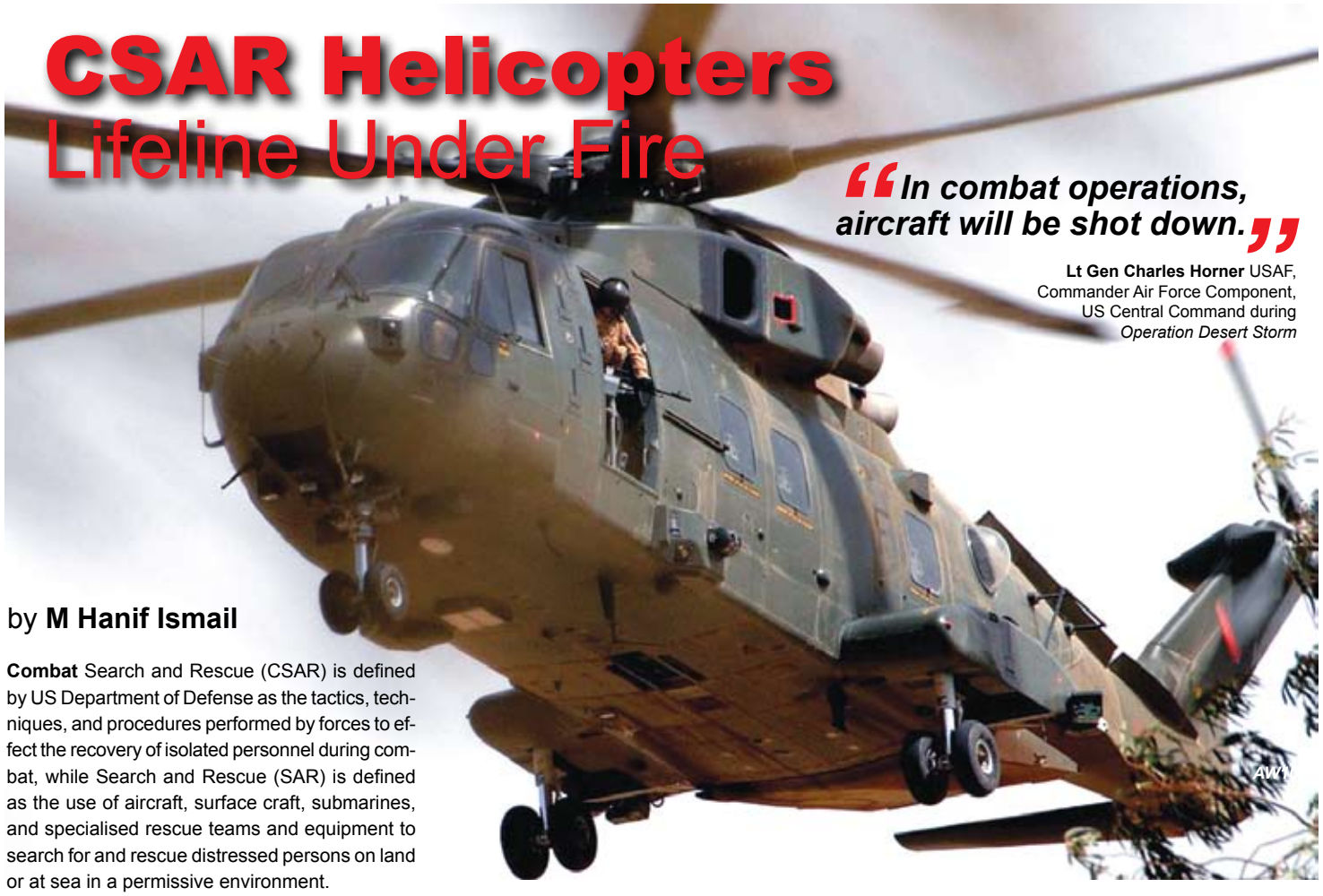
CSAR Helicopters
Lifeline Under Fire



US DoD

> ***"In combat operations, aircraft will be shot down."***
>
> **Lt Gen Charles Horner** USAF, Commander Air Force Component, US Central Command during *Operation Desert Storm*

by **M Hanif Ismail**

Combat Search and Rescue (CSAR) is defined by US Department of Defense as the tactics, techniques, and procedures performed by forces to effect the recovery of isolated personnel during combat, while Search and Rescue (SAR) is defined as the use of aircraft, surface craft, submarines, and specialised rescue teams and equipment to search for and rescue distressed persons on land or at sea in a permissive environment.

Combat Search and Rescue operations are generally acknowledged as being very risky and very time sensitive. These two factors lead to the requirement that assets used in combat SAR missions must be well protected and have a very high performance, so it is able to transport the recovered personnel, which might be in critically injured, to a safe heaven as fast as possible. One of the most important assets to have in any combat SAR task force is a capable helicopter which possess these qualities. Here, ***ADJ*** looks at some of the helicopters marketed as being combat SAR capable.

