



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

Advisory Circular

Subject: Acceptance of Aeronautical Data
Processes and Associated Databases

Date: 09/20/10

AC No: 20-153A

Initiated by: AIR-130

1. Purpose of this Advisory Circular (AC).

a. This AC will help you to:

(1) Obtain a Letter of Acceptance (LOA) from the Federal Aviation Administration (FAA) that acknowledges compliance with this AC regarding aeronautical data processing.

(2) Evaluate whether data processes comply with the requirements of RTCA, Inc. document DO-200A, *Standards for Processing Aeronautical Data*.

(3) Define the data quality requirements (DQRs) for aeronautical data when obtaining airworthiness approval of new equipment or installations where the function of the equipment is dependent on an updateable database.

(4) Understand how an organization adheres to the data preparation and data transmission criteria applicable to the functions performed by that aeronautical data chain link or participant.

b. This AC is not mandatory and does not constitute a regulation. In it, we describe a means, though it is not the only means, to obtain a LOA that acknowledges compliance with this AC. However, if you use the means described herein, you must follow it in all respects.

2. To Whom this AC Applies. We wrote this AC for aeronautical data service providers, original equipment manufacturers, avionics manufacturers, and operators.

3. Summary of Major Changes and Scope.

a. AC 20-153 only applied to navigation databases. This AC applies to other types of aeronautical data, such as terrain, obstacle, and airport map databases.

b. This AC provides a means for manufacturers of existing systems with RTCA/DO-200 compliance to obtain a LOA.

c. 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.

d. This AC does not apply to software programming pins (for option selectable software), configuration files, aircraft personality modules, registries, or other lookup tables used by airborne systems and equipment to adapt equipment to the aircraft.

e. This AC does not address airborne system databases that are used by an airborne system and approved as part of the type design of the aircraft or engine. Examples of airborne system databases include engine power settings (takeoff, climb, Maximum Continuous Thrust (MCT), Cruise) and airfield performance data (takeoff distance, V speeds).

f. Appendix 1 provides sample LOA applications. Appendix 2 provides sample FAA LOAs. Appendix 3 provides an objectives matrix.

4. Cancellation. AC 20-153, issued on July 08, 2005, is cancelled. However, LOAs issued under AC 20-153 remain effective until they are superseded, surrendered, withdrawn by the holder, or terminated by the FAA.

5. Approvals Based on RTCA/DO-200A Compliance.

a. RTCA/DO-200A is the standard used to develop, support implementation, and assess change of data processing quality assurance and data quality management. Implementing a process complying with the requirements of RTCA/DO-200A provides a level of assurance that the data quality is maintained throughout all phases of the data handling process within an organization. Data quality is defined by several characteristics including accuracy, resolution, integrity (referred to as assurance level), timeliness, completeness, traceability and format. This includes the interface to a data supplier, receipt of the data, processing of the data, database distribution, and the interface to a customer. RTCA/DO-200A does not ensure the quality of Contracting State-originated data that is being addressed through other means such as an ICAO standard.

Note: The ultimate responsibility of ensuring that the data meets the quality for its intended application rests with the end-user of that data. This responsibility can be met by obtaining data from a supplier accredited against this standard by an appropriate organization. This does not alter the supplier's responsibility for any functions performed on the data.

b. The intent of RTCA/DO-200A is to address the specific issues of the aeronautical data process by requiring organizations to have in place an acceptable quality management system (QMS) based on the requirements associated with the aeronautical data process. RTCA/DO-200A, section 1.5.4 defines the basic concepts associated with the aeronautical data process, including the concepts used by suppliers, users, and the requirements for an aeronautical data chain. RTCA/DO-200A, section 1, Figures 1-1 and 1-2, depict two examples of data flow

in an aeronautical data chain for navigation and terrain applications. RTCA/DO-200A, section 2, contains the requirements for the aeronautical data process. RTCA/DO-200A, appendix B provides guidance on defining the DQRs; appendix C demonstrates compliance with the requirements contained in section 2. RTCA/DO-200A, section 3 details the specific objectives, procedures, and reports associated with auditing an aeronautical data process to demonstrate compliance with section 2.

c. The process of collecting this data begins at the governmental body level, where ICAO Contracting States around the world are responsible for compiling and transmitting the aeronautical data through its aeronautical information publication (AIP) in accordance with ICAO Annex 15 requirements. In the past, terrain data has not typically been considered AIP, and is not subject to the 28-day Aeronautical Information Regulation and Control (AIRAC) cycle. The latest edition of ICAO Annex 15, however, indicates AIP will include electronic terrain and obstacle data in accordance with the following coverage areas. Area 1 (entire territory of a state) and Area 4 (category II/III) data began to be available in November 2008. Area 2 (terminal area) and Area 3 (aerodrome/heliport) data will begin to be available through AIP by November 2010 with additional data sets becoming available by November 2015.

Note: ICAO Contracting States are required to include the elements found in ICAO Annex 15, appendix 4, part 1 in its AIP. Contracting State AIP may include the elements recommended in ICAO Annex 15, appendix 4, part 2. Department of Defense (DOD) data may not be appropriate for aeronautical use, so we do not consider this data as AIP, but it may be considered as an official government source, if it is the only data source available.

d. The data service provider is an organization that collects the aeronautical data from the Contracting States or other sources and inputs the data into an electronic file as specified by the avionics manufacturer. For navigation data, this file has typically been processed into a standard format, defined by the Aeronautical Radio, Incorporated (ARINC) specification 424. For terrain, obstacle and airport map data this file has typically been defined by RTCA/DO-291A or by the ARINC specification 816. Other data interchange specifications and formats are allowed, as long as they meet the format requirements specified by the data customer (application provider, end-user, etc.).

e. The avionics manufacturer receives the aeronautical data file from the data service provider and loads that data into its ground-based processing software. This software is designed to run automated checks on the data, to customize the geographic area coverage and data content, and then compress or “pack” the data by changing the format into that specified for the target avionics. Once these steps have been accomplished, a navigation data file, or set of files, is created for each customer. The data is then sent to the customer, either electronically or on loadable media. If the data is sent electronically, the customer will have the means to transfer the data to loadable media or directly into the avionics system. The last activity of this process is the loading of the aeronautical data into the aircraft’s avionics system.

f. Navigation systems are designed to use navigation databases that are updated in accordance with the ICAO 28-day AIRAC cycle. Once loaded, the database information typically will not be changed until the beginning of the next AIRAC effective date. If a major change occurs or an error is detected within the 28-day cycle, the updated information may not be available to the automated system until the next cycle.

Note: As of Amendment 36, dated 01 April 2010, ICAO Annex 15 recommends obstacle and airport map data is distributed in the Contracting State's AIP under the regulated AIRAC system.

6. Who needs to apply for a LOA?

a. This guidance is provided for all organizations within the aeronautical data chain except for an ICAO Contracting State (see paragraph 18 of this AC). This includes operators, data service providers, original equipment manufacturers, and avionics manufacturers that process aeronautical data. Organizations that comply with this AC may apply for a LOA for its aeronautical data process. The LOA identifies organizations within the aeronautical data chain that demonstrate acceptable data processes for applications that include navigation, terrain, obstacle, and airport map databases.

Note: For any Assurance Level 1 (critical) or 2 (essential) data that are not included in the Contracting State's AIP, the origination of data must be validated by the data service provider (reference paragraph 14).

b. The LOA formally documents that a supplier's databases are being produced pursuant to RTCA/DO-200A, or for some established systems, RTCA/DO-200 (see paragraph 19 of this AC). For those applications requiring database integrity (e.g., U.S. Area Navigation (RNAV) and Required Navigation Performance (RNP) Routes and terminal procedures, airport moving map displays, Terrain Awareness and Warning System (TAWS)), the LOA may be used as evidence of compliance with RTCA/DO-200A in support of application for operational approval or in support of a maintenance task per the instructions for continued airworthiness. RTCA/DO-200A defines standards for processing and distributing data for aeronautical applications, such as navigation and flight planning.

7. Definitions.

a. Aeronautical database – An aeronautical database is any data that is stored electronically in a system that supports airborne aeronautical applications. An aeronautical database may be updated at regular intervals.

Note: In this AC, aeronautical databases will refer to aeronautical data only as defined below.

b. Aeronautical data – Data used for aeronautical applications such as navigation, flight planning, flight simulators, terrain awareness and other purposes, which comprises navigation data and terrain and obstacle data. However, this AC does not address databases for engine

power settings (takeoff, climb, MCT, cruise) or airfield performance data (takeoff distance, V speeds) and does not consider these types of data as aeronautical data as used in this AC.

c. Airport Map Database – Any navigation data stored electronically in a system supporting airport map applications. Airport map data is information intended to be used to assist the pilot to identify the aircraft's position with respect to items on the airport surface.

d. Data supplier – Organizations, not including the Contracting States, or entities acting on behalf of the Contracting State, that collect, process, or originate aeronautical data. Data service providers, avionics manufacturers and end operators may all act as data suppliers in the aeronautical data chain.

e. Navigation Database – Any navigation data stored electronically in a system supporting navigation applications. Navigation data is information intended to be used to assist the pilot to identify the aircraft's position with respect to flight plans, ground reference points and navaid fixes (such as VHF omni-directional radio ranges (VORs), nondirectional radio beacons (NDBs), etc.) as well as items some points on the airport surface.

f. Obstacle Database – Any data stored electronically in a system supporting obstacle applications. Obstacle data includes any natural or manmade fixed object which has vertical significance in relation to adjacent and surrounding features and which is considered as a potential hazard to the safe passage of aircraft.

g. Terrain Database – Any data stored electronically in a system supporting terrain applications. Terrain data includes the natural surface of the earth excluding man-made obstacles.

