).

7. DISCUSSION. The timely, efficient exchange of AI and METI will contribute to safety, efficiency, and utility in aircraft operations. Stakeholders will need timely access to accurate AI and METI to plan, revise, assess, and safely execute flight operations. Data link provides the means for timely access for pilots/aircrew.

a. Benefit of AI and METI Data Link Services.

(1) Enhanced Operational Safety. Pilots that understand the limitations of the data link METI and AI are better able to make sound decisions regarding safety of flight. In part 121 operations, these decisions require concurrence by an aircraft dispatcher (domestic and flag) or person authorized to exercise operational control (supplemental), unless the pilot is declaring an emergency.

(2) Increased Situational Awareness. AI and METI data link products, especially graphical products, significantly improve the pilot's situational awareness level and ability to quickly interpret AI and METI.

(3) Better Airline and GA Economics. Improved flight efficiencies can increase schedule predictability, aircraft utilization, passenger comfort, and the return on investment while reducing fuel consumption.

(4) Better Alternate Airport Planning. Improve the pilot's ability (along with the aircraft dispatcher or person authorized to exercise operational control in part 121 domestic, flag, or supplemental operations) to select the best alternate airport while preflight planning, or en route, because of access to near-real-time alternate airport field conditions available in the cockpit.

(5) Reduced Aircraft Maintenance. Display of weather hazards, such as hail and severe turbulence, will assist the pilot in avoiding these hazardous areas, which will reduce, if not eliminate, maintenance that would be otherwise needed to inspect the aircraft and return it to service.

(6) Reduced Pilot Workload. Decreases the pilot's actions required to obtain a specific piece of information (e.g., Notices to Airmen (NOTAM), or can increase the amount of AI and METI gathered, reviewed, and understood with the same effort as required with the current method of AI and METI gathering.

b. Three Data Link Modes. There are three data link modes that are used for transmission of AI and METI to aircraft. The intended use of the AI and/or METI will determine the most appropriate data link mode.

- Broadcast Mode.
- Contract/Demand Mode.
- Contract/Update Mode.

c. METI Data Link Service Decision Classifications. Pilots and aircraft dispatchers (part 121 domestic and flag operations) and persons authorized to exercise operational control (part 121 supplemental operations) use METI to support in-flight decisions. These decisions are impacted by many factors, including the flight environment and the time available for deliberation and action. Deliberation begins when information is made available to the flightcrew (and dispatcher or person authorized to exercise operational control for part 121 domestic, flag, or supplemental operations). The sooner the information is available, the better the chances are that the safest course of action is taken prior to the aircraft encountering adverse weather phenomena, or other operational constraint. Additionally, the age (known as latency) of METI establishes whether specific information is appropriate for use in any or all of the pilot decision classifications. Three classifications of pilot decisions are defined for use of METI.

(1) Data Link Weather Planning Decision Service (WPDS). This service provides METI that supports pilot decisions well in advance (i.e., 20 minutes or longer) of any potential encounter (strategic).

(a) This service is designed to provide METI to support pilot decisions for flight planning and in-flight monitoring, and/or replanning with a lead time to decision of 20 minutes or longer. As a minimum, weather information from this service updates the pilot's awareness of the future environment, including a probability assessment of that future. The information may indicate a need to monitor the situation more closely; it may suggest to the pilot to be more aware of the need for possible decisions and further updates required later on during the departure, en route, or arrival phases of flight.

(b) WPDS METI may consist of the entire range of METI useful for flight planning, in-flight monitoring, and/or replanning. Examples include surface observations, gridded winds and temperatures aloft, in situ pilot and automated aircraft reports, weather radar information, turbulence, in-flight icing, and volcanic ash. METI included in the WPDS may be provided by the broadcast, contract demand, or contract update modes. Information received by the flight deck avionics or a portable display device may be stored and made available for later use by the pilot (or cockpit applications), or displayed directly in the flight deck.

(2) Data Link Weather Near-Term Decision Service (WNDS). This service provides METI that supports pilot decisions that are closer (i.e., 3-20 minutes) to any potential encounter (strategic or limited tactical).

(a) This service is designed to provide METI as support for near-term decisions with a lead time between 3 and 20 minutes, such as weather avoidance. The WNDS will focus upon METI suitable for near-term deviations to avoid weather hazards.

(b) The information will consist primarily of hazardous weather advisories, surface observations, near-real-time pilot or automated aircraft weather reports (including information from nearby, proximate aircraft, using data crosslink), weather radar summaries, and derived hazard products.

NOTE: METI included in the WNDS may be provided by any of the broadcast, contract/demand, or contract/update modes.

(3) Data Link Weather Immediate Decision Service (WIDS). This service provides METI that supports pilot decisions that require immediate attention (i.e., less than 3 minutes) (tactical).

(a) This service is designed to provide METI to flightcrews to support immediate decisions, with a lead time of less than 3 minutes. This service provides information that may require immediate action by the pilot to avoid, exit, or mitigate a known hazard. WIDS information must be delivered to the pilot with high integrity, availability, and continuity in recognition of the importance to safety.

(b) Examples of such WIDS category related to METI include changes in Runway Visual Range (RVR) and/or a wind-shear warning while on final approach. Wake vortex visualization is another immediate decision-support application, in this case, one enabled by data crosslink between nearby, proximate aircraft. Decisions supported by WIDS typically will not permit deliberation or consultation; rather they require specific, rule-based actions by the pilot.

NOTE: Frequent updates of observational data, analyses, and forecasts maintain the timeliness of weather information. METI included in the WIDS may be provided by the contract/update mode.

d. AI Data Link Services. AI uplink services offer the potential to harmonize AI among stakeholders to increase safety, capacity, efficiency, economic and environmental benefits, and to minimize the risks associated with information overflow. Today, NOTAMs are mainly text-based, with the exception of the graphical NOTAMs published in the FAA's Notice to Airmen Publication (NTAP). Graphical depiction in combination with text would in many cases make the information more intuitive and easier to interpret, thus increasing safety. In the transition to the digital world, there are two distinct services.

(1) Data Link BSS. This service provides complete and/or update synchronization of the aircraft AI databases. BSS is envisioned to replace or update, in whole or in part, all AI resident in onboard databases. Pilots in part 91 operations already update their installed avionics using BSS, usually by downloading a new database to a memory card and then inserting the card into the aircraft avionics. Pilots update their portable device databases using BBS directly from the Internet. Section 43.3(k) now permits pilots to update BSS in certain types of avionics without a logbook entry. As technology advances, these avionics systems may be updated via data link BSS, which will simplify the update process, as well as provide more frequent updates than the 28-day Aeronautical Information Regulation and Control (AIRAC) cycle.

(a) Examples include:

- The 28-day navigation, terrain, obstacle, and aerodrome mapping data updates.
- Updates to pre-composed as well as data-driven charts. (Data-driven charts are described in SAE ARP 5621, Electronic Display of Aeronautical Information (Charts)).

(b) Complete or Update BSS Synchronization:

- Complete Sync is the replacement of an entire database in the aircraft's data system.
- Update Sync is the replacement of AI that has changed since the previous sync specific to the dataset.

(2) Data Link Aeronautical Update Service (AUS). This service provides temporary and permanent changes to aeronautical data to the cockpit throughout the current 28-day AIRAC cycle (e.g., NOTAMs).

(a) The original onboard data file does not change. Updates are independent of the databases resident on the flight deck and are only intended to be graphically "overlaid" on aeronautical data already stored onboard an aircraft. (In practice, though, AUS data could be merged with data-driven files, providing the AUS changes were brought to the attention of the flightcrew.)

