International Civil Aviation Organization SAM/IG/24-WP/6.6
South American Regional Office 23/10/2019
Twenty-Fourth Workshop/Meeting of the SAM Implementation Group SAM (SAM/IG/24) – Regional Project RLA/06/901
(Lima, Perú, 4 to 8 November 2019)

Agenda Item 6: Other matters

IMPLEMENTATION OF REMOTE CONTROL TOWER (R-TWR) IN BRAZIL

(Presented by Brazil)

SUMMARY

This note presents information on the implementation and operation of the first R-TWR in the SAM Region.

1. Background

1.1. After expanding the remote provision of AFIS to five of its airfields and having stipulated the extension of this service modality to another five by the end of 2020, discussions began (since mid-2017) with a view to implement a remote aerodrome control tower (R-TWR), which was completed on October 18, 2019. A company aimed at accumulating operational experience capable of supporting the expansion of this service to at least three other aerodromes at the end of 2023 did the work.

2. Discussion

2.1 To provide the project with an environment conducive to testing, the Santa Cruz Military Aerodrome (SBSC) in the southeast of the country was chosen because its low traffic flow. At this airfield, on October 18, 2019, the operation of the first Brazilian R-TWR began.

2.2 The normative basis used was the documentation referred to by PANS-ATM, which is the "Guidance Material on Remote Aerodrome Air Traffic Services", produced by the European Union Aviation Safety Agency. In this sense, although it is possible to identify in various discussion forums the use of the expressions "digital tower", "virtual tower" and "remote tower" with different meanings, the Brazilian implementation, despite its construction (figures 1, 2 and 3) being located near the SBSC airstrip, it adopted the terminology "remote tower", or simply R-TWR, to designate the facility that provides the aerodrome control service without direct visualization of the controlling aircraft as something natural existing in the traditional "local towers", regardless of the shortest distance between the service airfield and the R-TWR facilities.

