FAA

NextGen Portfolio Management & Technology Development Directorate (ANG-C)

Remote Tower Systems

Concept of Operations (ConOps)

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Report for Operational Safety Assessment

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Document Revision History

Version	Date	Author	Sections Changed	Description of Change
1.0	4/7/2020	ANG-C5	All	Initial draft

Acronyms

Acronym	Definition
AC	Advisory Circular
AGL	Above Ground Level
ASOS	Automatic Surface Observation System
ATC	Air Traffic Control
ATCS	Air Traffic Control Specialist
ATCT	Airport Traffic Control Tower
AWOS	Automated Weather Observing System
CFR	Code of Federal Regulation
ConOps	Concept of Operations
CTO	Control Tower Operator
CWP	Controller Working Position
FAA	Federal Aviation Administration
FCT	Federal Contract Tower
FNL	Northern Colorado Regional Airport
IFR	Instrument Flight Rules
IR	Infrared
JO	Joint Order
JYO	Leesburg Executive Airport
LOA	Letter of Agreement
MEL	Minimum Equipment List
NAS	National Airspace System
NFCT	Non-Federal Control Tower
OTW	Out the Window
OV-1	Operational View
OVR	Operational Visual Requirement
PCG	Pilot Controller Glossary
PTZ	Pan Tilt Zoom
RT	Remote Tower
RTC	Remote Tower Center
RTM	Remote Tower Module
SME	Subject Matter Expert
SMS	Safety Management System
VFR	Visual Flight Rules

Applicable Documents

(1) 14 CFR Parts 61, 65, 71, 73, 91, and 135

(2) Aeronautical Information Manual

(3) European Organization for Civil Aviation Equipment, Minimum Aviation System Performance Standard For Remote Tower Optical Systems, ED-240A

(4) FAA Advisory Circular 90-48, Pilots' Role in Collision Avoidance

(5) FAA Advisory Circular 90-93, Operating Procedures for ATCT that are not Operated by, or Under Contract with, the US

(6) FAA JO 1900.47, Air Traffic Control Operational Contingency Plans

(7) FAA JO 3120.4, Air Traffic Technical Training

(8) FAA JO 6040.4, ATCT Siting Process

(9) FAA JO 6480.7, ATCT and TRACON Design Policy

(10) FAA JO 6700.20, Non-Federal Navigation Aids, ATC Facilities, and Automated Weather Systems

(11) FAA JO 7110.65, Air Traffic Control

(12) FAA JO 7210.3, Facility Operation and Administration

(13) FAA JO 7210.54, FCT Operation and Administration

(14) FAA JO 7210.77, Non-Federal Weather Observation Program

(15) FAA JO 7210.78, FCT New Start and Replacement Tower Process

(16) FAA JO 7210.632, Air Traffic Organization Occurrence Reporting

(17) FAA JO 7210.633, Air Traffic Organization Quality Assurance Program

(18) FAA JO 7210.634, Air Traffic Organization Quality Control

(19) FAA JO 7900.5, Surface Weather Observing

(20) FAA JO 8000.90, Air Traffic Safety Oversight Credentialing

(21) FAA JO 8020.16, Aircraft Accident and Incident Notification, Investigation, and Reporting

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1 Introduction

The purpose of this Concept of Operations (ConOps) document is to describe the provision of Class D Airport Traffic Control Tower (ATCT) Services[1] by Air Traffic Control Specialists (ATCSs) utilizing a Remote Tower (RT) system. The RT concept is a new technological solution to the National Airspace System (NAS). This concept provides the ability for ATCT services to be provided from a Remote Tower Center (RTC) via a network of cameras, sensors, displays, and other supporting equipment. An RTC may be located either on-airport property or off-airport property in a remote location as compared to a traditional brick-and-mortar ATCT, which must be located on the airport surface.

1.1 Description

The RT concept utilizes a series of sensors located on the surface and display screens located on or off the airport in an RTC. This concept is often call "RT Visual Only." ATCSs utilize the information displayed on the screens to replace the direct visual presentation used in a traditional ATCT facility. ATCT services are provided using the information presented by the RT system in conjunction with existing ATCT minimum equipment. ATCSs using the RT system to provide ATCT services must adhere to the same Air Traffic Control (ATC) procedures in use at a traditional ATCT and be in accordance with Federal Aviation Administration (FAA) Joint Order (JO) 7110.65. Letters of Agreement (LOAs) support inter-facility coordination. Any required airspace designation, frequency assignments, or charting requirements should also continue as with the establishment and commissioning of traditional ATCTs. Appendix B contains a glossary of applicable terminology.