1. Updates may include both permanent and/or temporary changes to onboard or stored information.

2. AUS may include official State NOTAMs as well as company and other data integrator bulletins.

3. AUS services (as distinct from BSS) generally inform the pilot about abnormal conditions. Since the message will be based on specific conditions that exist for that time and date, each message will be unique. However, some examples of messages include:

- Relevant flight trajectory airspace changes (e.g., Systems Application Architecture (SAA), including TFRs) to address operational constraints and/or provide changes in routing opportunities;
- Updated nonroutine bulletins (e.g., Bird Notices to Airmen (BIRDTAM), NOTAMs) to address changes along the route of flight;
- Updated airspace capabilities (e.g., Global Navigation Satellite System (GNSS) outage depictions) resulting in reduced surveillance and navigation system capabilities;
- Flight optimization information (e.g., noise-sensitive environmental impact areas, North Atlantic (NAT) and Pacific Organized Track System (PACOTS) track routings);
- Airport/aerodrome surface moving map changes, including runway/taxiway closures, construction areas; and
- Gate-accessible, gate-linked dispatch/flight release documents.

(b) AUS information has specific effective times when overlaid upon a valid BSS database. The AUS relies on ground-air communication of AI effective during the planned flight (from pushback to arrival at the destination gate or parking area, including contingencies and anticipated delays). Therefore, when a request for aeronautical updates is made, the information considered for transmission is based upon an assessment of what information will be effective during the scheduled and actual flight time based on the time the request was made, and the planned route. Sometimes, though, crews may request NOTAMs for other airports, for contingency planning purposes. Updates are issued for the effective period of the updated information.

e. Airspace Domains.

(1) Preflight. This operational phase includes flight planning, briefing requirements, and aircraft preparation. In part 121 operations responsibility for preflight planning is a shared function between the pilot in command (PIC) and an aircraft dispatcher (domestic and flag operations) or between the PIC and person authorized to exercise operational control (supplemental operations). The flightcrew will often not be on board the aircraft during the preflight planning phase. However, preflight planning can continue all the way up until the point a flight takes off and is en route.

(2) Surface. The surface domain consists of an area approximately 10 miles in diameter and up to ~5,000 feet above ground level (AGL), consisting of the airport/aerodrome surface and

the immediate vicinity of the airport/aerodrome. This domain is used by ATC for pre-departure, taxi, takeoff, and landing portions of the flight. Surface applies to both towered and non-towered airports without an ATC presence. During this surface domain, it is assumed that the aircraft has moved for the purpose of flight.

(3) Terminal Maneuvering Area (TMA). The TMA domain consists of the airspace surrounding an airport/aerodrome, typically starting at ~5,000 feet AGL up to ~flight level (FL) 245. This is the transition airspace used by ATC to merge and space aircraft for landing or for entrance into the en route domain. The TMA typically radiates out ~50 nautical miles (NM) from the center of an airport/aerodrome.

(4) En route. The en route domain consists of the airspace that surrounds the TMA domain starting at ~FL245 to ~FL600. It is the continental (or domestic) airspace used by ATC for the cruise portion of the flight. Oceanic, remote, and polar are operating domains similar to the en route domain, except that they are associated with geographical areas generally outside of continental airspace.

f. Aircraft Crosslink and Downlink of Meteorological Data.

(1) Transmitted Data. Aircraft sensors and equipment can detect and transmit meteorological and environmental data to the ground and other nearby aircraft. These transmissions include such information as temperature, wind, humidity/water vapor, turbulence, icing conditions, precipitation/convection, wind shear, trends in rapidly developing/evolving convection, and volcanic ash. In addition, non-meteorological aircraft parameters supporting wake vortex avoidance applications can be transmitted.

(2) Downlinked Data. Data from aircraft that are downlinked to the ground (e.g., World Meteorological Organization AMDAR program) can be used for validation of data from other sources, and used as input to other downlinked METI to form enhanced or new products.

(3) Crosslinked Data. Data received by proximate aircraft are referred to as crosslink data. Proximate aircraft can use the information as point data for conditions at the location of the aircraft that transmitted the information (e.g., reports of adverse conditions such as severe to extreme turbulence).

8. RESPONSIBLE COCKPIT USE OF DATA LINK AI AND METI. METI and AI are highly dynamic and time-sensitive. The goal of AI and METI data link service is to provide timely distribution of AI and METI data both to and from the aircraft. Through these AI and METI data link services, pilots and/or cockpit applications should have timely access to information consistent with the information available to the ATM ground community.

- It should be noted that availability of AI and METI in the cockpit does not fulfill the part 121 regulatory requirement for aircraft dispatchers to provide the PIC with the most current available weather information.
- Users of FIS should familiarize themselves with the operational characteristics and limitations of their systems. Sources of information that may provide this specific guidance include manufacturer's manuals, training programs, and reference guides.

a. Data Link Service Matrix.

Category	Information	Mode	Service
1	METI	Contract/Update	WPDS/WNDS/WIDS
1	AI	Contract/Update	BSS/AUS
2	METI	Broadcast/Contract/Demand or Contract/Update	WPDS/WNDS
2	AI	Broadcast, Contract/Demand, or Contract/Update	BBS/AUS

b. Using Data Link Services for Direct User Access Terminal (DUAT)/Direct User Access Terminal System (DUATS), Lockheed Martin Flight Services, and/or Weather Briefing Documents/Dispatch Paperwork via Category 2 Data Link Service. Flight planning via a data link service and using a portable or installed electronic flight bag (EFB), whether on the ground or airborne, is an acceptable use of Category 2 Data Link Services.

(1) Pilots conducting flights not certificated under the provisions of 14 CFR part 119 are encouraged to use FAA/NWS products through FSS, Lockheed Martin Flight Services, and/or DUAT/DUATS. Pilots that are comfortable with self-briefing, via Lockheed Martin Flight Services, DUAT/DUATS, or an alternate means, may use the EFB to display the METI and AI as well as to file flight plans. There are numerous commercial applications that facilitate the pilot's ability to access METI and AI. Pilots should be familiar with any applicable disclaimer related to the accuracy of the information provided by the subscribed commercial service.

(2) Certificated operators using weather briefing documents and/or dispatch documents may use data link to provide updated METI and AI displayed on an EFB to complement flightcrews' weather briefing documents per the operator's flight dispatch, flight following, or operational control system. The EFB must be capable of displaying the METI and AI and/or dispatch/flight release package. The EFB should be easily accessible to the pilot for quick access to information when needed.

(3) Certificate operators may also choose to dispatch and release flights electronically while on the ground or airborne using data link and an EFB, similar to the process some operators use via ACARS today. It should be noted that any signatures to an electronic dispatch or flight release must meet the FAA's criteria for what constitutes a valid digital/electronic signature. Criteria for the validity of digital/electronic signatures are described in the current edition of AC 120-78, Acceptance and Use of Electronic Signatures, Electronic Recordkeeping Systems, and Electronic Manuals, and FAA Order 8900.1, Volume 3, Chapter 31, Section 2. All certificated operators must comply with all applicable 14 CFR parts, including dispatch and flight release rules, and the retention of records and reports. In accordance with the requirements of parts 121 and 125, certificate holders must include (or attach) weather reports and weather forecasts to each dispatch or flight release. The operator must retain these dispatch and flight releases in accordance with part 121 or 125 requirements, as applicable.

(4) To replace a traditional paper copy of the weather package that is printed on the ground (or airborne, via ACARS), the EFB must be capable of displaying/storing the METI and AI.

c. Pilot Actions. While data link has proven significant potential to improve safety, realization of the derived safety benefits depends heavily upon the pilot's knowledge and understanding of the specific system's capabilities and limitations. With data link METI and AI, pilots must pay particular attention to the service provided and any system particularities and limitations.

