

This backgrounder is based on material gathered in 2006 and 2007 and published as separate articles in Australian Defence Magazine in March and September 2007. GF

RUMOUR CONTROL

KC-30B tanker program - backgrounder

The RAAF's KC-30B Multi-Role Tanker/Transport program has entered a critical phase in its flight test and certification program.

Gregor Ferguson – January 2008

The RAAF's Aerial Refuelling Tanker project, Air 5402, passed a key milestone on 10 December 2007 when the tanker's Aerial Refuelling Boom System (ARBS) made its first in-flight contact with a receiver aircraft. Although the ARBS was mounted on EADS CASA's A310 flying testbed, the 'dry' contact with a Portuguese Air Force F-16 fighter (no fuel was transferred) marks the beginning of the final and most important part of the flight test and certification program for the KC-30 family of airborne tankers which are based on the Airbus A330-200 airliner.

The RAAF is launch customer for this new tanker, having ordered five KC-30B Multi-Role Tanker Transports (MRTT), worth some AUD\$1.8 billion, in 2004. The KC-30B is an essential component of the RAAF's emerging air order of battle; along with the Boeing 737 Wedgetail Airborne Early Warning & Control (AEW&C) system and JASSM stand-off missile, it is one of the enabling capabilities which the service must have in place before it can safely retire its ageing F-111C strike force. The KC-30B and stand-off weapons such as JASSM will be necessary to maintain the range, reach and flexibility afforded by the F-111.

For further background to the RAAF's tanker program and the development of the KC-30 family, see "The RAAF's plane in Spain" elsewhere on this site.

EADS, partnered with Northrop Grumman has offered a slightly different version, the KC-30A, to the US Air Force to meet the service's KC-X requirement for a new tanker to replace its ageing force of KC-135s. A final choice between the KC-30A and Boeing's KC-767 Advanced Tanker (AT) is expected early in 2008.

During the recent trial the ARBS performed the contact with the receiver aircraft at an altitude of 27,000 feet. The contact was fully representative of how the ARBS will be used during a typical refuelling mission. This was the 60th test flight for the boom in a program which has notched up more than 160 flying hours.

The flight test boom operator Don Cash said "the boom performed as expected, the movement was like a fine watch, very precise at 27,000 feet. It was easy to follow the receptacle on the F-16, and the contacts were smooth and precise. I truly believe we have a very capable boom system, as demonstrated today."

Cash has over 8,000 hours experience during 21 years as boom operator, instructor, evaluator and flight tester the USAF on KC-135, KC-10 and KDC-10 tankers.

The ARBS is 17m long at full extension and is controlled remotely by an operator at a Remote Air Refueling Operator (RARO) console in the cockpit, using an 3-D visual system. This increases safety and reduces workload for the boom operator, and enables the tanker crew to be located together.

The first of the RAAF's five KC-30Bs was part of the static display at the Paris Air Show in June 2007. The aircraft flew to Le Bourget from EADS CASA's Getafe plant near Madrid, where it has just completed its Multi-Role Tanker Transport (MRTT) conversion and made its 3-hour maiden flight with the ARBS and Flight Refuelling Mk32 underwing refueling pods installed. This milestone marked the start of KC-30B flight testing in the production configuration, prior to certification and delivery to the RAAF.

The RAAF's KC-30Bs have a high degree of commonality with the KC-30 Tanker offered as a replacement for the US Air Force's KC-135s. This commonality, with the RAAF as lead customer, ensures a low-risk approach for the USAF tanker program, according to John Young, CEO of EADS North America Tankers.

“The advances of this program directly benefit the Northrop Grumman KC-30 Tanker that is being offered as a replacement for the U.S. Air Force KC-135.”

If selected by the USAF, the KC-30 will ultimately be built at a new final assembly and modification center in Mobile, Alabama. The KC-30 industrial team bidding for the KC-X program is led by Northrop Grumman, and includes EADS, General Electric Aviation, Honeywell and Sargent Fletcher.

Other KC-30 variants have also been ordered by Saudi Arabia, the United Arab Emirates and the UK, the latter to replace the Royal Air Force's ageing VC10 and TriStar tanker/transport fleet. However, both Italy and Japan have ordered the KC-767, which is also currently in flight test.