1.2 Scope

The FAA is developing a strategy for evaluating and endorsing the use of RT systems in the NAS. The FAA implementation approach is to integrate RT technology as a viable option for service provision once the FAA has evaluated and validated this technology. The FAA is exploring the RT concept as an optional replacement for brick-and-mortar ATCTs for the provision of Class D ATCT services. The concept descripted in this document focuses on the implementation of RT systems that replace the out the window (OTW) view of a brick-and-mortar ATCT with a camera view. Therefore, the RT system evaluations supporting this concept are scoped to the visual component of the ATCSs' needs.

Congress directed the FAA to evaluate the RT concept at airports in the NAS with the FAA Reauthorization Act of 2018 Section 161, RT Pilot Program for Rural and Small Communities. The pilot program goals are to validate RT concepts and technology, validate the RT system business case, and establish and validate an RT equipment certification process and associated standards.

1.3 Document Overview

The RT system ConOps is a living document that will continue to be updated, improved, and validated as the RT Pilot Program results identify required safety, operational, or technical requirements. The initial focus of the RT system ConOps is to support the development of RT evaluation processes.

[1] See Appendix A for a list of Class D ATCT Services.

2 Current System

Currently in the United States, ATCT services are provided via conventional ATCTs. The purpose of an ATCT is to sequence arriving and departing aircraft and direct aircraft on the ground within the movement area. ATCSs do this utilizing the OTW view among other available tools.

2.1 Description of the System

An ATCT is a terminal facility that uses air-ground radio communications, visual signaling, and other devices to provide ATCT services to aircraft operating in the vicinity of an airport or on the movement area. ATCSs authorize aircraft to utilize the runway at the airport or to transit the airport traffic area regardless of flight plan or weather condition. Approach control services may be provided by ATCSs if suitably equipped, trained, and approved.

ATCSs receive information about the airport environment and movement area from visual observation, pilot reports, sensor information (e.g. wind), and other approved data sources (e.g., airport personnel). The ATCSs observe and obtain visual information via an OTW view. An ATCT cab must have an unobstructed 360-degree view of the airport movement per requirements (NAS SR-1000). Per FAA JO 7400.2 (17-2-10(a)), weather observations must be taken at the primary airport during the times and dates the Class D airspace is active. A federally certified weather observer or a federally commissioned automated weather observing system (AWOS) can take the weather observation. ATCSs interfaces with other facilities and air traffic within the airport environment and non-movement area in accordance with procedures identified in LOAs with adjacent facilities.

Class D airspace is defined in the 14 Code of Federal Regulation (CFR) Part 71 Subpart 61. Class D airspace is under the jurisdiction of a local ATCT. Aircraft operating within this area are required to establish and maintain radio communication with ATCSs. No separation services are provided to Visual Flight Rules (VFR) aircraft. The configuration of each Class D airspace area is unique. Class D airspace is normally a circular area with a radius of five miles around the primary airport. This controlled airspace extends upward from the surface to about 2,500 feet Above Ground Level (AGL). When instrument approaches are used at an airport, the airspace is normally designed to encompass these procedures. The Class D surface areas may be designated as full-time or part-time. Part-time Class D effective times are published in the Chart Supplements with airspace reverting to either a Class E surface area or Class G airspace outside of effective times. When a part-time Class D surface area changes to Class G, the surface area becomes Class G airspace up to, but not including, the overlying controlled airspace.

Visual navigation aid system allows the ATCSs to monitor and control airfield lighting systems to support aircraft in locating the airport, locating the runway, and navigating on the airport surface. Non-visual navigation aid systems allow the ATCSs to remotely monitor the different non-lighting systems that support aircraft in navigating to the airport/runway.