(1) Product Latency. Be aware of the product time or "valid until" time on the particular data link information displayed in the cockpit. *(For example, since initial processing and transmission of next generation weather radar (NEXRAD) data can take several minutes, pilots must assume that data link weather information will always be a minimum of 7 to 8 minutes older than shown on the time stamp. Thus, pilots must only use data link weather radar images for broad strategic avoidance of adverse weather.)* Pilots operating part 121 domestic or flag flights must contact their dispatcher for verification of current weather information. This is particularly important when adverse weather phenomena are present, or forecast.

(2) Product Update Cycles. Be aware of when and how often a product is updated as well as the DLSP update rate for particular products.

(3) Indication of System Failure. Be aware of partial or total system failure indications and the actions necessary to obtain affected METI and AI through other sources.

(4) Coverage Areas/Service Volume. Coverage limitations are associated with the type of data link network in use. For example, ground-based systems that require a line-of-sight may have relatively limited coverage below 5,000 feet AGL. Satellite-based data link weather services can have limitations stemming from whether the network is in geosynchronous orbit or low Earth orbit. Also, NWS NEXRAD coverage has gaps, especially in the western states.

(5) Content/Format. Since service providers often refine or enhance data link products for cockpit display, pilots must be familiar with the content, format, and meaning of symbols and displays (e.g., the legend) in the specific system.

(6) Data Integrity/Limitations to Use. This refers to the reliability of information depicted. Be aware of any applicable disclaimer by the service provider.

(7) Use of Equipment/Avionics Display. Pilots remain responsible for the proper use of an EFB or installed avionics. Pilots should be cognizant that, per the FAA practical test standards (PTS), they may be evaluated on the use and interpretation of METI and AI on an EFB.

(8) Overload of Information. Most DLSPs offer numerous METI and AI products with information that can be layered on top of each other. Pilots need to be aware that too much information can have a negative effect on their cognitive workload. Pilots need to manage the amount of information to a level that offers the most pertinent information to the specific phase of flight without creating a cockpit distraction. Pilots may need to adjust the amount of information based on numerous factors including, but not limited to, the phase of flight,

single-pilot operation, autopilot availability, class of airspace, and the weather conditions encountered.

9. USE OF AI AND METI BY CERTIFICATED OPERATORS AND PROGRAM MANAGERS.

a. Integration of AI and METI. Part 91 subpart K (part 91K) program managers and parts 121 and 135 certificate holders may integrate data link METI and AI into their respective aviation weather information system, as specified in FAA Order 8900.1, Volume 3, Chapter 26. When authorized, data link METI and AI data should support all phases of flight. Certificate holders/program managers must ensure that the METI via FIS comes from an approved source of weather reports and forecasts as listed on the certificate holder's/program manager's Operations Specification (OpSpec)/Management Specification (MSpec) A010, Aviation Weather Information.

b. Use of EFBs. An EFB is an acceptable means to view METI and AI in the cockpit. As this requires software and data connectivity, the EFB at a minimum is classified as a Class 2 EFB using Type B software and requires an authorization for use via OpSpec/MSpec/Letter of Authorization (LOA) A061, Use of Electronic Flight Bag. Certificate holders/program managers using an EFB to display METI and AI to the cockpit should comply with the guidelines and guidance related to EFBs found in the current editions of AC 120-76, AC 20-149, and AC 20-173, as well as Order 8900.1, Volume 4, Chapter 15, Section 1.

c. Broadcast FIS. Do not use broadcast data-linked METI and AIS products as a sole source for making tactical in-flight decisions regarding flight safety when avoiding adverse weather phenomena (e.g., negotiating a path through a weather hazard area), airspace, or obstacle hazards. Current data-linked METI and AI products may support strategic decisionmaking (e.g., route selection to avoid a weather hazard area in its entirety). Most broadcast DLSPs may be classified as Commercial Weather Information Providers (CWIP). Prior to using any weather information provided by a CWIP, certificate holders and program managers must contact their FAA certificate-holding district office (CHDO). In some cases, using weather information provided by a CWIP may require an FAA-approved Enhanced Weather Information System (EWINS).

d. Internet-Based Connectivity – Contract/Demand or Contract/Update. Certificate holders/program managers may choose to provide METI and AI in the cockpit, similar to the flight release information provided to flightcrews and aircraft dispatchers (or persons authorized to exercise operational control) during preflight planning on the ground. The certificate holder/program manager needs to develop protocols for using an Internet-based system in the cockpit, to include:

(1) Adherence to all pertinent 14 CFR parts. In particular, certificate holders conducting part 121 operations who desire to use an Internet-based system and EFB to communicate with a flightcrew must comply with communication and record retention requirements of §§ 121.99, 121.122, 121.695, 121.697 and 121.711.

(2) Security. If leveraging onboard Internet systems, a network security plan should exist for ensuring data confidentiality, integrity, and availability for cockpit access to the cabin system. Certificate holders and program managers using public Internet for weather information are responsible for assuring timely delivery of information without data corruption during the transmission.

(3) Restrictions to flightcrew use of non-pertinent information via the Internet during all aircraft movement operations.

e. Category 2 METI and AI Requirements. Category 2 services may include WPDS, WNDS, and AUS as standalone services or as a combination of services.

(1) Certificate holders/program managers need to develop METI and AI guidance to flightcrews for safe and effective use of data-linked FIS. This includes changes to manuals, operational procedures, minimum equipment lists (MEL), and the qualification of flightcrews through the approved training programs.

(2) Additionally, certificate holders conducting part 121 operations must develop guidance for aircraft dispatchers (domestic and flag) and operational control personnel (supplemental) that addresses the use of METI and AI in the cockpit. The procedures must include the method by which the certificate holder's pilots and dispatchers/operational control personnel have access to the same METI and AI for preflight planning and conduct of all flights.

(3) Certificate holders conducting part 121 domestic and flag operations must also have policies and procedures that address the requirements of § 121.601, which requires aircraft dispatchers to provide the PIC with the most current available information before a flight departs and while a flight is en route.

f. Safety Management System (SMS). The certificate holder/program manager should conduct safety risk management (SRM) and Safety Assurance (SA) of the data link system per their SMS program. The SRM process, at minimum, should assess situations of conflicting, incomplete, or missing METI and AI as well as for the loss of the complete METI and AI data link system. The risk assessment should result in a risk severity of no worse than Minor.

g. Manuals and Other Publications. Airplane Flight Manuals (AFM), operating manuals, maintenance manuals, general policy manuals, other manuals, publications, or written material, as applicable, must be appropriately amended to describe data link FIS equipment, procedures, and operational policies according to the appropriate regulation.

h. FIS Training Program Requirements.

(1) FIS Initial Training. FIS curriculum should contain, at a minimum:

- Textual description of each METI and AI product available;
- Graphical example (if applicable) of each METI and AI product available;
- Description of time stamping, color, and symbology schemes;
- Limitations in specific products;

- Differences between flight-planning METI and AI products and in-cockpit METI and AI products (if applicable);
- For part 121 operations, communication protocols with the dispatch center or flight following facilities regarding the METI and AI available in the cockpit vs. what is available in the dispatch center or flight following facility. Emphasis must be on commonality of information available to both the flightcrew and the dispatcher;
- Comparability between onboard weather radar and NEXRAD images; and
- Restrictions to using nonapproved METI and AI products.

