U.S. Department
of Transportation
Federal Aviation Administration

Advisory Circular

Subject: Acceptance of Aeronautical Data Processes and Associated Databases

Date: 4/19/16 **AC No:** 20-153B
Initiated by: AIR-130

1 PURPOSE OF THIS ADVISORY CIRCULAR (AC).

1.1 This AC describes an acceptable means, but not the only means, for showing compliance with the applicable airworthiness regulations for equipment with an installed aeronautical database. This AC is not mandatory and is not a regulation. However, if you use the means described herein, you must follow it in all important respects. The term "must" indicates mandatory requirements when following the guidance in this AC. The terms "should" and "recommend" indicate recommended guidance, but are not required for meeting the objectives of this AC. The term "objectives" identifies requirements when used in this AC.

1.2 We, the Federal Aviation Administration (FAA), wrote this AC to help:

1.2.1 Assess compliance regarding aeronautical data processing using the requirements of RTCA, Inc. document (RTCA/DO)-200B, *Standards for Processing Aeronautical Data*, when you are applying for and obtaining an airworthiness approval.

1.2.2 Explain the use of RTCA/DO-200B when seeking technical standard order authorization (TSOA) and installation approval under type certification (e.g., type certificate (TC) or, supplemental type certificate (STC)) for equipment with installed aeronautical databases.

1.2.3 Obtain a Letter of Acceptance (LOA) from the FAA acknowledging an applicant's aeronautical data process meets the objectives of this AC. An LOA confirms compliance with RTCA/DO-200B. For LOA applications, this AC contains three appendices; appendix 1 contains sample cover letters for LOA application(s), appendix 2 contains sample FAA LOAs, and appendix 3 contains an objectives matrix capturing the mandatory requirements of this AC.

2 TO WHOM THIS AC APPLIES.

We wrote this AC for aeronautical data suppliers (e.g., data providers, application integrators, etc.), aircraft manufacturers, avionics manufacturers, and operators / end-users demonstrating compliance to RTCA/DO-200B and using this means toward airworthiness and operational approvals. The standards used in this AC do not apply to Contracting States, or entities acting on behalf of Contracting States, publishing data as addressed in International Civil Aviation

Organization (ICAO) Annex 15, *Aeronautical Information Services*. This AC does not apply to software programming pins (for option selectable software), configuration files, aircraft personality modules, registries, parameter data items, or other lookup tables used by airborne systems and equipment to adapt equipment to the aircraft (i.e., airborne system databases).

3 SUMMARY OF MAJOR CHANGES AND SCOPE.

3.1 This AC provides a means for organizations to obtain FAA acceptance of their aeronautical data processes demonstrating compliance with RTCA/DO-200B. An LOA issued by the FAA or database acceptance as part of the equipment design approval under TSOA, TC, or STC substantiates the terms and conditions, and meets the objectives of this AC. For TSO and installation approvals with an associated database, RTCA/DO-200A is no longer an acceptable means of compliance after the publication date of this AC, except if already part of an applicable aircraft certification basis. Maintenance of an existing LOA under AC 20-153A, or previous versions, can continue as long as there are no major changes to the LOA. We will accept new applications for an LOA, including major changes to existing LOAs using an alternative means of compliance based on AC 20-153A using RTCA/DO-200A, *Standards for Processing Aeronautical Data*, for a period of up to 36 months after the publication date of this AC provided you:

- Make application requesting use of the alternative means of compliance,
- Satisfy the mandatory objectives referenced in AC 20-153A, appendix 3,
- Satisfy objectives 1-14, 1-15, 1-16, 2-2, 2-3, 2-4, and 2-5 referenced in appendix 3 of this AC.

3.2 RTCA/DO-200B updates include:

- Revisions to the standard reflecting integrity provisions and lessons learned from previous LOA activities,
- Expansion from a navigation data-centric focus to include all types of aeronautical data (e.g., navigation, terrain, obstacle, airport mapping, and other purposes),
- Revisions to improve linkages with current industry and regulatory activities (e.g., Single European Sky ATM Research (SESAR) / Next Generation Air Transportation System (NextGen), Performance Based Navigation (PBN), System Wide Information Management (SWIM), Aeronautical Data Quality (ADQ), etc.) and other updates,
- Improved characterization of data quality requirements (DQRs),
- Adapted RTCA/DO-330, *Software Tools Qualification Considerations*, to provide better structure and consistency for database production tool qualification,
- Improved content and guidance on validation and verification activities,
- New requirements and guidance on security for aeronautical data processing,
- Improved guidance on documentation and evidence of compliance,

- A consolidated compliance matrix listing all requirements ("list of shalls") to aid and streamline demonstration and verification of compliance.

3.3 This AC requires data suppliers to provide a release statement (reference paragraph 10.2.6 of this AC) with each database distribution for all new and existing LOAs when utilizing the means provided in this AC.

4 CANCELLATION. This AC cancels AC 20-153A, issued on September 20, 2010. However, LOAs issued under AC 20-153 or AC 20-153A remain effective after the publication date of this AC, unless they are superseded, surrendered, withdrawn by the holder, or terminated by the FAA. New applications for LOA or new airworthiness approval applications made after the publication date of this AC must utilize the means provided in this AC, or an equivalent means as provided in paragraph 3.1 of this AC, except if already part of an applicable aircraft certification basis.

> **Note:** This AC requires aircraft manufacturers, avionics manufacturers, or systems integrators to use the airworthiness guidance in paragraph 12 of this AC for all new LOAs, major changes to existing LOAs, as well as all new airworthiness approvals and major changes to existing airworthiness approvals.

5 WHAT IS AERONAUTICAL DATA? Aeronautical data is data used for aeronautical applications such as navigation, flight planning, flight simulators, terrain awareness, and other purposes (e.g., navigation data, terrain and obstacle data, and airport mapping data). Other purposes may include new and novel aeronautical applications (e.g., dynamic electronic charts, etc.) where definition of the data quality requirements and intended function may require new policy development, or issue papers.

6 RTCA/DO-200B COMPLIANCE.

6.1 RTCA/DO-200B is the standard used to develop, assess change and support implementation of data quality management. Implementing a process as described by RTCA/DO-200B provides a level of assurance for maintaining data quality throughout all phases of the data handling process. Several characteristics define data quality including accuracy, resolution, assurance level, timeliness, completeness, traceability and format. The scope of this standard includes the interface to a data supplier, receipt of the data, processing of the data, database distribution, and the interface to a customer (user). It is not the intent of RTCA/DO-200B to ensure the quality of Contracting State-originated data addressed through other means such as ICAO standards. The ultimate responsibility for ensuring data meets the quality for its intended use rests with the end-user of the data (reference paragraph 13 of this AC). The end-user can partially meet this responsibility by obtaining data from a supplier accredited against RTCA/DO-200B.

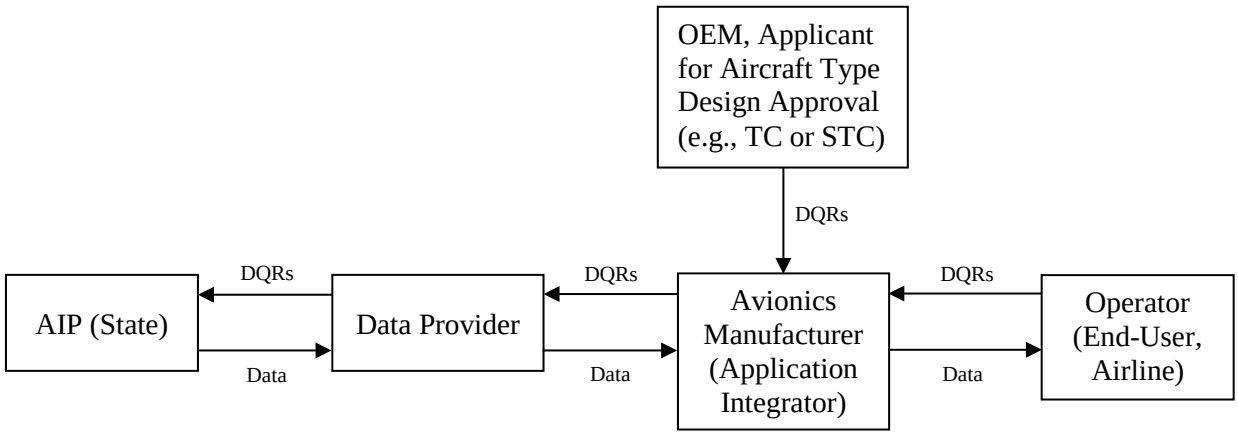
6.2 The intent of RTCA/DO-200B is to address the specific issues of the aeronautical data process by requiring organizations to have in place a quality management system (QMS) including the requirements associated with the aeronautical data process.

