Vereniging Nederlandse Verkeersvliegers

Remote Tower Services

Paper by:

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For further reading and background information please consult our Briefing Leaflet on Remote Tower Services (added to this paper)

VNV recognizes that Remote Tower Services (RTS) can increase safety and efficiency of aviation. Current and future RTS developments must adhere to the following:

- A Remote tower should at least meet rules and regulations applicable to conventional towers. This means that *(')Aerodrome control towers shall issue information and clearances to aircraft under their control to achieve a safe, orderly and expeditious flow of air traffic on and in the vicinity of an aerodrome with the object of preventing collision(s) between:*

  a) *aircraft flying within the designated area of responsibility of the control tower, including the aerodrome traffic circuits;*
  b) *aircraft operating on the maneuvering area;*
  c) *aircraft landing and taking off;*
  d) *aircraft and vehicles operating on the maneuvering area;*
  e) *aircraft on the maneuvering area and obstructions on that area.*

- A Remote Tower should provide at least equivalent levels of safety security and service as a 'conventional' tower. These are described in ICAO Doc 4444 PANS-ATM Chapter 2 and 8.

- RTS operation should not require any special communications or procedures for pilots. From a pilots perspective it should be as if conventional tower services are applicable.

- Operations in which a controller provides RTS operation to multiple airports at the same time shall not be conducted.

- In case a Remote Tower Centre (RTC) services multiple airports, this information shall be included in the AIP, including which airports are serviced by this RTC.

- In case multiple RTC's are able to service a single airport this information shall be included in the AIP, including the time needed to transfer services in case of contingencies involving the primary RTC. Also, any impact this transfer would have on airport capacity (for all airports that the RTC serves) will have to be assessed. The time needed for this transfer and the impact on capacity shall be verified by regular actual trial.

- In case a destination and destination alternate are served by one RTC and another RTC is able to take over the service, alternate fuel shall be increased to cover the time required to take over this service.

- In case two airports are served by one RTC, or by different RTC's using the same cyber-technology, one airport should not be selected as destination alternate for the other.

- Contingency procedures should be in place to ensure adequate service in case of (partial) breakdown of surveillance equipment.

- Before considering the use of a remote tower at an airport, a safety assessment shall be carried out as required by ICAO Doc 4444 PANS-ATM 2.6.1. This safety assessment shall, as a minimum, address the following subjects (of which 1, 2 and 3 are also required by IFALPA PANS ATM 7.1):

  1. The human factor, in relation to situational awareness of the controller operating the remote tower and the fact that there may not always be human redundancy.
  2. Recognition of and reaction to possible accidents.
  3. Research into the need for, and development of, appropriate tools to mitigate the identified risks.
  4. (cyber)Security measures needed to withstand intrusion.

- **When any of the above cannot be met, VNV does not support the implementation of RTS in that particular case.**

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[1] ICAO DOC 4444 PANS-ATM 7.1

REMOTE TOWER SERVICES
Briefing Leaflet

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Overview

Remote Tower Service (RTS) or Virtual Tower Service (VTS) is a concept of providing Aerodrome Traffic Service (ATS) to an airport from a location other than the airport itself. The Deutsche Zentrum für Luft- und Raumfahrt (DLR) first developed the idea for RTS back in 2002. Over the years it developed into an usable concept with the airport of Örnsköldsvik/Gideå (OER/ESNO) in Sweden now receiving RTS service from Sundsvall/Midlanda (SDL/ESNN). More RTS initiatives are planned especially in Sweden, but also in Norway, The United Kingdom (London City Airport), Ireland (Cork/Shannon) and Germany (Saarbrücken).

RTS Characteristics

RTS can be provided from one single station to one single airport or from one single station to multiple airports. Additionally, RTS can also provide contingency service in case the control tower located at the airport becomes unusable.

In order to provide the air traffic controller with the necessary information, multiple solutions are available, both for separate and combined use[1]:

- Camera's, providing 360 degrees vision, positioned at multiple locations around the airport.
- Enhancement with night vision and/or infrared equipment
- Environmental sensors to capture meteorological and other operational data
- Microphones to pick up sound
- Use of ADS-B on all ground vehicles to monitor ground movements.

Advantages over 'Conventional' Towers

Remote Towers can have numerous advantages over conventional towers.

- With RTS it becomes possible to provide higher service levels to remote airports or in situations in which it would otherwise be impractical to provide the services of a conventional tower.

- RTS is an effective way to provide temporary and/or seasonal services to airports that require those. RTS solutions are quickly setup after destroyed infrastructure. However, when a RTS facility is setup quickly, safety and cybersecurity will have to be taken into account.

- As new developments continue, RTS hardware is more easily upgraded (compared to conventional towers)

- The costs of building and maintaining a remote tower are significantly lower than those of a conventional tower. According to a recent study the 'estimated capital costs for a single-station remote tower facility are between $1.5 and $2.5 million, less than the recent capital costs of federal contract towers, which range between an estimated $3 million to $7 million'[2]. This study is focussing on smaller size regional American airfields, however, it gives an indication of the possible financial advantage of RTS.

- Staffing costs may be reduced because there is less relocation and possibly less staff is required to maintain service standards when multiple stations are controlled from a single RTC.

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[1] All of these innovations can also be installed at airports with 'conventional' towers to provide information to the air traffic controller.

[2] Remote Towers: A Better Future for America's Small Airports by Stephen D Van Beek, Ph.D.

Operational Requirements
As explained earlier RTS operation is fundamentally different when compared to conventional tower operation. These differences mean that there will have to be requirements specific for RTS operation.

- RTS operation should be based on ICAO SARP's. Currently there are no ICAO SARP's designed yet[3].

- The human performance factor will have to be investigated thoroughly. The effects on situational awareness to the controller (who will no longer be on site), especially when he is providing RTS to multiple airports will have to be examined. *VNV is opposed to operations in which a controller provides RTS operation to multiple airports at the same time.*

- Controllers have to be able to provide weather information up to the required level while they are not on site. This provides challenges as they will have to rely on weather radar and camera data. Their capability to assess weather may be enhanced by digital weather data.

- There has to be sufficient backup systems in place to cater for system malfunctions.

- RTS operations are more prone to cyber attacks since all data required to operate the airport is transmitted digitally. As operations expand RTC's may provide services to multiple airports which means cybercrime can have significant effect on service standards and safety.

- It imposes a risk on service standards to provide multiple airports with RTS from the same Remote Tower Centre (RTC). In this way all airports relying on RTS are affected by a single failure present at that particular RTC.

- Non standard occurrences (runway overruns/undershoots, evacuations, runway incursions, people or equipment without authority trespassing the movement area) at an airport will have to be noticeable to the controller.

- According ICAO DOC 4444 PANS ATM[4] watch shall be maintained by visual observation, augmented in low visibility conditions by an ATS surveillance system when available. Does the use of cameras at a remote tower pass the qualification 'visual observation'?

- ICAO DOC 4444 PANS ATM[5] also states that 'Where parallel or near-parallel runways are used for simultaneous operations, individual aerodrome controllers should be responsible for operations on each of the runways'. This requirement opposes the possible advantage of reduced staffing requirements of RTS.

- Whether the ATS function 'providing navigation assistance to VFR flights'[6] can be performed using only RTS systems will have to be investigated. Establishing a TMZ (Transponder Mandatory Zone) surrounding RTS airports may be a solution.

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[3] IFALPA PANS ATM 7.1

[4] ICAO DOC 4444 PANS ATM 7.1.1.2

[5] ICAO DOC 4444 PANS ATM 7.1.1.4

[6] ICAO DOC 4444 PANS ATM 8.10.1.1