(2) Initial Evaluation of FIS Knowledge and Skills. Evaluate individual flightcrew member's FIS knowledge and skills prior to FIS use. Acceptable means of initial assessment include the evaluation by an authorized instructor or check pilot using written, computer-based, or oral tests, and a flight simulation training device (FSTD) or an aircraft.

(3) FIS Recurrent Training. Integrate FIS recurrent training into other established recurrent training programs. Recurrent training should address any significant issues identified by in-service experience, system changes, procedural changes, or unique characteristics, such as the introduction of new aircraft/display systems or operations.

(4) FIS Recurrent Evaluation. Integrate FIS recurrent evaluation into recurrent proficiency and/or competency checking.

(5) Line Checks and Route Checks. When using FIS-equipped aircraft during line or route checks, check pilots should routinely incorporate proper FIS use as a discussion item.

(6) Crew Resource Management (CRM). CRM programs should address effective teamwork for using FIS information while in the cockpit.

i. Master Minimum Equipment List (MMEL)/MEL. Certificate holders/program managers should formulate necessary revisions to their MEL for each specific fleet type. At no time may FIS METI data mitigate current MMEL/MEL restrictions related to any of the aircraft's onboard systems, such as weather radar.

j. FIS Issues Unique to a Certificate Holder/Program Manager. Certificate holders/program managers should address any FIS issues that may be unique to their particular route environment, aircraft, procedures, or FIS display and control features. Examples include the following:

- Special Areas of Operation (SAO);
- Oceanic operations; and
- Polar/Remote operations.

k. Category 1 Additional Requirements. Category 1 services will entail all of the Category 2 requirements as well as additional requirements that are still in development. A detailed list of the additional Category 1 requirements will be published in a future revision of

this AC. However, as development work continues, it is anticipated that, at a minimum, the following items will need consideration:

(1) Availability. Accessibility to data within a designated service volume.

(2) Continuity. The probability that a communication transaction could be initiated and completed when needed.

(3) Currency. A temporal attribute indicating that displayed data received is up to date.

(4) Data Quality. The quality of aeronautical data and the way it is processed is characterized by: accuracy, resolution, assurance level, traceability, timeliness, completeness, and format. The degree that a data element meets the users' requirements determines its fitness for use. Ensuring data quality will be a key metric in enabling future Category 1 FIS data link services.

(5) Human Factors. Use of best recommended human factor design practices for promoting both effective and efficient human-machine interaction. Acceptable designs need to address both general and product-specific requirements.

NOTE: Acceptable AI and METI human factors guidance is currently published in Section 3.8 of RTCA's DO-267A, Minimum Aviation System Performance Standards (MASPS) for Flight Information Services-Broadcast (FIS-B) Data Link, although DO-267A is light on specifying cockpit display criteria (human factors) for AI. Future guidance on this topic is expected from SAE G-10 during calendar year 2014.

(6) Integrity. The probability that communication transactions are completed without errors.

(7) Mitigations. Mitigations reduce the level of risk of an operational hazard to within acceptable limits. Operational hazards and mitigation procedures pertaining to aeronautical and weather data link services are identified in RTCA DO-324, Safety and Performance Requirements (SPR) for Aeronautical Information Services (AI) and Meteorological (MET) Data Link Services. For example, an alternative means of communications (e.g., use of another data link or voice link) could be used as a means to provide the same or equivalent information to an aircraft in the event of lost data link, or the detection of corrupted communication over the intended communications link.

(8) Preemptive Prioritization. The ability of an onboard system-level server to permit data intended for both cabin and flight deck use to be prioritized, so as not to adversely impact the ability to send or receive data-linked messages to the flight deck. Preemptive prioritization ensures that if an aircraft's data link system is used to provide both flight deck operational use and cabin entertainment data, the flightcrew has prioritized access, such that the operational use of that data will not be affected.

(9) Security. An end-to-end systems-level analysis of present and future vulnerabilities, based upon a threat analysis, along with the introduction of appropriate mitigations to manage risks and maintain data assurance.

(10) Suitability. In the context of this AC, suitability is defined as the ability of the overall data link system to transfer trusted (e.g., quality assured) and current AI and METI from the data originator to the flightcrew to meet regulatory requirements. Suitability is the quality of having the needed attributes and properties appropriate for a specific intended function.

(11) Total Transaction Time (TTT). The total time required to initiate and complete an information transfer. Transaction time applies to demand, contract, and broadcast modes. Transaction time, by definition, may include an additional voice or electronic acknowledgement that a communication has been received by the flightcrew and/or the onboard automation. Total transaction time may include two-way communications if the message is to be used to comply with the operating rules (i.e., an acknowledgement of receipt). Transaction time is denoted in seconds.

/s/

John Barbagallo
Acting Director, Flight Standards Service

APPENDIX 1.THE FEDERAL AVIATION ADMINISTRATION'S FLIGHT INFORMATION SERVICE – B OVER UNIVERSAL ACCESS TRANSCEIVER DATA LINK

Flight Information Service – Broadcast (FIS-B) over Universal Access Transceiver (UAT) data link service provides meteorological and aeronautical information to the cockpit for aircraft operating in the U.S. National Airspace System (NAS). These products are broadcast over the ADS-B UAT link so pilots have timely information of regional weather and NAS status/changes that might impact flight. It is critical that pilots understand that FIS-B Meteorological Information (METI) and Aeronautical Information (AI) products are advisory-use information only and must not be used as the only source of METI and AI for making operational decisions (thus A Category 2 data link service).

FIS-B does not replace a Flight Service Station (FSS) via the phone, a Lockheed Martin Flight Services via the internet, Direct User Access Terminal/Direct User Access Terminal System (DUAT/DUATS), or dispatch/System Operations Control (SOC) (if applicable) briefing. FIS-B information may be used by the pilot for the safe conduct of flight and aircraft movement; however, the information should not be the only source of METI and AI. A pilot should be particularly alert and understand the limitations and quality assurance issues associated with individual products. This includes graphical representation of next generation weather radar (NEXRAD) imagery and Notices to Airmen (NOTAM)/temporary flight restrictions (TFR).

1. Current FIS-B Products. Here is a listing of the FIS-B over UAT products currently being provided:

FIGUREA-1. FLIGHT INFORMATION SERVICE – BROADCAST (FIS-B) PRODUCTS

Product	Description	Format
AIRMET	Airmen's Meteorological Information (AIRMET) is a weather advisory issued by a meteorological watch office for aircraft that is potentially hazardous to low-level aircraft and/or aircraft with limited capability. AIRMETs cover moderate turbulence, moderate icing, sustained surface winds of 30 knots or more, widespread areas of ceilings less than 1,000 feet and/or visibilities less than three miles, and extensive mountain obscurement.	Text/Graphic

