



Advisory Circular

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

**Subject: REMOTE TOWER (RT) SYSTEMS
FOR NON-FEDERAL APPLICATIONS**

Date: 02/18/2022

AC No: ###/####-###

Initiated By: AJW-121

1. **PURPOSE** - This Advisory Circular (AC) contains the Federal Aviation Administration's (FAA) standards, System Design Approval (SDA) process, and commissioning process for non-federal Remote Tower (RT) systems proposed for operation in Class D airspace in the National Airspace System (NAS). This AC applies to all entities associated with the designing, manufacturing, procurement, installation, or maintenance of an RT system to provide Airport Traffic Control Tower (ATCT) services.

Non-federal RT systems are owned, operated, and maintained by a non-federal sponsor such as the airport owner. For this AC, the use of the word "owner" is defined to be the organization responsible for the non-federal RT system and could include the airport owner, airport sponsor, airport authority, etc. System Commissioning of the RT system is discussed in this document; however, commissioning of the Remote ATCT service is outside the scope of this document.

2. **DEFINITION** - An RT system may consist of one or more types of optical sensors and displays to provide the necessary visual information to Air Traffic (AT) Control (ATC) Specialists (ATCS) to provide remote ATCT services. Optical surveillance sensors can include but are not limited to optical day/night cameras or infrared/thermal cameras. These sensors will be used to replace the information controllers presently gather by looking out the tower cab windows. The RT system is used in conjunction with the tower equipment found in AC 90-93, *Operating Procedures for Airport Traffic Control Towers (ATCT) that are not Operated by, or Under Contract with, the United States (Non-Federal)*, the tower Minimum Equipment List (MEL) in JO 7210.78,

FAA Contract Tower (FCT) New Start and Replacement Tower Process Appendix A, or potentially other supplementary tower equipment. This combination of equipment is used to allow ATCS to issue instructions that provide for safe and efficient operations as dictated by JO 7110.65, *Air Traffic Control* (thereafter JO 7110.65).

3. SYSTEM DESCRIPTION - An RT system is used by ATCS to provide ATCT services to an airport from a Remote Tower Center (RTC). The RTC may be on airport property or at a remote location and includes components such as visual presentation displays, system control functions, and controller working positions. RTC is connected to equipment located at the airport, including optical sensors and ancillary equipment.

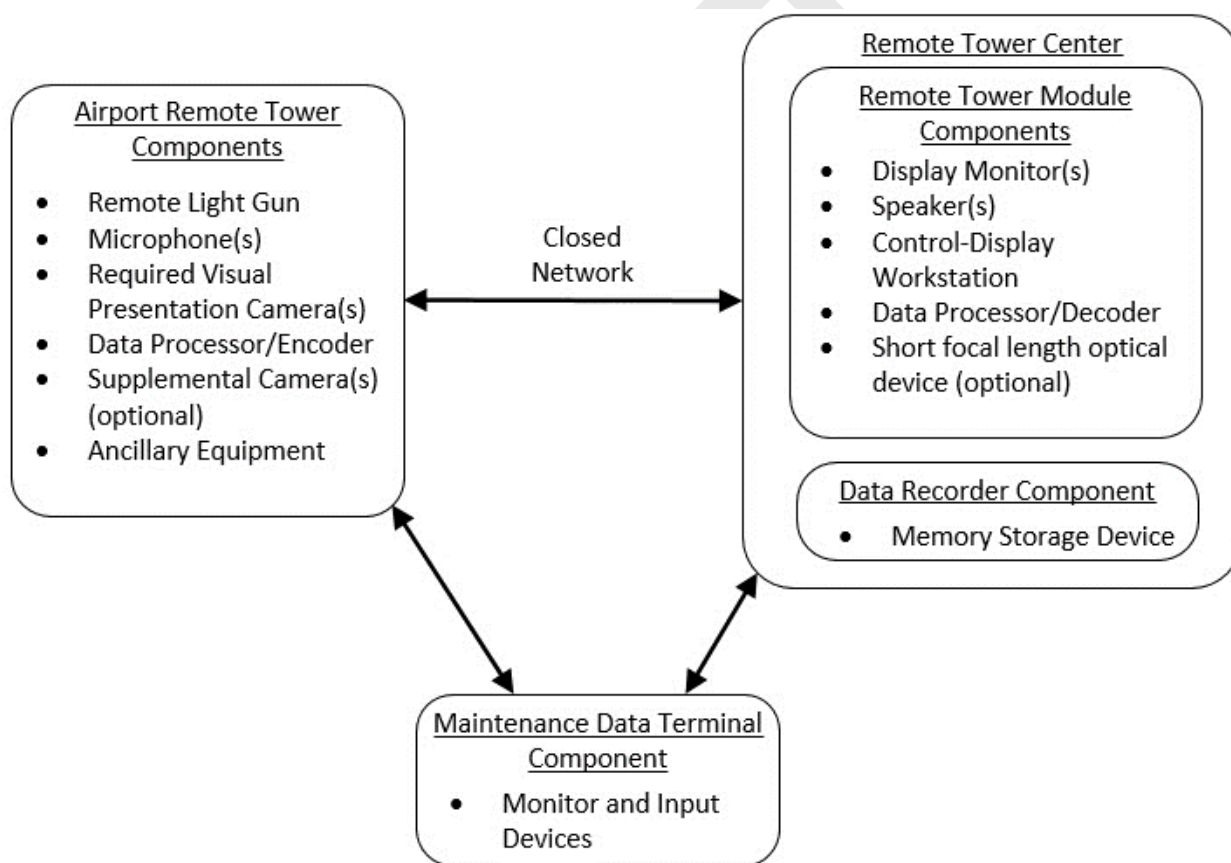


Figure 1 – System Overview

4. FUNCTIONAL DESCRIPTION – Functions making up an RT system are identified and described in the System Overview section of *Remote Tower (RT) Systems Minimum Functional and Performance Requirements for Non-Federal Applications*. Functions addressed are:
 - a. Required Visual Presentation (RVP)
 - b. Ambient Airfield Audio (AAA)
 - c. Data Recorder (DR)
 - d. Signal Light Gun (SLG)

- e. Control Status Display (CSD)
 - f. Maintenance Data Terminal (MDT)
 - g. Magnification
 - h. Supplemental Visual Presentation (SVP) (Optional)
5. DOCUMENT STRUCTURE & GENERAL PROCESS FLOW - Figure 2 is a graphical presentation of the overall process for design approval, installing and commissioning an RT system type at an airport in the NAS. The process is initiated by a sponsor desiring an RT system. The sponsor can review the Qualified Vendor System List (QVSL) to determine if the desired system has already received an SDA. If an SDA has already been granted the applicant initiates the process flow down the right-hand side of Figure 2. If an SDA has not been granted for the desired system, then the manufacturer of the system needs to request an SDA be granted, which initiates the process flow down the left-hand side of Figure 2. If an SDA is requested in combination with the commissioning process, there may be an overlap between the Siting Process and AT Site Operational Evaluation processes, as denoted by the dashed lines in Figure 2.

The following paragraphs provide an outline for the structure of this document as it relates to the Figure 2 process diagram.

SECTION 1: INTAKE PROCESS

The FAA performs the intake process as a screening process to qualify that an applicant and their proposed RT system is a viable SDA candidate prior to the expenditure of considerable time and resources.

SECTION 2: SYSTEM DESIGN APPROVAL PROCESS

The SDA process approves that a specific RT system configuration is compliant with appropriate technical, safety and operational requirements for usability in the NAS, where the minimum approval basis is defined in Section 2.1. The following steps make up the SDA process:

- Section 2.2: System Design Approval Reviews
Define a set of mandatory reviews of the applicant's overall design process.
- Section 2.3: FAA System Evaluation
Evaluate the siting, installation and acceptance processes of the RT system in an operational environment. Use this system to support system and operational evaluations of the installed system.
- Sections 2.4 and 2.5: System Design Approval Letter and Modification To Approved Systems
The means for communicating an SDA and general process for gaining acceptance of system changes are contained in these sections.

SECTION 3: SYSTEM COMMISSIONING

The site commissioning process culminates in FAA approval for public use of the RT system. As described in Section 3.1 (Sponsor Actions), the sponsor initiates the commissioning process and

is responsible for coordinating with the FAA to ensure all steps are completed. The following are the significant steps that make up the commissioning process:

- **Section 3.1: Sponsor Actions**
The system sponsor initiates and supports all steps in the commissioning process, where this section describes the sponsor's specific roles and responsibilities.
- **Section 3.2: Siting and installation Process**
This process ensures that the RT system is installed in a manner consistent with the applicant's siting criteria and all applicable FAA regulations and requirements, consistent with its intended use.
- **Section 3.3: AT Operational Evaluation**
Air Traffic Organization (ATO) Air Traffic Services evaluates the installed RT system and the defined procedures to ensure they can support the system's intended ATC operations.
- **Section 3.4: Commissioning Inspection**
A commissioning inspection, per Order 6700.20, *Approval, Operation, and Oversight of Non-Federal Systems* (thereafter Order 6700.20), confirms that the system complies with the Operations and Maintenance Manual (OMM), as well as any applicable AC's, orders, regulations, operational requirements, etc.
- **Section 3.5: Commissioning Notice to Air Missions**
This step describes the formal process to establish an RT system as commissioned and available for public use.

SECTION 4: ONGOING OVERSIGHT

Commissioned sites are periodically inspected, as described in this section, to ensure continued compliance with all commissioning and SDA requirements associated with this AC.

APPENDICES

The following appendices support meeting the requirements contained in the AC:

- **Appendix A System Design Approval Basis and Review Guidance Material**
Provide guidance material associated with requirements in sections 2.1 and 2.2.
- **Appendix B Physical Security**
Provides guidance material associated with requirements in section 3.1.1.3.
- **Appendix C Mitigable Hazards Applicable to System Siting**
Provides guidance material associated with requirements in sections 2.3.1 and 3.1.1.
- **Appendix D References**
List of documents referenced within this AC.
- **Appendix E Acronyms**
List of acronyms used within this AC.
- **Appendix F Table of Requirements**
List of all requirements contained in AC sorted by requirement ID.

The dashed lines in Figure 2 denote similar steps for siting and AT Operational Evaluations that fall under the SDA Process and Site Commissioning Process. It is anticipated that when SDA is

being sought, it would be in conjunction with a sponsor seeking to commission such that these steps may be performed jointly.

- APPLICATION - The provisions of this AC are effective immediately for all RT systems that are being considered for installation and commissioning in the NAS, RT systems that have been submitted for SDA, or for previously approved RT systems for which modifications have been submitted.

This version of the AC applies to RTs to be operated at single runway airports where an RTC facility is dedicated to a single co-located airport. This version of the AC does not address integrated radar.