7 WHAT IS THE AERONAUTICAL DATA CHAIN?

7.1 RTCA/DO-200B, section 1.5.4 describes the aeronautical data chain as a conceptual representation of the path aeronautical data takes from its origination to its end use. The aeronautical data chain is a series of interrelated links where each link provides a function facilitating the origination, transmission, preparation, application integration, and end-use of aeronautical data for a specific purpose. Because an organization may perform one or all of the functions comprising the aeronautical data chain, it may be responsible for data preparation and data transmission for more than one chain link.

7.2 Data requirements provide the basis for the processes performed on the data. Figure 1 of this AC shows a conceptual layout of a typical aeronautical data chain.

Figure 1. Typical Aeronautical Data Chain



8 WHAT IS A DATABASE LOA?

8.1 **Database LOA provides evidence of database integrity.** A database LOA is a formal letter issued by an FAA aircraft certification office (ACO) documenting a data supplier has met the requirements of this AC. For those applications requiring database integrity (e.g., Area Navigation (RNAV), Required Navigation Performance (RNP), Synthetic Vision System (SVS), terminal procedures, airport moving map displays, Terrain Awareness and Warning System (TAWS), etc.), the LOA may be used as evidence of compliance with RTCA/DO-200B. You can use the LOA in support of an application for operational approval, or in support of a maintenance task per the installation instructions of the equipment, or in of support instructions for continued airworthiness (ICA) of the aircraft.

8.2 We developed the database LOA framework in response to the need for performance-based operations requiring database integrity. Since the 1970s, installed systems relied on navigation databases to support their intended function. Prior to issuance of AC 20-153 in 2005, the FAA had no means to provide oversight of these databases or verify their compatibility with the equipment. Before this guidance, data suppliers had

no means to obtain FAA acceptance of their delivered data with formal verification and recognition of their processes. AC 20-153A expanded the LOA framework to include airport mapping, terrain and obstacle data in addition to navigation. It is important to emphasize the database integrity requirement for navigation data is typically driven by the operation (e.g., RNAV and RNP) while for other types of databases (e.g., airport mapping, terrain, and obstacle), the database integrity is determined at the time of airworthiness approval.

8.3 The objective of the database LOA is to provide evidence your aeronautical data processes meet the objectives of this AC, and in the case of a Type 2 LOA (see paragraph 9.1.2), it also provides installation eligibility privileges with the associated installation approval. Further, the LOA affords users an assurance of integrity based on increasing levels of process rigor. With the database LOA, we evaluate the data quality requirements and data processes used by you, rather than treating a database as a part approval, or having you verify the vast amount of data in a database. Verification of robust data processes allows updates to the data on aircraft without having to go through the change approval process.

8.4 A database LOA (Type 2) is the recommended means to manage an aeronautical database under an airworthiness approval (e.g., TC, STC, TSOA, etc.), rather than applying for a design change for the installed equipment at each database update. Additionally, when avionics policy states a RTCA/DO-200B requirement, we recommend obtaining a Type 2 LOA for change management, especially when data quality requirements need verification for integrity. Otherwise, we expect use of the current change control processes for TSO and STC/TC when there are changes to the data, including database updates.

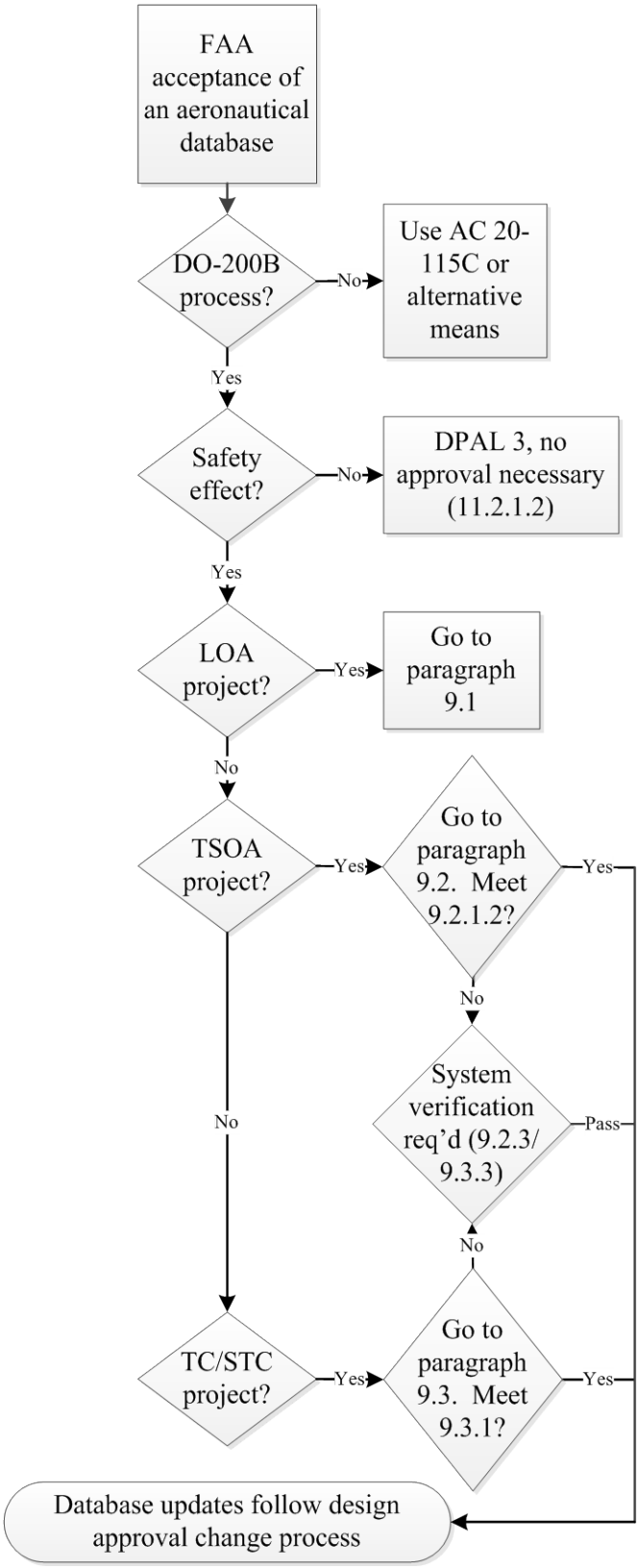
8.5 The LOA identifies organizations within the aeronautical data chain able to demonstrate established data processes related to the preparation and transmission of aeronautical data per their defined data quality requirements.

9 FAA ACCEPTANCE OF AERONAUTICAL DATABASES. There are three separate ways to gain FAA acceptance of your aeronautical database associated with a TSO, TC, STC, or LOA project utilizing this AC (see Figure 2):

> **Note:** It is not necessary to obtain FAA acceptance of an aeronautical database when failure to meet the DQRs has no safety effect (i.e., routine assurance-level data, Visual Flight Rules (VFR)-only navigation database, etc.).

- Obtain a database LOA.
- TSOA with an associated database (i.e., for a TSO requiring RTCA/DO-200B compliance (or earlier version)).
- Installation approval with an associated database (e.g., TC, STC).

Figure 2. FAA acceptance of an aeronautical database



9.1 Obtain a database LOA. We recommend a database LOA to gain FAA acceptance of a data supplier's aeronautical data processes. There are two types of data supplier LOAs issued by FAA. Type 1 LOAs are based on data requirements agreed upon between a data supplier and their customer (typically an avionics manufacturer) with no identified compatibility with an aircraft system or equipment. Type 2 LOAs ensure compatibility of the data requirements with installed systems or equipment (avionics manufacturers / application integrators). An end-user can utilize a Type 2 LOA as evidence of database integrity during the operational approval process or for an approved maintenance program. While RTCA/DO-200B applies to both types of LOAs, the Type 2 LOA data suppliers have additional requirements to ensure the delivered database is compatible with the DQRs necessary to support the intended function approved for the target application. Guidance material regarding the application of RTCA/DO-200B is in paragraphs 10, 11, and 12 of this AC.

9.1.1 Type 1 LOA. A Type 1 LOA provides recognition of your meeting the objectives of this AC with no identified compatibility with an aircraft system or equipment. A Type 1 LOA ensures the processes for producing the aeronautical data meets the objectives of this AC. This LOA applies to data suppliers, operators / end-users, avionics manufacturers, or others. A Type 1 LOA is not associated with a specific certification project (such as a TC, STC, or TSOA) or equipment type. DQRs can be defined by the data supplier and accepted by their customer, or can be agreed upon between them.

