Remote Tower Services: Developments, areas of concern and ITF position

This document is written by Patricia Gilbert (Vice Chair of the ITF's ATS Committee and Executive Vice President of NATCA – USA) to inform delegates of the Civil Aviation Section Conference (9-10 March 2017) about remote air traffic services (RTS). It outlines the developments as well as ITF's perspective and position on RTS.

The Secretariat decided to turn it into an educational document that aims to advance our aviation affiliates' understanding of RTS with a specific focus on the way to address the challenges for aviation workers and keep a close eye on the developments around the world.

The ITF believes that remote technology shouldn't be seen just through the prism of cost savings and involving trade unions in discussions to shape the project right from the start is vital. We hope that this document will provide you with a starting point and useful guide to this end.

This is a living document and will be subject to updates from you. Please send your updates to aviation@itf.org.uk. We will revise the document in line with your inputs. We also welcome comments and suggestions. If you have any, please send an e-mail to the same address.

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Air traffic control (ATC) is a service provided by air traffic controllers who direct and separate aircraft on the ground and through controlled airspace while also providing advisory services to aircraft in non-controlled airspace. The primary purpose of ATC worldwide is to prevent collisions and provide the safe, orderly and expeditious flow of air traffic. In some countries, ATC plays a security or defence role and in some cases operated by the military.

The brick and mortar air traffic control tower, an iconic airport landmark, has been synonymous with air traffic control for as long as the modern concept has existed. While air traffic control technology, in varying degrees, has evolved around the world the concept of a physical tower at the airport that allows air traffic controllers to visually direct/separate aircraft has remained unchanged.

Now with super-fast fibre networks, high definition cameras and remote sensing technology the concept, testing and deployment of remote tower services {also referred to as digital towers, virtual towers, remotely operated towers, remote air traffic services (ATS)} is advancing rapidly. The technology consists of cameras that transmit images and data to a separate control room/centre that could be off airport miles away. There, the view of the airport is stitched back together to create a live 360-degree image that can be augmented with other operational data like radar labels on individual aircraft and automatic detection/display of movements in the air and ground. A pan-tilt-zoom camera can be added giving the air traffic controller a detailed view on a separate monitor and advanced thermal infrared camera technology can enhance the view of the airfield during weather conditions, low-visibility and at night.

International Transport Workers Federation
Remote Towers Conference
February 2016
London, United Kingdom

On February 5-6, 2016, a Remote Towers Conference was held at the ITF House in London. The purpose was to give aviation unions an opportunity to exchange views and to develop strategies about remotely operated towers. The first day of the conference was dedicated to discussing the current implementation of remotely operated tower technology from the perspective of different stakeholders. A series of panel discussions provided an overview on the technology from not only the labor unions but also from manufacturers, employers and regulators. On the second day, the labor unions, as well as international professional organizations (IFATCA and IFATSEA), discussed the evolving technology to develop a global strategy.

By the end of the conference, the ITF affiliates reached several conclusions regarding the introduction of remotely operated towers. While the affiliates did not oppose the introduction of the technology, there were several concerns on the social impacts on affiliate member positions as well as the operational effects on air safety.

Depending on location/country, ANSPs support for the technology is primarily due to potential improved cost efficiencies/savings. Additionally, yet still unproven, are safety enhancements the technology may yield. For example, the technology can be used to augment tower operations where there are blind spots on the airfield or provide air traffic services at airports where currently is none exist. In the US, there are multiple airports with operations from 50,000 to over 100,000 operations a day without air traffic services. Additional cost efficiencies could be realized when aging physical towers are replaced by a remotely operated tower rather than being refurbished/repaired or replaced with a new brick and mortar tower.

