Remote Virtual Tower
For Military Use Cases

In a military scenario, timing is critical. The swift allocation of resources, accurate air situation picture and rapid response times are essential. Delays due to loss of tower services, or even just poor visibility due to bad weather, could be catastrophic to a mission. This is where remote tower can play a pivotal role.

The benefits of remote tower for airport operations and enhanced surveillance have long been discussed, but further operational capabilities for military use cases add another dimension. A remote virtual tower replicates the visual tower view to provide air traffic control (ATC) services from remote locations, consequently improving operations and enhancing safety. It adds new operational capabilities for a number of military use cases in Air Traffic Management and beyond to ensure different types of missions are accomplished.

Mitigating Military Challenges

All ATC operations demand accurate air situation picture and high quality data. Traditional ATC towers are at risk of limited visibility during adverse weather conditions, and in a military situation, this risk is further amplified. During a military operation that needs sufficient air power, many aircraft may need to arrive or leave an area within the same short time frame, putting considerable strain on limited ATC resources. Worse still is that ATC towers can also be an attractive target for attack, where controllers are endangered and the loss of air traffic services (ATS) could occur.

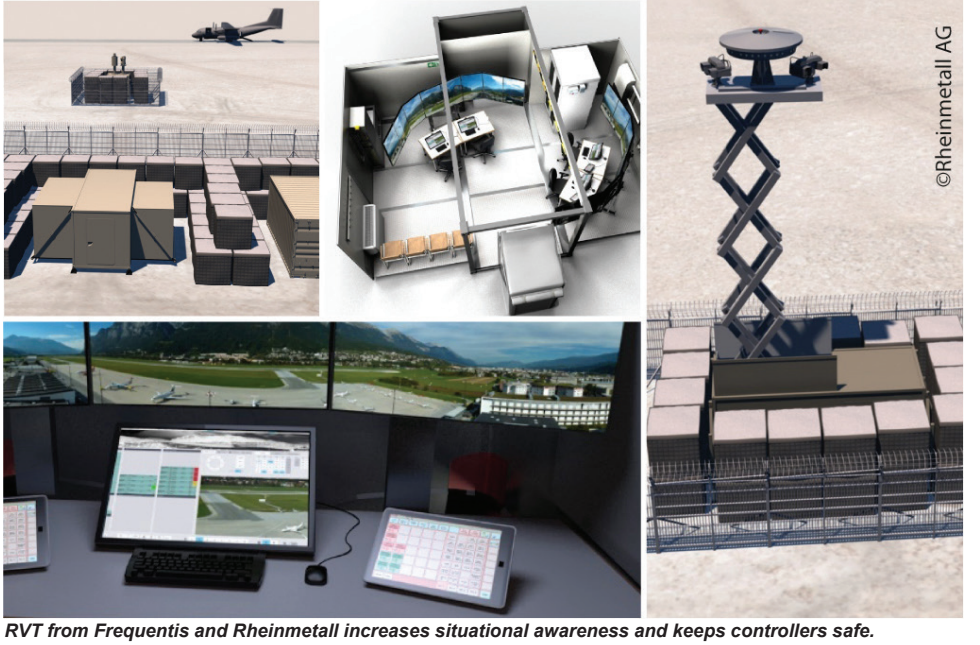
Advantages of RVT:

- Enhanced visibility.
- Safe controller working environment in war or crisis situations.
- Need for towers in remote or hazardous locations.
- Shared situational awareness.
- Cost-effective and fast deployment.
- Drone or object detection.

The ability to remotely control air traffic is what makes the remote virtual tower (RVT) concept so well-suited to military use cases. By replacing the “out-of-the-window” view with a visualisation system at a remote site, situational awareness is not only increased with enhanced visibility, but, military ATC is also protected at a safe location. It allows military ANSPs to deploy towers that provide enhanced efficiency, visibility and cost-effectiveness compared to mobile towers. Mission-proven sensors guarantee the operational readiness of a remote air base or deployed ATC operation even in harsh environments. RVT can also be implemented extremely quickly.

Whether military forces are participating in combat operations or providing humanitarian relief after natural disasters, the success of their missions can hinge on access to reliable, responsive ATS.