8. What is the Aeronautical Data Chain?

a. RTCA/DO-200A, section 1.5.4 describes the aeronautical data chain as a conceptual representation of the path aeronautical data takes from its creation to its end use. The aeronautical data chain is a series of interrelated links where each link provides a function that facilitates the origination, transmission and use of aeronautical data for a specific purpose. Because an organization may perform one or all of the functions that comprise the aeronautical data chain, that organization may be responsible for data preparation and data transmission for more than one chain link. The organizations within the aeronautical data chain and the applicable paragraphs of this AC are the:

- (1) Operator (RTCA/DO-200A: End-User) (paragraphs 11 and 12);
- (2) Original equipment manufacturer (RTCA/DO-200A: Application Provider) (paragraphs 19 – 23);
- (3) Avionics manufacturer (RTCA/DO-200A: Application Provider) (paragraphs 13, and 19 – 23);

(4) Data Service Provider (RTCA/DO-200A: Data Service Provider) (paragraph 13); and

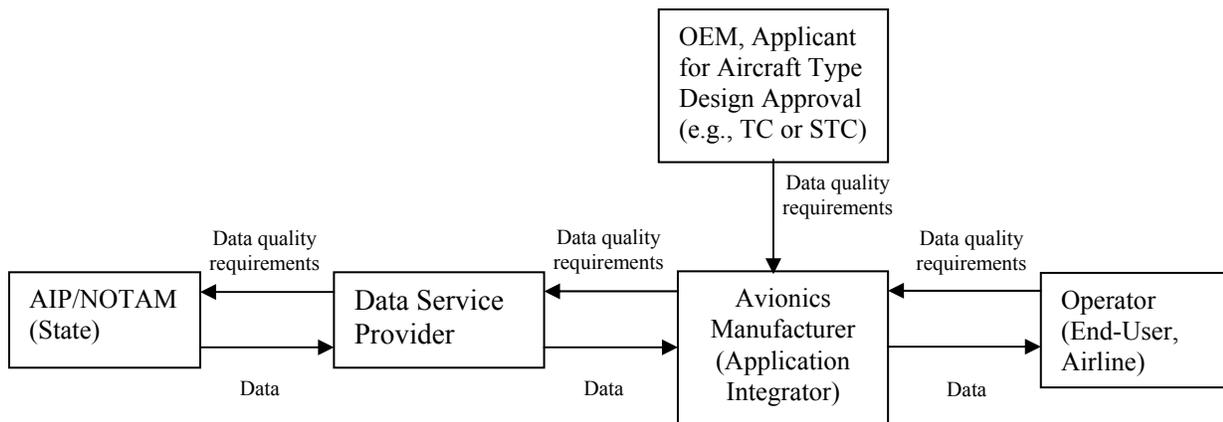
(5) Contracting State Aeronautical Information Service or Terrain Data Agency (paragraph 18).

b. With the exception of those organizations that operate data selection and packing tools covered under its data supplier's Type 2 LOA, all other organizations that process data should comply with paragraph 13 of this AC and obtain a LOA.

c. Database production procedures of non-U.S. data suppliers should comply with RTCA/DO-200A (or EUROCAE ED-76) to the satisfaction of the data supplier/user as verified by the supplier's civil aviation authority (CAA). The supplier's approval may be considered acceptable and equivalent to the LOAs defined in this AC. The relevant foreign authority and its approval method (e.g., European Aviation Safety Agency (EASA) LOA or Production Organisation Approval) must be identified to customers of the data. The suitability of the supplier may then be evaluated as part of the operational approval (see appendix 2).

d. This AC is structured to accommodate the FAA acceptance of a link (organization) as compliant with RTCA/DO-200 or DO-200A. To separate the links in a chain and grant a LOA to an organization requires mutual agreement of the data requirements between a data supplier and a customer (represented by a pair of interlocking chain links). 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



9. Types of FAA Data Supplier LOAs, Application Process, and LOA Maintenance.

a. Types of Data Suppliers. There are two types of data supplier acceptance letters. Type 1 acceptance letters are based on generic data requirements agreed upon between the data supplier and the customer and are for data suppliers that are data service providers. Type 2 acceptance letters are based on requirements that ensure compatibility with particular systems or equipment and are for data suppliers that are avionics manufacturers/application integrators.

Type 2 acceptance letters are intended to facilitate the operational approval process or approved maintenance program, and eliminate the operator's need to re-evaluate compatibility if the data supplier has already assured compatibility. While RTCA/DO-200A applies to both types of acceptance letters, the Type 2 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.

(1) **Type 1 LOA.** A Type 1 LOA provides recognition of a data supplier's compliance with RTCA/DO-200A with no identified compatibility with an aircraft system. A Type 1 LOA ensures the processes for producing the aeronautical data comply with this AC and the documented DQRs. This acceptance letter may be issued to data suppliers, operators, avionics manufacturers, or others. Guidance material regarding the application of RTCA/DO-200A to these organizations is provided in paragraph 13 of this AC. A Type 1 LOA does not address compatibility with intended functions or with particular avionic systems. A Type 1 LOA does not have to be associated with a specific certification project (such as a type certificate (TC), supplemental TC (STC) or technical standard order authorization (TSOA) or equipment type.

(2) **Type 2 LOA.**

(a) A Type 2 LOA provides recognition of a data supplier's compliance with RTCA/DO-200A and the compatibility of its delivered data with particular avionic systems. A Type 2 LOA may be issued to a design approval holder (TC/STC/TSOA) or to a data supplier who can establish that its data requirements are identical to those defined by a design approval holder. Identicality is typically achieved by either establishing design equivalency or by a licensing agreement between the design approval holder and the entity seeking approval. Guidance material for the application of RTCA/DO-200A to these entities is provided in paragraphs 13, and 19 – 23 of this AC.

(b) Because a Type 2 LOA recognizes compatibility with the DQRs necessary to support the intended function, the acceptance of a Type 2 data supplier must be associated with specific equipment. It may or may not coincide with the design approval of the equipment (such as a TC, STC or TSOA). Type 2 LOA letters identify the compatible equipment. Additionally, if an avionics company provides a data-packing tool to other participants in the data chain, the letter identifies that the process complies with RTCA/DO-200A subject to the use of the packing tool and any associated instructions.

(c) Many aircraft and avionics manufacturers have obtained approval for systems prior to the issuance of RTCA/DO-200A. For such systems, the DQRs for the avionics should have been identified prior to a data supplier obtaining a Type 2 LOA (see paragraphs 19 – 23 of this AC for guidance on requirements for existing systems). In lieu of identifying the DQRs, a statement of compliance to RTCA/DO-200 is acceptable, dependant upon adherence to the applicable terms and conditions of the Type 2 LOA that addresses these alternative means and verification that error reporting processes are in place and are being exercised effectively.

b. Application. A data supplier should submit an application for a LOA to the aircraft certification office (ACO) in the geographical area in which the data processing facility of the

applicant is located (see appendix 1, Sample application for an FAA LOA for the aeronautical data process). The application should include the following information:

- (1) The name and address of the data supplier facility that will be covered by the LOA.
- (2) A brief description of the type of FAA acceptance that will be sought; **Type 1 LOA** or **Type 2 LOA**. For a Type 2 LOA, the application must identify the compatible systems (make, model, series, and part number (hardware and software)). Since minor changes to the compatible system can result in a change to the DQRs, the design approval holder should coordinate any changes in advance to ensure that data suppliers update its data products to the new requirements in the same timeframe that the product is fielded.
- (3) **QMS Declaration.** A statement that certifies the applicant has established a QMS, as described in RTCA/DO-200A, section 2.5. An application for a Type 2 LOA using compliance to RTCA/DO-200 would make a statement that certifies the applicant has established a quality assurance process, as described in RTCA/DO-200, section 4.
- (4) **Data Package.** Regardless of the basis upon which acceptance is sought; the application data package must include information that defines the DQRs or data processes. For a Type 2 LOA, this includes substantiation that the DQRs for the aeronautical data will support the intended function and continued airworthiness of the installed equipment. For a Type 2 LOA using compliance to RTCA/DO-200, the data package requirements must be modified as specifically prescribed in the following paragraphs. 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 may include, but is not limited to, the following:
 - (a) One copy of the applicant's compliance plan as described in RTCA/DO-200A, section 2.2. A compliance matrix should be submitted to the FAA to simplify the review process. If a compliance matrix is submitted, it should reference the documentation explaining how each objective of this AC (and RTCA/DO-200A) is accomplished (see appendix 3 of this AC). For a Type 2 LOA using compliance to RTCA/DO-200; the applicant's compliance package should substantiate meeting the requirements and intent of RTCA/DO-200, and if a compliance matrix or plan is submitted, it should reference the documentation demonstrating the original installed equipment airworthiness compliance and RTCA/DO-200 compliance.
 - (b) **Data Process Description.** The applicant should provide a high-level description of its data process, inspection and test procedures (including process controls and incoming supplier controls) for processing data. This should include means to address any changes to the DQRs, data processing procedures, and for implementation into the aeronautical data process. They should also illustrate the methods of traceability and configuration control for all delivered aeronautical data.
 - (c) **Compatibility.** For a Type 2 LOA only, include a list of systems for which compatibility has been established including make, model, series, and part numbers (hardware, software, and database).