Social impacts include, but are not limited to;

- probable reduction in jobs/positions for ATCOs, ATSEPs, Technicians, Administrative support
- relocations (less desirable community, displaced families)
- flags of convenience

Safety concerns discussed, but not limited to;

- training/certification/licensing
- different layouts and weather patterns when ATCOs are required to certify on multiple aerodromes
- simultaneous operations
- maintenance responsibilities
- equipment reliability, resilience, redundancy
- fall-back mode/contingency
- visual quality, frame rate
- lack of global regulation from ICAO

Positive effects on affiliate members and aviation safety discussed;

Remote Tower Centre:

- improved working environment - centre rather than a single person operation
- more desirable community or geographic location to live
- increased pay due to multiple aerodrome ratings/certifications

Airports - currently no ATC service/augmentation of current Tower operation:

- enhanced service/safety
- increase in positions

The ITF affiliates were clear that the regulatory framework should be ICAO led to ensure minimum standards are globally applied. However, while ICAO should create minimum standards, regions and nations should, and not be prevented from, regulating higher standards. Currently there are no regulations on this evolving technology and the lack of ICAO issued regulations will create a risk of regulatory forum shopping. The affiliates also agreed that ICAO should review existing ICAO reference documents on their applicability on a remote tower environment. Affiliates also asked that ITF convene a panel of experts (or workgroup) to keep the regulatory framework under review.

Lastly, all agreed that it is imperative that ANSPs have FULL consultation with affiliates from the very beginning and that they are subsequently embedded in the testing and implementation team(s). Affiliates discussed ITF creating a best practices guide as some ANSPs and their counterpart affiliate unions have been testing and deploying the technology.

International Civil Aviation Organization
"RPAS and Remote ATS Symposium"
May 2016
Stockholm, Sweden

ICAO held a symposium in May 2016 in Stockholm. ICAO's goal for the symposium was to advance the understanding of remotely piloted aircraft systems and remote air traffic services with a specific focus on the way to address the challenges and make best use of the opportunities availed by these parallel, cutting edge technologies. The event focused on operational and regulatory issues related to new technologies and operations, building on the experiences of early adopters worldwide.

The ITF sent some of the designated remote tower experts to the symposium to participate in the dialogue, establish contacts, build relationships and network with members from ICAO, State representatives and manufacturers. Additionally, it allowed the ITF participants to ask questions, comment and raise concerns in the symposium sessions. It also allowed our participants to learn more, not just about the technology, but also about the driving force behind its deployment and garner more feedback from early adopters.

While the ITF delegation attended the symposium, attendees were largely made up of ANSP management, representatives of vendors/manufacturers (developing and marketing digital technology) and government regulators. The percentage of attendees who were ATCOs was very small, and the opportunity to express concern or make comments before this symposium was minimal.

At that time, ICAO had very little to offer and didn't give any indication when or how they were going to address remote tower (digital) technology. It appeared this symposium was used by ANSPs and potential vendors to attempt to sway ICAO and the regulators on the benefits of remote tower technology, but also the concept of multiple airport operations by ATCOs in remote tower centres.

ICAO's lack of interest in regulating this technology was of concern to the ITF delegation. ICAO seemed content on waiting for regional and national regulators. The FAA even suggested that regulators await the ANSP's views on what regulation would be acceptable.

The ITF attendees at the symposium discussed the idea of establishing an ITF working group, which they would be a part of, so they could keep abreast of remotely operated tower technological developments and ensuing regulations.

International Civil Aviation Organization
39th Triennial Assembly
September, 2016
Montreal, Quebec

The ICAO Assembly is the Organization's sovereign body. It meets at least once every three years and is convened by ICAO's governing body, the Council. ICAO's 191 Member States and many international organizations are invited to the Assembly, which establishes the worldwide policy of the Organization for the upcoming triennium.

During Assembly Sessions, ICAO's complete work programme in the technical, economic, legal and technical cooperation fields is reviewed in detail. Assembly outcomes are then provided to the other bodies of ICAO and to its Member States to guide their continuing and future work.

The ITF submitted a working paper (WP263) titled, "A SAFE, HOLISTIC AND CONSIDERED FRAMEWORK FOR THE FURTHER INTRODUCTION OF REMOTE OPERATED TOWERS" at the 39th ICAO Assemble in Montreal in September 2016.

