

AVIATION WEEK

& SPACE TECHNOLOGY

PARIS AIR SHOW 2007

Core Architecture

Marshall Aerospace's new avionics suite meets international requirements for military cockpit upgrades

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Marshall Aerospace is offering a common core digital avionics architecture that it developed for the cockpit upgrade of four Royal Netherlands Air Force (RNLAf) C-130H Hercules and nine U.K. Royal Air Force (RAF) Tristar aircraft.

For the time being, the potential customers are all operators of pre-C-130J Hercules models, including Austria,

er C-130Ks with this new cockpit, says Military Aircraft Business Manager Eddie MacLean. This could be done by 2010, but the RAF is "reluctant to accept the business case" because the planned out-of-service date for the C-130Ks is 2013, depending on a timely introduction into service of the Airbus Military A400M.

One argument to go ahead with an update of at least some of the RAF's C-130Ks is that the evolving CNS/ATM requirements will increasingly lead to airway and altitude restrictions for older C-130s, if their navigation and communications equipment is not brought up to the latest standard.

"The RNLAf C-130 and RAF Tristar programs are running in parallel. That led us to adopt a common core avionics architecture so we could avoid duplication of work that is common across both contracts, optimizing our engineering ef-

The Tristar upgrade is just a basic CNS/ATM-compliant cockpit including four large flight displays, a flight management system, a partial communications suite and an engine instrument display system.

The RNLAf C-130 CUP effort, however, is much more comprehensive. Two ex-U.S. Navy EC-130Q Tacamo aircraft are to be completely refurbished and brought up to an upgraded C-130H standard by Marshall with deliveries scheduled for 2008. The aircraft were acquired by the RNLAf through Derco Aerospace and subsequently taken from desert storage in Tucson, Ariz., and shipped to Cambridge last spring.

Following these two aircraft, the two in-service C-130H-30s of the RNLAf are also to be brought up to the new standard.

The new standard includes not just the common core cockpit, but a range of extras including tactical displays, threat-warning displays from Terma, satellite communications, Link 16 tactical data link, secure VHF/UHF and HF voice communications, a secure digital intercom system, military GPS, night vision compatibility

and a cabin safety improvement modification package.

The aircraft will also receive airborne communications addressing and reporting system (Acars) as part of a package based on Rockwell Collins' CMU-900 communications management unit. Other new items are Honeywell's RDR-4000M weather radar (also used in the Boeing C-17), enhanced ground proximity warning and traffic collision avoidance systems plus a digital moving map system from German-based EuroAvionics. The Dutch C-130s will also be equipped with a central erase capability that allows the crew to instantly delete all classified data on the onboard systems.

As such, the Netherlands C-130 program is the "biggest single thing going through the company" representing £35 million (\$69 million) worth of business to Marshall Aerospace. ●



Two ex-U.S. Navy EC-130Q Tacamo aircraft (above) are being upgraded for the Netherlands, which includes the common core cockpit (right).



France, Japan, the U.K. and the U.S., company officials say.

The digital avionics upgrade kit is based on a CMA 9000 flight management system from CMC Electronics; a flat panel display system for primary flight, navigation and engine instrument display from Innovative Solutions and Support; and a communications kit largely from Rockwell Collins and Telephonics.

The suite costs approximately \$4.5 million per aircraft and complies with all relevant current and known near-future international requirements for communications navigation surveillance/air traffic management (CNS/ATM) systems performance, according to Marshall Aerospace, which has its headquarters here.

For the RAF, Marshall Aerospace is proposing an option to upgrade its old-

fort," says Project Manager Neil Thompson. "It has allowed us to introduce common equipment from key suppliers, to assemble harnesses and shelves off-aircraft, to generate a common suite of documentation and to optimize rig testing for core functionality validation. Moreover, it is providing Marshall Aerospace with an opportunity to market a core avionics upgrade as a fully validated and integrated solution."

The avionics package was designed as the core of the RNLAf C-130 Cockpit Upgrade Program (CUP) and the RAF Tristar Minimal Military Requirements (MMR) program. Preliminary design review for Tristar MMR was completed in early April and the first aircraft is expected to arrive at Cambridge this month or next for the new cockpit to be installed. Flight testing is currently scheduled to start in early 2008.