The KC-30 MRTT is derived from the Airbus A330-200 airliner. To date, more than 700 A330s have been ordered for airline and government customers, and the aircraft's production rate is increasing to meet a growing international demand. Qantas is an A330-200 operator and will be responsible for converting the RAAF's four remaining KC-30Bs at its Brisbane facility, and for through-life support of the tanker fleet under an initial five year contract signed in February 2007.

The KC-30 MRTT conversion of the basic Airbus A330 involves a range of military modifications including the two underwing aerial refuelling pods, the ARBS mounted on the rear fuselage centre line, military communications (including Link 16 for full tactical connectivity), data link, navigation, IFF, mission planning and electronic warfare self-protection equipment.

The RAAF selected the KC-30B in 2004 in preference to the KC-767. The approved cost of Project Air 5402 is \$1.777 billion; EADS CASA's prime contract is worth \$1.509 billion. The deliverables under this contract include the five KC-30Bs, a full flight

simulator, five years' initial in-service support and the establishment of a Contractor Support Organisation in Australia. The planned in-service date - comprising delivery of two aircraft, completion of qualification testing and issue of the military airworthiness certificate - is late-2009.

The KC-30B has a maximum take-off weight of 233 tonnes. Its standard wing tanks can carry up to 111 tonnes of fuel so the aircraft requires no extra tanks to carry a militarily useful payload in the tanking role. This leaves its cargo bay uncluttered to carry up to 42 tonnes of military and commercial air cargo pallets. It can also carry up to 272 passengers in a two-class configuration.

The ARBS features an automatic flight load alleviation system that provides a larger refuelling envelope for both tanker and receiver and enhanced controllability; it has a maximum fuel transfer rate of 4,500 litres/min while the two Mk32B under-wing hose and drogue pods have a maximum nominal fuel flow rate of 1,600 litres per minute.

But the ARBS is an all-new system designed by EADS CASA for which the RAAF is launch customer. It is a relatively high-tech device employing a 'fly by wire' control system and its certification program is running approximately 12 months behind schedule, though this has not impacted yet on the delivery schedule of the completed aircraft. The DMO acknowledged the potential for schedule delays with a developmental system and provided plenty of contingency.

The ARBS was installed on a modified Airbus A310 airliner test bed – this replicates accurately the aerodynamic and structural characteristics of the A330. But a series of minor engineering delays pushed the start of flight testing back from August 2005 to March 2006. Some of these related to the design of the RARO station adjacent to the flight deck; some to the ARBS itself (including supplier delays in the US); and some to the age and condition of the second-hand A310 selected as a test bed. None were serious, but all impacted on the schedule.

Part of the contingency allowance is a fall-back plan for parallel test and certification activities using both the A310 and KC-30B, if necessary, to achieve the RAAF's in-service date. The fall-back plan is now being implemented and at this stage the program is still on track to meet this target date.

The flight test program has validated all the engineering projections so far and the A310 test bed will carry out 'dry' and then 'wet' contacts (the latter actually transferring fuel) with receiver aircraft to achieve qualification of the boom system, including the RARO. First flight of the KC-30B with all refuelling systems operational is scheduled for early-mid 2008. Final testing of the new tanker with RAAF receiver aircraft will be conducted in Australia in early-mid 2009.

EADS CASA selected CAE Inc in March 2006 to supply a full flight and mission simulator for the KC-30B, a new training facility, and a mission systems trainer under a contract worth \$46 million. The simulator will be delivered to Amberley in 2009. CAE

has also signed an initial agreement directly with Defence to provide five years of support services for the training systems.

The in-country modification and in-service support program is worth some \$500 million to Qantas Defence Services Ltd. Thales Australia is supporting development of the KC-30B mission systems including development, manufacture and design and integration activities under subcontract to its European parent and EADS CASA; Thales in Europe is also part of the AirTanker Consortium which won the Royal Air Force's Future Strategic Transport Aircraft (FSTA) contract to replace its ageing VC10 and TriStar tanker fleet.

GKN Services Australia has contributed to the design of the airframe structural modifications and will manufacture parts for the modification kits; Australian Aerospace is assisting with technical documentation and support of the fuel system; and Pennant Australia is supporting the logistics analysis.

While Project Air 5402 hasn't escaped the technical problems inherent in any developmental program, the Defence Materiel Organisation's management of the associated risks would appear thus far to have succeeded in containing expectations and maintaining the final delivery schedule.

ENDS