(d) **Tool Summary.** For a Type 1 or 2 LOA using compliance to RTCA/DO-200A, the applicant must summarize the use of tools in its data process, which tools are qualified, the means used to qualify such tools, and the procedures for maintaining the tools. For a Type 2 LOA using compliance to RTCA/DO-200, a list of tools and a description of how they are qualified must be provided.

(e) **Quality Manual.** A quality control manual for the QMS. For a Type 2 LOA using compliance to RTCA/DO-200, a quality assurance process manual.

(f) **Data Error Handling.** The applicant must have a procedure to be used in the event an unsafe condition or error is found in the data. The procedure should address the actions the applicant intends to take to develop and distribute corrective action (to be taken by customers, users of the database, inform source, and inform the FAA ACO/manufacturing inspection district office (MIDO)). Procedures must describe how to advise data suppliers of all suspected and confirmed errors with the source data, and to inform customers and the FAA ACO/MIDO of confirmed data errors that may have a safety effect on the operational use. Procedures must also describe how to inform customers and the FAA ACO/MIDO of changes to the LOA status in a timely manner. Applicants must ensure confirmed data errors that may have a safety effect on the operational use are addressed without any delay, usually within 24 hours.

10. Post Acceptance Responsibilities.

a. Data suppliers may hold a LOA from the FAA provided the following activities are performed:

(1) **Reporting Errors and Defects.** The holder of a LOA for its aeronautical data process must establish a procedure to report to the FAA (ACO/MIDO from which the LOA was obtained) all confirmed errors or defects of the aeronautical data produced and distributed under the LOA that may have a safety effect on the operational use of that data. Examples of such data 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 (assurance levels 1 and 2) and must be handled immediately and without delay. The initial reporting of confirmed safety related errors or defects must be timely and prompt to customers, the FAA, and to the source (Contracting State/data service provider) to ensure swift resolution. The initial reporting and handling of safety related errors or defects must be completed within 24 hours and resolution completed in a timely manner. The holder of a LOA should endeavor through data process/procedure to ensure receipt of data alerts reporting safety related errors or defects to data customers (application provider, end-user, etc.) in the aeronautical data chain and the FAA, and data customers must consider safety related data alerts prior to use of data updates.

(2) **Maintain a QMS.** The holder of a LOA for its aeronautical data process must maintain a quality management system as described in RTCA/DO-200A, section 2.5. Changes to the QMS that may affect the data quality objectives must be reported to the issuing ACO/MIDO before implementation. For a Type 2 LOA using compliance to RTCA/DO-200, the holder of a LOA for its aeronautical data process must maintain a quality assurance process

per RTCA/DO-200, section 2.4. Changes to the quality assurance process must be reported to the issuing ACO/MIDO before implementation.

(3) **Changes to Data Process.** The holder of a LOA for its aeronautical data process must submit minor design changes for an existing LOA in accordance with procedures agreed to by the applicant and the issuing ACO/MIDO. Major design changes must be substantiated and approved prior to implementation in the same manner as that for the original LOA. The definitions of what design changes are minor or major must be established prior to issuance of the LOA and documented in procedures agreed to by the ACO/MIDO. Procedures for reporting of changes to data process must also address changes to tools used in its data process.

(4) **Internal Audits.** The holder of a LOA for its aeronautical data process must perform periodic internal audits as described in RTCA/DO-200A, section 3, with the maximum time between audits (whether total or incremental) of not more than one year. For a Type 2 LOA using compliance to RTCA/DO-200, the holder of a LOA for its aeronautical data process must perform periodic internal audits as described in RTCA/DO-200, section 4.2, with a maximum time between audits (whether total or incremental) of not more than one year. Any major non-conformities as described in RTCA/DO-200A, section 3.4, must be reported to the FAA office issuing the LOA. For a Type 2 LOA using compliance to RTCA/DO-200, the holder of a LOA for its aeronautical data process must report any non-conformities to the FAA office issuing the LOA. Additionally, the FAA may perform periodic audits in accordance with procedures agreed to by the applicant and the ACO/MIDO.

(5) A LOA holder must notify the FAA (ACO/MIDO from which the LOA was obtained), when they no longer comply with the conditions of the LOA.

(6) The holder of a LOA for its aeronautical data process must provide a compliance/release statement with each database distribution to broadcast LOA status, stating its compliance and providing information on known deficiencies.

(7) The LOA is not transferable and is effective until surrendered or withdrawn by the holder, or terminated by the FAA, as described in the LOA.

b. Notification of LOA Status Changes to Data Customers. The holder of a LOA must notify its data customers of the status of its LOA. They must also provide the status of LOAs (or foreign acceptance, including designation of the foreign authority that acknowledges the foreign source's compliance to RTCA/DO-200A (or RTCA/DO-200) and the means of approval or acceptance) for all previous data chain participants up to, but not including, a Contracting State's AIP. The method of notification must be timely to ensure customers can react to changes in the status of a 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 web site for customers, with a procedure to reference that site before updating data. This would ensure notification of any changes in the LOA status.

11. How Does This Guidance Apply to Operators?

a. Operator's 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 that data meets the quality requirements for its intended application (Title 14 of the Code of Federal Regulations (14 CFR) § 91.503). Updating data in an aeronautical database under this AC is considered to be maintenance. The following guidelines apply to operators seeking compliance with RTCA/DO-200A:

- (1) 14 CFR part 91 operators may update databases in accordance with 14 CFR § 43.3(g).
- (2) 14 CFR parts 121, 125, and 135 operators must update databases in accordance with its approved maintenance program. For 14 CFR part 135 rotorcraft operators, this includes maintenance by the pilot in accordance with 14 CFR § 43.3(h).
- (3) Updating "navigation" data addressed by this AC is considered preventative maintenance (ref. 14 CFR part 43, appendix A (c)(32)):
 - (a) No disassembly of the unit is required (disassembly does not include removal and replacement of a database memory module or card that is accessible from the front of an installed panel-mounted system and requires no tools (e.g., screwdrivers or wrenches)), and
 - (b) Pertinent instructions are provided.
- (4) The operator must ensure the data meets the DQRs, as defined in the data supplier's Type 2 LOA.
- (5) The operator defines the completeness and timeliness requirements for the data, or accepts the requirements defined by its data supplier.
 - (a) The operator must validate that the completeness and timeliness requirements for the data are appropriate for the operations authorized.

Note: This validation could include the simple and effective assurance of data completeness and timeliness by the operator via a database identification page within the airborne equipment identifying the data set and period of validity.
 - (b) If the operator chooses to define the completeness and timeliness requirements, he must document the processes for data handling (receipt, storage or archiving, configuration management, configuration control, installation/loading, and data supplier coordination).
- (6) The operator must review the status information for all previous aeronautical chain participants up to, but not including, a Contracting State's AIP to confirm the validity of RTCA/DO-200A (or RTCA/DO-200) compliance for its supplier(s). 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 or EASA LOA.

(7) The operator must have procedures established to report back to its Type 2 data supplier any discrepancy or error in the data that may have a safety effect on the operational use of that data. The operator 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.

12. Operators Formatting and Altering Data. If the operator is performing data preparation and data transmission (e.g., formatting or altering information within an aeronautical database), then in order to demonstrate RTCA/DO-200A compliance, it must comply with paragraphs 13, and

19 – 23 of this AC and obtain a LOA. RTCA/DO-200A compliance toward an LOA can also be achieved if the operator uses a data selection and packing tool from an accepted data source, and that tool is referenced in the data supplier's LOA as producing data compatible with the operator's equipment.

Note: Data preparation and data transmission in this context pertains to altering or re-formatting of the database provided by the Type 2 LOA holder.

13. How Does This Guidance Apply to Data Suppliers?

a. The data supplier may obtain FAA acceptance of its aeronautical data process in accordance with RTCA/DO-200A and this AC. Paragraph 9 of this AC establishes procedures for aeronautical data suppliers to obtain an FAA LOA.

b. A data supplier may follow the requirements contained in RTCA/DO-200A, section 2, as a means for obtaining FAA acceptance of the aeronautical data process.

(1) **Compliance Plan.** The data supplier must develop a compliance plan as described in RTCA/DO-200A, section 2.2.

(2) **Documentation of DQRs.** The data supplier must meet the requirements of RTCA/DO-200A, section 2.3, and document the DQRs for all delivered data. Either the data supplier or the recipient can document the DQRs, but both must mutually agree. Evidence of the mutual agreement between a Type 2 LOA holder and its data supplier must be available. The only exceptions to this requirement are obtaining the data in the AIP or receiving the data through an official government source. The DQRs must be under configuration control and both parties must approve all modifications.

Note: The assurance levels identified in RTCA/DO-201A are applicable to RNAV and may not be applicable to other applications.

(3) **Data Processing Requirements.** The data supplier must comply with RTCA/DO-200A, sections 2.4 and 2.5. The following paragraphs clarify certain aspects of those requirements.

(a) **Data Alteration.** The data supplier must not alter the data from any supplier without informing the data originator of the change and endeavoring to receive concurrence in a timely manner (see RTCA/DO-200A, section 2.4.2).

1. For navigation databases, any change is considered an alteration of data when the resultant operation of the aircraft does not comply with the instrument flight procedure instructions published by the Contracting State, such as changing a heading to a track. This requirement to notify the data originator only applies to the alteration of the data or procedure, and does not apply to assembling, translating, selecting, or formatting the data.