- REQUEST FOR INFORMATION - Further information concerning RT standards and the FAA SDA and System Commissioning processes may be obtained from: Non-Federal-Program@faa.gov

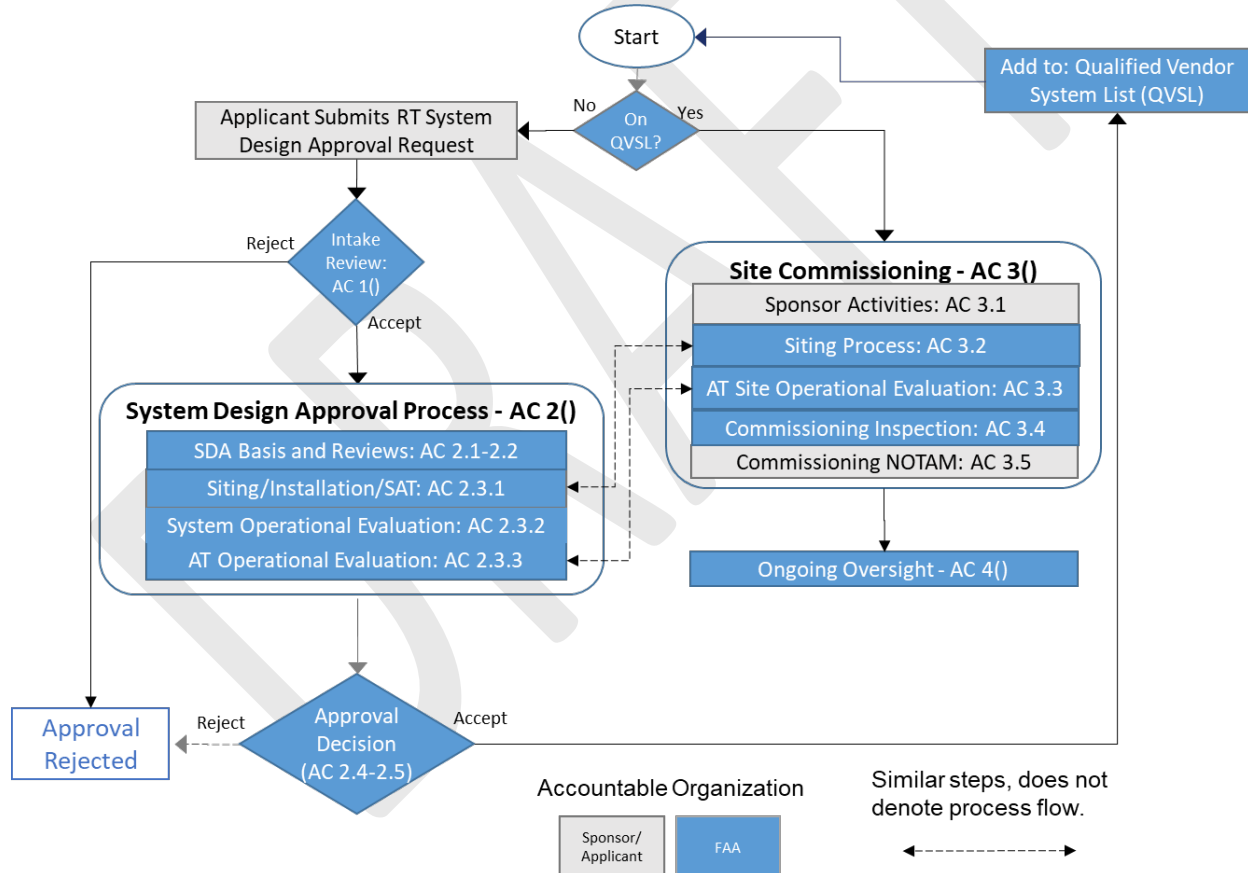


Figure 2 – SDA and Commissioning Process

TABLE OF CONTENTS

1	Intake Process	1
1.1	System Requirement Specification	1
1.2	System Design Approval Plan.....	1
1.3	Concept of Operations	1
1.4	Functional Hazard Assessment	1
1.5	Preliminary Assessment of Operational Feasibility	1
2	System Design Approval Process	2
2.1	Approval Basis.....	2
2.2	System Design Approval Reviews	2
2.2.1	PLANNING REVIEW	2
2.2.1.1	SYSTEM DESIGN APPROVAL PLAN.....	3
2.2.1.2	SYSTEM ENGINEERING MANAGEMENT PLAN	3
2.2.1.3	REQUIREMENTS VALIDATION PLAN	3
2.2.1.4	REQUIREMENTS VERIFICATION PLAN.....	3
2.2.1.5	INTEGRAL PROCESS PLANS	4
2.2.2	SYSTEM REQUIREMENTS REVIEW	4
2.2.2.1	SYSTEM FUNCTIONAL DESIGN.....	4
2.2.2.2	REQUIREMENTS DEFINITION	5
2.2.3	ARCHITECTURE REVIEW	5
2.2.3.1	SYSTEM ARCHITECTURE	5
2.2.3.2	ALLOCATION OF SYSTEM REQUIREMENTS	5
2.2.4	SYSTEM VERIFICATION REVIEW	6
2.2.5	COMPLEX HARDWARE, SOFTWARE REVIEWS.....	6
2.2.5.1	COMPLEX HARDWARE DESIGN.....	6
2.2.5.2	SOFTWARE DESIGN	7
2.2.6	ADDITIONAL TECHNICAL DOCUMENTATION.....	7
2.2.6.1	COMMERCIAL INSTRUCTION BOOK	7
2.2.6.2	SYSTEM SITING PLAN	7
2.2.6.3	AIR TRAFFIC CONTROL END-USER GUIDE & MANUAL	7
2.2.6.4	SYSTEM CHARACTERIZATION DOCUMENT	8
2.2.6.5	SYSTEM SECURITY PLAN.....	8
2.2.6.6	TRAINING MATERIAL.....	8
2.2.6.6.1	USER TRAINING.....	8
2.2.6.6.2	MAINTAINER TRAINING	8
2.3	FAA System Evaluation	9
2.3.1	SITING, INSTALLATION AND SITE ACCEPTANCE TEST EVALUATION	9
2.3.2	SYSTEM OPERATIONAL EVALUATION.....	9

2.3.3	AIR TRAFFIC OPERATIONAL EVALUATION	10
2.4	System Design Approval Letter	10
2.5	Modification To Approved Systems	11
3	Site Commissioning Process.....	12
3.1	Sponsor Actions	12
3.1.1	SITE PLANNING	12
3.1.1.1	PHYSICAL LAYOUT DIAGRAM	13
3.1.1.2	SITE PLANNING DATA.....	13
3.1.1.3	PHYSICAL SECURITY.....	13
3.1.2	INSTALLATION, CALIBRATION, & SITE ACCEPTANCE TEST	13
3.1.3	COMMISSIONING PLANNING	14
3.1.3.1	OPERATIONS AND MAINTENANCE MANUAL.....	14
3.1.3.2	LETTER OF AGREEMENT	15
3.2	Siting and installation Process	15
3.3	AT Operational Evaluation	16
3.4	Commissioning Inspection	16
3.5	Commissioning Notice to Air Missions	16
4	Ongoing Oversight	17
4.1	FAA Periodic Ground Inspections	17
4.2	Ongoing System Validation.....	17
	Appendices.....	18
APPENDIX A	SYSTEM DESIGN APPROVAL BASIS AND REVIEW GUIDANCE MATERIAL	A-1
APPENDIX B	PHYSICAL SECURITY	B-1
APPENDIX C	MITIGABLE HAZARDS APPLICABLE TO SYSTEM SITING.....	C-1
APPENDIX D	REFERENCES	D-1
APPENDIX E	ACRONYMS	E-3
APPENDIX F	TABLE OF REQUIREMENTS	F-8

TABLE OF FIGURES

Figure 1 – System Overview..... ii
Figure 2 – SDA and Commissioning Process v

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1 INTAKE PROCESS

During the intake process, the FAA evaluates the maturity level of the applicant's proposed non-federal RT system for admittance into the SDA process. The purpose is to ensure at an early stage that the general design and functionality of the system is a candidate for SDA and that it is suitable for ATC evaluation. If the FAA determines that the applicant's system is viable in the NAS, the applicant can proceed to the SDA process pending FAA resource availability. The documents listed in Section 1 describe the minimum list of deliverables that the applicants must [AC_R0001] submit.

1.1 SYSTEM REQUIREMENT SPECIFICATION

The System Requirement Specification (SRS) provides the requirements, functions, characteristics, and constraints of the applicant's proposed RT system.

1.2 SYSTEM DESIGN APPROVAL PLAN

The SDA Plan provides a high-level overview of the applicant's proposed or implemented systems engineering processes, requirements basis, safety scheme, software/hardware assurance guidelines, schedule, system architecture, and security concept, proposed approval artifacts, baseline configuration for approval, key risk areas and point of contact.

1.3 CONCEPT OF OPERATIONS

The Concept of Operations (CONOPS) describes the functional characteristics and capabilities of the proposed system from the Air Traffic user's perspective, the environment the system is expected to operate in, and what services are expected to be provided.

1.4 FUNCTIONAL HAZARD ASSESSMENT

The Functional Hazard Assessment (FHA) defines the Function, Failure Condition Hazard Description, Effect of Failure, Classification, Supporting Reference Material, and Verification.

1.5 PRELIMINARY ASSESSMENT OF OPERATIONAL FEASIBILITY

The Preliminary Assessment of Operational Feasibility (PAOF) provides information that supports that the applicant's system concept is feasible for use in the NAS. Examples may include installations, lab setups, paper prototyping.

2 SYSTEM DESIGN APPROVAL PROCESS

SDA is an evaluation method the FAA uses to verify that a non-federal system and its associated documentation meet appropriate technical, safety, and operating requirements. This evaluation is accomplished using process, design, and test data provided by an applicant, testing when deemed appropriate by the FAA, and an air traffic determination of usability in the NAS. When the FAA review team finds compliance with all criteria, the initial acceptance of a specific system configuration/design is recommended for SDA to the FAA Director of Operations Support. This acceptance and associated substantiation artifacts serve as the baseline for reviewing and accepting any future design modifications.

Non-federal systems are held to the same level of rigor as federally owned systems. The applicant is required to supply the applicable substantiation artifacts (e.g., system level test procedures and results, requirements and design documents, schematics) to support the review activities. As described in the following sections, some reviews are discrete review activities. Other activities such as software and hardware design assurance require periodic reviews over an extended period. An initial meeting is held to ensure that the applicant understands the process and requirements, and to establish a schedule for the coordinated review activities listed in Section 2.2.

2.1 APPROVAL BASIS

The applicant design is evaluated against the FAA requirements contained in the *RT Systems Minimum Functional and Performance Requirements for Non-Federal Applications*. Additional requirements and functionality may be incorporated, and it is incumbent on the applicant to address the impact of these changes.

2.2 SYSTEM DESIGN APPROVAL REVIEWS

The following subsections outline the mandatory review areas for the SDA of a non-federal RT system. Appendix A contains guidance material to assist the applicant, who is responsible for showing compliance (i.e., demonstrate that all objectives are met). The FAA is responsible for reviewing all submittals to determine compliance. The documentation needed to show compliance may vary depending on the applicant's CONOPS, internal development processes, and system architecture.

2.2.1 PLANNING REVIEW

The purpose of the Planning Review is to ensure that the applicant's development processes are documented and can reasonably be expected to produce products compliant with the *RT Systems Minimum Functional and Performance Requirements for Non-Federal Applications*.

A series of primary planning documents must [AC_R0002] be submitted by the applicant defining the applicant's processes to be following in their development process. The specific makeup, titles and content of the applicant's planning documents may differ, but the expectation is that all subjects will be addressed.