AW101

The AW101 is the medium/heavy multi-role helicopter from AgustaWestland. The helicopter benefits from a modern design with embedded safety-enhancing features. The AW101 is based on a common airframe and core system and is configured to meet diverse roles for pre-dominantly maritime and utility tasks. The large cabin can carry up to 36 troops on crashworthy seats or 16 stretcher patients. Three GE CT7-8E engines, with a two engine cruise option to extend range or endurance, provide excellent performance in all environments.

Agility, range, and endurance coupled with a comprehensive advanced avionics and mission system suite enable the aircraft to fulfil multiple tasks in one mission. For combat search and rescue, the AW101 can be equipped with window or door mounted guns, Defensive Aids Suite and air-to-air refuelling equipment.

With a typical range of 750nm and a large capacity cabin, AW101 is one of the most advanced and capable SAR helicopter available today. The AW101 has already demonstrated over 900nm non-stops flying in a SAR evaluation flight.

In addition to its already excellent range capabilities achieved with internal fuel tanks, the AW101 range can be further extended by air-to-air refuelling, which has successfully been demonstrated in trials with a C-130 tanker aircraft.

CH-47 Chinook

The CH-47 Chinook is a twin-engine, tandem rotor helicopter from Boeing. The venerable helicopter has undergone numerous upgrades since the first CH-47A model was delivered to the US Army for use in Vietnam. An upgrade programme exists to remanufacture 300 of the current fleet of 425 CH-47D's to the CH-47F standard. The MH-47E is the Special Forces variant of the Chinook and will be remanufactured to the MH-47G.

The Chinook's cockpit accommodates two pilots and an observer. The communications suite includes jam resistant HF and UHF radio systems and the helicopter is equipped with an Identification Friend or Foe (IFF) interrogator. Three machine guns can be mounted on the helicopter, two in the crew door on the starboard side and one window-mounted on the port side. Additionally, the helicopter is equipped with a suite of countermeasure systems, which could include one or more of the following: a missile approach warner, jammers, radar warner, and chaff and flare dispensers.

The main cabin can hold up to 33 fully equipped troops. For medical evacuation, the cabin can accommodate 24 litters (stretchers).

Ramp operations can be carried out on water using an optional power-down ramp and water dam configuration.

The Chinook is equipped with two T55-GA-714A turboshaft engines, which are pod-mounted on either side of the rear pylon under the rear rotor blades. The self-sealing fuel tanks are mounted in external fairings on the sides of the fuselage. The fixed tanks hold 1,030 gallons of fuel. Three additional fuel tanks can be carried in the cargo area. In-flight refuelling can extend the range of the MH-47 helicopter.

The CH-47F upgrade programme involves the installation of a new digital cockpit and modifications to the airframe to reduce vibration. The upgraded cockpit will provide future growth potential and will include a digital data bus that permits installation of enhanced communications and navigation equipment for improved

CH-47 Chinook

situational awareness, mission performance, and survivability. Airframe structural modifications will reduce harmful vibrations, reducing operations and support (O&S) costs and improving crew endurance.

A separate but complementary effort involves the installation of more powerful and reliable T55-GA-714A engines that improve fuel efficiency and enhance lift performance by approximately 3,900lb. Installation of an improved crashworthy extended range fuel system (ERFS II) will enable Chinook self-deployment and extend the operational radius of all other missions.

EC725 Caracal

The EC725 is a multi-role helicopter from Eurocopter, designed for the most demanding missions. The EC725 is a combat proven helicopter. The helicopter, which was introduced in 2005, has seen combat service worldwide, including in Afghanistan. The EC725 design evolved from experience gained with the Cougar family, and the helicopter is the latest version of this medium lift (11-tonne class) helicopter. The EC725 has operated from ships as well as ashore.

The French Forces are successfully operating the EC725 in the harshest environment of Afghanistan. The success of the EC725 demonstrated in Afghanistan, reflects the excellent capabilities of the EC725 as a force multiplier and how this aircraft can offer decisive tactical advantage to any operator.

The EC725 is designed to operate in all environments, including sandy or maritime environment, and all weather, including full icing conditions. The helicopter can operate during both day and night with state-of-the-art night vision goggles (NVG) compatibility. The EC725 has outstanding range, up 700nm without refuelling. To extend its range, the helicopter has air-to-air refuelling capability, with its Hover In Flight Refuelling (HIFR) system.

The EC725 is powered by two Turbomeca Makila 2A1 each providing 2,382 shaft horsepower. The helicopter can be armed with 7.62mm machine gun in forward cabin windows; two 180-round 20mm gun pods, as well as two 19-round 2.75" rocket launchers.

HH-60G Pave Hawk

The HH-60G Pave Hawk twin-engine medium-lift helicopter from Sikorsky is a highly modified version of the US Army Black Hawk helicopter. The helicopter features an upgraded communications and navigation suite that includes integrated inertial navigation/global positioning/Doppler navigation systems, satellite communications, secure voice, and Have Quick communications.

The primary mission of the HH-60G Pave Hawk helicopter is to conduct day or night personnel recovery operations into hostile environments to recover isolated personnel during war. The HH-60G is also tasked to perform military operations other than war, including civil search and rescue, medical evacuation, disaster response, humanitarian assistance, security cooperation/aviation advisory, NASA space flight support, and rescue command and control.

