360° CAMERA MODULE

KONGSBERG

360° Camera Module

The KONGSBERG 360 Camera System provides a unique optical capability to Detect, Recognize and Identify all targets of interest within the Area of Responsibility of the Air Traffic Controllers.

This camera system is particularly designed to provide a superior Out-The-Window (OTW) view in a remote center or virtual tower center, so to:

- Provide the operator with vision acuity as equal to the OTW as possible, both with respect to optical resolution, light sensitivity, color reproduction, scale and orientation.
- Reduce the required data bandwidth as much as possible between aerodrome and control center without compromising the vision acuity.
- Provide the user with a module based system for easy maintenance and shortest possible downtime during replacement and service.
- To avoid impaired visibility due to rain and snow all windows are equipped with wipers. Heated windows will improve the efficiency of the wipers and avoid problems with ice and snow. The rotational speed of the 360° Camera Module will in itself prevent snow, rain, salt, sand and other debris from sticking to the windows.

360° CAMERA SYSTEM

- Visual acuity 1.0 - same resolution as the human eye with a 20/20 vision
- All weather protection
- Day camera and IR camera integrated and fusioned into one image
  - 360 and 60 degrees field of view seamless presentation - no stitching

Functional Description

The 360° Camera Module is based on a rotating platform incorporating two cameras. One line scan camera for visual light, VIS 360°, and one line scan camera for Long Wave Infrared Light, IR 360°.

Both cameras, VIS 360° and IR 360°, use Time Delayed Integration (TDI) technique to improve light sensitivity. The platform will rotate at 5Hz and provide 5 high resolution 360° degree images per second. The captured image is projected on a native cylindrical format. A cylindrical format will provide a more realistic rendering for the operator than a set of static cameras will.

This solution has a number of inherent advantages. When presented on a curved video wall, the presentation of the video is completely continuous and uniform in the horizontal plane. Changing sunlight levels or even direct sunlight will not restrict the ATCO's view, since a digital sunshade that will improve the visibility around the sun is available. For Remote Tower operations the relatively low transmission bandwidth is another inherent advantage. The 5 Hz update rate on 60 Hz flicker-free screens highlights the Operators attention to moving objects as aircraft, cars and animals. The 5 frames per second update rate is more than adequate to achieve situational awareness similar to a traditional brick-and-mortar Out-The-Window view.

This sensor combined with the offered display solution, will give the operator a real angle perception between objects as they will appear with exactly same separation as in Out-The-Window View of a classic tower, and provide exceptional visual detection capability. The Detection, Recognition and Identification (DRI) range performance have been verified through field tests according to STANAG 4347 and 4349.

Infrared Capability

The Infrared camera is a high-end cryogenically cooled Thermal Camera with superior sensitivity and pixel resolution that matches the visible camera. The vertical field of view is 17 degrees and it can be operator controlled upward and downward to cover the same field of view as the colour camera. The Thermal camera solution gives the ATCO a unique situational awareness even during night time, with the possibility to detect people, animals, birds, vehicles etc. on, or close to, the runway. A cooled IR system will be superior to an un-cooled IR system for in particular challenging weather and low-light conditions.

This IR capability has been referred to as a game changer by experienced ATCOs. This advanced Thermal Camera gives exceptionally good DRI-range performance during both night- and daytime, and hence provides superior situational awareness compared to alternative solutions. The IR sensor system is also the key capability for ANSPs that will implement Remote Aerodrome Meteorological Observation System (RAMOS) procedures.

Kongsberg Defence & Aerospace AS
P.O. Box 1003
N-3601 Kongsberg, Norway

Phone: +47 32 28 82 00

aviation.security@kongsberg.com