

# KONGSBERG REMOTE TOWERS



## FEATURES

- Low bandwidth requirements and media hiring cost
- Low technical footprint and maintenance cost
- Scalability and flexibility (#Airports, Multimode capability and airport complexity)
- Full Eye Resolution (Visual Acuity 1.0) and 5 fps
- Day cameras and Infrared Sensors, IR fusion with day camera image
- Seamless panoramic image (Field of View: 360° horizontal and 60° vertical)
- Augmented Reality
- Service Oriented Architecture (SoA) and DDS with modular and scalable system architecture

## KONGSBERG Remote Towers

### - The unique solution

The KONGSBERG Remote Towers (RT) is the solution for all future remote tower related operations; virtual, contingency and remotely controlled towers.

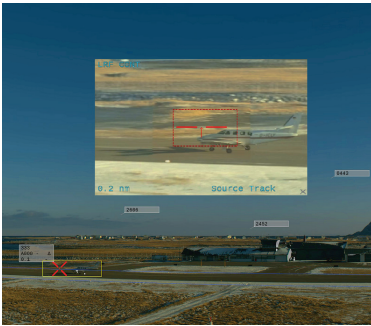
The KONGSBERG Remote Towers is designed and engineered from the top down to provide exceptional performance; drawing on decades of operational excellence and research in cutting-edge camera technologies, real-time systems with high network security based on open international DDS standard, and sensor technologies.

KONGSBERG is an international high technology powerhouse – providing solutions ranging from the deep ocean to outer space. KONGSBERG provides robust and leading-edge electro-optical sensor technology as part of the KONGSBERG Remote Towers – technology that is a direct spin-off from the world's most advance military sensor technology.

The KONGSBERG Remote Towers contributes with real-time network technology that provides a true, open Service-Oriented Architecture (SOA) and inherent safety logic, to guarantee safe and flexible remote tower operations. The international standard Data Distribution Service, or DDS, is used as the SOA middleware as it is designed to be used in mission critical real-time systems.

SOA and DDS are keywords in the future ATM Interoperability Infrastructure SWIM (System Wide Information Management).

The KONGSBERG Remote Towers contributes to Avinor's NINOX program - the world's largest RTS program. More than 36 sites in Norway is designated for Remote Tower Systems, starting implementing 15 airports in one control center.



### Total Cost of Ownership – a system lifetime

The KONGSBERG Remote Towers has well-proven technical equipment with a low technical footprint, included redundancy, which contributes to low maintenance cost.

The KONGSBERG Remote Towers has low network bandwidth requirements, without compromising image quality. For a remote tower center located far from the airports, the cost of redundant, leased networks with the required quality of service and latency can be very high.

The KONGSBERG Remote Towers is designed with an infrastructure supporting both single- and multi-mode capability and is scalable to support at least, but not limited to, 15 Airports. This gives the cost benefit of running several airports from one controller position.

By using the team expertise, the customer saves time and cost running and implementing remote towers.

### Detect, Recognize, Identify - what do you need to see?

- How well do you discover a flock of birds or drones over the runway?
- How early do you detect an approaching aircraft or how to see an aircraft leaving the aerodrome longer?
- Are you able to detect animals on the runway in the darkness?

Extreme performance day cameras and Infrared Sensors - The Electro-Optical Sensor Suite (EOSS) consists of a rotating platform housing a visual and infrared 360° cameras and a pan-tilt-platform (PTP) housing a visual zoom camera, a fixed lens IR camera, a laser range finder and a signal light gun. The camera sensors provides extreme high resolution, capable of capturing details at the accuracy of the human eye.

The KONGSBERG Remote Towers combines the infrared and day cameras sensor information into a fused image. This gives the controller a higher possibility to detect unwanted objects such as animals, flocks of birds or other objects.

Using a camera with 5Hz rotation attracts the ATCOs attention easier, the ability detect if an object is moving or is stopped, e.g. at stopbars and holding positions. This is due to step-wise update of object movement instead of smoother updates.

No study has discovered any negative results for 5Hz rotation, neither on visual detection performance or physiological stress.

The integrated display of the PTP gives controllers an exceptionally clear picture of airport operations: aircraft markings and landing gear are clearly visible – even in low light and bad weather conditions. It is also possible to initiate tracking of moving objects.

Visual overlays and augmentation - To ensure that the ATC operator has complete overview of the remotely operated airspace, the KONGSBERG Remote Towers provides several means of situational awareness aids. A typical Out-The-Window view presentation may consist of several visual overlays and augmentation: Track Labels, Meteorological Data, PTZ picture-in-picture view, 3D Terrain Overlays, Runway/taxiway overlays, Moving Target Indicators (MTI) and IR Hot Spot Detection.

In order to increase situational awareness the environmental sound from the airport is provided to the air traffic controller via a loudspeaker.

### Flexible, adaptable and easily integrated – a key capability

The KONGSBERG Remote Towers has an open architecture that is flexible and adaptable to future needs and enhancements.

The KONGSBERG Remote Towers may include the integration and control of airport lighting, airport environmental conditions, electronic flight strips system, airport and terminal sensors and radars and other components very easy. This integration may be a full integration into one heads down display, or as several displays.

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