There are many rules and procedural hurdles, including assuring support of the working paper (WP) by at least two Member States, to successfully manoeuvre through the ICAO process at Assembly. ITF encountered significant opposition from the EU States and the United States, specifically on our language on a complete prohibition of the concept of simultaneous operations (more than one aerodrome being operated concurrently by one person).

Whether a State agreed with the concept or not was of less importance than the fact that it is not an acceptable protocol to ask ICAO to bring the work to an expert group and then to dictate what the group must conclude. We agreed to modify our proposal to say that ICAO must consider the human factors issues associated with simultaneous operations. After making this change ITF delegates lobbied the States for which we had contacts. Additionally, support was gained from other regions which ensured the ITF working paper would be heard.

Ultimately, the ITF accomplished getting Remotely Operated Towers on the ICAO work programme. Of note, the USA representative, from a safety standpoint, did not believe simultaneous operations

are appropriate thus could be an ally as the issue progresses. ITF continued to monitor the progress as the matter moved from the technical commission to the report. ITF was able to offer an amendment to the report to ensure the licensing issue was properly reflected. Despite the previous opposition from the EU States, the delegation from Germany argued in favour of the human factors study for simultaneous operations and their amendment was accepted, which was a positive outcome for ITF.

The final wording of the report from the technical commission to the plenary was as follows;

> The Commission reviewed A39-WP/263, presented by the International Transport Worker's Federation, which invited ICAO to commence work on a comprehensive global regulation for the implementation and operation of remote towers. The Commission noted that the existing ICAO work programme already included remote ATS. Consequently, the Commission agreed that the matters raised in the working paper should be provided to the relevant group of experts. Any review should take into account human factors principles and the potential for the utilization of performance-based provisions and guidance. The Commission also recalled that Annex 1 — Personnel Licensing outlined the knowledge, experience and skill requirements for an aerodrome control rating, and that the competency-based approach to ATC training was detailed in the Manual on Air Traffic Controller Competency-based Training and Assessment (Doc 10056) and was designed to ensure appropriate knowledge and skill requirements were met.

While the process was challenging, and required a significant amount of work by all members of the ITF delegation, the outcome was positive. It is important to continue to work this issue as it progresses through the ICAO work programme.

Some of the Remotely Operated Towers testing and deployment

EU/Europe collectively:

Part of the European Union's Single European Sky ATM Research Programme (SESAR) is focusing on the use of remote tower technology that enables the provision of single or multiple aerodrome

ATS from a remote tower centre and extensive testing of new air traffic management developments on the ground.

The remote tower concept aims to enable air traffic controllers or flight information service officers to provide air traffic service to rural airports with usually low traffic densities from a Remote Tower Centre using camera video streams, instead of the conventional view from the control tower at the airport. Project coordinator Joern Jakobi from the DLR Institute of Flight Guidance, "Our aim is to make the remote tower concept fit for the purpose of providing safe, high-quality and cost-effective air traffic services to multiple airports from a single controller working position. As a result, smaller airports will in the future remain sustainable meeting the global demand for increasing mobility and networking." According to DLR Institute of Flight Guidance, small airports in Hungary, Germany, Sweden, Lithuania, Norway, Slovakia, Italy and Poland provide validation platforms for the research work.

Sweden:

Sundsvall Remote Tower Centre (RTC) passed Single European Sky ATM Research (SESAR) site acceptance testing in February 2013. In 2015 the Swedish Transport Agency approved the remote tower for Sundsvall. The Sundsvall RTC manages operations for Sundsvall, Härnösand and Örnsköldsvik airports. Sundsvall was the first Remote Tower certified for operational use.

Sundsvall is in the process of shifting to the RTC daytime and ATS during night time. They are waiting for formal approval to go down from the double-manning (regulatory requirements for final validation) to ease staffing and then they run from the RTC permanently. They could run around the clock from the RTC today, but it costs too much staff due to double staffing.