Beyond the benefits of protecting controllers from harm and ensuring ATS, the RVT concept also gives military ANSPs the opportunity to gain enhanced shared situational awareness–provided they are equipped with the right tools. Extension possibilities include drone detection, surveillance sensors, asset tracking, airbase protection and surveillance fusion.



RVT from Frequentis and Rheinmetall increases situational awareness and keeps controllers safe.

RVT can also act as a contingency tower if something goes wrong, preparing an airport for the potential loss of ATS. In addition, RVT can provide enhanced visibility and safety capabilities to domestic airbase operations, supplementing existing technology with best-in-class visuals and object detection.

The emergence of drone technology poses another challenge and threat that military air navigation service providers (ANSPs) must be ready to deal with. By integrating drone detection into RVT, ANSPs gain a safer alternative to traditional approaches to military ATM, helping to bolster airbase and flight security. This is a clear requirement for future military operations.

Added Value

The RVT concept has already gained traction in the civil sphere, and has the potential to add even greater value in military scenarios. By enabling users to provide ATC services on demand and remotely, RVTs can reduce the risk to personnel, help avoid capital investments and optimise the allocation of resources. By being equipped with improved shared situational awareness–as well as object detection and tracking–military personnel can approach missions with greater confidence.

These benefits are not restricted to operations in deployed situations and natural disasters: they can also play a supportive role in peacetime operations. RVT is about much more than replacing the out-of-the-window view.

The Remote Virtual Tower increases flexibility and situational awareness while keeping controllers out of harm’s way by locating them in secure environments. The operationally proven and tested controller workplace ensures safe operation of air traffic. The sensor mix with different spectral bands increases the overall situational awareness under standard and silent operations.

State-of-the-Art Features

Advanced sensor technology, in combination with sophisticated video processing and tracking capabilities creates data feeds, which can be used beyond ATC in base and technical operations, for purpose of surveillance, general defence and airbase security. Mission proven sensors from Rheinmetall have a successful track record in detecting, classification and tracking of incoming threats from the air, land and sea. Military grade Infrared Sensors deliver a clear image of all detected tracks. The fast infrared search and track IR-scanner (FIRST) offers a scalable, up to 360° seamless view with high update rates. This allows using the tracking mechanism to detect and mark the aircraft with its ADS-B information and provides the user with additional situational awareness also at night. The FIRST also enables the user to be silent if needed. The long-range pan tilt zoom (PTZ) cameras allow an enlarged view of the airfield for identifying airplanes or threats. Laser distance measurement provides 3D data to precisely analyse threats and allocate the appropriate resources.

Additionally, the Frequentis VCS is a perfect extension to provide safety-critical air-to-ground and ground-to-ground communication in its most reliable form. Proved by its use in various control centres, including remote towers, its high- performance VoIP technology brings together the vast experience and superior functional level of the market leader, resulting in unique functions and performance supporting remote ATS operations.

The Frequentis smartTools components, for example MET or LICOS, provide the controller with an overview of multiple meteorological data, visualised in relation to runway positions. The airfield lighting system, as well as navigational aids, can then be controlled and monitored accordingly. smartSTRIPS further reduces the controller workload through integrated workflow support, which assists the ATCO during the decision-making process. To underpin the entire RVT infrastructure, Frequentis also provides ATM-grade networking and recording capabilities. Customisable and integrated working positions for controllers provide scalable panoramic views. The RVT displays information from a wide-range of sensors, and can be controlled via intuitive multi-touch gestures and configurable "shortcuts". Crucially, Frequentis designs its solutions based on industry best practices and security standards.

Replacing the out-of-the-window view with a visualisation system enhances the controllers' view.