9.1.2 Type 2 LOA.

9.1.2.1 A Type 2 LOA provides recognition of your meeting the objectives of this AC and the compatibility of its delivered data with particular avionic systems supporting an intended function. A Type 2 LOA recognizes compatibility with the DQRs necessary to support an intended function by listing the associated equipment.

> **Note:** A Type 2 LOA is only applicable for the equipment listed on the LOA, and the applicant is responsible for identifying all equipment using the associated database.

9.1.2.2 A Type 2 LOA applies to a design approval holder (DAH) (TC/STC/TSOA) or to a data supplier who can establish its data requirements are identical to those defined by a DAH. You achieve this identicality by either establishing design equivalency or by a licensing agreement between the DAH and the entity seeking approval. Regardless, identicality requires formal agreement between all participants (e.g., agreement to DQRs, licensing agreements, etc.). When under license or using design equivalence, the DAH remains responsible for demonstrating (e.g., using system verification tests, sampling checks, etc.) the DQRs are consistent with the intended function of the equipment (see paragraph 12 of this AC).

9.1.2.3 Many aircraft and avionics manufacturers have obtained approval for systems prior to the issuance of RTCA/DO-200B. For such systems, you must identify the DQRs for the avionics prior to application for a Type 2 LOA.

9.1.2.4 Many organizations seeking a Type 2 LOA as an application integrator employ another organization to do certain phases of their aeronautical data processing. A typical model for this arrangement would entail creating a packing tool for the other organization to use to prepare and distribute your data. However, regardless of whether we recognize the other organization as RTCA/DO-200B compliant for their processes, the processes used for your data processing must be your own. You must demonstrate your defined processes are effective and have the appropriate approval, control, and oversight mechanisms to ensure compliance when being performed outside of your organization. For organizations working for you, the processes they use, as well as the records they maintain, must be under your control and accessible in order to hold a Type 2 LOA.

9.2 TSOA with an associated database.

9.2.1 When a TSO states a requirement for RTCA/DO-200B compliance (or earlier version), use of database LOA (Type 2) is recommended. No further demonstration is necessary for the TSOA (related to the aeronautical database) when you apply for and obtain a database LOA (Type 2). If you do not obtain a database LOA (Type 2), then you must address the following as part of your TSO application:

9.2.1.1 Many FAA TSOs do not specify RTCA/DO-200B for aeronautical database assurance. For TSOs specifying a version prior to RTCA/DO-200B, or not specifying any version of RTCA/DO-200, we recommend you use RTCA/DO-200B. If you use RTCA/DO-200B in lieu of a specified earlier version, request a deviation in accordance with the requirements of 14 CFR part 21, subpart O.

9.2.1.2 As part of the compliance documentation (reference RTCA/DO-200B, section 2.2) submitted with the TSO application, you must address the following:

- Define the DQRs; ensure they are consistent with the intended function of the TSO (see RTCA/DO-200B appendix B).

- Define the verification methods for all data and validation methods for data not coming from authoritative source (reference paragraph 11.2.1).

- Define the data process techniques and procedures (i.e., Quality Management (QM) process) from origination of the data through loading the data into the application, of ensuring the quality of the data. Further,

you must document how you will maintain these data processes (for all suppliers in the aeronautical data chain) throughout the lifecycle of the installed article.

Note: You may use an LOA from a previous data chain participant as evidence the data received meets the agreed DQRs.

Note: As part of the process definition for change management, define the level of system verification testing appropriate for major and minor changes to the items in paragraph 9.2.1.2 (e.g., DQRs, process documentation, etc.).

- Define the requirements and conditions for updating and verifying the database in the installation instructions.

9.2.2 The AFM supplement or installation instruction must identify any restriction/limitations concerning operating with aeronautical databases (e.g., expired, etc.).

9.2.3 Without a database LOA, database updates with a failure effect other than no safety effect are a change to the TSO article. Additionally, if you do not satisfy the items in paragraph 9.2.1.2, then you must perform system verification tests to verify the database in the context of the functional software (reference AC 20-115C and AC 20-174).

Note: The intent of this paragraph is to allow database approval for applicants who do not seek an LOA or do not meet the items in paragraph 9.2.1.2, but rather are relying on system verification tests to ensure the quality of the installed database.

9.3 Installation approval with an associated database. We do not expect this approval method to be effective for large data sets or databases needing frequent update (e.g., more frequent than one update per year).

9.3.1 There are three types of installed databases: (1) aeronautical databases, (2) airborne system databases, and (3) other databases, which are not part of the type design of the aircraft (e.g., Electronic Flight Bag (EFB) Type A and B, Electronic Checklist (ECL), user modifiable, etc.). This AC provides guidance related only to "aeronautical databases" and highlights your responsibility for showing compliance to all applicable 14 CFR part 23/25/27/29 sections for installed aeronautical databases. This responsibility is more straightforward within the LOA framework (or if the database is associated with TSOA); however, if you do not obtain an LOA, then as part of the compliance documentation (reference RTCA/DO-200B, section 2.2) submitted you must address the following at time of installation approval:

- Define the DQRs; ensure they are consistent with the intended function (see RTCA/DO-200B appendix B).

- Define the verification methods for all data and validation methods for data not coming from authoritative source (reference paragraph 11.2.1).

- Define the data process techniques and procedures (i.e., Quality Management (QM) process), from origination of the data through loading the data into the application, of ensuring the quality of the data. Further, you must document how you will maintain these data processes (for all suppliers in the aeronautical data chain) throughout the lifecycle of the aircraft.

  Note: You may use an LOA from a previous data chain participant as evidence the data received meets the agreed DQRs.

  Note: As part of the process definition for change management, define the level of system verification testing appropriate for major and minor changes to the items in paragraph 9.3.1 (e.g., DQRs, process documentation, etc.).

- Define the requirements and conditions for updating and verifying the database within the ICAs.

9.3.2 The AFM must state any restriction/limitations concerning operating with aeronautical databases (e.g., expired, etc.).

9.3.3 Without a database LOA, we consider updates to a database with a failure effect other than no safety effect to be a change to the installation approval. Additionally, if you do not satisfy the items in paragraph 9.3.1, then you must perform system verification tests to verify the database in the context of the functional software (reference AC 20-115C and AC 20-174).

Note: The intent of this paragraph is to allow database approval for applicants who do not seek an LOA or do not meet the items in paragraph 9.3.1, but rather are relying on system verification tests to ensure the quality of the installed database.

10 LOA APPLICATION PROCESS AND POST-ACCEPTANCE RESPONSIBILITIES.

10.1 Application. Submit your application for an LOA to the ACO in the geographical area in which your data processing facility is located (see appendix 1, Sample application for an FAA LOA for the aeronautical data process). An application includes the following:

10.1.1 Facility. The name and address of your facility.

10.1.2 Type 1 or Type 2 LOA? A brief description of the type of FAA acceptance sought: Type 1 LOA or Type 2 LOA. For a Type 2 LOA, the application must identify the compatible systems part/model numbers (hardware, software, and database). Since changes to the compatible system can result in a change to the DQRs, you should coordinate those

changes with the DAH early, to ensure updates to data products meet the new requirements at the same time the product is reviewed.

10.1.3 Data set. A brief description of the type of data set included in the scope of the application (e.g., navigation, terrain, obstacle, airport mapping, etc.).

10.1.4 Data package. The application data package must include authorized versions of all of the plans and procedures for the processing of aeronautical data and quality management requirements. For a Type 2 LOA, you must include substantiation of the DQRs, demonstrating the aeronautical data will support the intended function of the installed equipment and are part of the airworthiness approval documentation. The complexity of the data package will vary depending upon the critical nature of the data as it relates to the product in which it will be loaded. The data package must include, but is not limited to, the following:

10.1.4.1 One copy of your compliance documentation as described in RTCA/DO-200B, section 2.2. This includes a compliance plan as described in RTCA/DO-200B, section 2.2.1, as well as all documentation supporting your compliance as described in RTCA/DO-200B, section 2.2.2. Preparation of the compliance plan simplifies the review process and provides reference to all other plans and procedures supporting your compliance. The compliance plan includes a completed RTCA/DO-200B compliance matrix (see RTCA/DO-200B, appendix F), as well as a completed objectives matrix found in appendix 3 of this AC (to cover AC objectives). It provides reference to the other documentation showing where in the plans and procedures the objective evidence required by this AC and RTCA/DO-200B is accomplished.

10.1.4.2 Data process description. Provide a high-level description or process diagram of the data process, inspection and test procedures (including process controls and incoming supplier controls) for processing data in the Data Processing Procedures as described in RTCA/DO-200B, appendix E, item 3. This includes means to address any changes to the DQRs, data processing procedures, and implementation into the aeronautical data process. Additionally, illustrate the methods of traceability and configuration control for all delivered aeronautical data.