2.2 Operational Policies and Constraints

2.2.1 Establishment of an ATCT

Installation of ATCTs in the NAS are currently informed by FAA JOs 6480.7 and 6480.4, which define ATCT establishment processes and include criteria for facility site selection and ATCT cab height requirements. The guidance for the establishment or replacement of an ATCT in the Federal Contract Tower (FCT) Program is in FAA JO 7210.78. This order identifies the minimum equipment list (MEL) items that are required for any “new start” or existing non-Federal ATCT seeking acceptance into the FCT Program. The Communication Systems include telecommunication (ground to ground) and radio (air to ground) communication to enable ATCS/Supervisors to communicate with aircraft/helicopters, ground vehicles, adjacent air traffic control facilities (e.g. overlying), airport operators, and emergency personnel. Weather equipment

provide ATCSs the relevant weather information on and near the airport (e.g., temperature, barometric pressure, wind direction/strength, visibility, precipitation, cloud ceiling, etc.).

2.2.2 Operations of an ATCT

Having an operational ATCT at the airport requires pilots to establish two-way radio communication with ATCSs and follow air traffic control instructions (14 CFR § 91.129). ATCSs follow and adhere to operational requirements outlined in FAA JOs 7110.65, 7210.3, and other applicable Orders. Facility staffing requirements are based on the procedures in FAA JOs 7110.65 and 7210.3.

2.3 Users or Involved Personnel

- Airport owners, sponsors, and management
- FAA-certified ATCSs
- Airport traffic
- Airport users including service providers, flying public, flight schools, and fixed-base operators
- Adjacent and/or overlying air traffic facilities
- Technicians involved with ATCT equipment maintenance

2.4 Support concept

Non-Federal Equipment. Equipment, systems, and facilities procured by an entity other than the Federal Government, and thus part of the non-Federal inventory. States, U.S. possessions or territories, airport authorities, municipalities, counties, companies, or private interests own Non-Federal equipment. Such equipment may be maintained by the owner or by the FAA under a reimbursable agreement (if eligible for FAA maintenance, in accordance with FAA JO 6700.20). The owner may fund the procurement of this equipment through a Federal airport grant, based on eligibility, or other sources.

Non-Federal Air Traffic Control Tower. An ATCT that is non-Federally owned and is not in the FCT Program. The physical building is maintained by the non-Federal entity. The ATCSs are funded 100% by the non-Federal entity. Both non-Federal and FAA owned equipment might be installed in the ATCT.

Sponsor. For the purposes of the Non-Federal Program, the owner of a non-Federal facility. The owner is a non-Federal entity such as a state, U.S. possession or territory, airport authority, municipality, county, company, or private interest. Please note: In other programs, “sponsor” could mean other things, for example the entity providing funding for an airport project.

FAA Contract Tower. An ATCT that is not a FAA ATCT. FCTs may be FAA-owned or Sponsor-owned; however, in both cases contract-ATCSs are hired to work in the FCTs. These contract-ATCSs are not FAA ATCSs. The FAA funds contracted-ATCSs’ salaries. The non-Federal entity may have to bear some of the cost, but no more than 20%. Both non-Federal and FAA owned equipment might be installed in the ATCT. The non-Federal entity is responsible for maintenance of the physical building.

3 Description of Change

3.1 Justification

RT vendors have been conducting research and development into alternatives for the brick-and-mortar ATCT in Class D airspace. RT systems are deployed outside of the NAS in various countries, including Sweden, Norway, and Germany. RT systems potentially afford installation and maintenance cost savings and location flexibility. The main objective of this RT concept is to provide ATCSs with sufficient OTW information to provide Class D ATCT services. The ATCT services themselves should remain unchanged from a traditional ATCT with only the equipment utilized for the provision of these services changing.

3.2 Assumptions and Constraints

- RT system is installed at airports offering Class D ATCT services.
- No additional surveillance systems (standalone or integrated) are required.
- RT system meets the requirements to operate and manage either as
    - A Non-Federal Control Tower (NFCT) (as defined in FAA Advisory Circular (AC) 90-93) or
    - An FCT (in accordance with FAA JO 7210.78) if entry into the FCT program is within scope.
- One airport is serviced by one RT system. Multiple airports simultaneously serviced by one RT system is not within scope.
- ATCSs will receive all applicable training in accordance with FAA JO 3120.4 and/or FAA approved ATC vendor training plan.
- ATCS credentials are maintained in accordance with FAA JO 8000.90, the same as for current ATCTs in Class D. Each holder of a Control Tower Operator (CTO) certificate must meet the requirements of 14 CFR Part 65.
- Inter-facility coordination is transparent to the adjacent facilities and in alignment with LOAs.
- ATC procedures are transparent to the local airport traffic.
- ATCS positions and facility management procedures are in accordance with FAA JOs 7110.65 and 7210.3 and the FCT program requirements.

