



الهيئة العامة للطيران المدني
CIVIL AVIATION AUTHORITY

قطر QATAR

VIRTUAL TOWER

Mohamed Al-Naimi

Electronics Engineer

Qatar Civil Aviation Authority

Air Navigation Department



BACKGROUND STORY

- Pre Virtual tower
- Project Commencement
- FIFA WORLD CUP 2022

FIFA WORLD CUP
Qatar2022



AGENDA

- What is a Virtual Tower
- Synonyms
- Benefits
- V-TWR set up
- Camera Types
- Functions
- Servers
- Controller working position
- Control and monitoring system
- Safety net conflicts and warnings
- Conclusion



WHAT IS A VIRTUAL TOWER

- **Concept of the Virtual tower: -**

Modern concept where the air traffic services (ATS) at an airport is performed somewhere other than in the local control tower.

- **Purpose**

Eliminating blind spots on the airport ground by the help of cameras and sensors.

- **Coverage**

Depending on the number of cameras and the end user preferences.

- **Other uses**

Contingency plans.



SYNONYMS

- Virtual Tower
- Remote Tower
- Digital Tower



BENEFITS

- Benefits of having a virtual tower:-
- Cost effective
- Operated at any location
- Augmented reality
- Situational awareness
- Sustainability
- Elimination of blind spots
- Contingency positions
- Scalability
- Capability to integrate with external system



V-TWR SET UP

- Equipment used:
 1. Cameras (Fixed position , Pan Tilt Zoom , Signal light gun)
 2. Microphone
 3. Display Screens
 4. Servers (Archiving , Tracking & Processing)
 5. Workstations

CAMERA TYPES

- Fixed Position Cameras (FPC) : 180° panoramic out of the window view (OTW)
- Pan ,Tilt , Zoom (PTZ) : controlled manually by a joystick or a mouse, or, automatically by auto-tracking
- Signal light gun: in case of a communication failure. Manually controlled. 360° rotation





FUNCTIONS OF THE V- TWR SYSTEM

- Auto tracking
- Auto stitching
- Day & night modes
- Low visibility mode
- Presets
- Flight Labels
- Record and Playback
- Control and monitoring



SERVERS

- Two main servers:-
 - Tracking and processing:
 - Archiving



CONTROLLER WORKING POSITION

- Consisting of :
 - Set of Monitors (Video wall)
 - Touch screen
 - Air Navigation Systems
 - Speakers
 - Mouse & keyboard
 - Map window
 - MET data display
 - Flight list
 - Redundant workstations



QTR1234 H
B77W B9 34R

QTR1234 H 34L
B77W A004 132 F13



CONTROL AND MONITOR SYSTEM

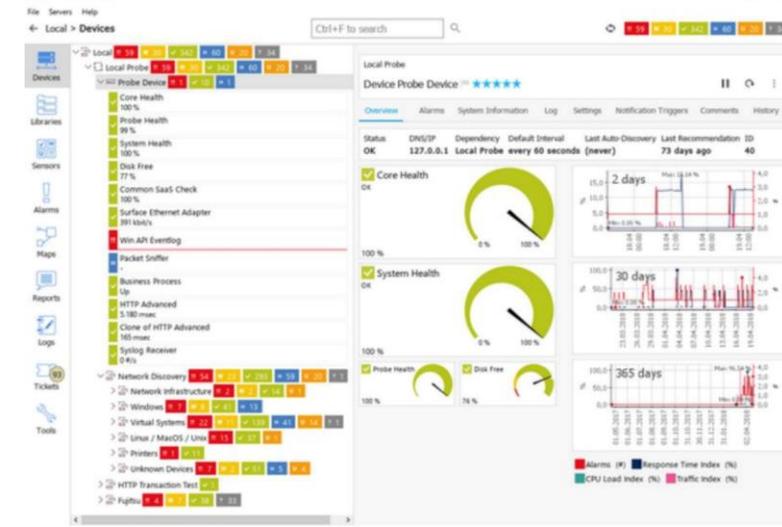
- Open source Network Monitoring Software:
- Status bar

Pri ADEXP: Connected Pri Cat62: 12.24 Msg/s
Sec ADEXP: Disconnected Sec Cat62: Disconnected

o NOTE: Black - Operational

o Yellow – Degraded mode

o Red – Non-Operational





SAFETY NETS CONFLICTS AND WARNINGS

The available known alerts are listed as follows:

- Arrival alert
- Departure alert
- Restricted area alert
- Runway crossing or runway/taxiway alert
- Runway status alert
- Stop Bar crossed alert
- Taxiway alert/ unauthorized movements
- Special SSR code alert





CONCLUSION

- Why V-TWR?
- Future upgrades
- Potential of substituting conventional ATC towers.

THANK YOU

Any Questions?