10.1.4.3 Compatibility. For a Type 2 LOA, you must include a list of systems for which you will ensure compatibility with intended use including part/model numbers (hardware, software, and database) by demonstrating (e.g., using system verification tests, sampling checks, etc.) the DQRs are consistent with the intended function of the associated equipment (see paragraph 12 of this AC). This is always done through an appropriate arrangement with the original equipment manufacturer (OEM) / DAH at time of first listing on the LOA or when proposing additions to the compatible equipment list. We also recommend performing periodic sampling checks on individual data

sets (e.g., via simulation, test bench environment, etc.) to confirm continued compatibility.

10.1.4.4 Data error handling and reporting. We consider a data error an escape from the supplier's quality system and a failure to meet DQRs. The applicant must have a procedure to address an unsafe condition or error found in the distributed data. The procedure should address the actions you intend to take to develop and distribute corrective action to all affected parties (e.g. source, users of the database, FAA ACO/manufacturing inspection district office (MIDO)). Procedures must describe how to communicate with data suppliers for all suspected and confirmed errors with the source data, and how to inform customers and the FAA ACO/MIDO of confirmed data errors having potential to adversely affect the safety of operational use. Your procedure must describe how to communicate without undue delay (within 72 hours of detection/knowledge) change in LOA status and any confirmed data errors having potential to adversely affect the safety of operational use. Examples of data errors with potential to adversely affect safety include, but are not limited to final approach segment (FAS) data block changes, path and terminator "leg type" coding, as well as critical and essential data elements.

10.2 LOA post acceptance responsibilities. The requirements for maintaining your LOA privileges are:

10.2.1 Error reporting. You must report to customers (application provider, end-user, etc.), the FAA and to source (if applicable) any failure, malfunction, or defect in the distributed data having potential to adversely affect the safety of operational use. The initial reporting of confirmed safety-related errors or defects must be timely and prompt (within 72 hours of detection/knowledge) to ensure swift resolution. You must endeavor, through documented procedure, to ensure receipt of data alerts reporting safety-related errors or defects. You must consider any safety-related data alerts prior to use of the affected data.

10.2.2 Maintain a QMS. You must maintain a QMS as described in RTCA/DO-200B, section 2.5. You must report all changes made to the QMS affecting the data quality objectives to the issuing ACO/MIDO before their implementation.

10.2.3 Changes to data process. You must submit minor design changes for an existing LOA in accordance with procedures agreed to with the issuing ACO/MIDO. You must substantiate major design changes, and the ACO/MIDO must accept them prior to their implementation. Procedures for reporting of changes to the data process must also address changes to tools used in its data process.

10.2.4 Auditing. You must perform periodic internal audits of both AC 20-153B and RTCA/DO-200B objectives as described in RTCA/DO-200B, section 3, with the maximum time between audits not to exceed one year. Audits may be total or conducted

incrementally, as long as you audit all the objectives at least annually. Any major non-conformities as described in RTCA/DO-200B, section 3.4, must be reported to the FAA office issuing the LOA. Additionally, the FAA may perform periodic audits in accordance with procedures agreed to by you and the ACO/MIDO. Scheduling of periodic FAA audits should use a risk-based approach to determine the appropriate intervals considering such factors as the type of LOA, maturity of the FAA/data supplier relationship, and evidence the data supplier's internal audit program is performing adequately.

10.2.5 You must notify all users and the FAA (ACO/MIDO from which the LOA was obtained), when you no longer comply with the conditions of the LOA.

10.2.6 You must provide a release statement with each database distribution to broadcast the identified LOA status, state your compliance, and provide information on known deviations and alterations. The release statement must include:

- LOA status (e.g., current, suspended, expired, etc.).
- Any deviations to the agreed DQRs (e.g., deletion of procedures due to source / processing errors (i.e., completeness change), etc.).
- Any data alteration (reference RTCA/DO-200B, section 2.4.2).

Note: The objective for the release statement is to communicate LOA status and any deviations/alterations so the operator / end-user can satisfy their responsibility for ensuring the data meets the quality requirements for its intended function. The release statement may be in the form of an enclosed document, an electronic posting with the download files, or on the web.

10.2.7 You must surrender or withdraw your LOA if you no longer uphold its terms and conditions. The LOA is not transferable and is effective until surrendered or withdrawn by you, or terminated by the FAA, as described in the LOA.

10.2.8 Notification of LOA status changes to data customers. You must notify your data customers of the status of your LOA. You must also be aware of and provide any change in status of LOAs (or foreign acceptance, including designation of the foreign authority acknowledging the foreign source's compliance to RTCA/DO-200B and the means of approval or acceptance) for previous data chain participant(s) up to, but not including, a Contracting State's Aeronautical Information Publication (AIP). The method of notification must be timely to ensure customers can react to changes in the status of an LOA before they accept the next data update.

Note: An example of this notification requirement might consist of posting a copy of the LOA on a website for customers, with a procedure to reference the site before updating data. This would ensure notification of any changes in the LOA status.

11 HOW DOES THIS GUIDANCE APPLY TO DATA SUPPLIERS?

11.1 A data supplier seeking an FAA LOA for acceptance of its aeronautical data process meeting the objectives of this AC should follow the guidelines contained in paragraph 10 of this AC for application procedures.

11.2 In addition to the requirements in RTCA/DO-200B, the following applies for obtaining FAA acceptance of the aeronautical data process:

11.2.1 Verification and Validation of Data.

11.2.1.1 You may receive data from any data supplier in the aeronautical data chain. If a data supplier has complied with the requirements of RTCA/DO-200B, or previous version as evidenced by an FAA LOA, the responsibility to validate the incoming data meets the DQRs is discharged (reference RTCA/DO-200B, section 1.5 and 2.3.3 (3)). Likewise, for data published in the AIP, provided via an official government source (as recognized by the FAA), or an authoritative source (as recognized by the FAA (reference RTCA/DO-200B, appendix A)), the responsibility to validate the incoming data meets the DQRs is discharged (we refer to these types of suppliers/publications as authoritative source). We recommend the use of verification or validation techniques whenever possible to catch data errors. You must verify and validate data obtained from non-authoritative sources through an approved process prior to delivery (reference RTCA/DO-200B, appendix C). You should evaluate the suitability of the foreign data supplier as part of your LOA application. Responsible management and process approval authority must be located in the United States for the FAA to discharge validation requirements for a data supplier's internal supply sources located outside the United States.

> **Note:** Database production procedures of non-U.S. data suppliers should comply with RTCA/DO-200B (or EUROCAE ED-76A) to the satisfaction of the data supplier/user as verified by the supplier's civil aviation authority (CAA). The FAA recognizes approvals by the CAA through bi-lateral agreement or EASA LOA / Data Supplier Certificate (EASA LOAs / Data Services Provider Certificates demonstrating RTCA/DO-200A / RTCA/DO-200B (or EUROCAE ED-76 / EUROCAE ED-76A) are acceptable). The approval by the CAA may be acceptable and should be equivalent to the FAA acceptance defined in this AC.

11.2.1.2 Data Process Assurance Level (DPAL). The level of rigor representing the amount of verification and validation tasks performed during data processing to assure data quality is known as data process assurance level, or DPAL. The DPAL is determined by the integrity requirement of the data

through allocation of risk using a preliminary system safety assessment of the system architecture (reference RTCA/DO-200B, appendix C, section C.2, AC 23.1309-1, *System Safety Analysis and Assessment for Part 23 Airplanes,* AC 25.1309-1, *System Design and Analysis,* ARP 4754A, *Guidelines for Development of Civil Aircraft and Systems,* and ARP 4761 *Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment*). For data processes with a mixture of DPALs (e.g., processing DPAL 1 data with DPAL 2 data), then the higher DPAL is recommended across a mixed data set. Otherwise, you must employ partitioning and protection to ensure the higher DPAL data set utilizes the higher rigor. Regardless, the DPAL should be consistent with the tightest requirements derived from malfunction or availability effects caused by the data (reference RTCA/DO-200B, appendix C, section C.2.3).

11.2.1.3 Acceptable techniques for the verification and validation of navigation and other aeronautical data are in RTCA/DO-200B, appendix C and RTCA/DO-201A, sections 2.1.7 and appendix B.

11.2.1.4 Acceptable techniques for the verification and validation of airport mapping data are in RTCA/DO-272D, section 3.10.

11.2.1.5 Acceptable techniques for the verification and validation of terrain and obstacle data are in RTCA/DO-276C, sections 6.1.4 and 6.1.5.

