Request for Proposal – Remote Air Traffic Control Tower (rTWR) dated June 1, 2021

Question #1, "Please post Exhibit E referenced in the RFP as the conceptual camera layout to the RFP website prior to the due date for industry questions next week, as it is difficult to respond without the full set of requirements and documents."

RESPONSE: Exhibit E was initially prepared to provide a conceptual camera layout and referenced in Exhibit B, System Requirements. It has since been determined that Vendors should have the ability to propose their own unique concept, free of any suggested camera configuration, and therefore any reference to Exhibit E is removed from the Request for Proposal, Exhibit B. Exhibit B is revised as follows, eliminating earlier reference to Exhibit E:

Exhibit B

Remote Tower System Requirements

Friedman Memorial Airport (SUN)

Remote Tower System:

The remote tower system:

1. **Shall** have individual local, ground and supervisor controller working positions.
2. The vendor is encouraged to propose innovative display configurations that would economize control room/remote tower facility space requirements and support more efficient remote tower operations.
3. **Shall** have a distributed camera system:
    a. 360° HD camera array
    b. 220°± HD secondary camera array(s) with an approach/departure path PTZ or fixed zoomable camera.
4. The camera enclosures **shall** have an environmental housing with internal heating elements.
5. The remote tower system **shall** have an integrated signal light gun slaved to a PTZ camera controlled via a pointing device, mouse, joystick, keyboard, etc.
6. The signal light gun PTZ camera **shall** automatically track a target, as well as be controlled via a pointing device such as a mouse, joystick, keyboard, etc.
7. The remote tower **shall** have two optical PTZ cameras in addition to the signal light gun PTZ camera.
8. The remote tower system **shall** have one or more infra-red (IR) camera(s) supporting IR tracking of non-cooperative targets.

9. The optical and IR automation system **shall** be provided with “hot” swap-over redundant servers.
10. Camera masts **shall** be connected to the remote tower facility via a closed fiber optic system.
11. Vendor **shall** provide the necessary camera and display spares.
12. The remote tower system **shall** have the capability of recording video and track-based display data for replay at a later date and store the data for 45 days.
13. The remote tower system **shall** have the capability of recording voice communications (local, ground, emergency frequency, shout line, etc,) on separate channels for replay at later date and store the recordings for 45 days.
14. The remote tower system **shall** have onsite and remote monitoring and maintenance capability that displays and records system status, error messages, event logs, system latency, etc.
15. The remote tower video and track-based monitoring system **shall** provide real time alerts to the controllers of any system anomalies such as image freezing, latency, data/service interruptions, system reboots, etc.
16. The remote tower system **shall** meet all requirements of the most recent version of the FAA Remote Tower Order.
17. The remote tower system **shall** meet the Reliability, Maintainability, and Availability (RMA) design assurance level of the most current Remote Tower Requirements.
18. The vendor **shall** provide all required FAA documentation to include but not limited to the following:
    a. Operator training material.
    b. System operation and maintenance (O&M) material.
    c. As-built system record drawing.
    d. Component warranties.
    e. Etc.
19. The vendor **shall** provide a draft ongoing O&M contract proposal for 5 years to include:
    a. Estimated annual fee for O&M.
    b. Remote maintenance and monitoring.
    c. System technical refresh.
    d. Etc.

Visual Surveillance System:

Video (visual and IR) System:

1. The video system **shall** provide uninterrupted video surveillance of the local airspace and airport movement area.
2. The video system **shall** allow a controller to digitally zoom any segment of the 360° panoramic view from video displays located at the local, ground or supervisor working positions to visually acquire an airborne target at a distance of 3 nm.
3. The camera system **shall** provide a zoomable view of the approach/departure corridor for each runway for 3 nm.
4. The video cameras **shall** have a vertical field of view that minimizes the "zone-of-invisibility" above the 360° panoramic view and/or provide overlapping distributed camera views.
5. The video display **shall** provide configurable graphical overlays of airfield areas of interest such as runways, taxiways, connectors, hold short lines, construction areas, navaid sensitive areas, etc.
6. The human machine interface (HMI) **shall** support manipulation of multiple insets and views on the video displays via a mouse, keyboard with hot keys, or joystick, etc.
7. The camera array system **shall** provide a 360° view of the local Class D airspace via an individual display at each controller and supervisor position. The system may include a panoramic video wall.
8. The video system **shall** have the ability to alert the controller of a latency between the camera and the display greater than 1.5 seconds.
9. The camera system **shall** have the ability to alert the controller should the displayed image freeze for a period greater than 5 seconds.
10. The video system **shall** operate day or night.
11. The video system **shall** operate in low visibility weather conditions.
12. The camera system **shall** have a frame rate of not less than 25 frames per second.
13. There **shall** be a method to remotely clean foreign objects from the camera lens.
14. The system **shall** include PTZ cameras that can be operated by the controllers via a mouse, joystick or keyboard or other input device with capability to zoom in on selected areas on the airport or aircraft in the local area.
15. The PTZ camera **shall** support up to 25 adaptable preset positions.
16. The PTZ cameras **shall** support target detection and automatic tracking,
17. The video surveillance system **shall** incorporate infra-red (IR) capability presented to the controllers via a configurable human-machine-interface (HMI) as a picture-in-a-picture.
18. The video and track-based displays system **shall** display an accurate airport map at each working position, local, ground and supervisor.
19. The video system **shall** employ the latest video compression algorithm.

- The video system **shall** support a graphical user interface (GUI).

Video Tracking System:

1. The video tracking system **shall** be capable of detecting, designating, and tracking via adaptable symbology (box, circle, triangle, etc.) non-cooperative targets on the airport surface and in the local airspace.
2. The video tracking function **shall** be capable of detecting and tracking cooperative and non-cooperative targets with a visual cross section of 0.5 M^2 within the airport movement area.
3. The camera tracking system **shall** have a 95% probability of detection.
4. The video tracking system **shall** be capable of associating target and tag data from the track-based surveillance system and display the target designator and data on the visual display system.
5. The video tracking system **shall** support manual tagging of non-cooperative targets.
6. The video tracking system may incorporate IR tracking capability of cooperative and non-cooperative targets.

Airspace/Surface Track-based Surveillance (Add Alternate):

Track-Based Surveillance System: A track-based system utilizing a combination of data from SWIM, non-Federal ADS-B receivers and vehicle "squitters" should be proposed as an **add-alternate**. The proposed track-based system **shall** meet the following minimum requirements:

1. The track-based automation platform **shall** accept and display processed data from the FAA SWIM, non-Federal dual-link ADS-B receivers, and vehicle "squitters".
2. The track-based system **shall** have a latency not greater than 1.5 seconds (latency $\leq$ 1.5 seconds).
3. The track-based system **shall** provide departure and arrival flight plan information.
4. The track-based display **shall** have the capability of visually differentiating arriving and departing aircraft via configurable symbology (shape, color, etc.).
5. The track-based surveillance system **shall** provide seamless coverage of the local airspace out to no-less-than 25 nm from the airport reference point.
6. The track-based system **shall** detect, track, and designate via adaptable symbology (box, circle, triangle, etc.) cooperative targets in the airspace and on the airport surface.
7. The target-based system **shall** be integrated into the video system to permit target designators and data tags to be shown on the video displays.
8. The target designators and data tags **shall** be presented as a smoothed track on the video display.
9. The track-based surveillance system **shall** have an update rate not more than 2 seconds.
10. The system **shall** have a system latency of not more than 1.5 seconds from detection to display.

11. The track-based surveillance system **shall** be certified to provide situational awareness to the controller in the remote tower facility.
12. The track-based surveillance system **shall**, at a minimum, be capable of detecting cooperative targets in the local Class D airspace and displaying position, altitude, velocity, and identification.
13. The track-based surveillance system **shall** be capable of associating target and tag data with the video tracking system and display the target designator and data tag on the visual display system.
14. The track-based displays **shall** be configured to display target and tag data that mimics the FAA's STARS displays.
15. Local, ground and supervisor positions **shall** have access to the track-based displays.
16. The track-based system **shall** display an accurate map of the airport with approach fixes and VFR reporting points.
17. The track-based system **shall** support display of range rings in 5 nm increments out to 25 nm and display the airport Class D limits (4 nm) as a differentiable range ring from the airport reference point

The track-based system **shall** have the ability to turn on and off graphically depicted geographical and man-made obstacles within the Class B airspace on the track-based display.