COOPERATION

In cooperation with ARVOO (processing board design and fibre-optic data handling), Adimec (camera systems), BARCO (monitors) and Glenair (fibre-optic connections) TNO has developed the Tanker Remote Vision System (TRVS). KLM Engineering & Maintenance was responsible for the installation and certification in the KDC-10 at the beginning of December 2009. Due to the great need for transport capacity for the Afghanistan mission, for instance, the first KDC-10 only became available last December. The second aircraft will be equipped with TRVS at the end of February 2010.

Mid-air refuelling gains an added dimension

A key aid for mid-air refuelling has been developed in the Netherlands. The Tanker Remote Vision System is a state-of-the-art system built by a Dutch industry consortium and TNO for the Netherlands Royal Air Force. It was certified for use in KDC-10 tanker aircraft at the end of 2009.

Virtually all NATO countries have systems whereby an operator visually connects a refuelling boom to an aircraft that needs refuelling, pouring some two thousand litres of fuel into the fighter jet travelling at a speed of around 800 kilometres per hour. The Netherlands Royal Air Force uses a system whereby a control station is located directly behind the cockpit of the tanker aircraft. Video equipment helps the operator control the refuelling boom from behind a series of screens.

TNO has been involved in the 'performance' measurements of this analog system since the 1990s when two civilian DC-10 aircraft were converted into KDC-10s for both passenger and freight transport as well as for mid-air refuelling operations. In 2001 the Netherlands Royal Air Force developed an upgrade plan for the KDC-10 aircraft and knocked on TNO's door two years later for the development of an improved system.

A demonstration version of this new Tanker Remote Vision System (TRVS) was ready in 2005. TNO project leaders, Hans Bol and Dr Leo van Breda: 'By definition the new, digital TRVS produces better performances in terms of image quality, dynamic and *stereovision*.' They say that the image quality is at least three times better than the 'old' analog vision system and the depth of vision better by a factor of ten. 'Seeing with TRVS is comparable to seeing with the naked eye. And even better in some aspects,' Bol and Van Breda claim.

SIMULATOR

Warrant officer Dieter Thomassen is 'senior KDC-10 Boom Operator'. He refers to the collaboration with TNO as 'fantastic'. Thomassen argues for the acquisition of a future boom operator simulator/trainer, which can use TRVS technology. Until now all operators go to the United States three times a year for their initial training and for recurrency/refreshment. No decision has yet been taken on the development of a boom operator simulator and nothing worthwhile can yet be said about any TNO involvement in such a development.

Captain Misja Woudt, the Defence project leader, is also positive about the collaboration with TNO: 'There are just a couple of software adjustments necessary but the TRVS exceeds our expectations. The image quality is much better.'

TNO has recently agreed an engineering support contract with Defence. Whether TRVS will become the vision system for the latest generation of tanker aircraft remains to be seen but it is very clear that Dutch industry has very high international ambitions with TRVS.

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