

C-130J Hercules Tactical Transport Aircraft, United States of America

Airforce-technology



The Lockheed Martin C-130 is the US Air Force principal tactical cargo and personnel transport aircraft. The C-130J Hercules is the latest model, featuring a glass cockpit, digital avionics and a new propulsion system with a six-bladed propeller.

The C-130 has been in continuous production since 1954 and more than 2,500 Hercules aircraft were built for 63 countries.

C-130J transport aircraft upgrade

The improvements built into the C-130J, which entered production in 1997, have enhanced the performance of the aircraft in terms of its range, cruise ceiling time to climb, speed and airfield requirements.

A stretched version, the C-130J-30, has been developed and designated the CC-130J by the USAF. The first C-130J-30 for the UK RAF (the launch customer) was delivered in November 1999.

The C-130J entered active service with the USAF at Little Rock Air Force Base in April 2004 and was first deployed in December 2004.

The first of five C-130J Super Hercules aircraft intended for deployment at Little Rock left Lockheed Martin's facility, for delivery to the base, in August 2013.

The first combat airdrop for the USAF was in July 2005. The US Air Mobility Command declared initial operating capability for the C-130J in October 2006.

The US Air Force awarded a \$167m block upgrade contract to Lockheed Martin in December 2011 to overhaul the C-130J Hercules with Block 8.1 configuration.

The Block 8.1 configuration contains software and hardware capability expansion such as modernised identification friend or foe (IFF), automatic dependent surveillance broadcast, communication, navigation and air traffic management datalink.

Cockpit of the C-130J Hercules transport aircraft

The C-130J is crewed by two pilots and a loadmaster. The new glass cockpit features four L-3 systems with multifunction liquid crystal displays for flight control and navigation systems.

Each pilot has a Flight Dynamics head-up display (HUD). The dual mission computers, supplied by BAE Systems IEWS, operate and monitor the aircraft systems, as well as provide status updates for the crew.

The cockpit is fitted with the Northrop Grumman low-power colour radar display. The map shows digitally stored image data.

The C-130J is equipped with a Honeywell dual-embedded global positioning system / inertial navigation system (GPS/INS), an enhanced traffic alerting and collision avoidance system (E-TCAS), a ground collision avoidance system, SKE2000 station keeping system, and an instrument landing system (ILS).

In July 2008, Lockheed Martin announced the following would be included in the baseline configuration of new C-130Js: Elbit Systems global digital map unit, and the TacView portable mission display and InegrFlight commercial GPS landing system sensor unit, supplied by CMC of Canada.

Cargo systems

The cargo bay of the C-130J has a total usable volume of more than 4,500ft³ and can accommodate loads up to 37,216lb. For example, three armoured personnel carriers, five pallets, 74 litters (stretchers), 92 equipped combat troops or 64 paratroops. The bay is equipped with cargo handling rollers, tie-down rings, stowage containers, and stowage for troop seats.

Countermeasures

The ATK AN/AAR-47 missile warning system uses electro-optic sensors to detect missile exhaust and advanced signal processing algorithms and spectral selection to analyse and prioritise threats. Sensors are mounted near the nose just below the second cockpit window and in the tail cone.

The BAE Systems AN/ALR-56M radar warning receiver is a superheterodyne receiver operating in the 2GHz to 20GHz bands. A low-band antenna and four high-band quadrant antennae are installed near the nose section below the second window of the cockpit and in the tail cone.

The BAE Systems Integrated Defence Solutions (formerly Tracor) AN/ALE-47 countermeasures system is capable of dispensing chaff and infra-red flares in addition to the POET and GEN-X active expendable decoys.

The Lockheed Martin AN/ALQ-157 infra-red countermeasures system generates a varying frequency-agile infrared jamming signal. The infrared transmitter is surface mounted at the aft end of the main undercarriage bay fairing.

