

# C-130 Life Extension Programme Contributed by Chris Gee

NZ7004 recently returned to Whenuapai following completion of its Life Extension Programme (LEP). This C-130 LEP is the most intensive upgrade to existing C-130 airframes ever undertaken and has the potential to be licensed to other C-130 users around the world as their airframes also reach refurbishment age. Regular KiwiFlyer Contributor, Chris Gee, attended the welcome home ceremony in October.

**THE FIRST** of the Royal New Zealand Air Force's venerable C-130H Hercules aircraft to be upgraded through the Life Extension Programme and returned to the RNZAF, Aircraft NZ7004, was welcomed back to 40SQN with a ceremony at RNZAF Base Whenuapai on 21st October. Minister of Defence Dr Wayne Mapp and the Chief of the Defence Force Lieutenant General Jerry Mateparae were at the welcoming ceremony for NZ7004, and were shown through the new aircraft and simulator by the aircrew.

The C-130H has been in service with the RNZAF since 1965, before many of its pilots were born, yet the LEP will allow the airframe to remain in service until 2020 by which time the aircraft will have been in service for 55 years. The upgrade is extremely comprehensive, both to the airframe and the avionics. The airframe has been significantly refurbished, including the large job of replacing the centre wing section and adding a Fatigue Analysis Monitoring System (FAMS). 98% of the wiring has been replaced, with over 85km worth of wiring added.

The most dramatic feature of the upgrade is the new Glass Cockpit with moving map display, and the modern Flight Management System. The avionics additions are extensive, and include an upgraded APN-241 Radar with Ground Mapping capability, an Upgraded Radar Altimeter, a new Traffic Collision Avoidance System (TCAS II), and an Enhanced Ground Proximity Warning System (EGPWS) for terrain avoidance.

The aircraft's navigation capabilities

have been enhanced with the addition of a Twin Honeywell Embedded Global Positioning System and Inertial Navigation System, which gives the aircrew Required Navigation Performance (RNP) 0.3 approach capability. These navigation

The C-130 LEP has a new Self Protection System, comprising a Missile Launch Detector System (MLDS), which detects the UV signature of SAM and MANPAD launches, and alerts the crew accordingly.

Other new aircraft systems include the addition of a Caution Advisory Warning system (CAWS), a Digital Engine Instrument Display System, Digital Fuel Quantity Indicating System, a Flight Data Recorder, a new Internal Communications System, upgraded Air Conditioning and Pressurisation system with a rapid cooling capability, and of course, an upgraded electrical system to cope with the new avionics.

Since all these upgrades have taken place internally, there is very little external difference between the LEP and the 'Legacy' Hercules, however there are a few changes that are noticeable. The most obvious is the addition of an Auxiliary



New C-130 LEP NVG compatible glass cockpit.

facilities, along with the NVG compatible flight deck, allow the aircraft to operate into small, unlit airstrips at night, without the need for any airfield aids or guidance from the ground.

An advanced communications suite has been added with a Military SATCOM facility, two V/UHF Radios, which allow frequency hopping (SINCGARS & HAVEQUICK compatible), as well as two VHF Radios capable of voice & data. This will allow the aircraft to integrate with other modern defence forces around the globe and also brings the aircraft up to the modern standard for civilian Air Traffic Control.



The legacy C-130H cockpit.

Power Supply on the front of the port main landing gear housing, the UV sensors for the MLDS on the nose and tail, and the SATCOM Antennae on the roof.

The new C-130 LEP man-machine interface drastically reduces the workload



Lieutenant General Jerry Mateparae addresses the audience at RNZAF Base Whenuapai.



Missile Launch Detection System Sensor

of the aircrew, providing more time for mission focus and increasing situational awareness. In order to speed up training on these very advanced systems, a C-130 LEP 'Part Task Trainer' has been built at Whenuapai which electronically emulates the aircraft systems and allows the crew to train without using expensive 'real' airtime. While not actually a full Flight Simulator (the crew must still travel to Florida for their flight and emergency simulation training) the PTT allows the aircrew to develop their teamwork and train for specific missions in a very convincing simulated cockpit environment.

The Life Extension Program has not been without its difficulties, with the prime contractor L-3 Communications closing down its L-3 SPAR Aerospace facility in Canada and Safe Air being awarded the contract from L-3, which then had to lay off 100 staff as the project fell two years behind schedule due to problems integrating the Flight Management System. The fact that the FMS is currently at version 116 shows the complexity involved with this kind of software. The issues are now mostly resolved however, and the RNZAF's entire fleet of 5 C-130's will receive the same upgrade.

NZ7004 is about to enter approximately six months of Operational Testing and Evaluation with 40SQN, during which time the RNZAF will write the book on how the aircraft will be operated and its new capabilities utilised.

The next airframe, NZ7005, has also nearly completed the process and is due back soon to join NZ7004 at Whenuapai. The technology used in the LEP upgrade was largely developed specifically for, and by, the RNZAF, and much of the upgrade work on the remaining airframes is to be undertaken by Safe Air.



Minister for Defence Dr Wayne Mapp is shown the Part-Task Trainer.

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