Additional planning documents may be necessary for this review depending on the level of information contained in the primary planning documents, as described in this section. The additional planning

documents may consist of any or all of the subjects listed under section 2.2.1.5 for processes that are integral to the development program.

The following paragraphs describe an example set of planning documents that collectively identify the subject material to be addressed during the planning review. See section A.2.1 for additional guidance material including review objectives for the Planning Review.

2.2.1.1 SYSTEM DESIGN APPROVAL PLAN

The purpose of the SDA Plan is to communicate the applicants proposed means of compliance to the approval authority. The importance is to foster early communication and develop an agreement between the parties regarding intended means of showing compliance. Early communication is essential to allow time to resolve any issues identified by the approval authority before any significant development activity is accomplished.

2.2.1.2 SYSTEM ENGINEERING MANAGEMENT PLAN

The System Engineering Management Plan (SEMP) should describe an applicant's overall systems engineering management approach, including their proposed efforts for planning, controlling and conducting a fully integrated engineering effort. The plan consists of three core subjects:

1. Technical Project Planning and Control -
Includes details of the project and how it is managed: scope, roles and responsibilities, schedule/project plan, configuration control, issue management and decision making, project reviews, guiding processes and constraints, measurements of success, verification and validation, etc.
2. Systems Engineering Process -
Includes details of the processes used to guide the activities during each phase of the system lifecycle.
3. Engineering Specialty Integration -
Includes details of how the efforts of engineering specialties are used and integrated with the overall activities of the system engineering effort. Engineering specialties include: Human Factors, Process Assurance, Safety, Configuration Management, Security, etc.

Note that complex hardware and software development are separately addressed in section 2.2.5.

2.2.1.3 REQUIREMENTS VALIDATION PLAN

The Requirements Validation Plan should describe the process used to ensure the requirements at all levels of the program are complete and correct. The process ensures requirements are verifiable, unambiguous, complete, and consistent. The validation process should be complete prior to implementation of the requirement within the design and should involve all relevant technical disciplines depending on the level of the requirements hierarchy.

2.2.1.4 REQUIREMENTS VERIFICATION PLAN

The Requirements Verification Plan should describe the process and criteria to be applied when showing how the implementation satisfies its requirements at each level of the implementation.

2.2.1.5 INTEGRAL PROCESS PLANS

As listed above, the primary planning documents associated with the development process are supported by integral processes that may require their own planning documents. A listing of potential integral process planning documents are as follows:

- Safety Program Plan
- Configuration Management Plan
- Process Assurance Plan
- Requirements Management Plan
- Complex Hardware Plans
- Software Plans
- Human Factors Plan
- Reliability/Maintainability/Availability Plan

It is recognized that an applicant's set of planning documents may vary but their collective content should address all of the above subjects.

2.2.2 SYSTEM REQUIREMENTS REVIEW

The purpose of the System Requirements Review is to ensure that the *RT Systems Minimum Functional and Performance Requirements for Non-Federal Applications* have been adequately incorporated into the applicant's system level requirements or that a suitable deviation or waiver has been requested and approved. This review will address any system level requirements that implement additional functionality beyond the minimum requirements to ensure acceptability for operational use.

The System Requirements Review focuses on two key areas: the applicant's functional design, including interfaces, both external to the system and internal between functional elements; and the applicant's system requirements completeness, including validation and identification of any deviations/waivers.

The applicant must [AC_R0003] deliver as a minimum: System Requirements, an FHA, traceability of system requirements to the FAA minimum requirements and justification for any requirement deviations or waivers.

See section A.2.2 for additional guidance material, including review objectives for the System Requirements Review.

2.2.2.1 SYSTEM FUNCTIONAL DESIGN

The applicant's system functional design at a minimum is to include functions to meet all requirements identified in the *RT Systems Minimum Functional and Performance Requirements for Non-Federal Applications*. Additional functionality may be included at the applicant's discretion based on inputs from various sources including other industry standards, customer requests, or functions identified by the applicant.

Documentation for the functional design includes functional descriptions that identify how the functions support the concept of operation defined in the CONOPS (see section 1.3). The documentation also includes descriptions of the interfaces, both external to the system and internal between functional elements.

An FHA is to be performed to identify all failure conditions including the rationale for their severity classifications and validation all system level safety requirements.

2.2.2.2 REQUIREMENTS DEFINITION

The applicant's system level requirements include all requirements identified in the *RT Systems Minimum Functional and Performance Requirements for Non-Federal Applications*. Requirements for additional functionality may be included at the applicant's discretion based on inputs from various sources, including other industry standards, customer requests or functions identified by the applicant.

As required in section 2.2.2, the applicant provides their SRS and traceability to the FAA's minimum requirements. If any *RT Systems Minimum Functional and Performance Requirements for Non-Federal Applications* requirements are not fully satisfied by the proposed system requirements, suitable waivers or deviations from the approval basis are submitted by the applicant and reviewed by the FAA. Waivers and deviations are defined as follows:

- A waiver is defined as deferring or releasing an obligation to comply with a specific requirement.
- A deviation is defined as a variance or alteration to a specific requirement.

The output of this activity is a set of validated system requirements and associated interface definitions.

2.2.3 ARCHITECTURE REVIEW

The purpose of the Architecture Review is to ensure that the system architecture has been fully defined and that all system requirements have been allocated to various segments of the architecture (e.g., sub-system, hardware components, software components, processes and procedures).

The System Requirements Review focuses on two key areas: system architecture definition and allocation of system requirements. The system architecture development is an iterative process to ensure that a resulting design can reasonably be expected to meet all system requirements. Once the architecture is validated, the system requirements are allocated to the items based on the architecture.

For the architecture review, the applicant must [AC_R0004] deliver as a minimum: a System Design Description Document, a Preliminary System Safety Assessment (PSSA) (incorporating applicable safety analyses), item requirement documents and traceability of item requirements to the system requirements.

See section A.2.3 for additional guidance material, including review objectives for the Architecture Review.

2.2.3.1 SYSTEM ARCHITECTURE

The system architecture is defined in the System Design Document (SDD).

Part of the system architectural process is to validate that the architecture can reasonably be expected to meet the system requirement. Validation of system safety requirements, are addressed using a PSSA. The applicant can employ other analyses for applicable requirements validation.

2.2.3.2 ALLOCATION OF SYSTEM REQUIREMENTS

All system requirements will be allocated to item requirement documents based on the items defined within the system architecture. Additional derived requirements, that result from the selected

architecture are identified and included in the applicable item requirements document. All item requirements are to be validated following the applicant's integral process relative to requirements management with suitable artifacts available for review.

2.2.4 SYSTEM VERIFICATION REVIEW

The System Verification Review aims to ensure that each level of the system implementation meets its specified requirements. The applicant's processes and procedures for requirements verification were previously reviewed (see section 2.2.1.4) and are expected to be followed. The system and items designs are completed before starting verification with test articles matching the configuration records.

For the verification review, the applicant must [AC_R0005] at a minimum deliver or make available: a final Configuration Index, Verification Procedures, Verification Results, System Safety Assessment (SSA), Verification Compliance Matrix and System Approval Summary Report.

See section A.2.4 for additional guidance material, including review objectives for the System Verification Review.

2.2.5 COMPLEX HARDWARE, SOFTWARE REVIEWS

An output of the system requirements review is the identification of any system items, which are expected to include complex hardware or software. This section imposes additional reviews for any items incorporating complex hardware or software.

2.2.5.1 COMPLEX HARDWARE DESIGN

The applicant must [AC_R0006] show compliance with the objectives of RTCA, Inc. (RTCA) DO-254, *Design Assurance Guidance for Airborne Electronic Hardware* (thereafter RTCA DO-254)/European Organisation for Civil Aviation Equipment (EUROCAE) ED-80, *Design Assurance Guidance for Airborne Electronic Hardware* (thereafter EUROCAE ED-80), as a means, but not the only means, to seek SDA, for each complex hardware configuration item.

Per RTCA DO-254 the definition for a "Complex Hardware Item" and "Simple Hardware Item" is as follows:

Complex Hardware Item - All items that are not simple are considered to be 'complex'. See definition of Simple Hardware Item.

Simple Hardware Item –A hardware item is considered simple if a comprehensive combination of deterministic tests and analyses can ensure correct functional performance under all foreseeable operating conditions with no anomalous behavior.

For use within this AC, the applicability of RTCA DO-254/EUROCAE ED-80 does not include Commercial-Off-The-shelf (COTS) microprocessors. This approach is consistent with AC 20-152, *RTCA, Inc., Document RTCA/DO-254, Design Assurance Guidance for Airborne Electronic Hardware*, which excludes COTS microprocessors due to the lack of life cycle data to satisfy related objectives.

See section A.2.5.1 for additional guidance material associated with reviews for items containing complex hardware.

2.2.5.2 SOFTWARE DESIGN

The applicant must [AC_R0007] show compliance with each applicable objective of RTCA DO-278A, *Software Integrity Assurance Considerations for Communication, Navigation, Surveillance and Air Traffic Management (CNS/ATM) Systems* (hereafter RTCA DO-278A)/EUROCAE ED-109A, *Software Integrity Assurance Considerations for Communication, Navigation, Surveillance and Air Traffic Management (CNS/ATM) Systems* (hereafter EUROCAE ED-109A), as a means, but not the only means, to seek SDA, for each configuration item containing software (i.e., Computer Software Configuration Item [CSCI]).

See section A.2.5.2 for additional guidance material associated with reviews for items containing software and for the method an applicant can follow to propose an alternate means of compliance.

2.2.6 ADDITIONAL TECHNICAL DOCUMENTATION

2.2.6.1 COMMERCIAL INSTRUCTION BOOK

The applicant must [AC_R0008] submit a Commercial Instruction Book (CIB) prepared in accordance with FAA-D-2494, *Technical Instruction Book Manuscript: Electronic, Electrical, and Mechanical Equipment, Requirements for Preparation of Manuscript and Production of Books* (hereafter FAA-D-2494).

The CIB is prepared to support a trained maintenance technician in performing any of the following operations, applicable to the applicant's RT system:

- Periodic maintenance
- Corrective maintenance
- Return-to-Service tasks
- Modification of hardware
- Loading software
- Documentation of system performance (maintenance log)
- Spares management

See section A.2.6.1 for additional guidance material for preparation and review for the RT system CIB.

2.2.6.2 SYSTEM SITING PLAN

The applicant must [AC_R0009] submit a System Siting Plan that contains the applicant's plans and considerations for system siting at any installation. This siting plan is utilized to support installation studies of the applicants RT system in a manner consistent with the applicants design (i.e., accounting for all applicable system limitations). This includes, but is not limited to, siting of the airport remote tower components relative to the airport property as well as siting of remote tower module components relative to distance/orientation between display monitors and workstations.

See section A.2.6.2 for additional guidance material for preparation and review for the RT system CIB.

2.2.6.3 AIR TRAFFIC CONTROL END-USER GUIDE & MANUAL

The applicant must [AC_R0010] submit an End-User Guide that contains all relevant information associated with the operation of the RT system by ATCSs. This document provides ATCS's with complete and accurate information on how to operate the system.

See section A.2.6.3 for additional guidance material for preparation and review for the End-User Guide and Manual.

