

Indian Light Combat Helicopter vs Chinese Z-10 Attack Helicopter

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Introduction

Both China and India, despite being the world's largest military helicopter markets, did not have a suitable dedicated attack helicopter in their inventory till very recently. In the early Seventies, while the Indian military had a limited number of Chetak helicopters armed with TOW anti-tank missiles, the Chinese, in their modernisation thrust, had procured eight French Gazelle helicopters equipped with HOT anti-tank guided missiles. Over the years, the Chinese military has made deliberate and concerted efforts to acquire a state-of-the-art Attack Helicopter (AH) ex-import. Their efforts to acquire the Italian A129 Mangusta and subsequently the US AH-1 Huey Cobra came to naught, mainly due to the Tiananmen Square incident resulting in sanctions by the Western nations. Subsequent efforts by China to acquire the Russian MI-25/MI-35 AH from the erstwhile USSR also did not fructify. This led it, in 2003, to finally embark on a development project for a combat helicopter of its own. The result is the development of the new Chinese AH Z-10 which was displayed for the first time at China's International Aviation and Aerospace Exhibition in Zhuhai in 2012. The Z-10 today is one of the newest, modern, state-of-the-art AH in the world. According to data available, China has around 60-70 operational Z-10 AHs with the People's Liberation Army (PLA), equipping about 3-4 aviation units. Reports

suggest that the Z-10 is in the same class as the South African Rooivak and Italian Mangusta but falls much below the capabilities of the US Apache.

The Indian military, on the other hand, was able to replace its old and vintage Chetak armed helicopters with the Russian MI-25/MI-35 AHs acquired in the late Eighties and early Nineties to equip two squadrons of the Indian Air Force (IAF). However, the Kargil conflict was the trigger for the development of a dedicated AH, capable of operating in the mountains, including in high altitudes. The inability of the MI-25/MI-35 and even the armed MI-17 to operate at these heights resulted in a critical weapon system being left out of the battle, for which India paid a heavy price in terms of casualties. Accordingly, the government approved the development of the Light Combat Helicopter (LCH) by the state-owned Hindustan Aeronautics Limited (HAL) in 2006. The LCH is presently undergoing development flights and is expected to enter service by the end of 2015. The LCH is stated to be a multi-role combat helicopter with the unique and distinct capability to operate in high altitudes – an advantage over other attack helicopters in the world today. Even the Z-10, though capable of operating in the mountains, has no stated capability of high altitude operations. Once operational, the LCH will form part of the Indian Air Force and Army inventories.

Design and Development

The LCH is a derivative of the HAL Dhruv, which is already in service with both the Army and Air Force; in fact, the weaponised version of the Dhruv christened 'Rudra' has recently entered service with the Indian Army with the first unit under raising. While the Rudra basically is an armed helicopter/ gunship, the LCH is being developed as a dedicated attack helicopter, capable of operating at high altitudes – it will have the same weapon package as the Rudra. The LCH development being based on an existing helicopter is expected to greatly reduce project costs. As per HAL, the projected requirement for the Air Force and Army is 65 and 114 respectively.

The LCH has a maximum weight of 5.5 tonnes, and service ceiling of 6,500 m (21,300 ft). The design features a narrow fuselage with stealth profiling, armour protection and the helicopter will be equipped to conduct day-and-night combat operations. According to reports, the LCH will also feature a digital camouflage system. The LCH has a two-crew cockpit. It will be equipped with helmet-mounted targeting systems, electronic warfare systems and advanced weapon systems. The project involves the development of three Technology Demonstrators (TDs) of which two have already been developed and put through

various tests related to flight performance, including high altitude operations and weapons integration. The third prototype of the LCH is about to be delivered and is expected to be different from the LCH-1 and LCH-2. The third prototype is said to be significantly lighter than its predecessors and is expected to be as real as the actual LCH – the timeframe for induction of the LCH is end 2015.

