



ECA
Piloting Safety

Remote Towers

- ECA Position -

Remote Towers (also referred to as Remote Tower Services RTS, Remote Tower Operation RTO, Remote Aerodrome ATS RAATS and Remote Virtual Tower) is a concept where the air traffic service (ATS) at an airport is performed remotely, i.e. somewhere else than in the local control tower. It comprises the re-location of air traffic controllers to a Remote Tower Centre (RTC) and the provision of all required data including a camera display of the airport and aircraft (normally with enhancement features).

This paper outlines the European pilots' perspective and position on Remote Towers and updates its 2014 [position](#). ECA accepts the development of Remote Tower Services (RTS), provided that the flight safety, service and quality level is met or increased, compared to conventional tower services. The required conditions are explained below.

The concept of RTS is already in place in the single or sequential mode in Remote Tower Centres. However, as the implementation plans and operation procedures are not (yet) standardized, the concept varies in each of the implementing states.

Multiple-mode (simultaneous) RTS are being explored in certain countries, but are less mature and present significant technical and human factors challenges.

1. Description of the Concept

Conventionally, visual observation of traffic in the pattern and on ground from a local air traffic control tower was the single means of observing and separating traffic at airports worldwide. With the appearance of radar and new surveillance systems for airborne and ground movements, as well as an ever-increasing size of airports, camera and ground-surveillance systems have been installed in accordance with ICAO DOC 4444. The ICAO procedures are based on visual observation as the method of choice whenever possible.

The concept of Remote Tower Services differs fundamentally from traditional modes of tower operation. Cameras and sensors can be placed anywhere on the field, and not just in one location, and air traffic controllers can be presented a virtual picture of reality, enhanced by additional artificially created information. RTCs can be located anywhere, but are usually planned to be at a reasonable distance from all the airports to be controlled in order to reduce latency of signals and increase technical reliability.

The concept is dependent on new technical installations and a secure and uninterrupted transfer of data between the airport and the RTC.

In the concept as outlined by the SESAR programme, radar coverage and radar separation are vital. This means that the separation methods, airspace design and identification requirements (e.g. transponder) need to be adapted to the specifics of RTS.

The Remote Tower concept can be applied to airports of all sizes and kinds of locations. While initially meant for small rural airports, plans are now being developed and implemented to use

it for medium-sized airports alike and as contingency measure for major airports or for apron control only.

Following modes of operations may be distinguished:

- **Single Remote Tower**
One-to-one working position with a controller working only one aerodrome at a time, even if licenced for more than one facility ('sequential').
- **Multiple Remote Tower**
One single operator is controlling more than one aerodrome at the same time ('simultaneous'). This requires multiple ratings for each controller and careful staffing schedules. This concept is completely new compared to current operations, is less mature than single RTS and poses major challenges.
- **Contingency Tower**
A contingency facility to be used when an airport tower is unserviceable for a short period of time (e.g. fire, technical failure). Remote Tower operation will then ensure at least a basic level of service.
- **Supplementary use of Remote Tower**
In case of an airport expansion by a new runway to substitute a control tower required for the unobstructed view to this runway from the existing tower (or other facility).

2. Considerations & Requirements

ECA considers that the introduction of Remote Towers is a fundamental change to the conventional system, with the latter having proven to be successful over the years. ECA accepts the development of Remote Towers, provided that an equivalent or increased safety level of flight operations is met, the workload and procedures remain comparable for Pilots and ATC being affected, and the following considerations are met:

- **Neither standardised provisions on charting requirements nor flight procedures for Remote Towers exists. ICAO provisions are in development, but there is still an urgent need for globally and regionally accepted SARPS, definitions and procedures:**
 - Common standards and recommended practices, definitions and procedures need to be developed, covering flight procedures, separation standards and minimum requirements of systems and sensors among others (see section Resources EASA Guidance Material on Remote tower operations).
 - Technical redundancy is key, e.g. multiple independent connections between the RTC and associated RT units. Therefore, if a Main RTC (MRTC) represents a single point of failure, it should be backed up by a Contingency RTC (CRTC) unless other acceptable contingency procedures are established. A CRTC must enable a safe and timely transfer of service in order to resume delivery of Remote ATS to units served by the failed MRTC.
 - The Aeronautical Information Publication (AIP) should include information relevant to airspace users:
 - Indication that Remote Tower Service is/will be provided, including the mode of operation.
 - Interdependence with other airports if serviced by a common Remote Tower Center (especially with multiple-mode RTS at the same Remote Tower Centre).
 - Contingency and degraded mode procedures need to be defined and implemented (see section Resources Guidance Material on Remote tower operations, section 6.5).
- **Risks may change in regard to the specifics of Remote Towers. The effects of this specifics need to be studied, effectively mitigated against and**

communicated about. Following aspects should be included in the review:
(in no particular order)