The USAF has selected the Northrop Grumman Large Aircraft Infra-red Countermeasures (LAIRCM) system to equip its C-130 aircraft. LAIRCM is based on the AN/AAQ-24(V) NEMESIS. It entered low-rate initial production in August 2002 and completed initial operational test and evaluation in July 2004.

A five-year delivery order for the system was placed by the USAF in July 2006. Australia requested the sale of LAIRCM to equip its fleet of 12 C-130J in May 2008.

Radar

The Northrop Grumman MODAR 4,000-colour weather and navigation radar is installed in the upward-hinged dielectric radome in the nose of the aircraft. The weather radar has a range of 250nm.

Turboprop engines of C-130J

The C-130J is equipped with four Allison AE2100D3 turboprop engines, each rated at 4,591 shaft horsepower (3,425kW). The all-composite six-blade R391 propeller system was developed by Dowty Aerospace.

The engines are equipped with full-authority digital electronic control (FADEC) by Lucas Aerospace. An automatic thrust control system (ATCS) optimises the balance of power on the engines, allowing lower values of minimum control speeds and superior short-airfield performance.

The aircraft can carry a maximum internal fuel load of 45,900lb. An additional 18,700lb of fuel can be carried in external underwing fuel tanks. The refuelling probe installed on the centre of the fuselage has been relocated on the C-130J to the port side, over the cockpit.

Stretched C-130J-30

The C-130J-30 is the stretched version of the C-130J. The cargo floor length of the stretched version is increased from 40ft to 55ft, which gives a significant increase in the aircraft's airlift capability.

The stretched C-130J-30 can carry eight 463L pallets, 97 litters, 24 CDS (US Container Delivery System) bundles, 128 equipped combat troops or 92 paratroopers.

The first C-130J-30 for the UK RAF was delivered in November 1999 and deliveries of all 15 aircraft ordered were completed in June 2001.

The aircraft is in production for the US Air Force (39 aircraft, the first of which was delivered to the Air National Guard in December 2001), the Royal Australian Air Force (12), the Italian Air Force (ten) and are ordered by the Kuwaiti Air Force (four) and the Danish Air Force (three).

C-130J international orders

A total of 1,186 C-130J and C-130J-30 aircraft were ordered and more than 150 delivered. Orders are: US Air Force, Air National Guard, Marine Corps and Coastguard (89 C-130J and C-130J-30 and 20 KC-130J tankers), UK (10 C-130J, 15 C-130J-30 all delivered), Italian Air Force (12 C-130J and ten C-130J-30 all delivered), Royal Australian Air Force (12 C-130J, all delivered), Kuwaiti Air Force (four C-130J-30) and the Danish Air Force (four C-130J-30 all delivered).

In April 2004, the US Marine Corps formally accepted the first KC-130J tanker / transport into service. The aircraft was first deployed in combat in April 2005 in Iraq. In December 2006, an additional order was placed for three C-130J-30 for the USAF and one KC-130J for the USMC. The KC-130J was delivered to the USMC in October 2010.

In May 2007, India requested the foreign military sale (FMS) of six C-130J aircraft. The \$1.2bn FMS contract was placed in February 2008. The first C-130J was delivered to the Indian Air Force (IAF) in December 2010 and entered into service in February 2011. The third and fourth C-130Js were delivered in June 2011. The fifth aircraft was delivered in September 2011. Deliveries were concluded in December 2011.

In November 2007, Norway placed an order for the purchase of four C-130J Super Hercules aircraft under a \$519m FMS agreement. One aircraft was delivered in November 2008 and the second in April 2009. Deliveries concluded in May 2010 with the handing over of the fourth C-130J aircraft. In September 2012, Lockheed Martin delivered an additional C-130J Super Hercules aircraft to the Norwegian Air Force as Norway lost one of its four aircraft in March 2012.

In January 2008, Canada placed a C\$1.4bn order for 17 C-130J aircraft. The first delivery took place in June 2010 at the Canadian Forces Base Trenton. Deliveries were completed by April 2012.

In June 2008, the USAF ordered six HC/MC-130J special operations variants of the C-130J. The first MC-130J was delivered in March 2011.