2.2.6.4 SYSTEM CHARACTERIZATION DOCUMENT

The applicant must [AC_R0011] submit a System Characterization Document (SCD) reflecting the system configuration being requested for SDA. The SCD provides a single document that contains relevant system description information for inclusion in the system assessment process, including system architecture, interfaces, data/information types, and the general system operations and maintenance environment. Earlier drafts of this document are expected to be submitted to support earlier reviews of the architecture relative to security. The final document is provided to RT system sponsors to support their site-specific SCD.

2.2.6.5 SYSTEM SECURITY PLAN

The applicant must [AC_R0012] submit a System Security Plan (SSP) that describes how security controls are to be implemented. The SSP is to contain methods for security controls with sufficient detail to enable implementation by the RT system sponsor.

The applicant prepared version of the SSP is considered a draft to be completed by prospective RT system sponsors with site-specific security mitigations incorporated. The format of the SSP and RT system-specific requirements to be addressed in the SSP will be contained in the *RT System – System Security Plan Template*, which is under development. See section 3.1.1 for further information associated with the sponsor update to the SSP.

The applicant creates a record of proposed mitigations for any security risks identified by the FAA, and track the activities, schedules, and status of these activities to the FAA.

2.2.6.6 TRAINING MATERIAL

This section addresses the need for both user and maintainer training material. See section A.2.6.6 for additional guidance material for preparation and review for the user and maintainer training material.

2.2.6.6.1 User Training

The applicant must [AC_R0013] prepare and submit user training for FAA review where the user may be an ATCS or System Administrator. This training material is to provide ATCS and System Administrators with a solid understanding of proper system operations, capabilities, and limitations as detailed in the ATC End-User Guide & Manual.

2.2.6.6.2 Maintainer Training

The applicant must [AC_R0014] prepare and submit maintainer training for FAA review. This training material supports a Certified Maintenance Specialist in the performance of periodic maintenance, gives guidance on troubleshooting, repair and 'return to service' as detailed in the CIB.

2.3 FAA SYSTEM EVALUATION

There are three objectives for this activity, which all require the installation of the applicant's RT system in as close to a real-world setting as possible:

1. Evaluate the processes and procedures identified for siting, installation and site-acceptance-testing using the System Siting Plan.
2. Conduct an on-site operational assessment for system stability, maintainability, and operations using documented procedures, provided in the CIB (section 2.2.6.1) and maintainer training (section 2.2.6.6.2).
3. Conduct an on-site operational assessment for operational acceptability by ATCT to control traffic, using documented procedures, provided in the ATC end-user guides/manuals (section 2.2.6.3) and controller training (section 2.2.6.6.1).

The FAA System Evaluation activities are to assess the final configuration installed in an operational setting. This step requires the applicant to provide a candidate system at a U.S. location with an environment consistent with its intended use. It can be an existing system installation or a loaned system installed at an FAA facility such as William J. Hughes Technical Center (WJHTC) or Mike Monroney Aeronautical Center (MMAC). The initial SDA will likely be performed in conjunction with the systems first commissioning, such that the first commissioning site will be used for the SDA operational evaluation.

2.3.1 SITING, INSTALLATION AND SITE ACCEPTANCE TEST EVALUATION

Once the site is selected, the applicant performs the site planning activities that include all analyses and documentation identified by the applicants siting process (see section 2.2.6.2) and an FAA Remote Tower Siting Order, which has not yet been prepared.

Following acceptance of the applicant's siting documentation, the applicant coordinates installation of their RT system based on the procedures approved during the SDA reviews. This includes Site Acceptance Test (SAT) (see section 3.1.2).

The FAA conducts a Functional Configuration Audit (FCA) and a Physical Configuration Audit (PCA) on the product baseline prior to SDA. The applicant ensures that the as-built system meets requirements, is traceable, and is appropriately documented and controlled. The audit will be conducted using Order 1800.66, *Configuration Management Policy*. The audit will be tailored to the artifacts and configuration items identified for RT systems.

2.3.2 SYSTEM OPERATIONAL EVALUATION

The FAA performs a System Operational Evaluation of the installed system focused on system stability and general ability to evaluate system status and the performance of maintenance activities efficiently.

Details regarding the System Operational Evaluation are customized depending on the applicant's design but are expected to include the following activities:

- a. *System Stability Test* - Operate the system continuously over an extended period of time (e.g., 30 days) in the manner intended for operational use.
- b. *System Log Event Recording* - Review of logs for system/security event and fault logs.

- c. *Evaluation of System Operation* - Review independent user performance data to verify that the information reported in the event log is correct.
- d. *CIB Review* - Verify the accuracy of the CIB using the installed candidate system. It includes a review of siting, installation, maintenance, and operating procedures.
- e. The RT system evaluation team determines other elements, as appropriate.

The System Operational Evaluation may be performed serially or parallel with the Air Traffic Operation Evaluation described in section 2.3.3.

2.3.3 AIR TRAFFIC OPERATIONAL EVALUATION

FAA Air Traffic representatives perform an Air Traffic Operational Evaluation to assess the RT system's functional acceptance for system operation and provision of the required visual information display performance. The focus of this evaluation is to determine the ATC services that the RT system can support based on the visual information provided by the RT system. The following documents supported this evaluation:

- *The Overarching Remote Tower System Research: Operational Visual Requirements (OVRs)* - This document identifies the visual informational needs of controllers at Air Traffic Control Towers providing operational air traffic services.
- *JO 7110.65* - Chapter 3 (Airport Traffic Control – Terminal) identifies the services that may be supported by the RT system for airport traffic control service based only on observed or known traffic.

Phased user testing at a system installation located in an environment consistent with its intended use is required to support this decision. These phases may include, but are not limited to:

- a. *System Optimization* - During this phase, the applicant works with the FAA to determine if system modifications are necessary to ensure or enhance usability within the NAS.
- b. *Passive Evaluation* - Traffic is controlled from a mobile tower or existing "brick-and-mortar" tower while controllers evaluate the RT system without actively controlling live traffic from the RT.
- c. *Active Evaluation* - Controllers are actively controlling live traffic from the RT.

2.4 SYSTEM DESIGN APPROVAL LETTER

Upon successfully completing the FAA non-federal SDA process, the applicant receives an SDA letter and the system configuration will be added to the QVSL of FAA-Approved Equipment for non-federal use, included as a supplement to Order 6700.20. The letter includes any operational limitations of the RT service. The SDA letter is a prerequisite for a non-federal sponsor to obtain commissioning and operation of an RT system in the NAS. See sections 3 and 4 of this AC for more information on the Site Commissioning Process, and Ongoing Oversight by the FAA.

2.5 MODIFICATION TO APPROVED SYSTEMS

In the event an applicant chooses to make a modification to an approved RT system listed on the FAA QVSL, the applicant must [AC_R0015] submit an SDA Plan, which outlines the change proposal and a change impact analysis to the FAA for review and approval. No commissioned systems may be updated prior to FAA approval of the new configuration.

An applicant may propose a process whereby minor changes may be implemented without prior FAA approval. Minor changes, such as those for part obsolescence or reliability enhancements, which have no impact on software, safety, form, fit or function. The applicant-specific process is submitted to the FAA for review and approval prior to implementation. Minor change notification would continue to be submitted to the FAA but could be submitted in parallel with implementation and fielding.

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3 SITE COMMISSIONING PROCESS

Order 6700.20 defines “Commissioning” as, “The act of the FAA giving permission for the use of a non-federal system to be available for public use after establishment.” The site commissioning process is described as being performed using an RT system configuration listed on the QVSL.

3.1 SPONSOR ACTIONS

All airport owners, or other parties contemplating purchase and installation of a non-federal RT system (sponsor), must [AC_R0016] coordinate with the FAA before purchasing any equipment. Consistent with Order 6700.20 Chapter 4, Section 5, the FAA Service Center non-federal Program Implementation Manager (PIM) is the official FAA point of contact and is responsible for the overall project coordination between the owner and FAA stakeholders. The FAA non-federal PIM coordinates the proposal with the Flight Procedures Office (FPO), Air Traffic Services, Operations Support Group, Frequency Management Office, Airport District Office and other FAA offices as needed. The non-federal PIM provides the sponsor with guidance to ensure compliance with Order 6700.20.

Sponsor actions in support of site commissioning are divided between:

- a. Site Planning
- b. Installation, Calibration and Site-Acceptance-Testing
- c. Commissioning Planning

3.1.1 SITE PLANNING

The sponsor is responsible for RT system site planning with support, as required, from the RT system manufacturer. Other organizations such as the airport authority, FAA stakeholders and subcontractors to the sponsor, as applicable, need to be engaged.

The sponsor must [AC_R0017] create and submit a site-specific SCD with input from the manufacturers SCD (see section 2.2.6.4) that reflects anything unique to the site installation. The SCD contains relevant system description information for inclusion in the system assessment process, including system architecture, interfaces, data/information types, and the general System operations and maintenance environment.

The sponsor must [AC_R0018] create and submit a site-specific SSP that describe how security control is to be implemented. This plan is developed from the manufacturer’s SSP, see section 2.2.6.5. This plan ensures that security controls, or other mitigations, are to be implemented for each security requirement within the SSP. This document is used to support the siting process and establishes content for the OMM and Letter of Agreement (LOA) (see sections 3.1.3.1 and 3.1.3.2, respectively). The sponsor creates a record of proposed mitigations for any security risks identified by the FAA, and track the activities, schedules, and status of these activities with periodic reports to the FAA. The format of the SSP and RT system-specific requirements to be addressed in the SSP is contained in the *RT System – System Security Plan Template*, which is under development.

The sponsor follows the site planning process defined in the manufacturer’s System Siting Plan (see section 2.2.6.2) and the process and procedures identified by the PIM.

The sponsor must [AC_R0019] incorporate, at a minimum, the Physical Layout Diagram, Site Planning Data, and Physical Security subjects in the planning process documentation, which is to be provided to the FAA.

Descriptions of these subjects are contained in the following section.

3.1.1.1 PHYSICAL LAYOUT DIAGRAM

Diagram(s) are prepared to show planned installation sites of all equipment, including interconnect cabling between equipment sites. The location of airport remote tower components, particularly cameras, microphones and remote light gun, in relation to the area of jurisdiction for which the ATCT services are to be provided will be identified.

A dimensioned layout for the remote tower module components specifically identifying the separation distances between the Controller Working Position (CWP) and RVP displays will be included.

A diagram is provided showing what portions of the RVP display contain “areas of jurisdiction” (failure of which would be deemed a critical failure), compared to “non-critical/non-essential” presentation areas (failure of which will not adversely impact ATC operations). Note that the “areas of jurisdiction” will include those identified as site-specific.

3.1.1.2 SITE PLANNING DATA

Site-specific data is produced to identifying the most challenging detection and recognition cases relative to object size and distance. This data is referred to as Detection and Recognition Range Performance (DRRP) in EUROCAE ED-240A Change 1, *Minimum Aviation System Performance Standard for Remote Tower Optical Systems* (thereafter EUROCAE ED-240A). The DRRP data will include all regions identified within the area of jurisdiction. See Table 5.1 in EUROCAE ED-240A for an example DRRP table.

Site planning data that identifies the intended ATCT services that the RT system is intended to support is to be provided.

3.1.1.3 PHYSICAL SECURITY

Documentation describing how the physical security requirements in Appendix B are met by the planned installation. This compliance may be accomplished by references to diagrams and data previously described (sections 3.1.1.1 and 3.1.1.2) or by additional documentation.