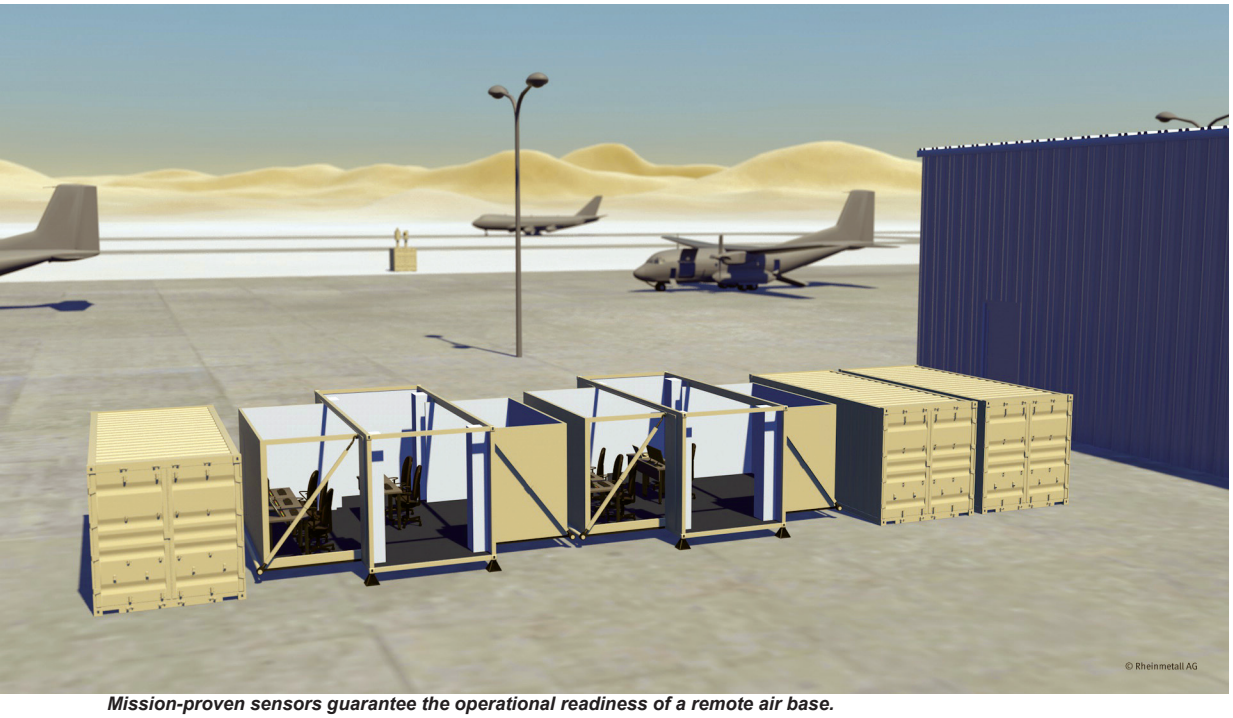
Operational Uses

In domestic airbase operations, the platform enhances visibility and flight safety, provides efficiency for smaller airbases, and is a cost-efficient tower alternative. For domestic off-base operations, the system provides quick ATC support for emergency landing strips, ensures safety for remote landing sites as well as enhanced situational awareness. In deployed operations, RVT supports safe combat missions, fast humanitarian assistance, enhanced staff protection, and is a cost-efficient contingency tower. Additionally the system offers surveillance, automation and protection capabilities. In this respect, it provides information sharing and data fusion, and can detect other systems such as UAS. It also provides enhanced airbase security and efficient protection.

Proven Benefits

The RVT solution from Frequentis and Rheinmetall is mature and in operational use. The companies have equipped the airport of Saarbrucken in Germany with remote tower technology, managing approximately 15,000 traffic movements per year for *Deutsche Flugsicherung*. Vienna Airport and Frequentis deployed a video-based surveillance solution for apron management at the largest airport in Austria, managing around 220,000 movements per year. Austrian Armed Forces and the two companies performed a test installation at the military airfield in Zeltweg in Austria to evaluate a video-based surveillance system for the purpose of air traffic control from a remote position and use this system for the protection and security of critical infrastructure. At an air base in the Middle East, intense testing took place in order to demonstrate the guaranteed performance of the system under the hot, dry and dusty environmental conditions, while military airbase protection capabilities were also evaluated, ensuring the system also provides detection and alarm for wildlife and potential threats resulting from air, land and sea.

RVT from Frequentis and Rheinmetall is flexible and highly customisable to individual defence customer needs and builds upon a fully integrated solution portfolio. From on demand services, enhanced night vision and object and threat detection, the need for RVT for military ANSPs is unquestionable.■



Mission-proven sensors guarantee the operational readiness of a remote air base.