In April 2010, the Israeli Government ordered nine C-130J-30 aircraft. Lockheed Martin delivered the first C-130J Super Hercules aircraft to Israeli Air Force (IAF) in June 2013.

Under an undefined contract action (UCA) signed with the US Government in April 2011, Lockheed Martin will supply an additional C-130J to Israel.

Qatar ordered four C-130J-30 aircraft. The production of the first C-130J-30 aircraft was completed in May 2011. Lockheed Martin delivered four C-130J-30 aircraft to the Qatar Armed Forces in September 2011. In August 2008, Iraq requested the sale of six C-130J-30 aircraft. The first aircraft completed its maiden flight in September 2012.

The Sultanate of Oman ordered one C-130J-30 long-configuration aircraft in July 2009 for delivery in 2012. In August 2010, Oman ordered two additional C-130J aircraft. The first aircraft was delivered in September 2012.

Lockheed Martin signed a contract with Tunisia in March 2010 to supply two C-130J Super Hercules airlifters. Lockheed Martin delivered the first C-130J to Tunisia in April 2013. The second aircraft was delivered in December 2014.

The US Government awarded a \$245m FMS contract to Lockheed Martin on 27 May 2010 for supplying three KC-130J refuelling aircraft to Kuwait Air Force. The contract was managed by the US Navy. The first aircraft was delivered in August 2014.

The Republic of Korean Air Force (ROKAF) ordered four C-130J Super Hercules aircraft in December 2010. Lockheed Martin delivered the first two C-130Js to the ROKAF in March 2014. It also provided aircrew and maintenance training for two years.

Lockheed Martin was awarded a \$270m contract by the USAF in February 2011 to supply C-130 Aircrew Training Systems (ATS). The contract includes provision of training and instruction services, site management, engineering support and operation and maintenance for aircrew training devices.

In September 2011, CAE was awarded a contract by the US Air Force to design, build and supply four additional full flight simulators for C-130J transport aircraft.

The first MC-130J Shadow II aircraft was delivered to the United States Air Force Special Operations Command by Lockheed Martin in September 2011. Lockheed Martin delivered the first HC-130J Combat King II aircraft to the US' Air Education and Training Command (AETC) in the same month.

Lockheed Martin was awarded an \$84.3m contract by the US Air Force on 12 September 2011 for the first phase of the C-130J Maintenance and Aircrew Training System (MATS) II programme. The company supplied four weapon system trainers (WST) to the Air Mobility Command, Air Combat Command and Air Force Special Operations Command for aircrew instruction, and renders programme management and engineering services as part of the contract.

The contract included an option to procure two more WSTs, in addition to other types of trainers, including a fuselage trainer. The USAF exercised one option to procure an additional WST. CAE designed and manufactured the WST under a subcontract received from Lockheed Martin in March 2013.

In October 2011, India exercised an option to purchase six additional C-130Js from Lockheed Martin under an estimated \$1.2bn foreign military sale. The US Air Force (USAF) baseline instruments, six Rolls-Royce AE 2100D3 additional engines, eight AN/AAR-47 missile warning systems, and eight AN/ALR-56M advanced radar warning receivers will also be delivered under the military sale.

In October 2012, the US Coast Guard placed a \$218m order with Lockheed Martin for three additional HC-130J aircraft.

Lockheed Martin delivered two additional C-130Js to Little Rock Air Force Base in December 2015. The US Government awarded a Multiyear II contract to Lockheed Martin in December 2015 for 78 C-130J aircraft. The USAF received two more C-130J Super Hercules aircraft in June 2016.

In December 2015, the Royal Air Force awarded a £369m contract to Marshall Aerospace and Defence Group, Lockheed Martin and Rolls-Royce to receive Hercules Integrated Operational Support (HIOS) for the C-130J fleet until 2022.

Lockheed Martin received a \$10bn contract in August 2016 to cover USAF's future orders under C-130J production programme. The scope of contract includes foreign military sales.