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The development of the Z-10 began in the mid-1990s. The prototype of the Z-10 made its maiden flight in 2003. The Z-10 helicopter has a standard gunship configuration with a narrow fuselage and stepped tandem cockpits. The gunner is seated at the front and the pilot at the rear. The fuselage has sloped sides to reduce radar cross-section. All vital areas are believed to be protected by armour plates. The Z-10 attack helicopter was developed by the Changhe Aircraft Industries Group (CHAIG) and China Helicopter Research and Development Institute (CHRDI) for the PLA. The helicopter is being manufactured by Changhe Aircraft Industries Corporation (CAIC). The Z-10 helicopter took to the skies for the first time in April 2003. The first helicopter was delivered to the PLA in 2009. The Z-10 was displayed for the first time at the 9th China International Aviation and Aerospace Exhibition in Zhuhai in November 2012 –it weighs 5.5 tonnes and has a stated service ceiling of 6,000 m. While initially it was thought that this project had received extensive technical assistance from Eurocopter and Agusta, it was revealed during the 2012 China air show that the design and development of the Z-10 had been secretly assisted by the Russian Kamov helicopter design bureau with the help of a programme known as Project 941. However, irrespective of the above, the reality is that the Z-10 is operational and in service in the PLA today, while the LCH is still in the developmental stage.

Main Features

Armaments and Weapons

Due to their modular design concept, both the LCH and Z-10 can be armed with a wide variety of weaponry. These could be in terms of machine-guns, cannons, rockets and missiles, both air-to-ground and air-to-air. Weapons of the Z-10 consist of the 14.5mm heavy machine-gun, 30-mm cannon, HJ-9/9A anti-tank guided missiles (comparable to the TOW-2A), newly developed HJ-10 anti-tank missiles (comparable to the AGM-114 Hellfire) and TY-90 air-to-air

missiles for engaging other helicopters. The databus architecture of the Z-10 enables the weaponry of both Russian and Western origin to be adopted. The armament package planned for the LCH is the same that is fitted on the Rudra. This includes the 20 mm M621 cannon (Nexter) mounted on a chin turret, 70/80mm rockets, French MBDA Mistral air-to-air missiles and the Helina air-to-ground (air version of the NAG anti-tank) missiles. It would be pertinent to mention here that the Helina which is supposed to be a fire and forget missile with a purported range of 7 km is not yet ready – even the Rudra which is already in service does not have critical anti-armour capability. This is, and will remain, a very crucial difference viz- a-viz the Z-10 till the Helina becomes operational and is successfully integrated into the LCH. Another important difference is that the Z-10 has the capability to carry 16 missiles while the LCH configuration will allow only 8, though presently the Z-10 also carries only 8 missiles due to a less powerful engine – the new engine with enhanced horse power is under development and will finally power the Z-10 to enable carriage of 16 missiles.

Power Plant

The LCH will be powered by two Turbomeca Shakti turbo shaft engines [1,430 shaft horse power (shp) each] driving a four-blade main rotor and four-blade tail rotor. The same engines are also fitted on the Advanced Light Helicopter (ALH) (Dhruv) and Rudra helicopters. In fact, the Shakti engine has already been tested for its performance in high altitude operations (the Shakti engine is being jointly developed by the French Turbomeca and HAL). On the other hand, numerous engines were used during the design and development stage of the Z-10, to include the Canadian Pratt & Whitney PT6C-67C, Russian Klimov VK-2500 from the Mi-17 and Ukrainian Motor-Sich TV3-117. However, with Pratt & Whitney coming under the adverse observation of US federal agencies regarding violation of the arms export control Act transfer regime, the Canadians withdrew from the project. The Chinese thereafter, with Russian and Ukrainian help, managed to develop their own engine, the WZ-9. Two of these engines producing 1,350 shp each, presently power the Z-10 driving a five-blade main rotor and two-blade twin tail rotors. However, this engine has proved to be too weak for the 5.5 tonne helicopter. With the aid of the French manufacturer Turbomeca, a new engine has been developed recently and designated the WZ-16. The new engine, with enhanced horse power of 2,000, will allow carrying of 16 HJ-10 missiles compared to the 8 earlier.