2. For navigation databases, changes that do not alter the results of the published instrument flight procedures and navigation fixes are not considered alteration of data. For example, a procedure published as “Direct to ABC” can be coded as a DF path terminator under ARINC 424. The DQRs are used as the basis for evaluating changes.

Note: For changes of this type, it is the data supplier’s responsibility to ensure the changes do not modify the original intended flight track.

3. If concurrence with the data originator cannot be obtained, the data supplier who alters the data assumes the role of the data originator and the associated responsibilities (see paragraph 13b(3)(b)). Data suppliers who alter source data must document the criteria for informing the data originator of data alteration and consider all potential conflicts with other supplied data.

4. Operations may reveal problems or conditions that could result in undesirable or potentially unsafe operations. Quality control processes, procedures, and records must exist for correcting deficiencies or preventing potentially unsafe operations.

(b) **Data Origination.** Criteria for originated data must be clearly defined, including documenting the validation process for the data origination. This requirement applies to altered data where concurrence with the originator could not be obtained (see paragraph 13b(3)(a) above). The quality management (QM) requirements (RTCA/DO-200A, section 2.5) must define data elements that can be originated or can be altered. The QM requirements must also define the level of review and approval required for each originated data element. Originated data must be distinguishable from Contracting State-provided data. For example, in a navigation database an originated approach procedure would not have the same title as a Contracting State-published approach, or the supplier could provide a separate list of originated data. The applicant must validate the data not from Contracting State AIPs. RTCA/DO-272B, section 3.9.2 and RTCA/DO-276A, section 6.1.5 both state, “demonstration by actual use of the database in simulation or flight-tests” provides a means, but not the only means for demonstrating the acceptability of originated data.

14. Verification and Validation of Data.

a. In an aeronautical data chain, data may be received from any data supplier. If a data supplier has complied with the requirements of RTCA/DO-200A, evidenced by FAA LOA, the responsibility to ensure that stated DQRs are attained is discharged (reference RTCA/DO-200A, section 1.4 and 2.3.3 1). Likewise, for data published in the AIP, or provided via an official government source, the responsibility to assure that stated DQRs are attained is discharged. Such data does not require verification or validation. Assurance Level 1 or 2 data obtained from other suppliers must be verified and validated appropriately prior to delivery and managed under an approved process. Refer to the RTCA/DO-200A, appendix A, Glossary, for the definitions of assurance level, verification, and validation as the terms apply to this AC.

b. Acceptable techniques for the verification and validation of airport map data can be found in RTCA/DO-272B, section 3.9.

c. Acceptable techniques for the verification and validation of terrain and obstacle data can be found in RTCA/DO-276A, sections 6.1.4 and 6.1.5.

15. Changes to DQRs and Identification of Non-Compliant Data. The process for establishing new configuration baselines should be identified in the configuration management plan.

a. Changes within the DQRs may impact 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 receiver. Sufficient advance notice of changes should be given to allow subsequent participants in the data chain (avionics manufacturer, original equipment manufacturer (OEM) and potentially the operator) sufficient time to review the effect of the change as described in paragraph 22b of this AC.

b. A data supplier may have certain data elements that do not comply with the three assurance levels identified in RTCA/DO-200A, appendix B, paragraph B.1.3. The DQRs for the non-compliant data should be assigned an assurance Level 4 (see Note below), indicating that it may not satisfy safety objectives. If this data is delivered as RTCA/DO-200A compliant, then the agreed-upon DQRs should identify this data and the fact that the assurance level is Level 4. The Level 4 data must be distinguishable from any compliant data through a configuration management process, and does not need to be distinguished in the database itself. The operator is ultimately responsible for ensuring that Level 4 data meets the quality requirements for its intended application.

Note: Level 4 data are defined as those elements that may not comply with the requirements of RTCA/DO-200A.

16. Tool Qualification. The data supplier must comply with the elements of RTCA/DO-200A, section 2.4.5. Tool qualification processes must distinguish between production and verification tool activities and must include methods used to demonstrate valid tool output. Tool test case

development must identify sufficient test cases to properly test tools to meet the required data quality for the data output.

Note: For reference purposes, the data supplier can find guidance on how to carry out tool qualification, definitions of tool qualification classifications, and greater detail of the activities needed to support tool qualification in RTCA/DO-178B, section 12.2.

17. Exceptions to RTCA/DO-200A. Digital Error Detection Techniques. Table 1 of this AC replaces Table C-1 of RTCA/DO-200A. This change reconciles the RTCA/DO-200A guidance with aircraft design assurance guidelines (AC 25.1309, AC 23.1309, etc.). This change does not impact the acceptability of data in Contracting State AIPs, where table C-1 (RTCA/DO-200A, appendix C, paragraph C.2.2.1, Table C-1) may still be used.

Table 1: Relationship Between Assurance Levels and Digital Error Detection Performance

Assurance Level	Probability of Undetected corruption
1	$\leq 10^{-9}$
2	$\leq 10^{-5}$
3	Not applicable

18. How does this guidance apply to origination of data?

a. RTCA/DO-200A, section 1.5.4.2 describes aeronautical data origination, however, oversight of Contracting State data is outside the scope of this AC.

Note: For navigation data, ICAO Annex 15 states that each Contracting State must take all necessary measures to ensure the aeronautical information/data it provides is adequate, of required quality (accuracy, resolution and integrity), and provided in a timely manner for the general conditions under which the service or facilities are available for international use.

b. Contracting States are encouraged to follow RTCA/DO-200A, RTCA/DO-201A, RTCA/DO-272B, and RTCA/DO-276A and apply the standards to the origination of the data. ICAO defines the standards for Contracting State data.

Note: Any non-compliance with ICAO standards may impact safety. The Contracting State should first attempt to comply with ICAO requirements. If the Contracting State is unable to comply, it should communicate all non-compliance through the AIP.

c. If any participant in the aeronautical data chain supplements Contracting State originated data or originates data that is independent of the Contracting State, that participant must meet the requirements in paragraph 13 of this AC regarding the origination of the aeronautical data.

19. What is the Relationship between RTCA/DO-200/200A and Airworthiness Approval?

This section provides guidance on the definition of DQRs for systems that use aeronautical data. manufacturers should define these requirements upon obtaining a Type 2 LOA for existing systems, alternative means for existing systems with RTCA/DO-200 based compliance, or at the time of airworthiness approval of a new system.

a. Requirements for Existing Systems with RTCA/DO-200 Compliance (prior TSOA, TC, or STC approval). Many aircraft and avionics manufacturers have obtained approval for systems prior to the issuance of this AC, and may not have identified its DQRs. For such systems, the DQRs for the avionics should be identified as described in RTCA/DO-200A prior to a data supplier obtaining a Type 2 LOA (see paragraph 9 of this AC). These requirements may be established by the design approval holder or by a data supplier covered under a production certificate 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 their FMS without the direct involvement of the OEM. The requirements should be based upon the original design documentation, supplemented as necessary to address the data quality characteristics. Typically, the data format accuracy and resolution is specified in the original RTCA/DO-178B documentation, and the corresponding assurance level integrity requirements are specified in RTCA/DO-201A, RTCA/DO-272B, or RTCA/DO-276A. The data accuracy, resolution, and assurance level may need to be re-examined for small RNP values or other operations not addressed in RTCA/DO-201A.

Note: DQRs reviewed and approved in accordance with AC 20-115B, RTCA, Inc. document DO-178B, do not need to be re-approved by the FAA to comply with this AC. Any additional documentation for data quality, (e.g., assurance level), that does not affect the TC or STC approved design, but is developed in support of this criteria, is supplementary information in support of the data supplier Type 2 LOA. This means no other certification activity is required for the airborne systems or equipment. Supplementary documentation changes may be reflected in documents separate from the TC or STC design documentation, but should provide the necessary references to such documentation. The TC or STC design holder may incorporate supplementary documentation into the certification basis at the next opportunity.

b. Requirements for Existing Systems with RTCA/DO-200A Compliance (prior TSOA, TC, or STC approval). The manufacturer must identify the DQRs. Many aircraft and avionics manufacturers have obtained approval for systems prior to the issuance of this AC, and may not have identified its DQRs. For such systems, the DQRs for the avionics must be identified prior to a data supplier obtaining a Type 2 LOA (see paragraph 9 of this AC). These

requirements may be established by the design approval holder or by a data supplier covered under a production certificate provided the data supplier has access to the original documentation for the avionics. For example, FMS suppliers to an OEM may document compatibility with its own FMS without the direct involvement of the OEM. The requirements should be based upon the original design documentation, supplemented as necessary to address the data quality characteristics. Typically, the data format accuracy and resolution is specified in the original RTCA/DO-178B documentation, and the corresponding assurance level integrity requirements are specified in RTCA/DO-201A, RTCA/DO-272B, or RTCA/DO-276A. The data accuracy, resolution and assurance level may need to be re-examined for small RNP values or other operations not addressed in RTCA/DO-201A.

Note: DQRs reviewed and approved in accordance with AC 20-115B, RTCA, Inc. document DO-178B, do not need to be re-approved by the FAA to comply with this AC. Any additional documentation for data quality, (e.g., assurance level), that does not affect the TC or STC approved design, but is developed in support of this criteria, is supplementary information in support of the data supplier Type 2 LOA. This means no other certification activity is required for the airborne systems or equipment. Supplementary documentation changes may be reflected in documents separate from the TC or STC design documentation, but should provide the necessary references to such documentation. The TC or STC design holder may incorporate supplementary documentation into the certification basis at the next opportunity.

c. Requirements for New Systems. For new systems requiring aeronautical data assurance, the manufacturer must identify the DQRs as part of the airworthiness approval documentation.