4 Remote Tower Concept

The RT concept allows for controllers to provide Class D ATCT services from a facility using camera derived video to replace the need for direct visual observation from an ATCT cab. Currently airports that cannot afford to implement and/or maintain a traditional brick and mortar ATCT have no alternatives to offer ATCT services. The RT concept offers a potentially cost-beneficial alternative to a traditional ATCT. In efforts to examine the RT concept, the FAA is developing a systematic approach to gain equipment endorsement and air traffic suitability for commissioning non-federal RT equipment for use in the provision of Class D ATCT services.

4.1 Objective and Scope

The objective of the RT concept is to provide Class D ATCT services that are transparent to the pilots and airport users. ATCSs using the RT system will use the same air traffic procedures in use at brick-and-mortar ATCTs in accordance with FAA Orders. Inter-facility coordination with adjacent airport or overlying facilities will continue to be guided by LOAs. Additionally, any necessary airspace designation, frequency assignments, or charting requirements will continue and follow pertinent FAA Orders and Regulations. The RT concept presented in this document is envisioned for operationally feasible low or medium traffic density airports. High density traffic airports are not being considered for this RT concept at this time.

4.2 Background

The idea of utilizing cameras to provide visual information to ATCSs is not a new idea in the NAS. From 2007 to 2011, the FAA researched a RT-like concept for large airports through Staffed NextGen Towers project. While the concept seemed viable at the time, the technology was not mature enough for the considered operational environment. In 2015, RT system vendors approached the FAA for guidance on obtaining approval of their RT systems. The FAA decided to leverage existing research and development to evaluate these 3rd party RT systems as non-federal systems. Saab Sensis installed a RT system at Leesburg Executive Airport (JYO) in 2015. The RT system at JYO is still undergoing evaluation and entered into the industry-led initial operating capability phase of evaluations in 2018. In 2018, Searidge Technologies installed an RT system at Northern Colorado Regional Airport (FNL) in Fort Collins, Colorado. Passive and active testing and evaluation of this system is expected to begin in 2020.

The international aviation community is also investigating the RT system concept. In the fall of 2014, the first RT system was operationally approved in Sweden. Many other countries are also in various stages of implementing, evaluating, and approving RT concepts and associated systems. However, it is important to note that the international RT system implementations are at airports with much lower general aviation and overall traffic levels than the US airports being targeted. Additionally, these international RT systems implementations generally incorporate surveillance information into the RT system.

4.3 Operational Policies and Constraints

Operational policies for the provision of Class D ATCT services using the RT system follow the existing air traffic procedures and facility management procedures (see Section 2.2.). Additional surveillance systems are not necessary, and radar services are not provided by ATCSs using RT systems.

The Technical Operations Non-Federal Program is the FAA program that regulates all non-Federally owned navigational and weather facilities that are directly associated with the NAS. Therefore, all regulation of RT equipment will be the responsibility of this group.

4.4 Description of the Concept

A RT visual only system consists of a core array of visual sensors that display a 360-degree view of the airfield across a series of displays. A visual reproduction of the airport environment is the core of the RT system and replaces the OTW view from the ATCT cab. The visual information display system must afford the ATCS a visual representation of the airport environment. The airport surface camera array will encompass at a minimum the airport movement area and must provide the ATCS with the information to detect, recognize, and identify airborne targets.

In addition to a 360-degree view, the RT system may provide supplemental information to ATCSs via additional distributed camera views, pan-tilt-zoom (PTZ) cameras, and ambient outdoor noise. These data sources will replace the visual and auditory information ATCSs presently gather through and by looking out the ATCT cab windows. The ATCS will utilize the RT system information in conjunction with existing NAS systems to provide Class D ATCT services.