3.1.2 INSTALLATION, CALIBRATION, & SITE ACCEPTANCE TEST

The sponsor is responsible for installing the approved RT system and conducting any necessary calibrations and tests. Other organizations such as the RT system manufacturer, airport authority, FAA stakeholders and subcontractors to the sponsor, as applicable, need to be engaged. Site-specific system calibrations and SAT procedures must [AC_R0020] be completed by the sponsor before Air Traffic Services performs site-specific approval testing.

The sponsor follows processes and procedures defined by the manufacturer’s System Siting Plan (section 2.2.6.2) and CIB (section 2.2.6.1).

FAA oversight of this process is coordinated between the sponsor and FAA non-federal PIM. See also section 3.2 for additional information.

3.1.3 COMMISSIONING PLANNING

The sponsor is responsible for participating in activities required to support RT system commissioning. The primary outputs of these activities are documented in the OMM or through an LOA. The process for commissioning and production of the OMM and LOA are defined in Order 6700.20.

3.1.3.1 OPERATIONS AND MAINTENANCE MANUAL

The sponsor must [AC_R0021] support the development of and sign an OMM that provides a clear understanding of the FAA and sponsor's responsibilities concerning operation and support of the RT system.

The following paragraphs describe the subject matter content consistent with the seven OMM parts identified in the FAA OMM template. Additional RT system-specific content is also included within the applicable OMM template part.

Part I. Agreement for the Operation & Maintenance

This agreement is between the FAA and the sponsor to comply with the OMM.

Part II. Operational Requirements

The sponsor and subsequent maintenance technician requirements to operate the RT system. It includes requirements related to credentials for maintenance technicians, Notice to Air Missions (NOTAM) generation, shutdown procedure for routine maintenance, treatment of Pilot Reports (PIREPs) and maintaining test equipment and spare parts. The sponsor ensures that procedures are established to manage the System Event Log, Security Audit Log and DR contents.

Prior to RT system commissioning, non-federal technicians and FAA Non-federal Inspectors have to complete all necessary training based on training materials developed during the SDA process.

Note that the adequacy of spares, test equipment and non-federal technicians can adversely impact system availability by delaying required maintenance. It is incumbent on the owner of the RT System to ensure that operational availability is sufficient to support operations. The required Continuity (1.5×10^{-5} per 120 seconds) and Mean Time To Repair (MTTR) (2 hours) result in an inherent availability of 0.999, which does not represent operational availability and may not be sufficient depending on the airport environment and outage impact on both local and system-wide NAS efficiency.

Part III. Maintenance Requirements

The sponsor ensures that proper procedures are performed, all period maintenance is performed, acceptable system configuration is maintained and system records are maintained. Sponsor requirements associated with physical security, flight inspection, ground inspections and personnel safety are also addressed.

Part IV. Aircraft Accident Procedures

It identified sponsor and non-federal technician requirements in the event of an RT system that is suspect in an aircraft accident.

Part V. 6000 Series FAA Forms

It identifies that the FAA provides forms for Technical Performance Record (TPR), Technical Reference Data Record (TRDR) and Facility Maintenance Log (FML).

Part VI. Remote Maintenance Monitoring (RMM)

Not applicable to RT systems.

Part VII. Non-Federal Facility Data

It contains an example form for facility data.

3.1.3.2 LETTER OF AGREEMENT

The sponsor must [AC_R0022] support the development of and sign an LOA, with ATO Air Traffic Services, which provides a clear understanding of other processes the sponsor follows pursuant to the operation of the RT system.

An LOA may be required when the air traffic manager deems it necessary to clarify responsibilities with the RT system sponsor when specific operational/procedural needs require their cooperation and concurrence. Examples of likely content for the LOA include:

- a. A procedure to mitigate a total RVP loss-of-function or loss of an RVP area of jurisdiction, which may include transitioning services to ATC Zero.
- b. A procedure to mitigate the loss of non-critical/non-essential presentation areas of the RVP.

See JO 7210.3, *Facility Operation and Administration*, Chapter 4, Section 3 *Letters of Agreement*, paragraph 4-3-1 for further information.

3.2 SITING AND INSTALLATION PROCESS

As identified in sections 3.1.1 and 3.1.2, the Sponsor is responsible for ensuring that the system is properly sited and installed in a manner consistent with RT system manufacturer and FAA requirements.

Siting and installation is an FAA led process whose purpose is to ensure that siting and installation are compliant with manufacturer requirements and all written FAA policies and procedures, including relevant ACs, FAA Orders and other directives.

A required artifact from this process is an OMM, which assures a clear understanding of the FAA and sponsor's responsibilities concerning the RT system. Sponsor support for the preparation of the OMM is discussed in section 3.1.3.1, which includes a description of the significant parts of the OMM. Areas of responsibility that are typically addressed in the OMM include:

1. Procedures to ensure proper system maintenance and verification covering scheduled and unscheduled maintenance.
2. Procedures to ensure that non-federal maintenance technicians have received the proper training and verification authority to maintain the system.
3. Procedures associated with compliance to physical and cybersecurity requirements

4. Contact information to report all outages or shutdowns to the appropriate Control Center, including coordination for issuance of a NOTAM.
5. A checklist and contact information for the sponsor to use in the event of an aircraft accident involving the non-federal system.
6. Procedures to maintain the proper on-site Facility Reference Data (FRD), which include the OMM, FML, TRDR, TPR and flight inspection reports.

Like a “brick-and-mortar” tower, the proposed RT system installation needs to be assessed for all safety risks. This process may require a Safety Risk Management (SRM) assessment if local FAA personnel affiliated with operations at the airport deem it necessary. The SRM may require the development of a local LOA between the sponsor and ATO Air Traffic Services to document other processes the sponsor follows to coordinate with local ATO Air Traffic Services personnel.

3.3 AT OPERATIONAL EVALUATION

ATO Air Traffic Services assess the RT system’s suitability for operation and provide the required visual performance for each site entering the NAS. Testing is performed as required to validate air traffic usability within the NAS. It may include the development of site-specific operational procedure requirements.

This activity is expected to be a subset of the activities described in Section 2.3.3, which addresses the Air Traffic Operational Evaluation associated with SDA.

3.4 COMMISSIONING INSPECTION

As the system approaches operational readiness, the owner must [AC_R0023] request a commissioning ground inspection by an FAA Non-federal Inspector. The inspector confirms that the system complies with Order 6700.20, the OMM, applicable ACs, orders, regulations, operational requirements, siting, etc. This inspection should be verified and attended by a non-federal technician. The inspection consists of the tests and checks identified in the RT system Ground Inspection Form, which encompass: 1) a review of the operations and maintenance documents on file at the facility, and 2) the recording of the initial facility performance data, which should be retained as commissioning documentation in the FRD, or similar historic record locations. The commissioning inspection is completed for the RT system to be commissioned by the FAA.

3.5 COMMISSIONING NOTICE TO AIR MISSIONS

Following successful completion of the commissioning inspection, the FAA non-federal PIM should notify the appropriate FAA Offices (i.e., National Flight Data Center [NFDC], FPO, Operations Control Center [OCC], national non-federal office) of the appropriate information. It may include the commissioning date, voice access telephone number, system owner, and maintenance arrangements.

4 ONGOING OVERSIGHT

4.1 FAA PERIODIC GROUND INSPECTIONS

The sponsor must [AC_R0024] support periodic visits to the operational RT system by the FAA to verify that the system continues to operate correctly. A site is to be physically inspected by the non-federal technician as witnessed by the FAA Non-federal Inspector typically annually (using Form 6700-13, *RT System Inspection Checklist*, which is under development) to maintain the airport's commissioning. The FAA Non-federal Inspector receives copies of FRD for inspection and retention. The FRD is a collection of technical documentation that includes the comprehensive, quantitative and performance information for that system and includes: OMM, FML, TRDR and TPR. Guidance for these visits may be found in the following documentation:

- a. The facility OMM and LOA
- b. Order 6700.20

4.2 ONGOING SYSTEM VALIDATION

Non-federal systems are required to meet the standards established at the time of their commissioning. The FAA periodic ground inspection is the primary means of ensuring this requirement is met. A failure to remain in compliance with the criteria of this AC may result in decommissioning the RT system or withdrawal of SDA. Systems may continue to operate as long as the sponsor:

- a. Maintains the system in accordance with the OMM
- b. Operates the system in accordance with the LOA
- c. Ensures the system configuration is an approved configuration
- d. Ensures all FAA required updates to equipment, maintenance or procedures are implemented in a timely manner
- e. Ensures all deficiencies identified by the FAA, which could include degradations in reliability or availability, is addressed

APPENDICES

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Appendix A System Design Approval Basis and Review Guidance Material

A.1 APPROVAL BASIS

The approval basis may incorporate additional functionality and requirements beyond the minimum FAA requirements identified in *RT Systems Minimum Functional and Performance Requirements for Non-Federal Applications*. This additional functionality may be a result of incorporation of:

- Additional industry standards such as EUROCAE ED-240A
- Customer requirements
- Derived requirements

A.2 SYSTEM DESIGN APPROVAL REVIEWS

The following guidance material is intended to aid the applicant in development of planning documents and will make references to the Society of Automotive Engineers (SAE) International Aerospace Recommended Practice (ARP) 4754A, *Guidelines for Development of Civil Aircraft and Systems* (hereafter SAE ARP4754A).

A.2.1 PLANNING REVIEW

The general planning process and elements are described in Section 3 of SAE ARP4754A. Note that the specific planning documents to be prepared by an applicant can vary. The objectives for the planning review, taken from Table A-1 of SAE ARP4754A, are listed as follows:

1. System development and integral processes activities are defined
2. Transition criteria and interrelationship among processes are defined
3. Assurance is obtained that necessary plans are prepared and maintained for all aspects of system development

Key planning documents that are directly linked to SDA reviews are described in the following sections. Additional planning documents associated with integral processes are addressed later in the section titled "Integral Processes".

For this review, the applicant will deliver all planning document associated with system design, development and use for which SDA credit is being requested.

A.2.1.1 SYSTEM DESIGN APPROVAL PLAN

The SDA Plan can be thought of as a contract between the applicant and certification authority that describes the system being developed, what its approval basis is, and how compliance with the approval basis will be shown. Key elements to incorporate include:

- a. Functional and operational description of the system including hardware and software, if defined.
- b. Summary of FHA
- c. Summary of PSSA
- d. Description of novel or unique design features planned

- e. Description of new technologies to be implemented
- f. Planned system approval basis (applicable requirements and regulations)
- g. Proposed method to show compliance with approval basis
- h. List of key data to be submitted and data to be retained under configuration control
- i. Approximate sequence and schedule for approval events
- j. Identification of personnel responsible for approval coordination

Additional guidance for the SDA Plan can be found in section 5.8.4.1 of SAE ARP4754A.

A.2.1.2 SYSTEMS ENGINEERING MANAGEMENT PLAN (SEMP)

The SEMP, also known as a Development Plan, is considered the top level planning document for the design/development program, which in addition to defining the processes to be employed, describes linkages to subtler or integral planning and process documents.

