

Tanker Remote Vision System

The Tanker Remote Vision System (TRVS) supports the in-flight refuelling operator with adequate view on the refuelling scene below the tanker aircraft and information concerning the tanker process during air-to-air refuelling operations. The system is initially designed for KDC-10 tanker aircraft of the Royal Netherlands Air Force (RNLAF) but can be adopted to any type of tanker aircraft.

TRVS is based on a modular approach and consists of a surveillance vision system to obtain optimal situational awareness around the aircraft and a stereo vision system for crystal clear stereoscopic operator viewing along the refuelling boom.

System overview

The Royal Netherlands Air Force (RNLAF) employs two McDonnell Douglas DC-10 aircraft that are converted to serve as tanker and transporter in a mixed role. These aircraft are therefore designated as 'KDC-10' ('K' is the type designation for tanker). The RNLAF KDC-10s resemble their American counterparts, however, they differ in fuel loading capacity and set-up of their inflight-refuelling system.

In the RNLAF configuration, the boom-operator station is located directly behind the cockpit. The boom is tele-controlled by using joysticks. The required visual feedback information is displayed on the operator console. The boom is controlled through a separate Boom Control Unit (BCU) which is integrated in the operator console. The BCU is not a part of TRVS. The TRVS interfaces with the BCU in order to receive information concerning the boom position and status. This information is presented in a graphic overlay on top of the refuelling image, together with the annunciators.

Visual information is provided by two video systems, a surveillance vision system and a stereoscopic vision system. Together, these systems form the 'Tanker Remote Vision System' (TRVS).

The surveillance vision system is based on three cameras covering more than 180 degrees horizontal field-of-view, between both the KDC-10's wingtips in aft direction. The images are displayed in a panoramic view on three monitors in the operator console.

The stereoscopic vision system is based on dual-channel images from two cameras aimed at the refuelling boom tip. Stereoscopic images are generated by means of a shutter system. The operator wears passive polarised glasses that separate the images yielding a vivid stereoscopic view. The stereoscopic vision system also comprises synthetic symbology in depth. The vision system is suitable for day and night vision (Near Infrared).

TRVS has been proven to be a high-performance vision system that has demonstrated its potentials during several air-to-air refuelling test flights

Specifications

Field-of-view of the surveillance system	Horizontal at least 180 degrees, vertical 62.0 degrees
Field of view stereoscopic system	Horizontal 35.5 degrees, vertical 27.0 degrees
Certification based on	DO-178B, DO-160D, DO-254
Electrical power consumption	Approx. 2 kW
Total installed weight	Approx. 280 kg