In addition to the RT System components, additional equipment items on either the FCT MEL or NFCT MEL (as dictated by the type of ATCT) must be installed for ATCS use. An ATCS using an RT system requires the use of these existing systems that are in ATCTs today. These systems will be implemented and function per existing FAA requirements. This also applies to the existing airport equipment, such as airfield lighting, navigational aids, Automated Weather Observing Systems/Automatic Surface Observation Systems (ASOS), wind information indicators, Digital Altimeter Setting Indicators, and Automatic Terminal Information System or Digital Automatic Terminal Information Systems. Figure 1, Operational View (OV-1), provides a high-level depiction of the RT system concept.

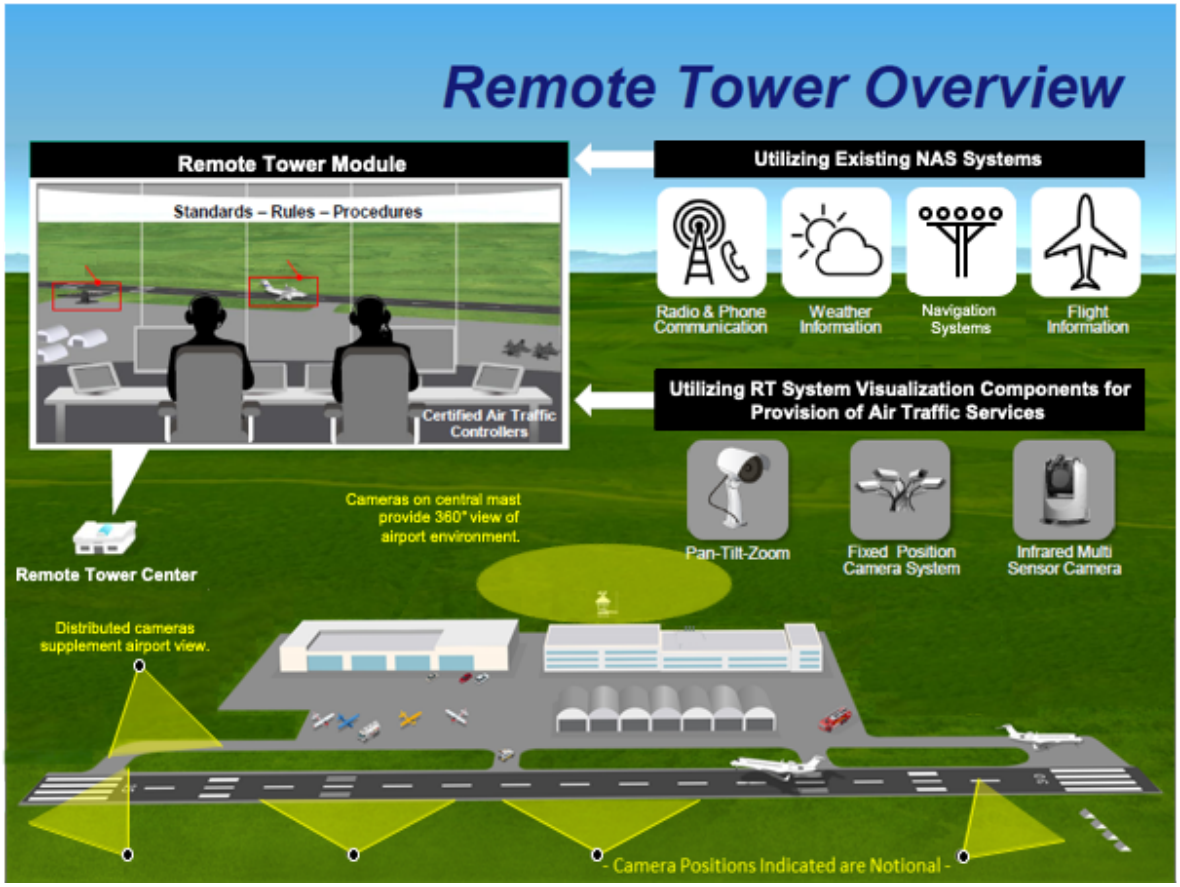

Figure 1: OV-1 of RT System

RT systems allow the airport flexibility in where the RTC is located, and potentially utilize infrastructure that has lower installation and recurring operating costs. The RTC, located on or off airport property, is comprised of remote tower modules (RTMs). These RTMs consist of displays, individual controller working positions (CWPs), and MEL equipment (see Figure 2). CWPs can be equipped with traditional MEL and other tools necessary to provide ATCT services including radios, lighting control, signal light gun, and navigation aid status. In the current scope, each RTM displays the information for a singular airport and is analogous to a traditional ATCT cab. An airport is serviced by one RT system and one RTM. RTCs may have one or multiple RTMs. For example, the RTC in Figure 2 include the RTM for airport KABC on the left and the RTM of airport KEFG on the right.