The SEMP should contain the associated technical management processes and describe the following:

- a. Life-cycle Activities
- b. Decision-making Structure
- c. Information Flow
- d. Tools
- e. Project Control
- f. Communications
- g. Integration Activities
- h. Required Resources
- i. Required Disciplines
- j. Relationships Between Organizations (multi-disciplinary, sub-contract, management)
- k. Project Communication
- l. Risk Assessment and Management
- m. Process Objectives
- n. Life-cycle Transition Criteria
- o. Associated Project Work Products

Additional guidance for the SEMP (Development Plan) can be found in section 5.8.4.3 of SAE ARP4754A.

A.2.1.3 REQUIREMENTS VALIDATION PLAN

The Requirements Validation Plan should be in place throughout the development process to support all levels of requirements. The plan should include:

- a. Methods for validation
- b. Data and records produced
- c. Method to access requirements validation information
- d. How validation maintained when requirements are changed
- e. Roles and responsibilities associated with validation
- f. Methods for managing assumptions associated with validation
- g. Role of independence between requirement definition and requirement validation

Additional guidance for the Requirements Validation Plan can be found in section 5.4.7.1 of SAE ARP4754A.

A.2.1.4 REQUIREMENTS VERIFICATION PLAN

Verification can be performed using methods that include test, demonstration, inspection or analysis as identified in the *RT Systems Minimum Functional and Performance Requirements for Non-Federal Applications*. Additional methods may be proposed. The method or methods employed will show full requirement coverage.

The requirements verification plan should include:

- a. Roles and responsibilities associated with conducting verification activities
- b. Impact of design assurance level
- c. Level of independence between the design and verification activities
- d. Verification methodologies
- e. Artifact to be produced during verification
- f. Sequence of dependent activities
- g. Identification of system verification credit taken for item (hardware or software) level verification activities

Additional guidance for the Requirements Verification Plan can be found in section 5.5.6.1 of SAE ARP4754A.

A.2.1.5 INTEGRAL PROCESS PLANNING DOCUMENTS

Planning for integral processes may already be incorporated in other planning documents or may require their own planning documents. This is up to the discretion of the applicant. The following paragraphs will provide guidance associated with planning for these integral processes.

Safety Program Plan – This plan should describe the scope and content of the safety activities and how they integrate with the overall development activities. The specific processes for performing safety analyses as well as inputs and outputs should be described. Additional guidance for safety planning can be found in section 5.1.5 of SAE ARP4754A. Guidance material associated with conducting a safety assessment process can be found in SAE International ARP4761, *Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment* (thereafter SAE ARP4761).

Configuration Management Plan – This plan is applicable to managing the configuration of the system, items making up the system as well as all forms of documentation and data that support its approval. Additional guidance for configuration management planning can be found in section 5.6.2.1 of SAE ARP4754A.

Process Assurance Plan – This plan describes the method that will be applied to ensure that the development processes are properly adhered to. Additional guidance for process assurance planning can be found in section 5.7.2 of SAE ARP4754A.

Requirements Management Plan – This plan identifies and describes how the requirements are captured and managed. Additional guidance for requirements management planning can be found in section 5.3 of SAE ARP4754A.

Complex Hardware Plans – This plan applies only if complex hardware is being incorporated into the product design. See section 2.2.5.1 to determine applicability of complex hardware requirements. Additional guidance for complex hardware planning can be found in section 4.0 of RTCA DO-254/EUROCAE ED-80.

Software Plans - This plan applies only if software is being incorporated into the product design. See section 2.2.5.2 to determine applicability of software requirements. Additional guidance for software planning can be found in section 4.0 of RTCA DO-278A/EUROCAE ED-109A.

Human Factors Plan – This plan identifies and describes the processes and procedures used to incorporate human factors into the system and item design. This would encompass consideration for human interfaces to the system, including user/operators (ATC personnel), installers and maintainers.

Security Plan – This plan identifies and describes the processes and procedures used to ensure that all security risks are managed. This would include ensuring that all applicable security requirements are implemented and verified.

Reliability/Maintainability/Availability Plan – This plan identifies and describes the processes and procedures used to manage the reliability, maintainability, and availability aspects of the system design, including their interfaces to other development activities.

A.2.2 SYSTEM REQUIREMENTS REVIEW

The general process associated with the functional design and allocation of functions to system requirements are described in Section 4.2 and 4.3 of SAE ARP4754A, though multiple integral processes described in Section 5 are also applicable. The objectives for the Systems Requirement Review, taken from Table A-1 of SAE ARP4754A are listed as follows:

1. Functions, functional requirements, functional interfaces and assumptions are defined
2. Functions are allocated to systems
3. The system FHA is performed.
4. System requirements, including assumptions and system interfaces are defined
5. System derived requirements (including derived safety-related requirements) are defined and rationale explained
6. Development activities and processes are conducted in accordance with those plans

A.2.2.1 SYSTEM FUNCTIONAL DESIGN

The functional design process frequently requires many iterative cycles rather than a single sequential process. Multiple trade studies are common to assess the impact of design decisions on characteristics including: performance, capability (features), safety, human factors, maintainability and suitability for intended purpose, etc. As the functional elements are being developed their interfaces are also defined in Interface Control Documents (ICDs) that identify their physical, functional and performance characteristics.

Once the functions and interfaces are defined an FHA will be performed to support the identification of system level safety requirements. For guidance on performing an FHA, see Appendix A to SAE ARP4761. Any results that differ from hazard classifications identified in the *RT Systems Minimum Functional and*

Performance Requirements for Non-Federal Applications. The following information is to be provided for each function:

- Identification of failure condition(s)
- Identification of the effects of the failure condition(s)
- Classification of each failure condition based on the identified effects and assignment of the necessary safety objectives
- Statements defining the considerations and assumptions made during the evaluation

A.2.2.2 REQUIREMENTS DEFINITION

The applicant will demonstrate that all of the system requirements that are required to implement the functional design and are compliant with the *RT Systems Minimum Functional and Performance Requirements for Non-Federal Applications*. The system level requirements should have been developed using the applicant's processes and procedures that include the following:

- a. Demonstration that each requirement is verifiable, unambiguous, complete, and consistent.
- b. Demonstration that each requirement traces to an RT system technical requirement or a derived justification.
- c. Requirements derived from the FHA are allocated to the SRS.

A.2.3 ARCHITECTURE REVIEW

The general process associated with development of the system architecture and allocation of system requirements to items are described in Section 4.4 and 4.5 of SAE ARP4754A. The objectives for the Systems Requirement Review, taken from Table A-1 of SAE ARP4754A are listed as follows:

1. System architecture is defined
2. The PSSA is performed
 - a. The common cause analyses are performed
 - b. Independence requirements in functions, systems and items are captured
3. System requirements are allocated to the items
4. System and item requirements are complete and correct
5. Assumptions are justified and validated
6. Derived requirements are justified and validated
7. Item requirements are traceable
8. Item requirement validation compliance substantiation is provided
9. Development activities and processes are conducted in accordance with plans

A.2.3.1 SYSTEM ARCHITECTURE

The system architecture establishes the structure and boundaries within which specific item designs are implemented. This would typically include identification of whether an item is COTS or was developed by the applicant, as well as its content relative to use of complex hardware or software. Multiple candidate architectures are typically traded off before selection of a proposed architecture. A PSSA is performed on the selected architecture to validate that it is capable of meeting all system safety requirements. The specific safety analysis techniques to be incorporated in the PSSA can vary but typically consist of Fault Tree Analysis (FTA), Zonal Safety Analysis (ZSA), Particular Risk Analysis (PRA)

and Common Mode Analysis (CMA). Hazards evaluated in the PSSA are likely to result in hazard mitigation strategies that are traced to item requirements or may result in new system requirements. For guidance in developing processes and procedures to conduct a PSSA or any of its individual safety analyses, see Appendix B in SAE ARP4761.

A.2.3.2 ALLOCATION OF SYSTEM REQUIREMENTS

System requirements are allocated to item requirement documents where the items were defined by the system architecture. The applicant will validate the item requirements using the applicant's integral process associated with Requirements Management. This validation will include ensuring that:

- All item requirements are complete, correct and unambiguous
- All assumptions and derived requirements are justified
- Requirements are traceable to system requirements, or derived

Evidence of process compliance will be expected to be available during the review.

A.2.4 SYSTEM VERIFICATION REVIEWS

The general process associated with implementing verification is described in Section 5.5 of SAE ARP4754A. Additional process information for compliance substantiation is described in Section 5.8.3 of SAE ARP4754A. The objectives for the Systems Verification Review, taken from Table A-1 of SAE ARP4754A are listed as follows:

1. Test or demonstration procedures are correct
2. Verification demonstrates intended function and confidence of no unintended functional impacts to safety
3. Product implementation complies with system requirements
4. System safety assessment performed and safety requirements are verified
5. Verification compliance substantiation identified
6. Assessment of any deficiencies and their related impact on safety is identified
7. Development activities and processes are conducted in accordance with plans
8. Compliance and substantiation is provided

A System Approval Summary Report is prepared to communicate the applicant's approval data in a concise manner that is consistent with the SDA Plan described in section 2.2.1.1. The contents of this report would include a system overview, approval requirements basis, waivers/deviations, open problem reports, verification artifacts and the final configuration of the system to be approved. Verification artifacts would include reference to any accomplishment summaries associated with complex hardware or software.

Evidence of process compliance will be expected to be available during the review.

A.2.5 COMPLEX HARDWARE, SOFTWARE REVIEWS

A.2.5.1 COMPLEX HARDWARE REVIEWS

This section only applies if the applicant's design incorporates complex hardware as defined in section 2.2.5.1.

The level of rigor to be imposed by application of RTCA DO-254/EUROCAE ED-80 is dependent on the design assurance level associated with the complex hardware item(s). The appropriate design assurance level for each complex item will be dependent upon the design assurance level requirements that are identified in the PSSA.

RTCA DO-254/EUROCAE ED-80 define objectives associated with the different phases of the hardware design life cycle. Rather than listing all objectives here, the following RTCA DO-254/EUROCAE ED-80 paragraph references identify where to find objectives for each life cycle:

- Planning Process (Section 4.1)
- Hardware Design Process (Sections 5.1.1, 5.2.1, 5.3.1, 5.4.1, 5.5.1)
- Validation and Verification Process (Section 6.1.1, 6.2.1)
- Configuration Management Process (Section 7.1)
- Process Assurance (Section 8.1)

Should an alternate means of compliance be desired by the applicant, a description of and justification for the alternate means should be provided to the FAA early in the design approval process. Reviews will be conducted to ensure compliance with applicable objectives. These additional review objectives may be incorporated into the previously identified reviews (sections 2.2.1, 2.2.2, 2.2.3, 2.2.4) or by conducting separate reviews.

A.2.5.2 SOFTWARE REVIEWS

This section only applies to items within this system for which the applicant has incorporated software.

The level of rigor to be imposed by application of RTCA DO-278A/EUROCAE ED-109A is dependent on the design assurance level associated with the item(s), which include software. The appropriate design assurance level for each software item will be dependent upon the design assurance level requirements that are identified in the PSSA.

Annex A of RTCA DO-278A/EUROCAE ED-109A contains a set of tables that identify both the process objectives as well as outputs for each development process. Additional objectives applicable to COTS software is contained in section 12.4.10 of RTCA DO-278A/EUROCAE ED-109A.