20. Defining DQRs.

a. An OEM for aircraft and avionics may use the requirements defined in section 2 of RTCA/DO-200A as a means to implement a “QM” process and to define the DQRs for the aeronautical database. The DQRs must be under configuration control. RTCA/DO-200A, section 2.3 and appendix B, provides an acceptable means to define the DQRs. As described in RTCA/DO-200A, aeronautical data is characterized by its accuracy, resolution, assurance level, traceability, timeliness, completeness, and format. However, timeliness and completeness are subsequently defined by the operator and need not be addressed by the design approval holder. 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-276A, section 3 defines a minimum set of DQRs that could be used for terrain awareness and warning systems. The applicant must define DQRs for other applications (e.g., synthetic vision systems or overlay of terrain on attitude indicator). For airport data, RTCA DO-272B sections 2 and 3 define a

minimum set of DQRs that could be used for airport map displays. The applicant should demonstrate that the airport mapping DQRs meet the requirements for its intended function and should document the means by which the data will be maintained.

b. 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 qualities can affect the equipment. The system certification 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. RTCA/DO-201A provides guidance on requirements supporting area navigation and the RNP operations described in RTCA/DO-236B.

(1) Many aspects of the DQRs are addressed to support compliance with AC 20-115B. DQRs reviewed and approved in accordance with AC 20-115B do not need to be re-approved by the FAA to determine compliance with this AC. However, the applicant should ensure that the DQRs developed under the RTCA/DO-178B standard are correctly established for the data's intended use (see RTCA/DO-200A, section 2.3), and may develop supplementary documentation to address some DQRs.

(2) Navigation, obstacle, and airport map data changes 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-178B software life cycle.

Note: When RTCA/DO-201A, RTCA/DO-272B, RTCA/DO-276A, or other comparable criteria do not address the source data for the data product, the data quality may only reflect the data supplier's processes and assurances specified by its DQRs.

21. Failure Condition Classification. The required assurance level for the data process must be identified and consistent with the intended use of the equipment. Because integrity of a process usually cannot be numerically quantified, the integrity requirement may be defined by an assurance level. RTCA/DO-200A, appendix B provides guidance on the assignment of an assurance level, based on the system safety assessment for the intended function. For example, with RNAV operations and basic RNP operations, all supporting data should comply with RTCA/DO-201A.

22. Identification and Configuration Control.

a. Configuration control processes should include traceability between the DQRs and a database specification. The DQRs can also be referenced in the instructions for continuing airworthiness.

b. Changes to the DQRs must be evaluated per the change control process of the TSOA and/or TC /STC approval. This does not preclude changes to the data itself that is expected to change, remain current, or support operations in different geographic regions. Changes to the

DQRs must be evaluated to determine whether they have a major, minor, or no effect on the system's intended function. The LOA holder must demonstrate that its processes ensure this evaluation occurs.

Note: The aircraft manufacturer, avionics manufacturer or systems integrator may incorporate any additional configuration management and control requirements found in other existing standards. Database configuration management should address identification/part number, version control, data quality assurance/management, coordination processes (e.g., reporting of errors), and change management.

23. Instructions for Continued Airworthiness (ICA) (14 CFR § 21.50(b)). For new projects, if the database is not identified as part of the type design, the ICAs should require that the data comply with the DQRs for the target hardware. For general aviation, if the database is loaded into the avionics through pilot action, the operator's manual should contain the procedures for ensuring the database complies with the DQRs. A LOA held by the avionics manufacturer and available to the equipment user will be necessary to determine the database is compliant with RTCA/DO-200A and compatible with its avionics.

Note: If the OEM or TSOA holder is involved in the delivery of aeronautical data to operators, the OEM or TSOA holder should obtain FAA acceptance of its aeronautical data process in accordance with paragraph 13 of this AC.

24. The Need for Database Integrity.

a. The aeronautical applications and functions that depend on databases are widespread. Since the 1970s, installed systems relied on databases to support intended functions, such as navigation data used to facilitate the presentation of flight information to the flight crew. Prior to issuance of AC 20-153, the FAA had not developed a process for acceptance or oversight of aeronautical databases and its compatibility with applications. Consequently, no guidance existed for data suppliers on how to obtain FAA acceptance of its aeronautical data processes.

b. With new performance-based operations requiring database integrity, guidance on how to obtain FAA acceptance is necessary. Due to the advancement of RNP and its dependence on data quality, RTCA developed standards to achieve the higher levels of assurance necessary for these data and data processes. In operations, such as those for RNP, where the operating margins are based upon specific levels of system performance, reducing and mitigating errors is a key safety factor. While data quality is often essential for primary functions, it is also beneficial to all other similar functions and applications, such as RNAV, terrain situational awareness, etc. Consequently, we provide this guidance material to address database processes and quality.

c. Aviation safety can be significantly degraded by aeronautical information errors related to the content of aeronautical databases, such as:

(1) **Errors Generated by the Contracting State.** Each Sovereign Nation or ICAO Contracting State publishes aeronautical data in support of navigation and other functions. This data frequently contains source origination errors, caused by factors such as survey errors, incorrect association of latitude/longitude with a fix, or invalid magnetic variation. Errors related to data entry or processing prior to release into the public domain also occur.

(2) **Errors Generated by the Data Service Provider.** Companies processing and integrating data from multiple Contracting States can also introduce errors. These errors typically result from the translation process, errors related to data entry or processing, misinterpretation of the Contracting State data, modifying the Contracting State data to achieve compatibility with the end application, or changing the data format in a manner incompatible with the end application.

(3) **Errors Generated by the Avionics Manufacturer.** Errors have occurred due to the processing or use of the data by the avionics manufacturer. Conversion of the data into the final data format has created errors by rendering the data incompatible with implementation assumptions (e.g., incompatible path/terminator combinations, etc).

25. Related Federal Aviation Regulations. 14 CFR parts 21, 23, 25, 27, 29, 43, 91, 121, 125, and 135.

a. Some U.S. operations (e.g., RNP procedures, RNAV routes, etc.) will require the operator to validate its data or obtain data from an accepted data supplier (reference 14 CFR § 91.503 requirement for the operator to have aeronautical data in current and appropriate form).

b. For foreign operations where the CAA requires approved data suppliers (e.g., Precision Area Navigation (P-RNAV) operations in Europe), a LOA for the relevant supplier provides one means of complying with 14 CFR § 129.17.

Note: Paragraphs 19 – 23 of this AC address the definitions of DQRs applicable to ensuring compliance with the airworthiness regulations for intended function and failure effects of equipment, systems and installations.

26. Related References.

a. 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/.

(1) AC 20-115, *RTCA, Inc., Document RTCA/DO-178B*.

(2) AC 25.1309-1, *Systems Analysis and Design*.

(3) AC 23.1309-1, *Equipment, Systems, and Installations in Part 23 Airplanes*.

b. 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 on line at <http://www.icao.int>. ICAO Annex 15, *Aeronautical Information Services*.

c. RTCA, Inc. Documents. You can order copies of RTCA documents from RTCA, Inc., 1828 L Street NW, Suite 805, Washington, DC 20036. Telephone: (202) 833-9339, or online at <http://www.rtca.org>.

(1) RTCA/DO-178B, *Software Considerations in Airborne Systems and Equipment Certification*, dated December 1, 1992 and its equivalent, EUROCAE document ED-12B, *Software Considerations in Airborne Systems and Equipment Certification*.

(2) RTCA/DO-200, *Preparation, Verification and Distribution of User Selectable Navigation Data Bases*, dated November 28, 1988.

(3) RTCA/DO-201, *User Recommendations for Aeronautical Information Services*, dated November 28, 1988.

(4) RTCA/DO-200A, *Standards for Processing Aeronautical Data*, dated September 28, 1998 and its equivalent, EUROCAE document ED-76, *Standards for Processing Aeronautical Data*.

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

(6) RTCA/DO-236B, *Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation*, dated October 28, 2003.

(7) RTCA/DO-272B, *User Requirements for Aerodrome Mapping Information*, dated April 14, 2009 and its equivalent, EUROCAE document ED-99B, *User Requirements for Aerodrome Mapping Information*.

(8) RTCA/DO-276A, *User Requirements for Terrain and Obstacle Data*, dated August 3, 2005 and its equivalent, EUROCAE document ED-98A, *User Requirements for Terrain and Obstacle Data*.

(9) RTCA/DO-291A, *Interchange Standards for Terrain, Obstacle and Aerodrome Mapping Data* dated April 14, 2009 and its equivalent, EUROCAE document ED-119A, *Interchange Standards for Terrain, Obstacle and Aerodrome Mapping Data*.

d. Society of Automotive Engineers (SAE) International Documents. Order SAE documents from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001. Telephone (724) 776-4970, fax (724) 776-0790. Copies may be ordered online at <http://www.sae.org>.

(1) ARP 4754, *Certification Considerations for Highly Integrated or Complex Aircraft Systems*.

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

e. Airlines Electronic Engineering Committee (AEEC), ARINC, Inc. Documents.

Order copies of ARINC documents from ARINC Incorporated, 2551 Riva Rd., Annapolis, MD, 21401. Telephone +1 800-633-6882, fax +1 410-956-5465. You can also get copies online at www.arinc.com.

(1) ARINC Specification 424, *Standard, Navigation System Data Base*.

(2) ARINC Specification 816, *Embedded interchange Format for Airport Mapping Database*.