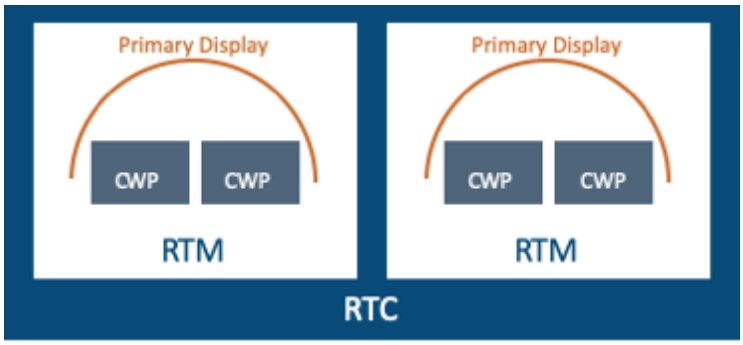

Figure 2: RTC concept

The RT system equipment includes the ability to provide the following functions:

- **Required Visual Presentation**: Visual presentations necessary for meeting the Operational Visual Requirements (OVRs) (see Section 4.4.1). A continuous fixed 360 degree view of the airfield and/or surrounding airspace must be provided.
- **Required Visual Presentation Control**: Input component(s) relating to the Required Visual Presentation.
- **Supplemental Visual Presentation**: Any auxiliary visual presentations that provide additional situation awareness above the Required Visual Presentation(s).
- **Supplemental Visual Presentation Control**: Serves as the input component(s) relating to the Supplemental Visual Presentation.
- **Signal Light Gun**: Communicates with aircraft and vehicles via lights in the event of loss of communication. (Note: Equivalent function to Signal Light Gun on MEL for conventional ATCTs.)
- **RT System Status Function**: RT System Status function indicates the overall RT System status to the ATCS(s). (Note: Reports any faults, system events, and / or other information necessary for the ATCSs.)

4.4.1 Operational Visual Requirements

The FAA held a series of workshops with Subject Matter Experts (SMEs) to create the first version of Operational Visual Requirements (OVRs). The OVRs describe the visual information needs of ATCSs at ATCTs proving Class D ATCT services. The OVRs document is a living document that will continue to be updated, improved, and validated. The implementation of RT systems replaces the standard OTW 3D view of a brick-and-mortar ATCT with a 2D view of the same environment.

Since the implementation of RT systems replaces the OTW display with an RT system display, the RT System OVRs are scoped to the visual component of the ATCSs' information needs.

The OVRs Report can be found in Appendix C.

4.4.2 International Alignment

One critical parameter is the time delay between image capture and presentation to the ATCSs on the visual presentation(s), which is called the end-to-end delay (also known as video latency). The RT system should demonstrate that the end-to-end delay does not exceed the established maximum end-to-end delay value.

> *Note: EUROCAE ED-240 [15] (REQ 01) stipulates a maximum end-to-end delay of 1 second for the visual presentation.*

Other requirements in the EUROCAE ED-240 are being considered.

4.5 Users or Involved Personnel

The users or involved personnel do not change from the current system.

- Airport owners, sponsors, and management
- FAA-certified ATCSs
- Airport traffic
- Airport users including service providers, flying public, flight schools, and fixed-base operators
- Adjacent air traffic facilities
- Technicians involved with ATCT equipment maintenance

5 Operational Scenarios

Human performance scenarios were developed that focus on Class D services. These scenarios were developed as part of RT evaluations and focused on identifying the visual information needs of ATCSs. The scenarios are divided into two categories – local control and ground control – with each of those categories being divided into two sub-categories – nominal and operational. Nominal scenarios represent operations where all components proceeded according to plan without an unplanned event or complicating condition (e.g., aircraft operating in the traffic pattern). Operational scenarios represent operations where a complicating condition (e.g., shift in winds), unusual / unplanned event (e.g., aborted takeoff), abnormal situation (e.g., animal loose at airport), or emergency situation (e.g., engine loss) occurs.