11.2.2 Data Security. Your data processing procedures must define the means of confirming data you receive is not corrupted, your means to protect stored data from corruption, and what methods you provide the user to verify the data they receive from you is not corrupted (reference RTCA/DO-200B, section 2.4.1, items 1, 3, and 12). Additionally, to protect from the possibility of intentional corruption, you must maintain records showing what data security provisions you implement to accomplish these objectives (reference RTCA/DO-200B, section 2.4.6). Your data security provisions must describe both the technical and organizational controls you implement to ensure you receive data from known sources and to prevent intentional corruption during processing and exchange of data. Provisions for data security must describe how you identify, assess, and mitigate security threats and prevent unauthorized access to data or tools. Moreover, there are two important concepts applicable to the rigor of your data security provisions. First, the higher the DPAL the more rigorous controls and protocols you will need to implement. Additionally, to protect data developed with higher item development assurance levels (IDAL), security provisions need to address any mixing of data processed at lesser DPALs and any potential vulnerability affecting the more critical data (see 11.2.1.2).

11.2.3 Changes to DQRs and Identification of Non-Compliant Data. You must identify the process for establishing new configuration baselines in the configuration management plan.

11.2.3.1 Changes within the DQRs may affect the ability of the equipment to satisfy the intended function of the installed equipment. Changes to the DQRs must be coordinated between the data supplier and user receiving the data. You should give sufficient advance notice of changes to allow subsequent participants in the data chain (avionics manufacturer, OEM, and potentially the operator / end-user) ample time to review the effect of the change.

11.2.3.2 You may have certain data elements not compliant with the three assurance levels identified in RTCA/DO-200B, appendix B, section B.1.3. If you deliver non-compliant data with RTCA/DO-200B compliant data, then the agreed-upon DQRs should identify this data as assurance Level 4, indicating it may not satisfy safety objectives. Level 4 data must be distinguishable from any compliant data through means acceptable to the FAA. The operator / end-user is ultimately responsible for ensuring Level 4 data meets the quality requirements for its intended application.

11.3 Tailored data. Tailored data is aeronautical data originated by an operator / end-user under their sole responsibility and for their exclusive use. The accountability for this data, and its subsequent update, remains solely with the operator / end-user and thus verification, validation, and corruption detection requirements are applicable to the data originator and not the data supplier. There are currently no established data requirements for tailored data. Therefore, data suppliers (i.e., both Type 1 and Type 2 LOA) must ensure tailored data is not distributed to entities other than the operator / end-user requesting the data.

> **Note:** This requirement means the Type 1 LOA holder must sufficiently identify tailored data to support the Type 2 LOA holder in meeting this distribution constraint.

11.4 Tool Qualification. Performance of tool qualification in RTCA/DO-200B utilizes RTCA/DO-330, *Software Tool Qualification Considerations,* with adaptations provided in RTCA/DO-200B, appendix D. FAA acceptance of your aeronautical database associated with a TSOA, TC, STC, or LOA project utilizing this AC provides various frameworks for recognizing this compliance and the relationship to the liaison process. As such, for the tool qualification liaison process under a TSOA, TC, or STC framework you would provide all necessary tool qualification data with the application and subsequent changes to the tool qualification data would follow the agreed change process for the type of approval (i.e., the Plan for Software Aspects of Certification (PSAC) and other output artifacts may include the required data or reference the artifact where this data is contained (e.g., the Data Processing Procedures)). Under an LOA framework, you would provide all necessary tool qualification data as part of the LOA application and subsequent changes to the tool qualification data would follow the agreed to LOA change process (i.e., the Data Processing Procedures fulfill the role of the PSAC and other output artifacts). In addition, regardless of which framework (i.e., TSOA, TC, STC, or LOA project utilizing this AC), you must submit the documentation (e.g., a Tool

Accomplishment Summary (TAS)) demonstrating tool qualification activities were satisfactorily completed.

12 WHAT IS THE RELATIONSHIP BETWEEN RTCA/DO-200B AND AIRWORTHINESS APPROVAL?

12.1 Identify the DQRs. The avionics manufacturer should identify the DQRs, usually as part of the compliance documentation at the equipment design level. During the airworthiness approval (e.g., TSOA, STC/TC), you must demonstrate the DQRs are consistent with the intended function of the equipment. Many aircraft and avionics manufacturers obtained approval for systems prior to the issuance of this AC and may not have previously identified its DQRs. For such systems, the data supplier must identify the DQRs demonstrated as consistent with the intended function of the avionics (e.g., using system verification tests, sampling checks, etc.) prior to obtaining a Type 2 LOA. The DAH should establish the DQRs, or alternately a data supplier covered under a production certificate may establish them (provided the data supplier has access to the original documentation for the avionics). For example, flight management system (FMS) suppliers to an OEM may document compatibility with its own FMS without the direct involvement of the OEM. The requirements should reflect the original design documentation, supplemented as necessary to address the data quality characteristics. Typically, you find definition of the data format, accuracy, and resolution in the high-level data requirements in the original equipment software documentation when using RTCA/DO-178C, or previous versions. These data requirements are refined in RTCA/DO-201A, RTCA/DO-272D, or RTCA/DO-276C with the corresponding assurance level integrity requirements assigned.

12.2 Defining DQRs. An aircraft manufacturer, avionics manufacturer or systems integrator must use the requirements defined in section 2.3 of RTCA/DO-200B as a means to define the DQRs for the aeronautical database. The DQRs must be under configuration control. RTCA/DO-200B, section 2.3 and appendix B, provides an acceptable means to define the DQRs. As described in RTCA/DO-200B, aeronautical data is characterized by its accuracy, resolution, assurance level, traceability, timeliness, completeness, and format. For navigation databases, this definition could include data elements with corresponding accuracy, resolution and assurance level, record types and interrelationships to define paths (e.g., ARINC 424 path terminators if used within the avionics), any filters being applied to those record types, and company-specific format requirements (field-by-field description of what is delivered in the packed data). For terrain and obstacle data, RTCA/DO-276C, section 3 should be used as a minimum set of DQRs used for terrain awareness and warning systems. As part of the design approval, an aircraft manufacturer, avionics manufacturer or systems integrator must define DQRs for other applications (e.g., synthetic vision systems or overlay of terrain on attitude indicator). For airport mapping data, RTCA/DO-272D sections 2 and 3 should be used as a minimum set of DQRs used for airport map displays. The aircraft manufacturer, avionics manufacturer or systems integrator must demonstrate the DQRs meet the requirements for the intended function and document the means to maintain the data.

12.3 Intended Function. The DQRs must be consistent with the intended function of the equipment identified as part of the normal design approval. One or more of the data characteristics can affect the equipment. The system compliance and installation documentation defines the system functions and any dependencies on the data (i.e., DQRs). For example, with navigation systems, this includes all uses of the system, such as navigating on published airways or routes, standard arrivals, departures, and specific types of approach operations.

12.3.1 Many aspects of the DQRs are addressed to support meeting the objectives of RTCA/DO-178C. DQRs reviewed and approved in compliance with RTCA/DO-178C, or previous versions, do not need re-approval by the FAA to meet this AC. However, the aircraft manufacturer, avionics manufacturer or systems integrator must ensure the DQRs developed under RTCA/DO-178C or previous versions, correctly establish the requirements on the data's intended use (see RTCA/DO-200B, section 2.3). The aircraft manufacturer, avionics manufacturer or systems integrator may need to develop supplementary documentation to address deficiencies in the DQRs. Supplementary documentation changes may be in documents separate from the TSOA, TC, or STC design documentation, but then they must provide the necessary references to such documentation. The TSOA, TC, or STC DAH should incorporate supplementary documentation into the certification basis at the next opportunity.

12.3.2 Navigation, obstacle, and airport mapping data change frequently. In order to retain data currency, this AC provides an acceptable means for associating the DQRs for the aeronautical data with the aircraft type design without requiring the data (e.g., loadable media) become part of the RTCA/DO-178C, or previous versions, software life cycle.

> **Note:** When RTCA/DO-201A, RTCA/DO-272D, RTCA/DO-276C, or other comparable criteria do not address the source data for the data product, the data quality may only reflect your processes and assurances specified by the DQRs.

12.4 Identification and Configuration Control.

12.4.1 Configuration control processes must include traceability between the DQRs and a database specification (e.g., a database definition document describing content, format, structure, and having a unique identification). The aircraft manufacturer, avionics manufacturer or systems integrator must also reference the DQRs in the installation documentation / ICAs.

12.4.2 The aircraft manufacturer, avionics manufacturer or systems integrator must evaluate changes to the DQRs per the change control process of the TSOA and/or TC/STC approval. This does not preclude changes to the data expected to change, remain current, or support operations in different geographic regions. The aircraft manufacturer, avionics manufacturer or systems integrator must evaluate changes to the DQRs to determine whether they have a major, minor, or no effect on the system's intended function.