Figure 1 - Facilities of R-TWR Santa Cruz

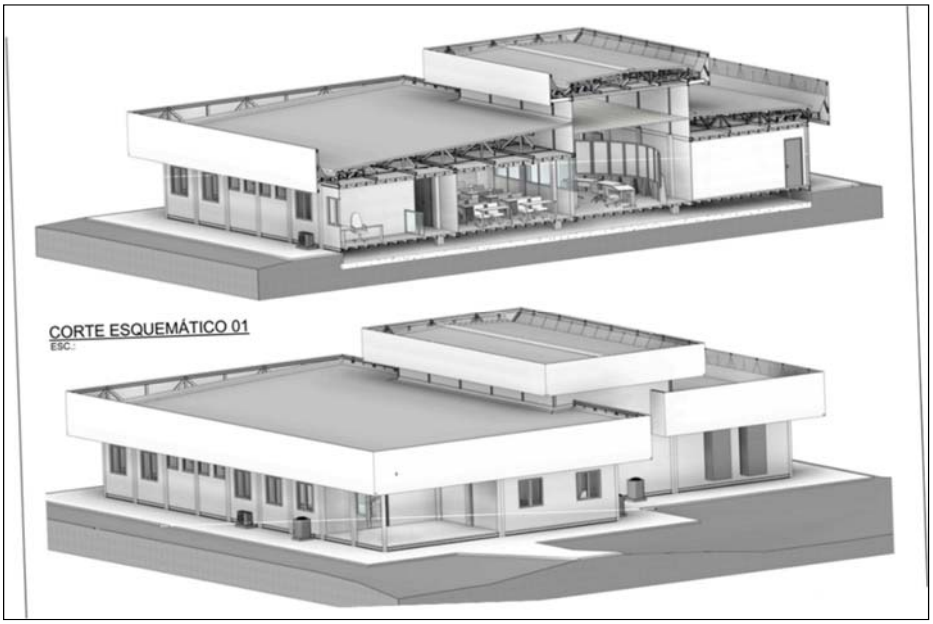

Figure 2 - Facilities of R-TWR Santa Cruz

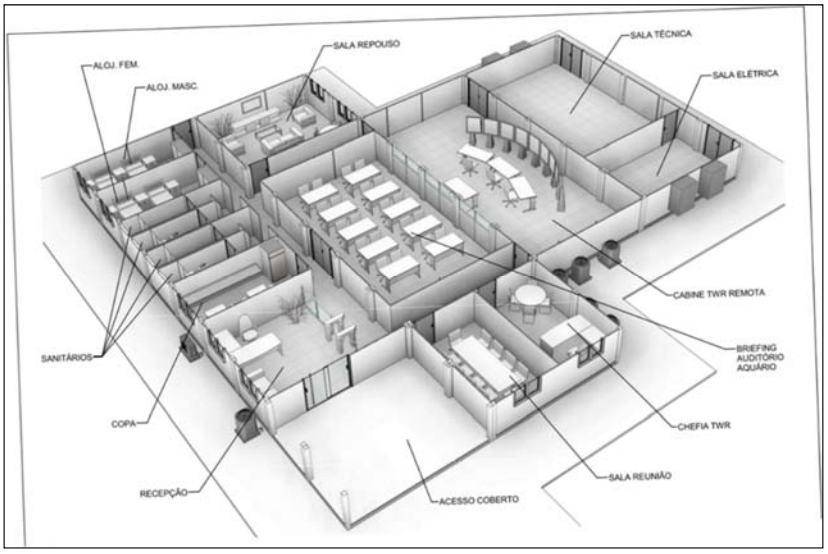

Figure 3 - Facilities of R-TWR Santa Cruz

2.3 As for the systems it has, the implementation of SBSC has the same functionality as a "local TWR" and, in addition, a camera display system that allows the air traffic controller to maintain a continuous surveillance of all operations in the area of maneuvers of the aerodrome and its surroundings, using a set of high-definition cameras (figure 4) with video output that meets the minimum resolution of 1080p (full HD), whose captured image is presented in real time in a single panoramic view through monitors that form a panel or "video wall" (figure 5) with image update at a minimum speed of 25 fps.

2.4 In addition, a dedicated camera with pan, tilt and zoom (PTZ) scrolling function is available, which allows the controller to direct and enlarge images of specific areas. Features such as "video tracking", "light gun", integration with data from the ATS surveillance system, aerodrome display system with the possibility of markings superimposed on the ground, among others, are also available in the TWR-Santa Cruz.

Figure 4 - R-TWR Santa Cruz camera system

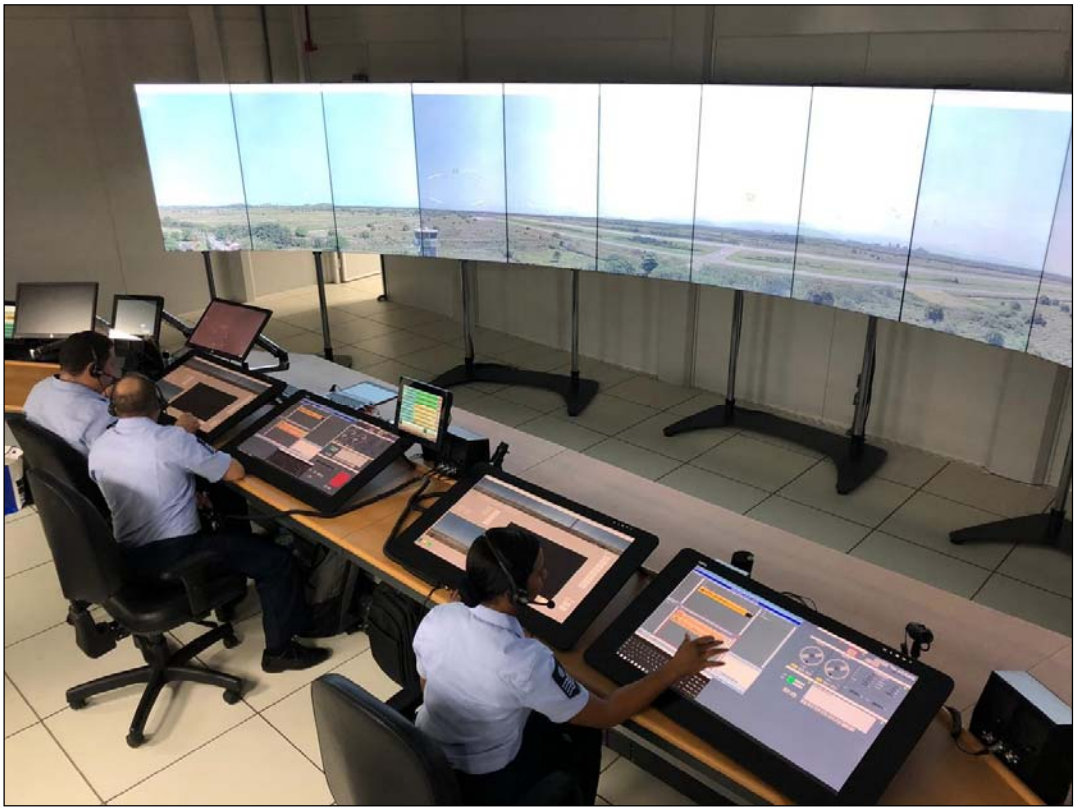

Figura 5 - Santa Cruz R-TWR operational positions

2.5 The implementation of the R-TWR Santa Cruz follows a gradual plan by which there will be an initial period of approximately six months in which the new agency will operate in parallel with the local TWR. This period aims to consolidate the theoretical and practical training provided to air traffic controllers, in addition to serving as a trial period, from which technical and operational data will be collected to improve the modus operandi of an R-TWR in Brazil, as well as for the eventual identification of points that need adjustments or should even be considered in future deployments.