Linkoping SAAB is waiting for the education plan to be approved to start training. They have already been in "shadow training" for some time, so this transition is expected to happen quickly. The system is in place and ready for running. Earliest this summer it can be ready to operate formally.

Among other things, one of the questions that they have not solved yet is about possible camera surveillance of the neighbouring houses. The Data Inspection Board believes that this could be solved by making operators promise not to look at these images. It is still an unresolved issue.

Regarding RTC Swedavia, the Towers of Malmö, Visby, Östersund, Umeå and Kiruna, the program of implementation that will extend over four years has just started. Start-up Conference took place where everyone involved in all projects meet. The distance between the concerned air traffic controllers and program management/engineers is very far. During the conference, each tower "explained where they stood on the issue and how their people were doing." There were many who probably surprised to hear that resistance and criticism were so strong.

A critical success factor for the whole programme will be the staffing issue. Technicians/engineers must also suffice. They need almost all controllers to move to have enough people to kick off. The situation is far from that at the moment. Several are already looking for new jobs. There isn't much trust in management and the project itself – particularly after it was revealed by the media that there was no positive business case.

On 31 March 2017, the military made the following statement: "Armed Forces consider that remote air traffic at Visby Airport does not take into account the needs of armed forces and this can have a significant impact on Armed Forces operations." About the other four airports LFV now must show how they can fulfil the needs of the armed forces. (In Sweden LFV is designated to deliver ATS also in case of war instead of the armed forces.)

Other projects

C-APP (approach), Delivery autumn -17. This is a working position they consider necessary to take in multiple towers. The system should be "technically" able to handle five TMA simultaneously on the radar screen.

Multiple ESNO-ESNN (Örnsköldsvik-Sundsvall). Ongoing development of the technical assistance required to connect and switch apart two airports. There are issues they are looking into, such as "How are the buttons going to look and what happens when you right-click on the mouse?"

In 2018 (our guess), they can begin to assess safety, technology/methodology. The idea is to pull out the approaches to one and joining the towers NO + NN in multiple. The savings will initially come to nothing. Rather the opposite will be the case. But they see this as a first step. The savings come later. If this happens then this can grow LARGE to many Airports.

NOTE: Link to Swedish ANSP LFV website, which has their interesting take on value of Remote ATS: https://www.lfv.se/en*Ireland:*

The system was installed with remote towers, sensors and cameras at Shannon and Cork airports and a remote tower centre in Dublin during the early part of last year. The remote sites were then connected to the centralized control room in Dublin.

There was a test carried out to see whether remote tower technology could be used at multiple airports by one air traffic controller at (Shannon and Cork) from a remote tower centre in Dublin. The Irish government received money from SESAR to buy and test the concept of working multiple airports from a remote tower centre by one air traffic controller.

Over 50 demonstrations were carried out last summer by the Irish Aviation Authority and its international consortium partners during operational trials of the system. The Irish Aviation Authority (IAA) claimed that the tests were highly successful and with carefully designed procedures, it will almost certainly be possible to allow one controller to simultaneously provide services for more than one low volume aerodrome. Trials began with low volume traffic, similar to night movements at both remote airports, with the levels of activity gradually increased to test what could safely be achieved.

http://www.eveningecho.ie/cork-news/cork-air-traffic-will-soon-controlled-virtual-tower-dublin/2627231/#.WKGIFAuabSo.twitter

Norway:

Has aggressive plans to use Remote Towers for many of their existing facilities with control towers. Avinor has decided to introduce remote tower services at up to 15 airports from one remote tower centre in Bodø in northern Norway.

(This information is from Avinor, Norway's ANSP provider)

We are developing the next generation of tower services. Remote towers make it possible to deliver local air traffic services to several airports from one location.

This will enable one person to handle multiple airports simultaneously. This will lead to a reduction in the operating cost as well as avoiding significant future investments in towers and equipment at each airport. The potential for better and more efficient operations is substantial. (even claims cost savings passed to airlines then consumers)

A prerequisite for the introduction of remote services is that the solution will be proven to be as safe as, or even safer, than the current system.