Note: The aircraft manufacturer, avionics manufacturer or systems integrator may incorporate any additional configuration management and control requirements found in other existing standards.

12.4.3 Database configuration management should address identification / part number, version control, data quality assurance / management, coordination processes (e.g., reporting of errors), and change management.

12.5 Instructions for Continued Airworthiness (ICA) (Title 14 of the Code of Federal Aviation Regulations (14 CFR) § 21.50(b)). If the aircraft manufacturer, avionics manufacturer or systems integrator do not identify the database as part of the type design (i.e., RTCA/DO-178C compliance), and if database assurance is required (i.e., database has a safety effect), the installation documentation / ICAs must require the data meet the database assurance objectives (e.g., RTCA/DO-200B) and comply with the DQRs for the target hardware. For example, for an aeronautical database with a Type 2 LOA, a statement in the installation instructions or ICAs accomplishes this by directing the operator / end-user (before installing an aeronautical database) to review the release statement (reference paragraph 10.2.6 of this AC), thereby verifying database assurance and acknowledging any deviations to the DQRs or data alterations.

12.6 Aircraft Flight Manual. You must document any assumptions related to database assurance in the aircraft flight manual.

Example: The approval of the XXX application is based on the XXX database provider obtaining a Type 2 Letter of Acceptance (LOA) (or an equivalent means of compliance as defined by airworthiness authorities) and the operator / end-user complying with the requirements of AC 20-153B, paragraph 13.

13 HOW DOES THIS GUIDANCE APPLY TO AN OPERATOR / END-USER?

13.1 Operator / end-user responsibilities. This AC does not alter or affect the responsibility or authority of the operator (aircraft owner or pilot) in updating aeronautical data. The end user (operator) is ultimately responsible for ensuring the data meets the quality requirements for its intended application. The following guidelines apply to operators /end-users seeking compliance with RTCA/DO-200B:

13.1.1 The operator / end-user is responsible for ensuring the DQRs were defined and appropriate for the intended use. A Type 2 LOA confirms this is valid for the compatible equipment listed on the LOA.

13.1.2 Of the data characteristics applicable to the installed equipment, the operator / end-user is responsible for defining the completeness and timeliness requirements for the data, or accepts the requirements defined by its data supplier. The operator / end-user accomplishes this by obtaining all the data needed to support intended use (i.e., completeness) and ensuring the data is valid for its period of use (i.e., timeliness).

13.1.3 Prior to updating aeronautical databases in installed avionics, the operator / end-user must review the release statement from its supplier to confirm the validity of RTCA/DO-200B compliance and acknowledge any report of deviations to the DQRs or any modification to the data by alteration. For non-U.S. companies with an approval or acceptance from their respective CAA, the FAA recognizes approvals by the CAA through bi-lateral agreement (e.g., EASA LOA / Data Supplier Certificate).

13.1.4 The operator / end-user must have procedures established to report to its Type 2 data supplier any discrepancy or error in the data having a potential safety effect on the operational use of the data. The operator / end-user must also have procedures to obtain notification of errors and anomalies from their data supplier and must consider such notifications prior to use of the affected data in flight operations.

13.2 Operators / end-users formatting and altering data. If the operator / end-user is performing data preparation and data transmission (i.e., formatting or altering information within an aeronautical database provided by the Type 2 LOA holder), then in order to demonstrate RTCA/DO-200B compliance, the operator must comply with paragraphs 10 and 11 of this AC and obtain an LOA, or an equivalent means.

14 RELATED REFERENCES. All references to FAA documents in this AC are to the current version.

14.1 FAA ACs. Order copies of Advisory Circulars from the U.S. Department of Transportation, Subsequent Distribution Office, M-30, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785. You can also get copies from our website at www.faa.gov/regulations_policies/advisory_circulars/.

14.1.1 AC 20-115, *Airborne Software Assurance.*

14.1.2 AC 20-174, *Development of Civil Aircraft and Systems*.

14.1.3 AC 23.1309-1, *System Safety Analysis and Assessment for Part 23 Airplanes.*

14.1.4 AC 25.1309-1, *System Design and Analysis.*

14.2 ICAO Documents. Publications are available from ICAO, Attention: Customer Service unit, 999 University Street, Montreal, Quebec, Canada H3C5H7. Telephone +1 514-954-8022, facsimile: 514-954-6769, sitatex: YULCAYA, email: sales@icao.int or online at http://www.icao.int. ICAO Annex 15, *Aeronautical Information Services.*

14.3 RTCA, Inc. Documents. Order copies of RTCA documents from RTCA, Inc., 1150 18th NW, Suite 910, Washington, DC 20036. Telephone: (202) 833-9339, or online at http://www.rtca.org.

14.3.1 RTCA/DO-178C, *Software Considerations in Airborne Systems and Equipment Certification*, dated December 13, 2011 and its equivalent, EUROCAE document ED-12C, *Software Considerations in Airborne Systems and Equipment Certification*.

14.3.2 RTCA/DO-200B, *Standards for Processing Aeronautical Data*, dated June 18, 2015 and its equivalent, EUROCAE document ED-76A, *Standards for Processing Aeronautical Data*.

14.3.3 RTCA/DO-201A, *Standards for Aeronautical Information*, dated April 19, 2000 and its equivalent, EUROCAE document ED-77, *Standards for Aeronautical Information*.

14.3.4 RTCA/DO-272D, *User Requirements for Aerodrome Mapping Information*, dated September 22, 2015 and its equivalent, EUROCAE document ED-99C, *User Requirements for Aerodrome Mapping Information*.

14.3.5 RTCA/DO-276C, *User Requirements for Terrain and Obstacle Data*, dated September 22, 2015 and its equivalent, EUROCAE document ED-98B, *User Requirements for Terrain and Obstacle Data*.

14.3.6 RTCA/DO-291C, *Minimum Interchange Standards for Terrain, Obstacle and Aerodrome Mapping Data* dated September 22, 2015 and its equivalent, EUROCAE document ED-119B, *Interchange Standards for Terrain, Obstacle and Aerodrome Mapping Data.*

14.3.7 RTCA/DO-330, *Software Tool Qualification Considerations*, dated December 13, 2011.

14.4 SAE International Documents. Order SAE documents from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001. Telephone (724) 776-4970, fax (724) 776-0790. Order copies online at http://www.sae.org.

14.4.1 ARP 4754A, *Guidelines for Development of Civil Aircraft and Systems*.

14.4.2 ARP 4761, *Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment*.

14.5 Airlines Electronic Engineering Committee (AEEC), ARINC, Inc. Documents. Order copies of ARINC documents from ARINC Industry Activities, 16701 Melford Blvd., Suite 120, Bowie, MD 20715. Telephone: (240) 334-2578, email: standards@sae-itc.org. Order copies online at http://www.aviation-ia.com/cf/store/.

14.5.1 ARINC Specification 424, *Standard, Navigation System Data Base*.

14.5.2 ARINC Specification 816, *Embedded Interchange Format for Airport Mapping Database*.

for Susan J. M. Cabler
Acting Manager, Design, Manufacturing, &
Airworthiness Division
Aircraft Certification Service

APPENDIX 1. APPLICATION FOR AN LOA

Figure 1. Sample of a Type 1 LOA Application

ACME Data Company
1919 Lombardi Avenue
Green Bay, WI 81119

Federal Aviation Administration
Chicago ACO (ACE-115C)
2300 East Devon Avenue, Room 107
Des Plaines, IL 60018

Manager, Aircraft Certification Office, ACE-115C

Subject: Request for New Type 1 Letter of Acceptance for ACME Data Company's Aeronautical Data Process

To Whom It May Concern:

ACME Data Company is applying for a new Type 1 letter of acceptance for our aeronautical data process. We meet the objectives of AC 20-153B and request your review of the enclosed data submitted in support of this application. ACME Data Company develops < *insert data type here* > data per the data quality requirements specified in ACME Data Document XXX.XX. We request acceptance of our aeronautical data process meeting the objectives of AC 20-153B based on the specification and control of these data quality requirements, compliance with RTCA/DO-200B, and our documented procedures for processing data**.** This < *insert data type here* > data is not intended to be directly loaded in any aircraft system.

We developed the data at ACME Data Company, 1919 Lombardi Avenue, Green Bay, WI 81119. ACME Data Company hereby certifies the Data Quality Requirements, Data Processing Procedures, and Quality Management System are in accordance with RTCA/DO-200B, section 2, and we produce < *insert data type here* > data in accordance with this system.

Your efforts in support of this request are most appreciated.

Sincerely,

Administrator,
ACME Data Company

Enclosures:
1 copy ACME Data quality control manual, specifications and processes.