Susan J. M. Cabler
Assistant Manager, Aircraft Engineering
Division

Appendix 1. Application for a LOA

Figure 1. Sample of a Type 1 LOA Application

The ACME Data Company
PO Box 1
Nowhere, Arkansas 71953

FAA – Southwest Region
2601 Meacham Blvd
Fort Worth, Texas, 76193

Manager, Aircraft Certification Office, ASW-150

Subject: Request for New Type 1 Letter of Acceptance for ACME 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 comply with AC 20-153A and RTCA/DO-200A and request your review of the enclosed data being submitted in support of this application. The ACME Data Company develops navigation information per the data quality requirements specified in ACME Document XXX.XX. Acceptance of our aeronautical data process is requested based on the specification and control of these data quality requirements, compliance with AC 20-153A and the documented procedures for processing data. This navigation information is not intended to be directly loaded in any aircraft system.

The information will be developed at the ACME Data Company, 3000 Hill Street, Nowhere, Arkansas 71953. The ACME Data Company hereby certifies that the Data Quality Requirements, Data Processing Procedures, and Quality Management System, which are in accordance with RTCA/DO-200A, section 2 has been established and the navigation information is produced in accordance with this system.

Your efforts in support of this request are most appreciated.

Sincerely,

Administrator,
ACME Data Company

Enclosures:

1 copy ACME drawings, quality control manual, specifications and processes.

Figure 2. Sample of a Type 2 LOA Application

The ACME Avionics Manufacturer
PO Box 1
Nowhere, Arkansas 71953

FAA – Southwest Region
2601 Meacham Blvd
Fort Worth, Texas, 76193

Manager, Aircraft Certification Office, ASW-150

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

To Whom It May Concern:

The ACME Avionics Manufacturer is applying for a new Type 2 letter of acceptance for our aeronautical data process. We comply with AC 20-153A and RTCA/DO-200A and request your review of the enclosed data being submitted in support of this application. The ACME Avionics Manufacturer receives data from other sources, and develops navigation information per the data quality requirements specified in ACME Documents XXX.XX and YYY.YY, respectively. Acceptance of our aeronautical data process is requested based on the specification and control of these data quality requirements, compliance with AC 20-153A and the 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 has established compatibility with these systems based on the original software design documentation approved under the original TSO authorization. Compilation of data to the compatible format is accomplished using ACME Tool 123.

The information will be developed at the ACME Avionics Manufacturer, 3000 Hill Street, Nowhere, Arkansas 71953. The ACME Avionics Manufacturer hereby certifies that the Data Quality Requirements, Data Processing Procedures, and Quality Management System, which are in accordance with RTCA/DO-200A, section 2 has been established and the navigation information is produced in accordance with this system.

Your efforts in support of this request are most appreciated.

Sincerely,

Administrator,
ACME Avionics Manufacturer

Enclosures:

1 copy ACME drawings, quality control manual, specifications and processes.

Figure 3. Sample of a Type 2 LOA Application using a RTCA/DO-200 Compliance

The ACME Avionics Manufacturer
PO Box 1
Nowhere, Arkansas 71953

FAA – Southwest Region
2601 Meacham Blvd
Fort Worth, Texas, 76193

Manager, Aircraft Certification Office, ASW-150

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

To Whom It May Concern:

The ACME Avionics Manufacturer is applying for a new Type 2 letter of acceptance for our aeronautical data process. We comply with AC 20-153A and RTCA/DO-200 and request your review of the enclosed data being submitted in support of this application. The ACME Avionics Manufacturer receives data from other sources, and develops navigation information per the data processes specified in ACME Documents XXX.XX and YYY.YY, respectively. Acceptance of our aeronautical data process is requested based on the specification and control of these data processes, compliance with AC 20-153A and the 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 has established compatibility with these systems based on the original software design documentation approved under the original TSO authorization. Compilation of data to the compatible format is accomplished using ACME Tool 123.

The information will be developed at the ACME Avionics Manufacturer, 3000 Hill Street, Nowhere, Arkansas 71953. The ACME Avionics Manufacturer hereby certifies that the Data Processing Procedures, Quality Assurance, and Configuration Management processes, which are in accordance with RTCA/DO-200, sections 3, 4, and 5 have been established and the navigation information is produced in accordance with this system.

Your efforts in support of this request are most appreciated.

Sincerely,

Administrator,
ACME Avionics Manufacturer

Enclosures:

1 copy ACME drawings, tool summary, quality assurance manual, specifications and processes.

Appendix 2. FAA LOAs**Figure 1. Sample of a Type 1 FAA LOA**

ACME Data Company
Box 1
Nowhere, Arkansas 71953

December 25, 2010

The FAA has determined the ACME Data Company complies with AC 20-153A and RTCA/DO-200A with regards to its processing of navigation data. The Type 1 LOA does not authorize the ACME Data Company to supply navigation data directly to an operator (e.g., end-user, airlines) for loading into the installed equipment.

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

1. The ACME Data Company data quality requirements for the receipt of data from other sources, and for the delivery of data to its customers, are defined in ACME document XXX.XX.
2. The ACME Data Company procedures for processing data are defined in 'XXX Data Processing Standards'.
3. Reporting of Failures, Malfunctions, and Defects. The 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 that may have a safety effect on operational use of the data.
4. Maintain a Quality Management System (QMS). The ACME Data Company must maintain a QMS as described in RTCA/DO-200A, section 2.5. Changes to the QMS that may affect the data quality objectives must be reported to the < *insert local FAA LOA Program Manager's office/MIDO* > before implementation.
5. Design Changes.
 - a. The 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 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* > that an unsafe condition exists in a database product supplied under this LOA, the ACME Data Company shall develop a corrective action and submit it to the < *insert local FAA LOA Program Manager's office* > for approval. The ACME Data Company shall expedite distribution of the approved corrective action to customers and users.
6. The ACME Data Company must perform periodic internal audits as described in RTCA/DO-200A, section 3, with a maximum time between audits (whether total or incremental) of not more than one year. Any major non-conformities as described in RTCA/DO-200A, 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 document XXX.XX.
7. ACME Data Company must advise its customers of the status of its LOA as well as the status of LOAs (or foreign acceptance, including designation of the foreign authority that acknowledges the foreign source's compliance to RTCA/DO-200A 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 that 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 Manufacturer
PO Box 1
Nowhere, Arkansas 71953

December 25, 2005

The FAA has determined that the ACME Avionics Manufacturer complies with AC 20-153A and RTCA/DO-200A with regards to its processing of navigation data. 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 FMS Compatibility Matrix, Document XXX.XX, dated YYY, or latest FAA approved revision.”

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

1. The ACME Avionics Manufacturer data quality requirements for the receipt of data from other sources, and for the delivery of data to its customers, are defined in ACME Documents XXX.XX and YYY.YY, respectively.
2. The ACME Avionics Manufacturer procedures for processing data are defined in ‘XXX Data Processing Standards’.
3. Reporting of Failures, Malfunctions, and Defects. The ACME Avionics Manufacturer 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 that may have a safety effect on operational use of the data.
4. Maintain a Quality Management System (QMS). The ACME Avionics Manufacturer must maintain a QMS as described in RTCA/DO-200A, section 2.5. Changes to the QMS that may affect the data quality objectives must be reported to the *<insert local FAA LOA Program Manager’s office/MIDO>* before implementation.
5. Design Changes.
 - a. The ACME Avionics Manufacturer 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 document XXX.XX. All other changes are considered major, and must be substantiated and accepted prior to implementation in the same manner as that for the original LOA.

- b. Upon receipt of notification by the < *insert local FAA LOA Program Manager's office* > that an unsafe condition exists in a database product supplied under this LOA, the ACME Avionics Manufacturer shall develop a corrective action and submit it to the < *insert local FAA LOA Program Manager's office* > for approval. The ACME Avionics Manufacturer shall expedite distribution of the approved corrective action to customers and users.
6. The ACME Avionics Manufacturer must perform periodic internal audits as described in RTCA/DO-200A, section 3, with a maximum time between audits (whether total or incremental) of not more than one year. Any major non-conformities as described in RTCA/DO-200A, 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 document XXX.XX.
7. ACME Avionics Manufacturer must advise its customers of the status of its LOA as well as the status of LOAs (or foreign acceptance, including designation of the foreign authority that acknowledges the foreign source's compliance to RTCA/DO-200A 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 that customers can react to changes in the status of its LOA.

Manager, {*regional*} Aircraft Certification Office

Figure 3. Sample of a Type 2 FAA LOA using RTCA/DO-200 Compliance

ACME Avionics Manufacturer
PO Box 1
Nowhere, Arkansas 71953

December 25, 2005

The FAA has determined that the ACME Avionics Manufacturer complies with AC 20-153A and RTCA/DO-200 with regards to its processing of navigation data. 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 FMS Compatibility Matrix, Document XXX.XX, dated YYY, or latest FAA approved revision.”

The following terms and conditions are applicable to this letter of acceptance:

1. The ACME Avionics Manufacturer data processes for the receipt of data from other sources, and for the delivery of data to its customers, are defined in ACME Documents XXX.XX and YYY.YY, respectively.
2. The ACME Avionics Manufacturer procedures for processing data are defined in ‘XXX Data Processing Standards’. Proper records must be maintained and configuration management guidelines established and followed in accordance with RTCA/DO-200.
3. Reporting of Failures, Malfunctions, and Defects. The ACME Avionics Manufacturer 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 that may have a safety effect on operational use of the data.
4. Maintain a Quality Assurance Process. The ACME Avionics Manufacturer must maintain a quality assurance process as described in RTCA/DO-200, section 4. Changes to these processes must be reported to the < *insert local FAA LOA Program Manager’s office* > before implementation.
5. Design Changes.
 - a. The ACME Avionics Manufacturer must submit changes to the data processing standards, or the quality assurances processes to the < *insert local FAA LOA Program Manager’s office* > in accordance with procedures described within

ACME document XXX.XX. These changes must be substantiated and accepted prior to implementation in the same manner as that for the original LOA.