Product	Description	Format
SIGMET	Significant Meteorological Information (SIGMET) is a concise description of the occurrence or expected occurrence of specified weather phenomena which may affect the safety of aircraft operations. SIGMETs are intended for dissemination to all pilots in flight to enhance safety. A SIGMET is issued for severe (or greater) turbulence, severe icing, widespread dust storm/sandstorm, and volcanic ash.	Text/Graphic
Convective SIGMET	A Convective SIGMET will be issued when the following conditions are occurring or, in the judgment of the forecaster, are expected to occur: a. A line of thunderstorms at least 60 miles long with thunderstorms affecting at least 40 percent of its length. b. An area of active thunderstorms affecting at least 3,000 square miles covering at least 40 percent of the area concerned and exhibiting a very strong radar reflectivity intensity or a significant satellite or lightning signature. c. Embedded or severe thunderstorm(s) expected to occur for more than 30 minutes during the valid period regardless of the size of the area.	Text/Graphic
METAR	METAR (aviation routine weather report) is a format for reporting weather information. METARs are predominantly used by pilots in fulfillment of a part of a preflight weather briefing. METARs typically come from airports or permanent weather observation stations.	Text
CONUS NEXRAD	Next-Generation Radar (NEXRAD) is a nationwide network of high resolution Doppler weather radars, which detect precipitation & atmospheric movement or wind. NEXRAD returns data which when processed can be displayed in a mosaic map which shows patterns of precipitation & its movement. The “CONUS NEXRAD” FIS-B product is a summary composite of available NEXRAD radar imagery across the 48 states.	Graphic
Regional NEXRAD	The “Regional NEXRAD” FIS-B product is a composite of available NEXRAD radar imagery in a local area, showing a more detailed image than the “CONUS NEXRAD” product.	Graphic
NOTAM	Notices To Airmen (NOTAM) are created and transmitted by the FAA under guidelines specified by International Civil Aviation Organization (ICAO) Annex 15, Aeronautical Information Services. NOTAMs are filed by various agencies with an aviation authority to alert aircraft pilots of any hazards en route or at a specific location. FIS-B NOTAM products consists of NOTAM Ds & NOTAM-FDCs (including TFRs and	Text data transmitted. (Onboard software may render as graphic.)

Product	Description	Format
	Public Law Security NOTAMs).	
PIREP	Pilot Reports (PIREP) are reports of actual weather conditions encountered by an aircraft in flight. This information is usually radioed by pilots to the nearest Flight Service Station (FSS). The PIREP is then encoded and made available to other weather offices and air traffic service units.	Text
SUA Status	Special Use Airspace (SUA) is an area designated for operations of a nature such that limitations may be imposed on aircraft not participating in those operations. Often these operations are of a military nature. The designation of SUAs identifies for other users the areas where such activity occurs, provides for segregation of that activity from other users, and allows charting to keep airspace users informed of potential hazards. SUAs are usually depicted on aeronautical charts.	Text
TAF	The Terminal Aerodrome Forecast (TAF) is a format for reporting aviation weather forecast information. Each TAF is valid for 24 hours or 30 hours, is updated four times a day at 0000Z, 0600Z, 1200Z, and 1800Z, and is amended (updated) as conditions require. TAFs complement and use similar encoding to METAR reports. They are produced by a human forecaster based on the ground. For this reason there are fewer TAF locations than there are METARs.	Text
Winds & Temperatures Aloft	Winds & Temperature Aloft Forecast is forecast for specific atmospheric conditions in terms of wind and temperature in a specific altitude measured mostly in feet above mean sea level (MSL).	Text
FIS-B Outage Notification	This message informs the user that a particular product is unavailable from the FIS-B Data Source, therefore there will not be any update for this product type beginning at the time specified in the message. FIS-B starts broadcasting this message within 30 seconds of the product outage and keeps retransmitting it periodically until the product has come back online.	Text

2. Future FIS-B Products. The FAA has authorized implementation of five new FIS-B over UAT data link products in the next few years.

a. Lightning. Graphical representation of each lightning stroke in a past 5-minute period.

b. Turbulence NOWcast. Two-kilometer resolution grid containing an eight-value turbulence intensity scale in each grid cell. The intensity scale depicts a weighted average turbulence for flight levels (FL) of 10,000 ft and above.

c. Icing NOWcast. Two-kilometer resolution grids, where each grid represents one of the eight 3,000 ft ranges from FL 030 to FL 240. Within each grid, each grid cell contains the four-value icing indication and the presence or absence of Supercooled Large Drop (SLD) formation.

d. Cloud Tops. Two-kilometer resolution grid indicating the altitude of the cloud top to an accuracy of 3,000 ft, ranging from FL 030 to FL 480.

e. One-Minute Automated Weather Observing System (AWOS). More frequent updates of METAR-formatted information.

3. FIS-B Data Link "Tiering." To make more efficient use of the available bandwidth for the FIS-B UAT uplink, a network of "tiers" of UAT radio stations have been established, in which UAT radio stations are assigned to one of four altitude tiers: high, medium, low, or surface. This allows the system to provide tailored sets of products that most effectively serve the different customer groups at each altitude tier. Pilots need to consider how the FIS-B tiers affect their specific flight scenario. The availability of certain FIS-B products depends on:

- Altitude tier an aircraft operates in.
- Look-ahead distance factor.
- In some cases, the size factor of an airport (for METAR and TAF reports). (See paragraph 5 of this appendix.)

NOTE: Pilots need to consider the performance of the aircraft as well as the update rate for a specific product. For example, a pilot of a light twin aircraft, flying at a medium altitude with a tailwind could easily have a ground speed in excess of 200 knots. Thus, traveling at over 3 NM per minute, a pilot may not have enough time to receive and decipher a pop-up TFR based on the 100 NM look-ahead and a 10-minute transmission interval.

FIGURE A-2. ALTITUDE TIERS

Tier	Altitude Range	Description
High Altitude	Surface to FL240 (optimum from 9100' AGL to FL240)	This altitude band extends up to the upper limit of FIS-B service (24,000' MSL). These ground stations serve higher performance General Aviation (GA) aircraft (turbocharged or turbine) operating in an en route environment, and also could serve aircraft in climb/descent (and some en route).
Medium Altitude	Surface - 14,000' AGL (optimum from 2200' AGL to 14,000' AGL)	These ground stations serve the majority of GA aircraft operating in an en route environment. The upper band of 14,000 feet was chosen as this is typically at or above the service ceiling of the world's most produced aircraft (Cessna 172: over 43,000 built), thus this band includes the largest quantity of aircraft.
Low Altitude	Surface - 3,000' AGL	These ground stations serve the majority of aircraft (of all types) operating in a terminal environment.
Surface	Surface	These ground stations consist of Surface Service Volume radios which serve aircraft in the immediate vicinity of major airports.

NOTE: While the required ceiling for FIS-B is FL 240, it is expected that users can access the FIS-B service above that altitude. In the present design, approximately 90 percent of the implemented Service Volumes have FIS-B coverage at FL 400.

4. FIS-B Look Ahead and Transmission Intervals. Figure A-3 presents the product look-ahead ranges for Low, Medium, and High altitude tiers radio stations, as well as surface stations.

FIGURE A-3. 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

Product	**Surface Radios**	**Low Altitude Tier**	**Medium Altitude Tier**	**High Altitude Tier**
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
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
AIRMET/SIGMET	100 NM look-ahead range	250 NM look-ahead range	375 NM look-ahead range	500 NM look-ahead range
PIREP/SUA	N/A	250 NM look-ahead range	375 NM look-ahead range	500 NM look-ahead range

FIGURE A-4. FIS-B OVER UAT PRODUCT UPDATE AND TRANSMISSION INTERVALS

Product	FIS-B Over UAT Service Update Intervals[1]	FIS-B Service Transmission Intervals[2]
AIRMET	As available	5 minutes
Convective SIGMET	As available	5 minutes
METAR	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
SUA Status	As available	10 minutes
TAF	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.