The scenarios can be downloaded at https://rts.forthillgroup.com/human-performance-scenarios.

6 Summary of Impact

6.1 Operational Impact

Transitioning from a non-towered environment to a towered environment impacts operations, but operational transitions will occur regardless of the RT system. VFR traffic operating on or near the airport will be required to equip and be in communications with ATCSs. All aircraft will receive and must follow ATCS issued instructions for landing and departing runways, and movements in the airspace. Pilot situation awareness will improve from the receipt of ATC traffic advisories, and Instrument Flight Rules (IFR) efficiencies will increase. Overlying ATC facilities that currently provide ATCT service to non-towered airports will now coordinate with the RT ATCSs to provide ATCT services to the airport.

6.2 Organizational Impact

The implementation of the RT concept impacts numerous lines of business within the FAA as well as industry. The necessity to evaluate vendors' RT systems as well as to facilitate each site deployment will require additional resources (staffing, funding, and training) throughout the FAA. The approval processes will result in increased demand on resources needed to facilitate the FAA's Safety Management System (SMS) Process. In addition, the FAA will need additional Technical Operations resources for staffing, training and travel to perform initial equipment certification as well as the annual verification inspections required for non-fed systems. Private industry should see an increase in resource needs as well to address the demand for implementing RT systems throughout the NAS.

7 Appendix A: Class D ATCT services

ID	Class D ATCT service
S1	***Air Traffic-Pilot Communication Services***
S1.1	Manage Radio Communication
S1.2	Manage Clearances, Instructions, or Information
S2	***Flight Plan Services***
S2.1	Manage Flight Plan
S2.2	Manage Amended Flight Plan Data
S3	***Ground Movement Services***
S3.1	Manage Ground Movement
S3.2	Manage Ground Sequencing and Spacing
S3.3	Manage Runway Separation
S3.4	Managing Takeoff Information and Instructions
S3.5	Manage Takeoff Cancellation and Aborted Takeoff
S3.6	Manage Potential or Actual Ground Conflict
S3.7	Manage Flow Constraint / Traffic Management Initiative
S4	***Airborne Services***
S4.1	Manage Overflight
S4.2	Manage Airborne Departure Including Pattern Airborne Departure
S4.3	Manage Arrival Including Pattern Arrival
S4.4	Manage Airborne Sequencing and Spacing
S4.5	Manage Go Around and Missed Approach
S4.6	Manage Potential or Actual Airborne Conflict
S4.7	Manage Potential or Actual Airspace Violation
S5	***Weather Services***
S5.1	Manage Weather and Severe Weather Condition Information
S6	***Special Operations, Emergency, and Unusual Situation Services***
S6.1	Manage Unsafe Condition
S6.2	Manage Special Operation
S6.3	Manage Response to Uncontrolled Object / Aircraft
S6.4	Manage Emergency Response
S6.5	Manage Unusual Situation

8 Appendix B: Glossary

The table below lists pertinent terms. When listed, the term and its description originate from the FAA JO 7110.65 Pilot Controller Glossary (PCG).