Germany:

Saarbrücken will be the first German airport under remote tower control. The German air navigation service provider DFS Deutsche Flugsicherung has signed a contract with the Austrian supplier Frequentis to equip Saarbrücken Airport with its remote tower solution. From 2017 on, DFS intends to operate aerodrome control services at this medium-sized airport from a remote tower centre, which will be in Leipzig. The airports of Erfurt and Dresden will follow.

The tower controllers will be cross-trained for more than one airport, enabling them to provide aerodrome control services for different airports from the remote tower centre. In this way, a more efficient and flexible shift planning will be possible. The three remotely controlled airports will have a common clearance delivery position.

Hungary:

Hungary ANSP is HungaroControl. By 2017, HungaroControl aims to operate a remote contingency tower in Budapest and a full-time remote tower by 2018. Although Budapest airport will not be the world's first remotely controlled airport, it will be the first of its size and complexity, with nearly 100,000 movements per year.

The remote tower concept at Budapest airport is built on the bidirectional integration of the existing ground surveillance system and an appropriately positioned camera network, aiming to enhance air traffic controllers' situational awareness and flight safety. The main contributors of the Budapest remote tower project are Indra Navia and Searidge Technologies.

This concept has made inroads into the international market: the emergency control centre at Dubai International Airport (DXB) could be implemented according to the suggestions of a consortium including HungaroControl. The main goal of the project was to provide a sustainable and safe contingency tower solution at 100% capacity level for Dubai Air Navigation Services (DANS) at Dubai International by relocating their aerodrome services to a remote site when needed.

Canada:

Currently the concept is not completely proven or defined, and Searidge understands that the multiple remote tower concept of operation will differ in terms of requirements and implementation for each airport and organization. The technological solution will therefore need to be flexible and address the unique factors of each customer.

This was a briefing given at the ICAO RPAS/Remote ATS Symposium by NavCanada.

http://www.icao.int/Meetings/Remotetech/Presentations/Day2_Session%205_Challenges_Rob%20Thugur.pdf

United Kingdom:

Work is already underway at NATS' Swanwick control centre on a remote (digital) tower operations room that will demonstrate the ANSP's capability to provide a remote air traffic control service for any airport that wants one.

- Remote tower services at small and medium size airports, by personnel located at a remote tower centre somewhere else.

- Contingency services at major airports, in the case of fire or other events which could take place at the control tower building. The contingency facility should be at safe, nearby, but different physical location.
- Synthetic augmentation of vision to increase situational awareness at airports during poor visibility conditions at the local airport control tower facilities.

United States:

The remote tower test at Leesburg, VA (KJYO) has completed phase 1a and 1b. This included the installation of a temporary air traffic control tower and the "passive shadowing" of the live operations from the remote tower. These tests were NOT conducted by FAA/NATCA Represented ATCO's. ATCO's were provided, at a cost, to Saab by RVA, an aviation services company which operates 97 of the United States' Federal Contract Towers (FCT's). Due to the fact, the FAA is not providing any funding for these tests, FAA ATCO's were not used.

NATCA designated representatives to observe 100% of the tests conducted during these trials. We have extremely detailed notes from these observations which will be used by our participant and representatives on the Safety Risk Management Panel.

This test is being funded by the State of Virginia and Saab at a non-towered general aviation airport with over 115,000 operations per year, located less than 10 miles Dulles International Airport (KIAD).

The next step is for the Safety Risk Management Panel (SRMP) to convene in April 2017. The initial phases of the remote tower testing ensure that hazards identified and unacceptable risk is mitigated before the technology is certified.

There are currently plans to conduct another remote tower test at Ft, Collins Airport (KFNL) in Colorado, located approximately 50 miles from Denver. KFNL is an airport with no air traffic control tower and currently no scheduled commercial air service. The airport had commercial air service until 2012, when the only operator pulled out because there was not an air traffic control tower. The airport has roughly 100,000 operations per year of which 96% is general aviation traffic, and is home to 3 flight schools.