5. Use of Airport Size as a Parameter. For selected FIS-B products (METAR and TAF), the size of the airport is used as a filtering parameter for FIS-B broadcasts. Out of the total of U.S. METAR reporting locations:

- Less than 2 percent are Class B airports (with the highest volume of air traffic).
- Less than 6 percent are Class C airports (with medium traffic volume).

a. METARs. High-altitude radio stations provide METARs for the largest airports across all of CONUS (all class B and C airports), while low-altitude radio stations provide METARs for all stations (regardless of airport size) within a more limited look-ahead range. This provides high-altitude en route users with nationwide weather information (as every location in CONUS is within at most 382 NM of a Class B or Class C airport), at a significant savings in radio bandwidth.

b. TAFs. The same filtering applies to the TAF product. Out of the total U.S. TAF forecast locations, 28 percent are Class B or C airports (three Class C airports do not have TAFs). Airport-size filtering is only applied to high-altitude CONUS radio stations, as locations outside of CONUS do not have the same bandwidth concerns (due to much lower geographic density of reporting stations), and locations outside of CONUS do not have a sufficient number of Class B and C airports to offer a reasonable en route view of weather.

c. Example for the User (Pilot) Perspective. On a 650 NM flight from Washington Dulles International (KIAD) to Orlando Executive Airport (KORL), the pilot will only receive the METAR for Orlando International Airport (KMCO) in the early portion of the flight (while within coverage of high-altitude tier radios). Once arriving within a closer radius (within 500 NM if under coverage of a high altitude tier radio; 375 NM if under coverage of a medium altitude tier radio; or 250 NM under coverage of a low altitude tier radio), the METAR for the smaller airport that is the specific destination (KORL) would become available.

APPENDIX 2. EXAMPLES OF AERONAUTICAL INFORMATION BASELINE SYNCHRONIZATION SERVICE/AERONAUTICAL UPDATE SERVICE

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
Examples of Baseline Synchronization Service (BSS) Products						
1		Aerodrome/Airport Mapping	Data quality standards defined in RTCA's DO-272C/EUROCAE ED-99C. Data exchange standards defined in DO-291B/ EUROCAE ED-119B. Database format standards defined in ARINC 816-2.	Includes land-and-hold-short operations (LAHSO) information. Also includes the virtual Aerodrome Surface Routing Network (ASRN). ASRN supports RTCA's SC-217/EUROCAE WG-44 CPDLC and manual entry D-Taxi application.	X	
2		Aerodrome/Airport Information	Standards not defined	Includes advisory information such as airport traffic pattern and altitude information, Fixed-Base Operator (FBO) information, hotel, restaurant, and rental car information, phone and contact numbers for air traffic control (ATC), available services, including medical and fuel availability, fuel type and quality (e.g., the Department of Defense's (DOD) "F" number) for diversions.	X	
3		Airspace and Communications	Partially defined in RTCA DO-201/ARINC 424	Could include Automatic Dependent Surveillance-Broadcast (ADS-B)/Automatic Dependent Surveillance-Rebroadcast (ADS-R) and Flight Information Service-Broadcast (FIS-B) Universal Access Transceiver (UAT)/ 1090 Extended Squitter (ES) Ground Broadcast Transceiver (GBT) service volumes. Includes static Special Activity Airspace (SAA) data	X	

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
				exclusive of dynamic temporary flight restrictions (TFR). Could also include new airspace restrictions over national park areas if S.1813 with SA.1779 is enacted.		
4		International Civil Aviation Organization (ICAO) Mode S Aircraft Addresses and ADS-B Aircraft "Clip Art" Silhouettes	Standards not defined	Enables "3D" ADS-B traffic depictions	X	
5		Electronic Charts	Standards for electronic charts are not defined.	Chart definitions are defined in SAE ARP 5989 "Electronic Aeronautical Symbols" and ARP 5621 "Standards for the Electronic Display of Aeronautical Information (Charts).		
			• Airport/Aerodrome/Heliport		X	
			• Standard Instrument Departures (SID)		X	
			• Engine Out Procedures		X	
			• Instrument flight rules (IFR) en route charts (low- and high-altitude)	Includes static SAA definition data	X	

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
			• Standard Terminal Arrival Routes (STAR)		X	
			• Instrument Approach Procedures (IAP)		X	
			• Charted Visual Approach Procedures	Example: KDCA Runway 19 Visual	X	
			• Noise Abatement Procedures		X	
			• Visual Aeronautical charts (e.g., visual flight rules (VFR) sectionals and VFR terminal area charts)	Also includes static SAA data	X	
			• Special Airport/Aerodrome Qualification Page	Example: Jep Page "10-18." Future depiction applications may make use of animation.	X	
6		Geopolitical	Standards not defined	Includes cities, county, and state borders. Includes major roads.	X	
7		Magnetic Field/ Magnetic Flux	Standards not defined		X	
8		Navigation	Data quality standards defined in RTCA's DO-201A/EUROCAE ED-77. Data exchange standards defined in ARINC 424-20. Database format standards	At the last Airlines Electronic Engineering Committee (AEEC) / System Architecture and Interfaces (SAI) meeting, three ARINC Project Initiation/Modifications (APIM) were presented that will: (1) split the work being done in ARINC 424 into two different documents, and	X	

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
			defined in ARINC 424A (dev).	(2) introduce a new format standard for terrain and obstacles DBs. These APIMs are as follows: • APIM 11-005A – Classic; • ARINC 424 NDB introducing XML and the XSD (data exchange standard); • APIM 12-005 - NDBX 2015 (replacing 06-003) (DB format standard); and • APIM 12-006 - Terrain and Obstacle (new DB format standard). Additionally, there was also an APIM introduced to address standards for data compression; APIM 12-007 - XML Compression (new).		
9		Noise Sensitive areas	Standards not defined.	Static data. Impacts VFR operations, advisory circular (AC) category of use, and Area Navigation (RNAV)/Required Navigation Performance (RNP) approach selection during any 24-hour period	X	
10		Obstacles	Data quality standards defined in RTCA's DO-276A / EUROCAE ED-98A. (Draft DO-276B approved by the SC-217 Plenary June 2012.) Data exchange standards defined in DO-291B / EUROCAE ED-119B. Database format standards may be defined in a future ARINC specification.	See Item 8, above.	X	

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
11		Terrain	Data quality standards defined in RTCA's DO-276A/EUROCAE ED-98A. (Draft DO-276B approved by the SC-217 Plenary June 2012.) Data exchange standards defined in DO-291B/ EUROCAE ED-119B. Database format standards may be defined in a future ARINC specification.	See Item 8, above	X	
12		Miscellaneous	Standards not defined. Scope includes:			
			• Notice to Airmen Publication (NTAP)		X	
			• Airport/Facility Directory (A/FD)		X	
			• State Aeronautical Information Publication (AIP) (Includes AIP supplements and amendments, Preflight Information Bulletin (PIB), and Aeronautical Information Circulars (AIC))		X	
			• Location of sporting stadiums, critical infrastructure, and ADS-B GBTs.	Support issuance of Aeronautical Update Service (AUS) status Notices to Airmen (NOTAM)	X	

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
Examples of Aeronautical Update Service (AUS) Products						
1	Aerodrome (AD)/Airport	Entire AD/Airport and Heliports	Public use Airport/Status	Includes commissioning, decommissioning, openings, closings, and abandonments.		X
			Rotating Beacon/Status			X
			Seaplane Base/Status	Includes commissioning, decommissioning, openings, closings, and abandonments.		X
			Helipad/Status	Includes commissioning, decommissioning, openings, closings, and abandonments.		X
			Wildlife Hazards (Specify bird activity and location)	NOTE: ICAO term is Bird Notice to Airmen (BIRDTAM). Can be listed under AD or Runway (RWY) if a specific runway is involved.		X
			Arresting gear/Status			X
			Wind indicator/Status	Includes wind socks and wind tetrahedrons.		X
			Weather reporting station (on-airport)/Status	Commissioning, decommissioning, out of service or unavailable.		X
		Runway	Entire Closure (full length)			X
			Distances Available/Status	Includes temporary changes to the Takeoff Distance Available (TODA), Takeoff Run Available (TORA), Accelerate Stop Distance Available (ASDA), and Landing Distance Available (LDA).		X