Figure 2. Sample of a Type 2 LOA Application

ACME Avionics
1919 Lombardi Avenue
Green Bay, WI 81119

Federal Aviation Administration
Chicago ACO (ACE-115C)
2300 East Devon Avenue, Room 107
Des Plaines, IL 60018

Manager, Aircraft Certification Office, ACE-115C

Subject: Request for New Type 2 Letter of Acceptance for ACME Avionics' Aeronautical Data Process

To Whom It May Concern:

ACME Avionics is applying for a new Type 2 letter of acceptance for our aeronautical data process. We meet the objectives of AC 20-153B and request your review of the enclosed data submitted in support of this application. ACME Avionics receives data from other sources and develops < *insert data type here* > data per the data quality requirements specified in ACME Avionics Documents XXX.XX and YYY.YY, respectively. We request acceptance of our aeronautical data process meeting the objectives of AC 20-153B based on the specification and control of these data quality requirements, compliance with RTCA/DO-200B, and compatibility of the delivered data with the following products:

ACME FMS Model XY, P/N 12345-23a
ACME FMS Model Z, P/Ns 56789-1 through 56789-8

ACME Avionics established compatibility with these systems based on the original software design documentation approved under the original TSO authorization. We compile data to the compatible format using ACME Avionics Tool 123.

We developed the data at ACME Avionics, 1919 Lombardi Avenue, Green Bay, WI 81119. ACME Avionics hereby certifies the Data Quality Requirements, Data Processing Procedures, and Quality Management System are in accordance with RTCA/DO-200B, section 2, and we produce < insert data type here > data in accordance with this system.

Your efforts in support of this request are most appreciated.

Sincerely,

Administrator,
ACME Avionics

Enclosures:
1 copy ACME Avionics quality control manual, specifications and processes.

APPENDIX 2. FAA LOAs

Figure 1. Sample of a Type 1 FAA LOA

ACME Data Company
1919 Lombardi Avenue
Green Bay, WI 81119

August 11, 2016

The FAA has verified ACME Data Company meets the objectives of AC 20-153B with regard to its processing of < *insert data type here* > data. This Type 1 Letter of Acceptance (LOA) does not authorize the ACME Data Company to supply < *insert data type here* > data directly to an operator (e.g., end-user, airlines) for loading directly into installed equipment.

The following terms and conditions are applicable to this LOA, are not transferable, and are effective until surrendered or withdrawn by the holder, or terminated by the FAA:

1. ACME Data Company's data quality requirements for the receipt of data from other sources, and for the delivery of data to its customers, are defined in ACME Data document XXX.XX.

2. ACME Data Company's procedures for processing data are defined in ACME Data document YYY.YY.

3. Reporting of Failures, Malfunctions, and Defects. ACME Data Company must report to the FAA < *insert local FAA LOA Program Manager's office* > any failure, malfunction, or defect of the aeronautical data produced under this LOA having a potential safety effect on operational use of the data.

4. Maintain a Quality Management System (QMS). ACME Data Company must maintain a QMS as described in RTCA/DO-200B, section 2.5. Changes to the QMS affecting the data quality objectives must be reported to the < *insert local FAA LOA Program Manager's office/MIDO* > for acceptance prior to implementation.

5. Design Changes.

   a. ACME Data Company must submit minor changes to the data quality requirements, the data processing standards, or the QMS to the < *insert local FAA LOA Program Manager's office* > in accordance with procedures described within ACME Data document XXX.XX. All other changes are considered major and must be substantiated and accepted prior to implementation in the same manner as the original LOA.

   b. Upon receipt of notification by the < *insert local FAA LOA Program Manager's office* > of an unsafe condition existing in a database product supplied under this LOA, ACME Data Company shall develop a corrective action and submit it to the < *insert local FAA LOA Program Manager's office* > for acceptance. ACME Data

Company shall expedite distribution of the accepted corrective action to customers and users.

6. ACME Data Company must perform periodic internal audits of both AC 20-153B and RTCA/DO-200B as described in RTCA/DO-200B, section 3, with a maximum time between audits of not more than one year. Audits may be total or conducted incrementally, as long as you audit all the objectives at least annually. Any major non-conformities as described in RTCA/DO-200B, section 3.4 must be reported to the < *insert local FAA LOA Program Manager's office* >. Additionally, the FAA may perform periodic audits in accordance with procedures described within ACME Data document XXX.XX.

7. ACME Data Company must provide a release statement with each database distribution to broadcast LOA status, state their compliance, and provide information on known deviations and modifications.

8. ACME Data Company must advise customers of the status of its LOA as well as the status of LOAs (or foreign acceptance, including designation of the foreign authority acknowledging the foreign source's compliance to RTCA/DO-200B and the means of approval or acceptance) for all previous chain participants (up to, but not including, a Contracting State's AIP). The method must be timely to ensure customers can react to changes in the status of its LOA.

Manager, *{regional}* Aircraft Certification Office

Figure 2. Sample of a Type 2 FAA LOA

ACME Avionics
1919 Lombardi Avenue
Green Bay, WI 81119

August 11, 2016

The FAA has verified ACME Avionics meets the objectives of AC 20-153B with regard to its processing of < *insert data type here* > data. For this Type 2 Letter of Acceptance (LOA), compatibility has been established with the following systems:

ACME FMS Model XY, P/N 12345-23a
ACME FMS Model Z, P/Ns 56789-1 through 56789-8

(or)

"…identified in ACME Avionics FMS Compatibility Matrix, Document XXX.XX, dated YYY, or latest FAA accepted revision."

The following terms and conditions are applicable to this LOA, are not transferable, and are effective until surrendered or withdrawn by the holder, or terminated by the FAA:

1. ACME Avionics' data quality requirements for the receipt of data from other sources, and for the delivery of data to its customers, are defined in ACME Avionics Documents XXX.XX and YYY.YY, respectively.

2. ACME Avionics' procedures for processing data are defined in ACME Avionics document YYY.YY.

3. Reporting of Failures, Malfunctions, and Defects. ACME Avionics must report to the FAA <*insert local FAA LOA Program Manager's office*> any failure, malfunction, or defect of the aeronautical data produced under this LOA having a potential safety effect on operational use of the data.

4. Maintain a Quality Management System (QMS). ACME Avionics must maintain a QMS as described in RTCA/DO-200B, section 2.5. Changes to the QMS affecting the data quality objectives must be reported to the < *insert local FAA LOA Program Manager's office/MIDO* > for acceptance prior to implementation.

5. Design Changes.

   a. ACME Avionics must submit minor changes to the data quality requirements, the data processing standards, or the QMS to the < *insert local FAA LOA Program Manager's office* > in accordance with procedures described within ACME Avionics document XXX.XX. All other changes are considered major and must be substantiated and accepted prior to implementation in the same manner as the original LOA.

b. Upon receipt of notification by the < *insert local FAA LOA Program Manager's office* > of an unsafe condition existing in a database product supplied under this LOA, ACME Avionics shall develop a corrective action and submit it to the < *insert local FAA LOA Program Manager's office* > for acceptance. ACME Avionics shall expedite distribution of the accepted corrective action to customers and users.

6. ACME Avionics must perform periodic internal audits of both AC 20-153B and RTCA/DO-200B as described in RTCA/DO-200B, section 3, with a maximum time between audits of not more than one year. Audits may be total or conducted incrementally, as long as you audit all the objectives at least annually. Any major non-conformities as described in RTCA/DO-200B, section 3.4 must be reported to the < *insert local FAA LOA Program Manager's office* >. Additionally, the FAA may perform periodic audits in accordance with procedures described within ACME Avionics document XXX.XX.

7. ACME Avionics must provide a release statement with each database distribution to broadcast LOA status, state their compliance, and provide information on known deviations and modifications.

8. ACME Avionics must advise customers of the status of its LOA as well as the status of LOAs (or foreign acceptance, including designation of the foreign authority acknowledging the foreign source's compliance to RTCA/DO-200B and the means of approval or acceptance) for all previous chain participants (up to, but not including, a Contracting State's AIP). The method must be timely to ensure customers can react to changes in the status of its LOA.