Term	Definition
Air Traffic Control	A service operated by appropriate authority to promote the safe, orderly and expeditious flow of air traffic (7110.65 PCG – Air Traffic Control)
Air Traffic Control Service	A service provided for the purpose of: a. Preventing collisions: 1. Between aircraft; and 2. On the maneuvering area between aircraft and obstructions. b. Expediting and maintaining an orderly flow of air traffic. (7110.65 PCG – Ai Traffic Control Service [ICAO])
Air Traffic Control Specialist	A person authorized to provide Air Traffic Control Service. (7110.65 PCG – Air Traffic Control Specialist)
Airport Traffic Control Tower	A terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area. Authorizes aircraft to land or takeoff at the airport controlled by the tower or to transit the Class D airspace area regardless of flight plan or weather conditions (IFR or VFR). A tower may also provide approach control services (radar or nonradar). (7110.65 PCG – Tower)
ATCT Service	A service provided by a control tower for aircraft operating on the movement area and in the vicinity of an aerodrome (7110.65 PCG – Airport Tower Control Service)
Class D Controlled Airspace	Generally, that airspace from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower. The configuration of each Class D airspace area is individually tailored and when instrument procedures are published, the airspace will normally be designed to contain the procedures. Arrival extensions for instrument approach procedures may be Class D or Class E airspace. Unless otherwise authorized, each person must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while in the airspace. No separation services are provided to VFR aircraft. (7110.65 PCG – Controlled Airspace – Class D)
Commercial off-the-shelf	A product or service developed for sale, lease, or license to the public and is currently available at a fair market value. (FAST Definitions – Commercial-off-the-shelf)
Controlled Airspace	An airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification. (7110.65 PCG – Controlled Airspace)
FAA Contract Tower	An air traffic control tower providing ATC services under contract with FAA, staffed by contracted air traffic control specialists. (7210.78 7d)
Minimum Equipment List	The MEL identifies those items that are required for any “new start” or existing tower seeking acceptance into the FCT Program. (7210.78 7i)

Term	Definition
Movement Area	The runways, taxiways, and other areas of an airport/heliport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports/heliports with a tower, specific approval for entry onto the movement area must be obtained from ATC. (7110.65 PCG – Movement Area)
National Airspace System	The common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information, and manpower and material. Included are system components shared jointly with the military. (7110.65 PCG – National Airspace System)
Non-Federal Control Tower	An air traffic control tower that is not staffed by FAA or FAA contracted controllers. An NFCT is not associated with the FCT Program or funded by the FAA. (7210.78 7k)
Non-Federal Equipment	Facilities that are owned by entities other than the Federal government. (6700.20 1)
Operational Suitability	The degree to which a new product or service is ready for operational use with consideration given to the following factors: reliability, availability, compatibility, transportability, interoperability, usage rates, maintainability, safety, human factors, supportability, and logistics. (FAST Definitions – Operational Suitability)
Signal Light Gun	A handheld directional light signaling device which emits a brilliant narrow beam of white, green, or red light as selected by the tower controller. The color and type of light transmitted can be used to approve or disapprove anticipated pilot actions where radio communication is not available. The light gun is used for controlling traffic operating in the vicinity of the airport and on the airport movement area. (7110.65 PCG – Light Gun)
Uncontrolled Airspace	Airspace in which aircraft are not subject to controlled airspace (Class A, B, C, D, or E) separation criteria. (7110.65 PCG – Uncontrolled Airspace)
Visual Flight Rules	Rules that govern the procedures for conducting flight under visual conditions. The term “VFR” is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan. (7110.65 PCG – Visual Flight Rules)

The table below lists specific RT terminology.

Term	Definition
Audio Output	Audio Output function transmits ambient audio to the RTC.
Controller Working Position	Location where the individual ATCS provides ATCT services within the RTM.
Conventional Tower	A facility located at an aerodrome from which ATCT service is provided principally through direct out-of-the-window observation of the aerodrome and its vicinity. (Based on EASA Annex I to ED Decision 2019/004/R)
OTW View	A view of the area of responsibility of the ATCS from a conventional ATCT, obtained via direct visual observation. (Based on EASA Annex I to ED Decision 2019/004/R)
Remote Tower Center	A facility housing one or more remote tower modules. (Based on EASA Annex I to ED Decision 2019/004/R)
Remote Tower Module	A combination of systems and constituents from where RT ATCT services can be provided, including one or more CWP and the visual presentation. (It can be compared with the tower cabin of a conventional ATCT.) (Based on EASA Annex I to ED Decision 2019/004/R)
Required Visual Presentation	Visual presentations necessary for meeting the Operational Visual Requirements (OVRs). A continuous fixed 360 degree view of the airfield and/or surrounding airspace must be provided.
Required Visual Presentation Control	Input component(s) relating to the Required Visual Presentation.
RT System	The various system components that comprise the RT.
Supplemental Visual Presentation	Any auxiliary visual presentations that provide additional situation awareness above the Required Visual Presentation(s).
Supplemental Visual Presentation Control	Serves as the input component(s) relating to the Supplemental Visual Presentation.

9 Appendix C: OVR Report