Reviews will be conducted to ensure compliance with applicable objectives. These additional review objectives may be incorporated into the previously identified reviews (sections 2.2.1, 2.2.2, 2.2.3, 2.2.4) or by conducting separate reviews.

This guidance in this AC is intended to harmonize ground-based software guidance with airborne software guidance contained in AC 20-115, *Airborne Software Development Assurance Using EUROCAE ED-12()* and RTCA DO-178() and AC 20-171, *Alternatives to RTCA/DO-178B for Software in Airborne Systems and Equipment*.

A.2.6 END USER DOCUMENTATION

A.2.6.1 Commercial Instruction Book

Guidelines for non-federally developed CIBs are established in Appendix I of FAA-D-2494. At a minimum, the contents of the CIB is to include:

- a. Theory of operation

- b. Operating instructions
- c. Standards and tolerances tables
- d. Installation guide
- e. Verification procedures (i.e., SAT procedures)
- f. Periodic maintenance and performance checks
- g. Step by step maintenance procedures
- h. Step by step repair procedures and 'return to service' procedures
- i. Maintenance and Logistics Support Plan
- j. Drawing tree
- k. Product drawings
- l. Parts list

The applicant should provide a CIB outline and prospectus prior to drafting the CIB, which shows all elements of the CIB are correctly planned for. This allows an early review to ensure completeness and reduce potential rework. The objectives for the CIB planning review are as follows:

- a. The required sections are covered in the CIB per FAA-D-2494 (e.g., general information, operation, technical description, standards & tolerances).
- b. The proposed format for CIB is reasonable with respect to its intended use (i.e., usefulness for maintenance, self-training, troubleshooting).
- c. The outline in the proposed draft is logically ordered (i.e., intuitive).

Some sections of the CIB may be desk reviewed, while others will be validated on the actual equipment. The CIB installation section will need to be verified at the time of installation. The sections on periodic maintenance, maintenance procedures, and corrective maintenance will need to be verified step by step with the equipment.

The objectives for the desk review of the CIB are as follows:

- a. The CIB is written in compliance with Specification FAA-D-2494.
- b. The following information is provided on the front cover
 - i. List of equipment with serial numbers
 - ii. List equipment contractor(s)
 - iii. National Stock Number (NSN) for CIB
- c. The Table of Contents components is correct:
 - i. The correct table number/figure number/section and title are referenced
 - ii. Page, paragraph, figure, and section numbering is correct.
- d. Figures are legible and if more than one sheet is provided, the proper number of sheets is used.
- e. Headers and footers are correct on all pages.
- f. Drawings in trouble support data is legible, and sheet numbering is correct.
- g. The functional characteristics, operation capabilities, and limitations of the equipment are included. Adequate text material that is augmented with suitable listings, tables, photographs, and illustrations.
- h. Instructions and procedures are in place for equipment operation with photographs and illustrations; this should include a startup and shutdown procedure, and to maintain and change

operations as required. Diagrams, photographs, and illustrations will be included to augment/enhance the text.

- i. There is a technical description to provide a complete understanding of how the equipment works. The description will present a simple description that reference diagrams and drawings. The simple description follows with a more detailed theory and operations section to include schematic diagrams. Mechanical functions will also be included in this section.
- j. Standards and tolerances are incorporated into the CIB as a separate section or incorporated in other sections of the CIB.
- k. There is a section on maintenance procedures, periodic maintenance, and corrective maintenance in accordance with FAA-D-2494 Appendix I.
- l. The CIB contains a listing of all replacement parts (e.g., identifies and describes the parts, provides necessary part numbers).
- m. Instructions and related drawings are included for siting equipment, normal installation and checkout of the equipment.
- n. The CIB adequately addresses the software, firmware and adaptation data used in the system in accordance with FAA-D-2494 Appendix I, including means to update and verify proper load configuration.
- o. There are instructions and data to isolate and repair faults in the system. The data will include block diagrams, schematic diagrams, logic diagrams of required levels, functional and signal flows, power and its distribution, and photos or diagrams of cabinets, chassis, modules, and printed circuit boards.

A.2.6.2 System Siting Plan

The system siting plan is required to demonstrate mitigation of the hazards identified in relevant sections of Order 6480.4, *Airport Traffic Control Tower Siting Process*. This is expected to include data collection procedures, timelines and review methodologies. It will also address any infrastructure requirements (e.g., power, real estate) for RT system equipment. (Note: This information may be included in the CIB). A formal site study report should be a product that comes out of the system siting plan; the plan will be followed by the sponsor at every installed site.

Some sections of the system siting plan may be desk reviewed, while others may require validation as part of an actual or mock installation.

A.2.6.3 ATC End User Guide & Manual

This document will provide ATC personnel with all necessary information for operation of the system under nominal and anomalous conditions. The ATC End User Guide & Manual is expected to be a handout as part of the training material such that it would benefit from being organization and structured in a similar manner. Sections 2.2.6.6.1 and A.2.6.6 address the controller training material.

Review of this material is expected to include both a desk review for content, completeness and usability, as well as a review against training material.

A.2.6.4 Reserved

A.2.6.5 Reserved

A.2.6.6 Training Material

The guidance in this section applies to both user and maintainer training. Additional guidance material is available from the *FAA Development Guide For Instructor-Led Training Materials* and associated *Training Template*.

The training material is expected to be prepared in a manner that supports its use with the following associated technical documentation:

- User training consistent with ATC end user guide and manual
- Maintainer training consistent with the CIB

Validation of training materials is a designation of approval indicating that the training has met criteria for being instructionally sound and technically accurate. The criteria include the following:

- a. Training materials align with the Course Design Guide (CDG)
- b. Formatting requirements are met
- c. Instruction is complete and accurate
- d. Instruction is effective
- e. Instruction is adequate
- f. Instruction is accepted by learners
- g. Assessments are valid, reliable, and have integrity

To help ensure training materials are validated, standard activities and processes are built into the course development process. Reviews of training materials are conducted at several points during the course development process. The course development process is described below:

Phase 1 – Course Planning and Design

Courseware and materials will be developed in accordance with specified formats and standards, and specific training development activities are required. These activities start at the beginning of training development with the creation of the Analysis Report (AR), CDG and Test Blueprint.

- a. AR – The analysis gathers details on the audience, job tasks and skills/knowledge/abilities and recommends training delivery methods. The AR summarizes the analysis and provides foundational information for course design.
- b. CDG – This document uses the results of the AR and outlines the structure and components of the course. The CDG is used in developing the course and includes the following elements:
 - i. Course objectives
 - ii. Assessment strategy
 - iii. Instructional strategy
- c. Test Blueprint – This document links each assessment item with its corresponding objective.

Phase 2 –Course Development

This phase consists of desk reviews of proposed training material as they are being developed. The goal of this phase is to ensure training materials are developed according to the CDG.

Phase 3 – Final Course Validation

There are three (3) activities that support the determination of validation:

- a. Course Walkthrough
 - i. This activity is conducted at the end of course development and includes the final draft of course materials. The purpose of the walkthrough is to review materials in their entirety with the course development team. Any changes identified in the walkthrough will be completed before conducting the Operational Tryout (OTO) and/or First Course Conduct (FCC).
- b. OTO
 - ii. This activity is conducted after the course walkthrough. The purpose of the OTO is to review materials in their entirety with course development team, instructors, and other testers as appropriate. This activity is the “dry run” of the course and allows instructors to become familiar with the materials and prepare for the FCC. An OTO is not needed for web-based training or eLearning, as there are not instructors.
- c. FCC
 - iii. This activity is the first full delivery of the course to learners/students. The students in the FCC receive credit for attending, assuming the course is deemed valid at the outcome. The following data is gathered from the FCC for validation purposes: learner feedback/comments, test results, test item analysis results.

Appendix B Physical Security

The following security requirements constitute the initial planning baseline for the RT initiative.

Requirements listed are principally based on the assumption that these facilities will carry a security level 1 designation. Changes to that assumption may result in additional security system requirements to this planning baseline. Any lease agreements should contain the relevant requirements.

Prior to deployment, FAA Office of Security and Hazardous Material (ASH) requests to visit specific locations that house RT operations, validate the security level based on defined risk factors outlined in Order 1600.69, *FAA Facility Security Management Program* (thereafter Order 1600.69), and conduct a formal assessment to tailor and confirm this baseline for that location.

B.1 SITE SECURITY

- a. Security lighting will be provided at building entrances and exits.
- b. Place large receptacles away from building entrances or other potentially vulnerable locations.

B.2 STRUCTURE SECURITY

- a. Windows and window frames will be of substantial construction to deter burglary.
- b. Windows within 16 feet of the ground, or otherwise accessible, will be locked when the facility is not attended.
- c. Establish procedures for emergency shutdown of the facility's HVAC system.

B.3 FACILITY ENTRANCE SECURITY

- a. Exterior doors and doors protecting critical operations areas will have an FAA Standard or BHMA grade 1 locking system installed.
- b. Exterior doors and doors protecting critical operations areas will be equipped with latch guards or astragals, be equipped with heavy-duty builder's grade hardware and have interior mounted hinges or have exterior mounted hinges modified to prevent removal.
- c. Doors will be made of solid, close or tight grained wood, employ sheet metal/metal clad that is 14-gauge or thicker (fire rated steel doors normally meet this requirement), or, if glass, be tempered or ANSI (American National Standards Institute) rated burglary resistant glass or have an equivalent film or laminate applied (glass embedded with wire mesh may also be used). Door frames will be of substantial construction in keeping with door construction.
- d. The number of doors use for ingress or egress will be kept to a minimum to support operations.
- e. Doors will remain locked when not in use. A cipher lock (mechanical push-button key pads or hard coded electronic keypads) is authorized for use when the facility is staffed. Access will be restricted to authorized personnel.
- f. Unless otherwise prohibited, doors designated for emergency egress will be equipped with
 1. Automatic door closing devices.
 2. Exiting hardware (e.g., crash bar).
 3. Local annunciation when opened.

- g. Personnel will be issued and display FAA Identification while in the facility. (Note: Facilities with fewer than 10 personnel assigned are not required to wear ID, but will have it in their possession).
- h. Access decisions for visitors will be assessed through either a peep-hole in the door or through an entry control video system.
- i. Visitors will be sponsored and escorted while in the facility. A visitor log will be used and then maintained for two years prior to destruction. Visitors will be issued and display visitor ID. Unnecessary hand-carried items should be left in the visitor's vehicle and not introduced into the facility.
- j. Vehicle towing signs should be placed in the parking lot and enforced to preclude unauthorized parking.
- k. A Key Control Officer will be appointed.
 - 1. A record of the total number keys and cores will be maintained.
 - 2. An annual inventory will be conducted that identifies total keys assigned, on hand, and issued.
 - 3. Keys will be retrieved from departing personnel.
 - 4. Unissued keys will be maintained in a locked container.
- l. Cipher lock codes and any other combinations or codes will be changed upon departure of personnel or compromise.
- m. Procedures for issuing keys or codes to utility companies will be coordinated with the Servicing Security Element (SSE).

B.4 INTERIOR SECURITY

- a. Access to any critical operations area will be further restricted to only those personnel required to perform their duties.
- b. Loss prevention measures will be implemented to protect high-value equipment.
- c. Sensitive Unclassified Information will be protected as required. Procedures to notify personnel working with sensitive information that visitors are in the area will be established.
- d. See Facility Entrance Security criteria for restricted/critical operations area door requirements.