Manager, *{regional}* Aircraft Certification Office

APPENDIX 3. OBJECTIVES MATRIX

Figure 1. Data processing objectives for AC

Objective Number	Objective	Reference	Applicant's Reference Document or ID	Objective Met Yes, No, Pending, or N/A	Notes
LOA post acceptance responsibilities.					
1-1	You must report to customers, the FAA and to source any failure, malfunction, or defect in the distributed data having potential to adversely affect the safety of operational use.	AC 10.2.1			
1-2	The initial reporting of confirmed safety-related errors or defects must be timely and prompt to ensure swift resolution.	AC 10.2.1			
1-3	You must endeavor, through documented procedure, to ensure receipt of data alerts reporting safety-related errors or defects.	AC 10.2.1			
1-4	You must consider any safety-related data alerts prior to use of the affected data.	AC 10.2.1			
1-5	You must maintain a QMS as described in RTCA/DO-200B, section 2.5.	AC 10.2.2			
1-6	You must report all changes made to the QMS affecting the data quality objectives to the issuing ACO/MIDO before their implementation.	AC 10.2.2			
1-7	You must submit minor design changes for an existing LOA in accordance with procedures agreed to with the issuing ACO/MIDO.	AC 10.2.3			
1-8	You must substantiate major design changes, and the ACO/MIDO must accept them prior to their implementation.	AC 10.2.3			
1-9	Procedures for reporting of changes to the data process must address changes to tools used in its data process.	AC 10.2.3			

Objective Number	Objective	Reference	Applicant's Reference Document or ID	Objective Met Yes, No, Pending, or N/A	Notes
1-10	You must perform periodic internal audits of both AC 20-153B and RTCA/DO-200B objectives as described in RTCA/DO-200B, section 3, with the maximum time between audits not to exceed one year.	AC 10.2.4			
1-11	Any major non-conformities as described in RTCA/DO-200B, section 3.4, must be reported to the FAA office issuing the LOA.	AC 10.2.4			
1-12	You must notify all users and the FAA, when you no longer comply with the conditions of the LOA.	AC 10.2.5			
1-13	You must provide a release statement with each database distribution to broadcast the identified LOA status, state your compliance, and provide information on known deviations and alterations.	AC 10.2.6			
1-14	The release statement must include LOA Status.	AC 10.2.6			
1-15	The release statement must include any deviations to the agreed DQRs.	AC 10.2.6			
1-16	The release statement must include any data alteration.	AC 10.2.6			
1-17	You must surrender or withdraw your LOA if you no longer uphold the terms and conditions.	AC 10.2.7			
1-18	You must notify your data customers of the status of your LOA.	AC 10.2.8			
1-19	You must be aware of and provide any change in status of LOAs for previous data chain participant(s) up to, but not including, a Contracting State's AIP.	AC 10.2.8			

Objective Number	Objective	Reference	Applicant's Reference Document or ID	Objective Met Yes, No, Pending, or N/A	Notes
1-20	The method of notification must be timely to ensure customers can react to changes in the status of an LOA before they accept the next data update.	AC 10.2.8			

How does this guidance apply to data suppliers?

2-1	You must verify and validate data obtained from non-authoritative sources through an approved process prior to delivery.	AC 11.2.1.1			
2-2	Your data processing procedures must define the means of confirming data you receive is not corrupted, your means to protect stored data from corruption, and what methods you provide the user to verify the data they receive from you is not corrupted.	AC 11.2.2			
2-3	To protect from the possibility of intentional corruption, you must maintain records showing what data security provisions you implement to accomplish these objectives.	AC 11.2.2			
2-4	Your data security provisions must describe both the technical and organizational controls you implement to ensure you receive data from known sources and to prevent intentional corruption during processing and exchange of data.	AC 11.2.2			
2-5	Provisions for data security must describe how you identify, assess, and mitigate security threats and prevent unauthorized access to data or tools.	AC 11.2.2			
2-6	You must identify the process for establishing new configuration baselines in the configuration management plan.	AC 11.2.3			

Objective Number	Objective	Reference	Applicant's Reference Document or ID	Objective Met Yes, No, Pending, or N/A	Notes
2-7	Changes to the DQRs must be coordinated between the data supplier and user receiving the data.	AC 11.2.3.1			
2-8	Level 4 data must be distinguishable from any compliant data through means acceptable to the FAA.	AC 11.2.3.2			
2-9	There are currently no established data requirements for tailored data. Therefore, data suppliers must ensure tailored data is not distributed to entities other than the operator / end-user requesting the data.	AC 11.3			
2-10	In addition, regardless of which framework, you must submit the documentation demonstrating tool qualification activities were satisfactorily completed.	AC 11.4			

Relationship between RTCA/DO-200B and airworthiness approval.

3-1	During the airworthiness approval, you must demonstrate the DQRs are consistent with the intended function of the equipment.	AC 12.1			
3-2	Aircraft and avionics manufacturers with airworthiness approval for systems prior to the issuance of this AC must identify the DQRs for the avionics prior to obtaining a Type 2 LOA.	AC 12.1			
3-3	An aircraft manufacturer, avionics manufacturer or systems integrator must use the requirements defined in section 2.3 of RTCA/DO-200B as a means to define the DQRs for the aeronautical database	AC 12.2			
3-4	The DQRs must be under configuration control.	AC 12.2			

Objective Number	Objective	Reference	Applicant's Reference Document or ID	Objective Met Yes, No, Pending, or N/A	Notes
3-5	As part of the design approval, an aircraft manufacturer, avionics manufacturer or systems integrator must define DQRs for other applications.	AC 12.2			
3-6	The aircraft manufacturer, avionics manufacturer or systems integrator must demonstrate the DQRs meet the requirements for the intended function and document the means to maintain the data.	AC 12.2			
3-7	The DQRs must be consistent with the intended function of the equipment identified as part of the normal design approval.	AC 12.3			
3-8	The aircraft manufacturer, avionics manufacturer or systems integrator must ensure DQRs developed under RTCA/DO-178C, or previous versions, correctly establish the requirements on the data's intended use.	AC 12.3.1			
3-9	References in the TC or STC must be provided for supplementary documentation changes found in documents separate from design documentation, if applicable.	AC 12.3.1			
3-10	Configuration control processes must include traceability between the DQRs and a database specification.	AC 12.4.1			
3-11	The aircraft manufacturer, avionics manufacturer or systems integrator must reference the installation documentation / DQRs in the ICAs.	AC 12.4.1			
3-12	The aircraft manufacturer, avionics manufacturer or systems integrator must evaluate changes to the DQRs per the change control process of the TSOA and/or TC/STC approval.	AC 12.4.2			

Objective Number	Objective	Reference	Applicant's Reference Document or ID	Objective Met Yes, No, Pending, or N/A	Notes
3-13	The aircraft manufacturer, avionics manufacturer or systems integrator must evaluate changes to the DQRs to determine whether they have a major, minor, or no effect on the system's intended function.	AC 12.4.2			
3-14	If the aircraft manufacturer, avionics manufacturer or systems integrator do not identify the database as part of the type design, and if database assurance is required, the installation documentation / ICAs must require the data meet the database assurance objectives and comply with the DQRs for the target hardware.	AC 12.5			
3-15	You must document any assumptions related to database assurance in the aircraft flight manual.	AC 12.6			

How does this guidance apply to an operator / end-user?

4-1	Prior to updating aeronautical databases in installed avionics, the operator / end-user must review the release statement from its supplier to confirm the validity of RTCA/DO-200B compliance and acknowledge any report of deviations to the DQRs or any modification to the data by alteration.	AC 13.1.3			
4-2	The operator / end-user must have procedures established to report to its Type 2 data supplier any discrepancy or error in the data having a potential safety effect on the operational use of the data.	AC 13.1.4			
4-3	The operator / end-user must have procedures to obtain notification of errors and anomalies from their data supplier and must consider such notifications prior to use of the affected data in flight operations.	AC 13.1.4			

Objective Number	Objective	Reference	Applicant's Reference Document or ID	Objective Met Yes, No, Pending, or N/A	Notes
4-4	If the operator / end-user is performing data preparation and data transmission, then in order to demonstrate RTCA/DO-200B compliance, the operator must comply with paragraphs 10 and 11 of this AC and obtain an LOA, or an equivalent means.	AC 13.2			

APPENDIX 4. ADVISORY CIRCULAR FEEDBACK INFORMATION

If you have comments or recommendations for improving this advisory circular (AC), or suggestions for new items or subjects to add, or if you find an error, you may let us know about it by using this page as a template and:

1) Emailing it to 9-AWA-AVS-AIR500-Coord@faa.gov, or
2) Faxing it to the attention of the AIR Directives Management Officer at 202-267-3983.

Subject: (insert AC number and title) Date: (insert date)

Comment/Recommendation/Error: (Please fill out all that apply)

An error is noted:

Paragraph _____

Page _____

Type of error (check all that apply): Editorial:----- Procedural-----

Conceptual____

Description/Comments:_____

_____

_____

Recommend paragraph _____ on page _____ be changed as follows:
(attach separate sheets if necessary)

_____

In a future change to this advisory circular, please include coverage on the following subject:
(briefly describe what you want added attaching separate sheets if necessary)

_____

Name: _____