The FAA recently closed a solicitation of interest seeking bids from vendors to participate in this test. Expectation is for a vendor to be named within the next several months and formal testing to begin in the fall of 2017.

NATCA recently received a request from Embry-Riddle (ERAU) for support in conducting a test at New Smyrna Beach Airport in Florida. KEVB is an FCT represented by NATCA, with a control tower. Frequentis is the vendor working with ERAU and their goal is to get a Remote ATS system certified for use in the US. We are scheduled to meet with them on April 12, 2017 to discuss details of their proposal.

With the large number of GA airports also comes the ability to run VFR traffic patterns. This will complicate the possible certification of remote tower systems in the US, especially a system that could replace a current control tower, as most current systems do not have the fidelity needed to run effective VFR pattern work.

The FAA has no official requirements in place for Remote Towers, which complicates the task and process of getting a remote tower system certified.

While the FAA's position had seemed to be one of "uninterested participant" in past remote tower tests, in late 2016 the FAA Administrator's Executive Council asked the agency to investigate the concept of Remote Tower Service levels. They have specifically asked to think outside the box on what groupings of services might make sense (may be less than what a regular tower might provide) such that we can enable currently non-towered airports to potentially provide some level of ATC services via Remote Tower technology. Once these service levels are established, the next ask was to establish a Qualified Vendor/system List to allow vendor systems to be qualified to deliver RTS services.

The ultimate idea here is to get away from "one-off" projects like Leesburg and have a more strategic methodology to handle vendors/organizations coming to the FAA requesting operational approval of their Remote Tower systems.

The concept is now evolving from the Class D model we see at KJYO to a menu of various service levels ranging from advisory services (no positive control or separation) to the Class D model and beyond to include Tower radar and ASDE surface surveillance.

Next Steps

As stated above, we need to ensure that we work to be involved in the ICAO work programme as their expert group works it through the process. It is important to build relationships with both the ICAO Council and the Air Navigation Commission (ANC). The Council is the political arm of the organization where the members are representatives of their States, while the Commission is a purely technical body, whose members are appointed as independent experts. The ICAO Panels, are panels of the Air Navigation Commission, however the Commission is responsible to the Council.

It is important to establish relationships as a first step (IFATCA and IFALPA both have representatives on the ANC). It has been discussed that we add an IFATCA representative to our group and also add an ITF representative to the IFATCA group. For information on who are the members of the ANC go to http://www.icao.int/about-icao/AirNavigationCommission/Documents/ANC-200_final_web.pdf

First step is to identify where we have existing relationships with members of the Council and their staff. As Assembly included the Council elections, new Council members will be coming on, particularly from seats held by rotation groups. Rotation groups are countries that have joined together to ensure a Council seat, but membership is rotated amongst the members of the group. Two of those groups are particularly relevant in this issue – ABIS, which includes Austria, Belgium, Ireland, Switzerland, Croatia, the Netherlands, Luxembourg and Portugal, and NORDICAO, representing the Nordic States, Sweden, Iceland, Finland, Norway, Denmark, Estonia and Latvia.

While the Assembly amended our paper, the physical paper is not amended. It is the responsibility of the Secretariat to reflect the changes in relaying the material to the expert group. It has been suggested that we amend our paper further or perhaps send a separate note to the secretariat. During the discussion on our paper the US suggested amendments to the action points in our paper.

They suggested;

Paragraph b) should read, “A license for an ATCO with a tower rating, indicating that the holder meets all qualifications required to provide aerodrome air traffic services regardless of the environment from which the services are performed,”

and

Paragraph c) should read, “Adequate improvements on training requirements and competence schemes for ATCOs, ATSEP, and maintenance staff so that new demand can be properly encompassed.”

ICAO recently advised ITF that they will be publishing a draft state letter. On March 28, the remote tower ITF group will meet at ITF House and will review progress and next steps.

Note: ETF/ATM meeting occurred in Madrid on the same date as this report. They reported that EASA’s next rulemaking group will meet the end of March.