- b. Upon receipt of notification by the *< insert local FAA LOA Program Manager's office >* that an unsafe condition exists in database product supplied under this LOA, the ACME Avionics Manufacturer shall develop corrective action and submit it to the *< insert local FAA LOA Program Manager's office >* for approval. The ACME Avionics Manufacturer shall expedite distribution of the approved corrective action to customers and users.
6. The ACME Avionics Manufacturer must perform periodic internal audits as described in RTCA/DO-200, section 4.2, with a maximum time between audits (whether total or incremental) of not more than one year. Any non-conforming processes 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 document XXX.XX. Records of audits must be maintained for a period of 5 years.
7. ACME Avionics Manufacturer must advise its customers of the status of its LOA as well as the status of LOAs (or foreign acceptance, including designation of the foreign authority that acknowledges the foreign source's compliance to RTCA/DO-200 and the means of approval or acceptance) for all Type 1 LOA holders (up to, but not including, a Contracting State's AIP). The method must be timely to ensure that 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 using RTCA/DO-200A

	Objective	Reference	Verification Method (e.g., Inspection, Observation)	Applicant's Reference Document or ID	Config. Control on Reference Document	Objective Met Yes, No or Pending	Notes Numerical reference
Application of RTCA/DO-200A to operators							
1-1	Before loading, the operator must ensure that the data complies with DQRs.	AC 11a					
1-2	The operator must document steps, if they have defined the requirements for completeness and timeliness.	AC 11a(5)					
1-3	Before loading, the operator must review status of all LOAs (or equivalent) within the data chain.	AC 11a(6)					
1-4	If performing data preparation or transmission, operator must comply with AC paras 10 and 11.	AC 12					

Relationship between RTCA/DO-200A, airworthiness approval and TSOA

2-1	For existing systems, the DQRs should be identified.	AC 19b/(19a)					
2-2	The DQRs must be under configuration control.	AC 20					
2-3	The DQRs must be consistent with intended function.	AC 20b					
2-4	Required assurance level for data process must be identified and consistent with intended use.	AC 21					
2-5	Changes to DQRs must be evaluated (major, minor, or no effect). Ensure processes are in place.	AC 22b					

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	Objective	Reference	Verification Method (e.g., Inspection, Observation)	Applicant's Reference Document or ID	Config. Control on Reference Document	Objective Met Yes, No or Pending	Notes Numerical reference
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Application of RTCA/DO-200A to data suppliers

3-1	Foreign suppliers must be identified.	AC 11a(6)					
3-2	Type 2 LOA must be associated with specific equipment.	AC 10a					

Compliance plan

4-1	Compliance plan must be developed per RTCA/DO-200A, Sect.2.2.	AC 13b(1)					
4-2	Compliance plan shall be prepared to address all aspects of data process. It shall identify the 5 items in RTCA/DO-200A, sect 2.2.	RTCA/DO- 200A 2.2					

DQRs

5-1	Documentation of DQRs per RTCA/DO-200A, Sect. 2.3.	AC 13b(2)					
5-2	Mutual agreement of DQRs between Type 2 LOA holder and its data suppliers.	AC 13b(2)					
5-3	Changes to DQRs must be coordinated between Type 2 LOA holder and its data suppliers.	AC 13b(4)					
5-4	Changes to DQRs that result in a major change to a TSOA article must obtain a new TSOA.	AC 10a(3)					
5-5	DQRs must be under configuration control.	AC 20					
5-6	The data shall have the agreed data accuracy.	RTCA/DO- 200A 2.3.2 Item 1					

	Objective	Reference	Verification Method (e.g., Inspection, Observation)	Applicant's Reference Document or ID	Config. Control on Reference Document	Objective Met Yes, No or Pending	Notes Numerical reference
5-7	The data shall have the agreed data resolution.	RTCA/DO-200A 2.3.2 Item 2					
5-8	The data shall have the agreed data assurance level.	RTCA/DO-200A 2.3.2 Item 3					
5-9	Level 4 data must be distinguishable from any RTCA/DO-200A compliant data.	AC 15b					
5-10	Documentation must show traceability between identification of installed data with version of DQRs.	AC 9b(4)(b)					
5-11	The data shall have the agreed data traceability.	RTCA/DO-200A 2.3.2 Item 4					
5-12	The data shall have the agreed data timeliness.	RTCA/DO-200A 2.3.2 Item 5					
5-13	The data shall have the agreed data completeness.	RTCA/DO-200A 2.3.2 Item 6					
5-14	The data shall have the agreed data format.	RTCA/DO-200A 2.3.2 Item 7					

NOTE: Per RTCA/DO-200A, the user is defined as any group or organization in the data chain that receives data. The user shall determine the DQRs. For example, an applicant for a Type 2 LOA is considered to be the 'user' of the data received by any Type 1 data supplier.

5-15	The user shall base the data quality upon the most restrictive requirement.	RTCA/DO-200A 2.3.3 Item 2					
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	Objective	Reference	Verification Method (e.g., Inspection, Observation)	Applicant's Reference Document or ID	Config. Control on Reference Document	Objective Met Yes, No or Pending	Notes Numerical reference
5-16	The user shall assure the quality requirements are attained.	RTCA/DO-200A 2.3.3 Item 3					
5-17	The user shall determine the nature of action to be taken in the event of an error or inconsistency.	RTCA/DO-200A 2.3.3 Item 4					
5-18	The user shall be responsible for establishing its requirement for being notified of any data alteration.	RTCA/DO-200A 2.3.3 Item 5					
5-19	The data supplier shall provide data that meets the agreed user DQRs.	RTCA/DO-200A 2.3.4 Item 1					
5-20	The data supplier shall have a system for handling problems reported during data processing and those reported by the user after delivery.	RTCA/DO-200A 2.3.4 Item 2					
5-21	All problems reported with the data shall be analyzed and any errors or anomalies resolved and documented.	RTCA/DO-200A 2.3.4 Item 3					
5-22	All errors or anomalies detected in the data shall be resolved prior to delivery.	RTCA/DO-200A 2.3.4 Item 4					
5-23	Information concerning any errors or anomalies found after delivery shall be made available to all affected users.	RTCA/DO-200A 2.3.4 Item 5					
5-24	Data supplier must establish a procedure to report to FAA any safety related error or defect.	AC 10a(1)					

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	Objective	Reference	Verification Method (e.g., Inspection, Observation)	Applicant's Reference Document or ID	Config. Control on Reference Document	Objective Met Yes, No or Pending	Notes Numerical reference
5-25	The means by which errors or anomalies are resolved shall be reported to all affected users.	RTCA/DO-200A 2.3.4 Item 6					
5-26	The delivery format requirements shall be documented.	RTCA/DO-200A 2.3.5 Item 2					
5-27	Documentation shall be maintained that identifies all of the suppliers of data and the approval status of each.	RTCA/DO-200A 2.3.5 Item 3					

Data processing requirements

6-1	Data supplier must comply with RTCA/DO-200A, sect 2.4.	AC 13b(3)					
6-2	The data processing procedures shall define the means to confirm that the data has been received without corruption.	RTCA/DO-200A 2.4.1 Item 1					
6-3	The data processing procedures shall define the means by which data is assembled.	RTCA/DO-200A 2.4.1 Item 2					
6-4	The data processing procedures shall define the means to ensure stored data is protected from corruption.	RTCA/DO-200A 2.4.1 Item 3					

	Objective	Reference	Verification Method (e.g., Inspection, Observation)	Applicant's Reference Document or ID	Config. Control on Reference Document	Objective Met Yes, No or Pending	Notes Numerical reference
6-5	The data processing procedures shall define the method of origination for locally originated data.	RTCA/DO-200A 2.4.1 Item 4					
6-6	Documentation of criteria for originated data.	AC 13b(3)					
6-7	Originated data must be distinguishable from Contracting State provided data.	AC 13b(3)					
6-8	The data processing procedures shall define the means to ensure locally originated data is not corrupted.	RTCA/DO-200A 2.4.1 Item 5					
6-9	Documentation of process for validating any originated data.	AC 13b(3)					
6-10	The data processing procedures shall define the means by which validation is performed.	RTCA/DO-200A 2.4.1 Item 6 (a-c)					
6-11	The data processing procedures shall define the action to be taken when data fails verification/validation.	RTCA/DO-200A 2.4.1 Item 7					
6-12	The data processing procedures shall define the method used to evaluate degradation of accuracy.	RTCA/DO-200A 2.4.1 Item 8					
6-13	The data processing procedures shall define the requisite skills and competencies.	RTCA/DO-200A 2.4.1 Item 9					