B.5 SECURITY OPERATIONS AND ADMINISTRATION

- a. Contractors will complete background investigations prior to being allowed unescorted access.
- b. The Facility Manager will prepare a Facility Security Plan that includes (see Order 1600.69C and contact your FAA SSE for more information):
 - 1. Visitor control procedures
 - 2. Shipping, receiving, and mail handling procedures.
 - 3. Procedures for securing high value equipment.
 - 4. Security incident reporting requirements.
 - 5. A First Responder Book.
 - 6. An Information Safeguards Plan.

7. An Occupant Emergency Plan that includes:
 - a. Workplace violence and active shooter plans.
 - b. Evacuation/relocation and shelter-in-place procedures.
- c. The Occupant Emergency Plan will be tested annually. The test will include a facility evacuation.
- d. The Facility Manager will conduct an annual table top exercise that evaluates preparedness for either an active shooter, workplace violence, or bomb threat incident on a three-year rotating basis. Local response agencies should be invited to the table top exercise.
- e. Facility personnel will receive an annual briefing on their responsibilities within the Facility Security Plan.

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Appendix C Mitigable Hazards Applicable to System Siting

<This is a placeholder that will be filled once an FAA Tower Siting Order applicable to RT systems has been drafted.>

DRAFT

Appendix D References

The following documents are referenced and/or applicable to this document entry. The latest revision of the document applies unless otherwise stated.

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Appendix E Acronyms

A	
AAA	
Ambient Airfield Audio	ii
AC	
Advisory Circular	i
ANSI	
American National Standards Institute	B-1
AR	
Analysis Report.....	A-10
ARP	
Aerospace Recommended Practice	A-1
ASH	
FAA Office of Security and Hazardous Material	B-1
AT	
Air Traffic.....	i
ATC	
Air Traffic Control.....	i
ATCS	
Air Traffic Control Specialist.....	i
ATCT	
Airport Traffic Control Tower.....	i
ATM	
Air Traffic Management	7, F-8
ATO	
Air Traffic Organization	iv
<hr/>	
C	
CDG	
Course Design Guide	A-10
CIB	
Commercial Instruction Book.....	7, F-9
CMA	
Common Mode Analysis.....	A-5
CNS	
Communication, Navigation, Surveillance	7, F-8
CONOPS	
Concept of Operations	1
COTS	
Commercial-Off-The-Shelf.....	6
CSCI	
Computer Software Configuration Item.....	7, F-8

CSD
Control Status Display iii

CWP
Controller Working Position 13

D

DR
Data Recorder ii

DRRP
Detection and Recognition Range Performance 13

E

EUROCAE
European Organisation for Civil Aviation Equipment 6, F-8

F

FAA
Federal Aviation Administration i

FCA
Functional Configuration Audit 9

FCC
First Course Conduct A-10

FCT
FAA Contract Tower ii

FHA
Functional Hazard Assessment 1

FML
Facility Maintenance Log 15

FPO
Flight Procedures Office 12

FRD
Facility Reference Data 16

FTA
Fault Tree Analysis A-5

I

ICD
Interface Control Document A-4

L

LOA

Letter of Agreement..... 12

M

MDT
Maintenance Data Terminal..... iii

MEL
Minimum Equipment List..... i

MMAC
Mike Monroney Aeronautical Center 9

MTTR
Mean Time To Repair 14

N

NAS
National Airspace System..... i

NFDC
National Flight Data Center 16

NOTAM
Notice to Air Missions 14

NSN
National Stock Number A-8

O

OCC
Operations Control Center 16

OMM
Operations and Maintenance Manual iv

OTO
Operational Tryout..... A-10

OVR
Operational Visual Requirements 10

P

PAOF
Preliminary Assessment of Operational Feasibility 1

PCA
Physical Configuration Audit 9

PIM
Program Implementation Manager 12

PIREP
Pilot Report 14

PRA
Particular Risk Analysis..... A-5

PSSA
Preliminary System Safety Assessment..... 5, F-8

Q

QVSL
Qualified Vendor System List iii

R

RMM
Remote Maintenance Monitoring..... 15

RT
Remote Tower i

RTC
Remote Tower Center ii

RVP
Required Visual Presentation ii

S

SAE
Society of Automotive Engineers A-1

SAT
Site Acceptance Test 9

SCD
System Characterization Document..... 8, F-9

SDA
System Design Approval..... i

SDD
System Design Document 5

SEMP
System Engineering Management Plan..... 3

SLG
Signal Light Gun..... ii

SRM
Safety Risk Management..... 16

SRS
System Requirement Specification 1

SSA
System Safety Assessment 6, F-8

SSE
Servicing Security Element B-2

SSP
System Security Plan 8, F-9

SVP
Supplemental Visual Presentation iii

T

TPR

Technical Performance Record 15

TRDR

Technical Reference Data Record 15

W

WJHTC

William J. Hughes Technical Center 9

Z

ZSA

Zonal Safety Analysis A-5

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Appendix F Table of Requirements

The following table list all requirements contained in this AC, in numerical order. The assignment of the requirement to applicant or sponsor is identified.

Req ID	Assigned	Paragraph Reference AC Requirement
AC_R0001	Applicant	1 Intake Process The documents listed in Section 1 describe the minimum list of deliverables that the applicants must [AC_R0001] submit.
AC_R0002	Applicant	2.2.1 Planning Review A series of primary planning documents must [AC_R0002] be submitted by the applicant defining the applicant’s processes to be following in their development process.
AC_R0003	Applicant	2.2.2 System Requirements Review The applicant must [AC_R0003] deliver as a minimum: System Requirements, an FHA, traceability of system requirements to the FAA minimum requirements and justification for any requirement deviations or waivers.
AC_R0004	Applicant	2.2.3 Architecture Review For the architecture review, the applicant must [AC_R0004] deliver as a minimum: a System Design Description Document, a Preliminary System Safety Assessment (PSSA) (incorporating applicable safety analyses), item requirement documents and traceability of item requirements to the system requirements.
AC_R0005	Applicant	2.2.4 System Verification Review For the verification review, the applicant must [AC_R0005] at a minimum deliver or make available: a final Configuration Index, Verification Procedures, Verification Results, System Safety Assessment (SSA), Verification Compliance Matrix and System Approval Summary Report.
AC_R0006	Applicant	2.2.5.1 Complex Hardware Design The applicant must [AC_R0006] show compliance with the objectives of RTCA, Inc. (RTCA) DO-254, Design Assurance Guidance for Airborne Electronic Hardware (thereafter RTCA DO-254)/European Organisation for Civil Aviation Equipment (EUROCAE) ED-80, Design Assurance Guidance for Airborne Electronic Hardware (thereafter EUROCAE ED-80), as a means, but not the only means, to seek SDA, for each complex hardware configuration item.
AC_R0007	Applicant	2.2.5.2 Software Design The applicant must [AC_R0007] show compliance with each applicable objective of RTCA DO-278A, Software Integrity Assurance Considerations for Communication, Navigation, Surveillance and Air Traffic Management (CNS/ATM) Systems (thereafter RTCA DO-278A)/EUROCAE ED-109A, Software Integrity Assurance Considerations for Communication, Navigation, Surveillance and Air Traffic Management (CNS/ATM) Systems (thereafter EUROCAE ED-109A), as a means, but not the only means, to seek SDA, for each configuration item containing software (i.e., Computer Software Configuration Item [CSCI]).

Req ID	Assigned	Paragraph Reference AC Requirement
AC_R0008	Applicant	2.2.6.1 Commercial Instruction Book The applicant must [AC_R0008] submit a Commercial Instruction Book (CIB) prepared in accordance with FAA-D-2494, Technical Instruction Book Manuscript: Electronic, Electrical, and Mechanical Equipment, Requirements for Preparation of Manuscript and Production of Books (thereafter FAA-D-2494).
AC_R0009	Applicant	2.2.6.2 System Siting Plan The applicant must [AC_R0009] submit a System Siting Plan that contains the applicant's plans and considerations for system siting at any installation.
AC_R0010	Applicant	2.2.6.3 Air Traffic Control End-User Guide & Manual The applicant must [AC_R0010] submit an End-User Guide that contains all relevant information associated with the operation of the RT system by ATCSs.
AC_R0011	Applicant	2.2.6.4 System Characterization Document The applicant must [AC_R0011] submit a System Characterization Document (SCD) reflecting the system configuration being requested for SDA.
AC_R0012	Applicant	2.2.6.5 System Security Plan The applicant must [AC_R0012] submit a System Security Plan (SSP) that describes how security controls are to be implemented.
AC_R0013	Applicant	2.2.6.6.1 User Training The applicant must [AC_R0013] prepare and submit user training for FAA review where the user may be an ATCS or System Administrator.
AC_R0014	Applicant	2.2.6.6.2 Maintainer Training The applicant must [AC_R0014] prepare and submit maintainer training for FAA review.
AC_R0015	Applicant	2.5 Modification To Approved Systems In the event an applicant chooses to make a modification to an approved RT system listed on the FAA QVSL, the applicant must [AC_R0015] submit an SDA Plan, which outlines the change proposal and a change impact analysis to the FAA for review and approval.
AC_R0016	Sponsor	3.1 Sponsor Actions All airport owners, or other parties contemplating purchase and installation of a non-federal RT system (sponsor), must [AC_R0016] coordinate with the FAA before purchasing any equipment.
AC_R0017	Sponsor	3.1.1 Site Planning The sponsor must [AC_R0017] create and submit a site-specific SCD with input from the manufacturers SCD (see section 2.2.6.4) that reflects anything unique to the site installation.
AC_R0018	Sponsor	3.1.1 Site Planning The sponsor must [AC_R0018] create and submit a site-specific SSP that describe how security control is to be implemented.
AC_R0019	Sponsor	3.1.1 Site Planning The sponsor must [AC_R0019] incorporate, at a minimum, the Physical Layout Diagram, Site Planning Data, and Physical Security subjects in the planning process documentation, which is to be provided to the FAA.

Req ID	Assigned	Paragraph Reference AC Requirement
AC_R0020	Sponsor	3.1.2 Installation, Calibration, & Site Acceptance Test Site-specific system calibrations and SAT procedures must [AC_R0020] be completed by the sponsor before Air Traffic Services performs site-specific approval testing.
AC_R0021	Sponsor	3.1.3.1 Operations and Maintenance Manual The sponsor must [AC_R0021] support the development of and sign an OMM that provides a clear understanding of the FAA and sponsor's responsibilities concerning operation and support of the RT system.
AC_R0022	Sponsor	3.1.3.2 Letter of Agreement The sponsor must [AC_R0022] support the development of and sign an LOA, with ATO Air Traffic Services, which provides a clear understanding of other processes the sponsor follows pursuant to the operation of the RT system.
AC_R0023	Sponsor	3.4 Commissioning Inspection As the system approaches operational readiness, the owner must [AC_R0023] request a commissioning ground inspection by an FAA Non-federal Inspector.
AC_R0024	Sponsor	4.1 FAA Periodic Ground Inspections The sponsor must [AC_R0024] support periodic visits to the operational RT system by the FAA to verify that the system continues to operate correctly.