2.6 Only after this initial trial period will the national regulations on the requirements and operation of an R-TWR be published, which will serve as a regulatory basis for other such implementations. At least three more aerodromes are planned with remote provision of the air traffic control service, all military. Finally, after the maturation of this type of operation, it is expected to provide the possibility of this remote ATS service to Brazilian aerodromes that serve civil aviation, and initially only those with low traffic density.

2.7 In the case of future deployments, as already mentioned, these will be limited to military airfields. Of the three planned aerodromes, two are expected to be controlled from the same physical structure, but with independent operational positions (single mode), while the third aerodrome would receive a structure like that provided in SBSC.

2.8 Figure 6 illustrates the data flow between the devices that make up the solution. In this figure, the external sensors are connected to the processors to transmit raw data from the images captured by the cameras. Processors handle this raw data by making it available to operators through multimedia communication protocols, which in turn integrate them using smartVISION software, providing a composite image of the context of aerodrome operations. The other capabilities of the solution are available in the operator's man-machine interface.

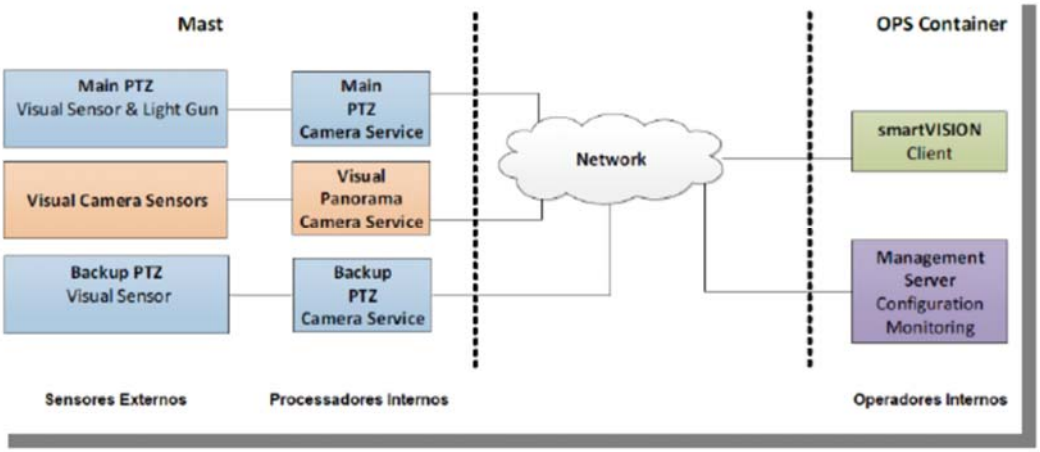

Figura 6- Flujo de datos

2.9 Figure 7 illustrates the components of this environment. The first describes the processing units responsible for composing images in a panoramic view and sending them to videowall screens, while the second illustrates the touch screens and their components for viewing images and controlling the functions of the R-TWR.

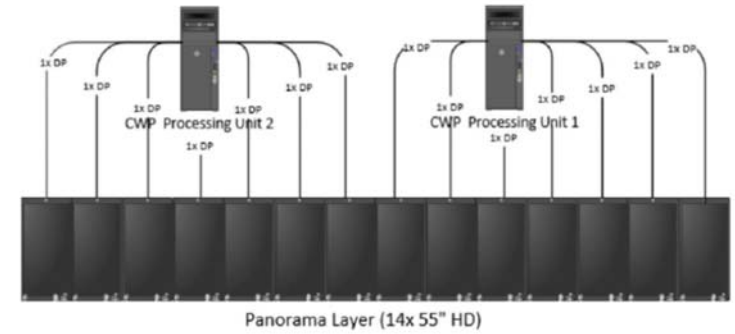

Figura 2

Figura 3

Figure 7 – R-TWRComponents

3 Benefits

3.1 From the information already available, it was possible to list some benefits of the possibility of remote provision of ATS services: elimination of logistical difficulties associated with equipment maintenance and the assignment of personnel at aerodromes located in regions of difficult access; possibility of increasing the situational awareness of operators (especially in an R-TWR) in view of employable technological advances; possibility of future expansion of the provision of ATS services in AD whose movement or location implies the current unfeasibility for the establishment of a local personell; rationalization of economic resources in view of the possibility of simultaneously providing service to more than one AD from a single operational post (R-AFIS) or single building that houses multiple operational posts (establishment of a remote aerodrome control center), possibility structuring a mobile solution to provide the aerodrome control service in contingency situations of the local agency or even to attend specific events in places normally devoid of ATS agencies, among others.

4. Proposed actions

4.1 The Meeting is invited to:

a) Take note of the information provided.

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