Cockpit and Avionics

The LCH is to have a glass cockpit with multifunction displays, a target acquisition and designation system with Forward Looking Infrared (FLIR), laser range finder and laser designator. Weapons will be aimed with a helmet mounted sight and there will be an electronic warfare suite with a radar warning receiver, laser warning receiver and missile approach warning system. The two pilots in the LCH sit one behind the other, compared to side-by-side in the Dhruv. All the flight controls, the hydraulics and the fuel system had to be redesigned for the LCH. The helicopter is to be fitted with a data link for network-centric operations facilitating the transfer of mission data to the other airborne platforms and ground stations operating in the network, facilitating force multiplication.

The Z-10 has a stepped tandem cockpit which accommodates a gunner in the front and a pilot in the rear on ejection seats. The cockpit is protected by composite armour. The bullet-proof glass canopy of the cockpit can withstand 7.62mm rounds. The modern glass cockpit is equipped with Multifunctional Displays (MFDs), a helmet mounted sight with night vision goggles and as per Chinese claims, a Fly-By-Wire (FBW) control system. The helicopter can be fitted with an FLIR and a low-light television as well as radar systems [Millimetre Wave Radar (MMW) – the MMW is also fitted on the Apache].

Employment Philosophy

Both the LCH and the Z-10 are likely to have a similar employment philosophy in conformation with the other state-of-the-art attack helicopters around the world, though the type of terrain and threat perception would dictate the actual employment philosophy. Their primary task remains anti-armour and anti-infantry roles as part of the overall combined arms team concept. Their secondary roles could include air defence against slow moving aerial targets [aircraft and Unmanned Aerial Vehicles (UAVs), Counter Surface Force Operation (CSFO), Suppression of Enemy Air Defence (SEAD) operations, escort to Special Heliborne Operations (SHBO), Counter-Insurgency Operations (COIN), offensive employment in urban warfare, support of combat Search and Rescue (SAR) operations and scout duties]. The LCH will also be capable of high-altitude operations since its operational ceiling will be 6,000-6,500 m (20,000-21,300 ft). The Chinese also claim that the Z-10 is capable of operating in the mountains though high altitude capability remains doubtful.

Comparative Analysis

The Z-10 is already operational and in service with the PLA but very little is known about its operations after induction into service and the problems being encountered which is normal in a newly manufactured aircraft – every new aircraft needs a period of two to three years to stabilise. The LCH, on the other hand, is still in its final developmental stage and yet to become operational and enter service. However, going by the comparative analysis of the stated capabilities of both attack helicopters as brought out earlier in the article, the basic configuration and key specifications are almost similar. Even the design features related to the cockpit, avionics, sensor suites and weapons /armament package are similar barring the different types/ origin of equipment being used. The present engine of the Z-10, the WZ- 9 is, in fact, a liability, restricting the full exploitation of the combat potential of the helicopter. However, the development of the WZ-16 engine for the Z-10 is going to be a complete game changer, giving it enhanced weapon carriage capability(16 missiles compared to the earlier 8) as well greater flexibility to operate in mountainous terrain. Its stated fly-by-wire capability gives it a clear edge over the LCH as it reduces the load of the pilot, thereby facilitating efficient mission management. The main weapon of the AH is the Air-to-Ground Missile (ATGM) and the Chinese HJ-10 missile being comparable to the Hellfire is a very potent weapon with range of more than 7 km. The Helina anti-tank missile for equipping the Rudra and LCH is not likely to be ready in the near future, leaving a critical void in the capability of the above Indian armed/attack helicopters. Efforts to procure an ATGM ex import for the interim (Israeli STRIKE- ER and MBDA's PARS-3) have not fructified despite trials having been completed a year back – this, in fact, is a major gap between the Z-10 and LCH as anti-armour remains the primary task of an AH.

The targeting systems in both AHs are electro-optical which have similar capability but if the MMW radar is installed on the Z-10 as claimed in the documents, it will give a distinct edge for multiple targeting even in adverse weather conditions, However, the MMW with the present technology needs a bigger platform like the Apache. This claim/development by the Chinese needs to be closely monitored. The only aspect where the LCH scores over the Z-10 is in its high altitude operations capability but this will only manifest itself once the LCH enters service and actually operates at these altitudes. Hence, based on the above facts in the overall analysis, presently, the Z-10 certainly has an edge over the LCH – however, this assessment could undergo a change once the LCH is fielded and justifies its stated claims.

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