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	Objective	Reference	Verification Method (e.g., Inspection, Observation)	Applicant's Reference Document or ID	Config. Control on Reference Document	Objective Met Yes, No or Pending	Notes Numerical reference
6-14	The data processing procedures shall define the tools required.	RTCA/DO-200A 2.4.1 Item 10					
6-15	The data processing procedures shall define the method used to verify received data.	RTCA/DO-200A 2.4.1 Item 11					
6-16	Data obtained from non-RTCA/DO-200A suppliers (excluding state data) must be verified and validated.	AC 14a					
6-17	The data processing procedures shall define the method by which data quality is preserved.	RTCA/DO-200A 2.4.1 Item 12					
6-18	The data processing procedures shall define the method for ensuring that any changed data meets resolution and accuracy requirements.	RTCA/DO-200A 2.4.1 Item 13					
6-19	The data processing procedures shall define the method to be used to provide the user with the ability to verify data.	RTCA/DO-200A 2.4.1 Item 14					
6-20	LOA holder submission of minor changes to the data process to the ACO as agreed to.	AC 10a(3)					
6-21	Major changes to the data process must be substantiated.	AC 10a(3)					

Data alteration

7-1	Documentation of criteria for informing the data originator of any data alteration.	AC 14b(3)					
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	Objective	Reference	Verification Method (e.g., Inspection, Observation)	Applicant's Reference Document or ID	Config. Control on Reference Document	Objective Met Yes, No or Pending	Notes Numerical reference
7-2	Altered data shall not be transmitted if the originator rejects the change.	RTCA/DO-200A 2.4.2					
7-3	Records shall be kept of all alterations and shall be made available to any user upon request.	RTCA/DO-200A 2.4.2					

Configuration management (CM)

8-1	CM plan shall define the data configuration requirements and shall identify all data to be placed under CM.	RTCA/DO-200A 2.4.3.1					
8-2	CM plan shall include all delivered data products.	RTCA/DO-200A 2.4.3.1 Item 1					
8-3	CM plan shall include all data that are identified in planning process as required to be stored in order to recover from data loss or corruption.	RTCA/DO-200A 2.4.3.1 Item 2					
8-4	Data elements placed under CM shall be assigned a unique identification contained within the data element as well as being used as a physical label.	RTCA/DO-200A 2.4.3.2					
8-5	The CM procedures shall ensure that the data element cannot be changed without changing the identification.	RTCA/DO-200A 2.4.3.2					
8-6	Records shall be maintained that identify the data content of all data elements and shall be sufficient to allow items 1-5.	RTCA/DO-200A 2.4.3.2					

	Objective	Reference	Verification Method (e.g., Inspection, Observation)	Applicant's Reference Document or ID	Config. Control on Reference Document	Objective Met Yes, No or Pending	Notes Numerical reference
8-7	A copy of each data element shall be retained for a period determined by the CM plan. The method of storage and number of copies shall be such that items 1-2 are achieved.	RTCA/DO-200A 2.4.3.2					

Skills and competencies

9-1	Procedures shall be established that define the means that personnel may acquire or maintain the required skills and competencies.	RTCA/DO-200A 2.4.4.1					
9-2	Appropriate records of skills and competencies shall be maintained.	RTCA/DO-200A 2.4.4.1					
9-3	Short falls in skills and competencies shall be identified and corrective actions taken.	RTCA/DO-200A 2.4.4.1					

Tool qualification

10-1	Each tool (new or modified) shall be reviewed to determine need for qualification.	RTCA/DO-200A 2.4.5.1 Item 1					
10-2	Justification for not qualifying a tool shall be documented.	RTCA/DO-200A 2.4.5.1 Item 2					
10-3	Tool qual plan shall describe the tool qualification process.	RTCA/DO-200A 2.4.5.2					

	Objective	Reference	Verification Method (e.g., Inspection, Observation)	Applicant's Reference Document or ID	Config. Control on Reference Document	Objective Met Yes, No or Pending	Notes Numerical reference
10-4	Tool qual plan shall identify: Tool requirements, qualification procedures, CM procedures, documentation requirements, QM procedures, and those responsible for qualification process including its authority.	RTCA/DO-200A 2.4.5.2					
10-5	Tool requirements shall be defined and include the functionality and performance of the tool, a description of the operational environment and user information.	RTCA/DO-200A 2.4.5.3					
10-6	Tool qualification procedures shall specify the means to ensure the required data quality for the data output and the means by which the tool satisfies the tool requirements.	RTCA/DO-200A 2.4.5.4					
10-7	The tool CM process shall provide a unique identification for each distinct version of the tool, the convenient visibility of the tool version, the ability to consistently replicate a particular version of the tool, a change control process and a secure environment for physical archiving, recovery and control.	RTCA/DO-200A 2.4.5.5					
10-8	Documents and reports shall be maintained to show that tool qualification activities have been completed satisfactorily.	RTCA/DO-200A 2.4.5.6					

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QM

11-1	LOA holder must maintain QMS.	AC 10a(2)					
11-2	LOA holder must report changes to QMS that affect objectives.	AC 10a(2)					
11-3	QM requirements must define data elements that can be originated or altered.	13b(3)					

	Objective	Reference	Verification Method (e.g., Inspection, Observation)	Applicant's Reference Document or ID	Config. Control on Reference Document	Objective Met Yes, No or Pending	Notes Numerical reference
11-4	QM requirements must define level of review and approval required for any originated data.	13b(3)					
11-5	LOA holder must perform periodic internal audits.	AC 10a(4)					
11-6	Any major non-conformities must be reported to FAA.	AC 10a(4)					
11-7	LOA holder must notify FAA when they no longer comply with conditions of LOA.	AC 10a(5)					
11-8	LOA holder must notify customers of LOA status and must be timely.	AC 10b					
11-9	The QM procedures shall define the criteria used for the review of plans and procedures, review of personnel skills records and review of qualified tools.	RTCA/DO-200A 2.5.1 Items 1-3					
11-10	The QM procedures shall identify who will have approval authority.	RTCA/DO-200A 2.5.1 Items 4-6					
11-11	All plans and procedures shall be reviewed and approved prior to its application.	RTCA/DO-200A 2.5.2					
11-12	Review of any new data requirements from suppliers shall be evaluated prior to its application.	RTCA/DO-200A 2.5.2					
11-13	Any unauthorized deviations from procedures shall be corrected.	RTCA/DO-200A 2.5.2					
11-14	All personnel shall be qualified to carry out designated procedures.	RTCA/DO-200A 2.5.2					

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	Objective	Reference	Verification Method (e.g., Inspection, Observation)	Applicant's Reference Document or ID	Config. Control on Reference Document	Objective Met Yes, No or Pending	Notes Numerical reference
11-15	Personnel shall have access to authorized version of the procedures.	RTCA/DO-200A 2.5.2					
11-16	Personnel shall be notified of any approved changes to the procedures.	RTCA/DO-200A 2.5.2					
11-17	Obsolete versions of documents shall not be used.	RTCA/DO-200A 2.5.2					
11-18	All tools including any updates shall be reviewed and approved prior to its application.	RTCA/DO-200A 2.5.2					
11-19	Records of procedures, personnel and tools shall be kept.	RTCA/DO-200A 2.5.2					
11-20	Records of all reviews shall be maintained.	RTCA/DO-200A 2.5.3					

QM event driven changes

11-21	Plans and procedures shall be reviewed when there are event driven changes (proposal to provide new data that may result in changes to procedures or tools).	RTCA/DO-200A 2.5.3.1					
11-22	Event driven changes shall be implemented prior to delivery of the affected data.	RTCA/DO-200A 2.5.3.1					
11-23	Event driven changes shall include an evaluation of data supplier's ability to meet required data quality.	RTCA/DO-200A 2.5.3.1					

	Objective	Reference	Verification Method (e.g., Inspection, Observation)	Applicant's Reference Document or ID	Config. Control on Reference Document	Objective Met Yes, No or Pending	Notes Numerical reference
11-24	Records of skill shall be reviewed for new tasks.	RTCA/DO-200A 2.5.3.1					
11-25	Personnel shall be authorized as having the necessary skills.	RTCA/DO-200A 2.5.3.1					
11-26	When an error is reported, action shall be taken to correct the procedures, skills or tools.	RTCA/DO-200A 2.5.3.1					

QM periodic reviews

11-27	Plans and procedures shall be reviewed periodically.	RTCA/DO-200A 2.5.3.2					
11-28	Records of skill for personnel shall be reviewed periodically to confirm personnel have required skills.	RTCA/DO-200A 2.5.3.2					
11-29	Tools shall be reviewed periodically to confirm ability of tool to meet DQRs.	RTCA/DO-200A 2.5.3.2					
11-30	The accreditation of suppliers (to the RTCA/DO-200A standard) shall periodically be confirmed.	RTCA/DO-200A 2.5.3.2					
11-31	All records of detected data errors shall be reviewed periodically. Any actions shall be recorded.	RTCA/DO-200A 2.5.3.2					
11-32	All periodic reviews shall include a review of all problems reported. Any deficiencies or limitations shall be assessed and corrective action taken if necessary to meet DQRs.	RTCA/DO-200A 2.5.3.2					

	Objective	Reference	Verification Method (e.g., Inspection, Observation)	Applicant's Reference Document or ID	Config. Control on Reference Document	Objective Met Yes, No or Pending	Notes Numerical reference
QM records and management reviews							
11-33	Retention of records shall be established and recorded.	RTCA/DO-200A 2.5.4 Item 1					
11-34	Records shall be legible.	RTCA/DO-200A 2.5.4 Item 2					
11-35	Records shall be retrievable.	RTCA/DO-200A 2.5.4 Item 3					
11-36	Management reviews shall confirm that data plans and procedures will meet required data quality and will evaluate the need for corrective/preventive action.	RTCA/DO-200A 2.5.5					
11-37	Results of the management reviews shall be recorded.	RTCA/DO-200A 2.5.5					