Australian Airline Pilots' Association
Member of IFALPA

POSITION PAPER

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REMOTE TOWERS

While the issue of Remote Tower Services is complex and requires some discussion, for the avoidance of any doubt, the position of AusALPA is firmly as follows:

AusALPA cannot support the full implementation of RTS until a safety standard equivalent to or greater than the current standard can be proven, and procedures and implementation agreed to by all stakeholders.

Introduction

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 relocation 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 Australian Airline Pilots Association (AusALPA) perspective and position on Remote Towers. AusALPA accepts the consideration of 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.

In some jurisdictions, single or sequential mode RTS in RTCs have progressed beyond mere concept. However, implementation plans and operational procedures have not yet been standardised, with the concept varying in each of the implementing countries (ICAO Contracting States).

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

Concept Overview

This section presents the concept of RTS as AusALPA currently understands it. Nothing in this section reflects any opinion or position of AusALPA.

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 RTS differs fundamentally from traditional modes of tower operation. Cameras and sensors can be placed anywhere on the field, 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 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, 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 (in theory) be applied to airports of all sizes and 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.

The modes of operations includes:

- ***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***
  To substitute/supplement a control tower, where an unobstructed view is required due to airport expansions by new runways (or other facility)

Considerations & Requirements

AusALPA 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. Though AusALPA is not opposed to the concept of Remote Towers in Australia, AusALPA does have some caveats to any position of support for the introduction of RTS. The most significant considerations for AusALPA are that any changes must provide at least an equivalent or increased level of safety for flight operations; that the workload and procedures remain comparable for pilots and ATC to current practices; and that the following considerations are incorporated into the planning and implementation of new systems:

- ***Standardisation and redundancy***
  - Neither standardised provisions on charting requirements nor flight procedures for Remote Towers currently exist. 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 prior to service commencement. These should cover

flight procedures, separation standards, and minimum requirements of systems and sensors among others (see EASA Guidance Material on Remote tower operations).
  - Technical redundancy is key, e.g. multiple independent connections between the RTC and associated Remote Tower 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 RTS is/will be provided, including the mode of operation.
    - Interdependence with other airports if serviced by a common RTC (especially with multiple-mode RTS at the same RTC).
    - Contingency and degraded mode procedures need to be defined and implemented (see section Resources Guidance Material on Remote tower operations, section 6.5).
  - Training for all users must be developed and delivered within a sufficient timeframe prior to service commencement, allowing users to obtain a more in depth understanding and identify areas of knowledge deficiency.
  - Current technology (including data infrastructure) may not allow for RTS to be installed in remote locations and operated from RTCs in capital cities. These issues must be thoroughly investigated prior to any implementation as they have the potential to undermine the entire system.

- ***Collaborative identification and mitigation of risk amongst stakeholders:***
  Risks may change regarding the specifics of Remote Towers. The effects of these specifics need to be studied, effectively mitigated against, and communicated. The following aspects should be included in the study and implementation (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 to the highest standard possible from hacking, data manipulation and malware.
  - 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 RTC failure.
  - Adequate management of navigation aids and lighting installations is needed, including location of the signalling lamp.
  - The minimum safety level should be no less than as current tower systems.

- Local knowledge must be utilised to assist with sensor and camera placement on the airfield. Current air traffic and ground staff should be consulted at each design and implementation phases.
- Considerations such as how equipment will be kept serviceable (for example camera lenses must be kept clean, sensors must be maintained) must be considered at the planning phase, and redundancy plans communicated to all stakeholders and factored into cost assessments.
- Key performance indicators must be agreed to amongst all stakeholders. Implementation performance should be tracked against these key indicators, with ongoing transparent systems performance available to all users.

- ***Multiple-mode operations:***
  Implementation of multiple-mode operations requires the thorough research of human factors, operational and technical implications, and adequate mitigation measures so that pilots can rely on an ATC operation that ensures an equivalent or higher safety level. Until this is the case, AusALPA does not support multiple-mode RTS.
  - The concept of RTS fundamentally changes the working environment of tower controllers and different procedures and techniques must 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-term 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. Multiple RTS controllers might be required to work at airports with completely different 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.
    Prior to the introduction of multi-mode RTS, detailed consideration needs to be developed to address the issue of increasing traffic density and complexity at a particular location that would require the transference of the RTS to a single mode operation instead.

- ***Safety cannot be compromised under any circumstances***
  - AusALPA will not support any increased risk to aviation safety brought about by the implementation of RTS in Australia.
  - The benefits of RTS need to be demonstrated in terms of improved safety and efficiency to aviation, and not in terms of cost saving.
  - AusALPA recognises potential benefits of RTS at low capacity airports and supports the phased trial of RTS systems at such locations prior to any implementation at busier airports.

Conclusions

In the current situation, AusALPA considers that Remote Towers could provide a benefit mainly 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. The lowered cost impact of RTS could mean that Australia is able to transition to an increased number of aerodromes that provide a control zone 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 sections of Part 172 into regulation as minimum standards for safe and efficient Remote Towers operation in Australia. Lowering the current safety level is simply not an option. There also needs to be a commitment to an ongoing review process that allows input from and considers the needs of all stakeholders.

Multiple-mode (simultaneous) RTS are less mature and present significant technical and human factors challenges. While these remain not fully addressed, AusALPA cannot support multiple-mode RTS.

Approved on 7 November 2022 by:

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Resources

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