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
			Threshold Displacement			X
			Safety Areas/Status			X
			Friction Measurements			X
			Braking Action			X
			Surface Condition (also called FICON or field conditions)	Includes winter conditions, such as depth of snow, and plowed runways or portions of a plowed runway, runway sanding or deicing, snow banks, runway light obscuration, runway cracks or ruts.		X
			Lighting Obscurations	Example: Obstructions caused by snow or ice.		X
			Lighted Sign Status			X
			Ground Lighting Status			X
			Direction - Lighting Sign Status			X
			Direction - In-Ground Lighting Status			X
			Direction - In-Ground Marking Status			X

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
			Approach Lighting System Status	Includes impact to descent / minimum decision altitudes. Includes approach lighting system status and visual approach lighting systems, e.g., Visual Approach Slope Indicator (VASI), precision approach path indicator (PAPI), medium intensity approach lighting system with runway alignment indicator lights (MALSR), Approach Lighting System With Sequenced Flashing Lights (ALSF-2), runway end identification lights (REIL).		X
			Pilot Controlled Lighting (PCL) Status	NOTE: May be listed under keyword AD or RWY.		X
			PCL Frequency Change			X
			Construction Status			X
			Wildlife Hazards (Specify bird activity and location)	NOTE: Bird activity listed either under AD or RWY, the latter if a specific runway is involved.		X
			Runway Visual Range (RVR) System/Status	NOTE: May be listed under keyword RWY or SVC.		X
			VFR Traffic Pattern/Status	Permanent procedures listed under BSS.		X
			Properties Change			X
		Taxiway	Closure (e.g., partial, full length, and crossing restriction changes)			X

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
			Construction/Status			X
			Designated Movement and Non-Movement Areas			X
			In-Ground Lighting/Status			X
			Lighted Sign/Status			X
			Work-in-Progress (WIP). Also known as Personnel and Equipment Working (PAEW)			X
			Ground Markings/Lighting Status			X
			Taxiway Surface Condition (FICON)			X
			Braking Action			X
		Apron (including ramp areas and parking)	Construction Status			X
			In-Ground Marking Status			X
			In-Ground Lighting Status			X
			Apron Surface Condition (FICON)			X

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
		Lighting (Aerodrome/Airport/ Heliport)	Ground Lighting System Status	Commissioning, decommissioning, outages, changes in classification or operation. Includes various lighting systems. Includes approach and runway lighting and PCL status and frequency change. NOTE: Ground lighting status needs to be harmonized with lighting listed under runway, taxiway, and apron areas.		X
		Services (Aerodrome/Airport/ Heliport)	Emergency Services	Aircraft Rescue and Fire Fighting (ARFF) availability.		X
			Fuel Availability	Includes potential impact on flight operations, e.g., delays possible in fueling diverting aircraft.		X
			Fuel Quality Indicator Status Changes	Fuel quality for type aircraft (e.g., the DOD issues an “F” series NOTAM for denoting compatibility of fuel in foreign countries).		X
			Fuel Price Status	NOTE: This is not a State-provided NOTAM.		X
			Customs Availability/Status			X

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
2	Airspace	Airspace Restrictions – Prohibited/Restricted/ Danger (P/R/D) areas (ICAO) and Federal Aviation Administration (FAA) SAA		SAA initiatives are broken down into first-tier and second-tier initiatives. Most DOD SAA airspace would activate static SAA data resident in an onboard database. SAA data also includes dynamic TFR status information.		X
		SAA – First Tier	Aerial Refueling Tracks			X
			Aerial Refueling Anchors	NOTE: Not listed in SAA Concept of Operations (ConOps).		X
			Altitude Reservations (ALTRV) – Stationary			X
			ATC Assigned Airspace (ATCAA)			X
			(Military) Visual Routes (VR)			X
			(Military) Instrument Routes (IR)			X
			Military Operations Areas (MOA)			X
			Orbit Areas			X
			Prohibited Areas			X

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
			Restricted Areas			X
			Special Flight Rules Areas (SFRA)			X
			TFRs			X
				Section 91.137(a)(1) – Protect persons and property on the surface or in the air from a hazard associated with an incident on the surface. Example: Chemical spills, volcanic eruptions.		X
				Section 91.137(a)(2) – Provide a safe environment for the operation of disaster relief aircraft. Example: firefighting, avalanche control.		X
				Section 91.137(a)(3) – Prevent an unsafe congestion of sightseeing and other aircraft above an incident or event which may generate a high degree of public interest. Example: Outdoor assembly, aircraft accident site.		X
				Section 91.138 – Temporary flight restrictions in national disaster areas in the State of Hawaii.		X
				Section 91.141 – Flight restrictions in the proximity of the Presidential and other parties. Example: Presidential and other VIP movements.		X
				Section 91.143 – Flight limitation in the proximity of space flight operations. Example		X

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
				areas include: Cape Canaveral AFS, NASA Wallops. Launches include military, commercial, and NASA operations.		
				Section 91.144 – Temporary restriction on flight operations during abnormally high barometric pressure conditions. Example: Flight operations in Alaska.		X
				Section 91.145 – Management of aircraft operations in the vicinity of aerial demonstrations and major sporting events. Examples: Super Bowl, Indy 500, air shows involving high-performance aircraft aerobatic teams.		X
				14 CFR part 99, § 99.7 – Special security instructions. Example: Certain military facilities, potential terrorist targets. Examples: Nuclear power plants, specific military installations.		X
			Temporary Special Use Airspace (SUA)	Temporarily expands existing airspace in support of DOD requirements		X
			Warning Areas			X
		SAA – Second Tier	Aerobatics Areas			X
			Aircraft Manufacturers' Test Airspace			X
			Alert Areas			X
			Commercial Space Launch and Reentry Areas			X
			Glider Operations Areas			X

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
			Parachute Jumping Areas			X
		Controlled Airspace	Change in hours of operation of the controlling facility	Includes applicable radio frequency connectivity to controlling facility.		X
		Terminal Maneuvering Area (TMA)/Control area (CTA)/Controlled zone (CTR) Status	Facility providing ATC control closed	ICAO TMA/CTA/CTR terms replaced by class of airspace in the United States.		X
3	Services	ATC Facility	Hours of operation	Includes the resulting airspace definition when ATC services are not available. Also includes times of operation of temporary air traffic control towers and functions.		X
		Weather	Automated Weather Services Status			X
		FIS-B/UAT	FIS-B Service Volume and Status			X
		ADS-B/Traffic Information Service – Broadcast (TIS-B)	ADS-R/TIS-B Service Volume and Status			X
			Ground Broadcast Transceiver (GBT) Location Changes			X
4	Points and Navigational Aids (NAVAID)	Waypoints and fixes	Changes in names, locations, and/or restrictions	In the United States, generally handled via Procedure NOTAMs.		X
		NAVAIDs	Status of ground-based navigation facilities including commissioning/ decommissioning,			X

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
			out-of-service, unmonitored, and unusable areas. NOTE: List is incomplete as there are many more NAVAID products and/or features that could be added here, such as hazardous in-flight weather advisory (HIWAS), Very high frequency Omnidirectional Range (VOR) voice, distance measuring equipment (DME), instrument landing system (ILS), markers, etc.			
			Whether Class 1 NAVAID monitoring is unavailable			X
			ILS glide slope changes due to snow			X
		Global Navigation Satellite System (GNSS) Infrastructure	GNSS Constellation/Outage Status			X
		GNSS Unreliable	Global Positioning Satellite (GPS) potentially unreliable for navigation			X
			GPS potentially unreliable for surveillance			X