- Replacement effects of the visual observation of the manoeuvring area by the camera display and additional information.
 - Adequate contingency procedures in case of hardware malfunctions (e.g. cameras, controller working positions) and system downgrades shall be in place.
 - All aircraft systems, on-ground systems/networks and data transfers between aircraft and ground shall be protected from hacking, data manipulation and viruses.
 - Communication procedures and regulations for airspace design around Remote Tower Airports (e.g. transponder mandatory zones) shall be evaluated and changed where necessary.
 - Avoiding holding patterns, diversions or hazardous situations due to ATC staff shortages.
 - Ensuring that real-time weather data and runway surface status is accurately assessed and transmitted to pilots, as the remote location does not allow a straight forward observation.
 - Adapted rules are established to cater for safety, security, operational effectiveness, including mitigation of risks and recognition of and reaction to possible accidents.
 - Flight planning with a Destination Alternate serviced from the same Remote Tower Centre as the Destination requires adequate contingency procedures for a full Remote Tower Centre failure.
 - Adequate management of navigation aids and lighting installations is needed, including location of the signalling lamp.
- **Implementation of multiple-mode of operation requires the thorough research of human factors, operational and technical implications, and adequate mitigation measures, so that pilots can rely on ATC operation that ensures an equivalent or higher safety level. Until this is the case, ECA does not support multiple-mode RTS.**
 - The concept of RTS fundamentally changes the working environment of tower controllers and different procedures and techniques have to be used. This is especially true for Multiple Tower operations. While some research has been conducted into the concept, not all implications on daily operations are yet fully understood. It would be advisable to first evaluate experience of prolonged live Single RTS, before establishing Multiple RTS.
 - There are currently no long-time studies on how human performance is affected in Remote Tower operations and current results indicate that there are certain limitations for humans with regards to working in an RTS environment. Therefore extensive training and monitoring is required when airports and controllers make the transition to Remote Towers.
 - Today, only few air traffic controllers hold ratings for more than one tower and it is unlikely that these would be exercised in a single work shift. In Multiple RTS controllers might be required to work at airports with completely different or very similar layouts and weather patterns. Both can lead to a fragmented situational awareness, causing misunderstandings, mix-ups and other working errors, thus having the potential to significantly decrease the safety of operations.
 - **Implementation of cross-border Remote Tower services requires a robust legal EU framework being in place to effectively prevent regulatory forum shopping, social dumping and market distortion. Until this is the case, ECA firmly opposes cross-border RTS.**
 - The technology of RTS will afford providers the ability to offer RTS across state borders – and hence different national jurisdictions. This will open opportunities for

RTS providers to seek a different regulatory environment to that of the state where the aerodrome is based. In a competitive market, this risks to open the door to 'regulatory forum shopping' where providers may seek a national forum with more lenient and commercially expedient regulatory (including social and taxation) regimes.

This could leave some RTS providers with less oversight and regulation than others, distort the market between RTS and normal on-site staffed aerodromes, create social dumping, and expose ATS staff to the risk of precarious atypical employment relationships with the attendant possible degradation in safety culture.

3. Conclusions

In the current situation Remote Towers provide mainly a benefit for small rural airports, expanding the ATS in opening hours and scope of services (as an on-site tower would be more costly) and for contingency towers as backup for existing control towers, increasing the reliability of service.

To make further (and possibly wider) use of the RTS concept, several requirements need to be met and implemented to ensure and enhance the existing safety level. One component should be the conversion of relevant parts of the EASA GM into regulation as minimum standards for safe and efficient Remote Towers operation in the EU. Lowering the current safety level is simply not an option.

Multiple-mode (simultaneous) RTS are less mature and present significant technical and human factors challenges. As long as these aren't fully addressed, ECA does not support multiple-mode RTS. The same is valid for transnational provision of RTS, which face major legal and social hurdles. Until these are fully and satisfactorily solved, ECA firmly opposes transnational RTS.

Brussels, September 2020

Resources (as of July 2020)

Regulation and guidance is given in Europe by the Single European Sky Air Traffic Management Research Programme (SESAR), as well as in other countries such as the United States ("Blended Airspace" in NextGen) and Australia.

Expert Group of the Human Dimension of the Single European Sky (Position Paper, Dec. 2017):

<http://www.atceuc.org/uploads/docs/human-dimension-in-remote-tower-operations-position-paper-issue-2-final.pdf>

SESAR JU: <https://www.sesarju.eu/projects/remotetower>

Eurocontrol SKYbrary: https://www.skybrary.aero/index.php/Remote_Tower_Service

EASA Guidance Material on Remote tower operations (Annex I to ED Decision 2019/004/R the EASA)

<https://www.easa.europa.eu/document-library/acceptable-means-of-compliance-and-guidance-materials/remote-tower-operations-gm-0>

ICAO Doc 4444 (PANS-ATM) Chapter 7 Procedures for Aerodrome Control Service

https://www.icao.int/airnavigation/Lists/T_Documents/DispForm.aspx?ID=83

IFALPA Technical Manual PANS ATM Chapter 7 Procedures for Aerodrome Control Service

<https://www.ifalpa.org/publications/> (Manual on request)

IFATCA on Remote Tower: <https://www.ifatca.org/remote-towers-guidance/>

ITF Remote Towers: <https://www.itfglobal.org/en/sector/civil-aviation/remote-towers>