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
5	Communications	Frequencies	Frequency Change Notices NOTE: List is incomplete as there are many other Comm NOTAMs and/or features that could be added here.			X
6	Surveillance	Radar	Radar System Status	Includes loss of Radar coverage due to temporary wind turbine interference, loss of secondary radar coverage.		X
		Other surveillance means	TIS-B/ADS-B Status			X
7	Procedures	Land and Hold Short Operations (LAHSO)	Temporary changes	Includes changes resulting from temporary changes in the LDA, or temporary changes in runway signage, marking or lighting.		X
		Departures/SIDs	Changes to SIDs	Includes decluttering logic.		X
		Arrivals/STARs	Changes to STARs	Includes decluttering logic.		X
		IAP	Includes RNAV/RNP procedures available	NOTAMs/Digital Automatic Terminal System (D-ATIS) messages when available.		X
			Changes to IAPs			X
		Holding procedure changes	Changes to procedures; holding air speed changes			X

#	AI Categories	AI Products/Services/ Subcategories	Product(s)/Features	Type/Comments	BSS	AUS
		Other (e.g., Obstacle Departure Procedure (ODP))	Changes to required minimum climb gradients			X
			Changes to minimums due to lighting outages or other environmental reasons			X
8	Routes	Airways	Changes in the Airway Minimum En Route Altitude (MEA)	In U.S., generally handled via procedural NOTAMs.		X
		Tracks	North Atlantic (NAT)/Pacific Tracks	Daily updates.		X
9	Obstructions	Obstructions, including towers, cranes, stacks, etc.	Includes permanent as well as temporary obstruction changes/ status			X
			Obstruction lighting outage changes/status			X
		Wind turbines	Includes new single- and multiple-site wind turbine changes/status	NOTE: Charted wind turbines located in BSS section.		X
		Temporary obstruction status	Moored balloons and kites	Example: High-Altitude Aerostat in Florida Keys.		X
			Tall vessels in a ship channel, near airports	Highly dynamic. Examples: General Edward Lawrence Logan INTL (KBOS); Philadelphia INTL (KPHL).		X

#	AI Categories	AI Products / Services / Subcategories	Product(s) / Features	Type / Comments	BSS	AUS
			Unlit obstructions	Applies to uncharted obstructions.		X
10	Miscellaneous	Airspace Hazard Alerts	Laser Light Activity – Planned	Planned/scheduled (non-hostile) activity.		X
			Laser Light Activity – Hostile	Requires immediate NOTAM issuance by ATC.		X
			Solar Flare Activity	Expected impact on the National Airspace System (NAS) and international flight operations.		X
		Noise-Sensitive Areas	Daily noise sensitive areas	Activates noise sensitive areas (stored as BSS). Daily cumulative noise NOTAMs support VFR noise reduction procedures, AC category of use, and RNAV (RNP) approach and departure routings.		X
		Bird Activity	Bird Activity – Migratory			
			Bird Activity – Local Off-airport Areas (e.g., landfills)	NOTE: Could impact unmanned aircraft operations.		X
			Bird Activity – On or in the vicinity of the airport	Could make use of advanced sensor technology such as new foreign object damage (FOD) systems and Internet-based data collection systems.		X
11	Other	Pointer NOTAMs				X
		Graphical NOTAMs	Graphical NOTAMs currently published in FAA's NTAP; includes complex textual and/or graphical procedures	Published as required, in support of specific events.	X	X

APPENDIX 3. ACRONYMS AND ABBREVIATIONS

Terminology or Acronym	Explanation
A/FD	Airport/Facility Directory
AAtS	Aircraft Access to SWIM
AC	Advisory Circular
ACARS	Aircraft Communications Addressing and Reporting System
AD	Aerodrome
ADS-B	Automatic Dependent Surveillance – Broadcast
AFS	FAA Flight Standards Service
AFSS	Automated Flight Service Station
AI	Aeronautical Information
AIM	Aeronautical Information Manual
AIP	Aeronautical Information Publication
AIR	FAA Aircraft Certification Service
AIRAC	Aeronautical Information Regulation and Control
AIRMET	Airmen’s Meteorological Information
AIS	Aeronautical Information Services
AIXM	Aeronautical Information Exchange Model
AMDAR	Aircraft Meteorological Data Relay

Terminology or Acronym	Explanation
ANSP	Air Navigation Service Provider
AOC	Airline Operations Center
AR	Authorization Required
ARP	SAE Aerospace Recommended Practices
ARTCC	Air Route Traffic Control Center
ASDE-X	Airport Surface Detection Equipment, Model X
ASOS	Automated Surface Observing System
ATC	Air Traffic Control
ATIS	Automated Terminal Information Service
ATM	Air Traffic Management
ATS	Air Traffic Service
ATSP	Air Traffic Service Provider
AUS	Data Link Aeronautical Update Service
AWOS	Automated Weather Observing System
BIRDTAM	Bird Notice to Airmen
BSS	Data Link Baseline Synchronization Service
CAA	Civil Aviation Authority
CDM	Collaborative Decision Making

Terminology or Acronym	Explanation
CFR	Code of Federal Regulations
CONUS	Continental United States
ConUse	Concept of Use
COTS	Commercial-Off-the-Shelf
CPDLC	Controller Pilot Data Link Communications
D-ATIS	Digital Automated Terminal Information System
DLSP	Data Link Service Provider
DOD	Department of Defense
DUAT/DUATS	Direct User Access Terminal/Direct User Access Terminal System
EFB	Electronic Flight Bag
ePIREP	Electronic Pilot Report
ES	Extended Squitter
FAA	Federal Aviation Administration
FICON	Field Conditions
FIS	Flight Information Service
FIS-B	Flight Information Services – Broadcast
FOC	Flight Operations Center
FSS	Flight Service Station

Terminology or Acronym	Explanation
ICAO	International Civil Aviation Organization
METI	Meteorological Information
METAR	Message d'observation meteorologieque pour l'aviation reguilere (Aviation Routine Weather Report)
NAS	National Airspace System
ND	Navigation Display
NextGen	Next Generation Air Transportation System
NOTAM	Notice to Airmen
NTAP	Notice to Airmen Publication
NWS	National Weather Service
PED	Portable Electronic Device
PIB	Preflight Information Bulletin
PIC	Pilot in Command
PIREP	Pilot Report
RVR	Runway Visual Range
RWY	Runway
SAA	Special Activity Airspace
SAR	Special Air Report

Terminology or Acronym	Explanation
SARPS	Standards and Recommended Practices
Sfc Ops	Surface Operations
SID	Standard Instrument Departure
SIGMET	Significant Meteorological Information
SigWx	Significant Weather
SOP	Standard Operating Procedure
SPECI	Special METAR
SUA	Special Use Airspace
SWAP	Severe Weather Avoidance Plan
SWIM	System Wide Information Management
TAF	Terminal Aerodrome Forecast/Terminal Area Forecast
TFM	Traffic Flow Management
TFMS	Traffic Flow Management System
TFR	Temporary Flight Restriction
TIS-B	Traffic Information Service – Broadcast
TMA	Terminal Maneuvering Area
TSO	Technical Standard Order
UAT	Universal Access Transceiver

Terminology or Acronym	Explanation
U.S.	United States
WIDS	Data Link Weather Immediate Decision System
WMO	World Meteorological Organization
WNDS	Data Link Weather Near-Term Decision Service
WPDS	Data Link Weather Planning Decision Service
Wx	Weather
WXXM	Weather Exchange Model