All HH-60Gs have an automatic flight control system, night vision goggles with lighting and forward looking infrared system that greatly enhances night low-level operations. Additionally, Pave Hawks have colour weather radar and an engine/rotor blade anti-ice system that gives the HH-60G an adverse weather capability.

Pave Hawk mission equipment includes a retractable in-flight refuelling probe, internal auxiliary fuel tanks, two crew-served 7.62mm or .50 calibre machineguns, and a 3,600kg capacity cargo hook. To improve air transportability and shipboard operations, all HH-60Gs have folding rotor blades.

The HH-60G Pave Hawk is powered by two General Electric T700-GE-700 or T700-GE-701C engines, each providing 1,560-1,940 shaft horsepower each. The helicopter has a range of 504nm. Pave Hawk combat enhancements include a radar warning receiver, infrared jammer and a flare/chaff countermeasure dispensing system.

Pave Hawks have a long history of use in contingencies, starting in *Operation Just Cause*. During *Operation Desert Storm* they provided combat search and rescue coverage for coalition forces in western Iraq, coastal Kuwait, the Persian Gulf and Saudi Arabia. They also provided emergency evacuation coverage for US Navy SEAL teams penetrating the Kuwaiti coast before the invasion.

During *Operation Allied Force*, Pave Hawks provided continuous combat search and rescue coverage for NATO air forces, and successfully recovered two air force pilots who were isolated behind enemy lines.

Today, Pave Hawks continue to deploy in support of operations *Enduring Freedom* and *Iraqi Freedom* in Afghanistan and Iraq. HH-60 crews have logged hundreds of American, coalition, and foreign national saves conducting CSAR and medical evacuations or MEDEVAC missions under low visibility, low illumination conditions at all altitudes.

EC725

MH-53J/M Pave Low

The MH-53J/M Pave Low IV is a medium-lift helicopter from Sikorsky. The helicopter is the largest, most powerful and technologically advanced helicopter in the US Air Force (USAF) inventory. The terrain-following and terrain-avoidance radar, forward-looking infrared sensor, inertial navigation system with global positioning system, along with a projected map display enables the crew to follow terrain contours. It also enables the crew to avoid obstacles in adverse weather, making low-level tactical penetration possible.

The MH-53J/M Pave Low's mission is low-level, long-range, undetected penetration into denied areas, day or night, in adverse weather, for infiltration, exfiltration and resupply of special operations forces.

The MH-53M Pave Low IV is a J-model that has been modified with the Interactive Defensive Avionics System/Multi-Mission Advanced Tactical Terminal. This system greatly enhances present defensive capabilities of the Pave Low. It provides instant access to the total battlefield situation, using near real-time electronic Order of Battle updates. It also provides a new level of detection avoidance with near real-time threat broadcasts over-the-horizon, so crews can avoid and defeat threats, and replan en route if needed.

Under the Pave Low III programme, the US Air Force modified nine MH-53Hs and 32 HH-53s for night and adverse weather operations. Modifications included forward-looking infrared, inertial global positioning system, Doppler navigation systems, terrain-following and terrain-avoidance radar, an on-board computer, and integrated avionics to enable precise navigation to and from target areas. The USAF designated these modified versions as MH-53Js.

The MH-53J/M is powered two General Electric T64-GE-100 engines; each providing 4,330 shaft horsepower, and has a range of 600nm. The helicopter can be equipped with a combination of three 7.62mm mini guns or three .50 calibre machine guns.

Since they entered the USAF inventory, Pave Lows, with their unique special operations mission and capabilities, have supported several campaigns. In 1990, Pave Lows from the 20th Special Operations Squadron led the way for US Army AH-64 Apaches during an air strike, thus opening the air war in *Operation Desert Storm*. Most recently, Pave Lows have played a crucial role in *Operations Enduring Freedom* and *Iraqi Freedom*.

Mi-17

The Mi-17 medium multi purpose helicopter is built by two Russian manufacturers, Ulan Ude Aviation Plant and Kazan Helicopter Plant. The helicopter is a significant modernisation of the well-reputed Mi-8 rotorcraft. Its versatility and high performance characteristics made it one of the most popular helicopter in the world. Over 11,000 Mi-8/Mi-17 helicopters have been produced to date. They are in service in 80 countries now.

At present, Kazan Helicopter Plant serially produces three main modifications of the Mi-8 rotorcraft: Mi-17-1V, Mi-17-V5, and Mi-172. The Mi-17-1V is a multipurpose helicopter. On the basis of this modification, various versions can be produced. The helicopter, when fitted with special equipment, can effectively perform SAR missions at any time of the day and in various weather conditions. The Mi-17 helicopter can be additionally equipped with SX-16 searchlight with an infrared filter; a surveillance system (FLIR) or a thermal imager; SLG-300 hoist (load-carrying capacity–300kg) and an additional device for cargo and casualties lifting (a two-seat cradle and a universal lifting seat).

The helicopter cabin can be adapted for the night vision goggles. The helicopter can also be equipped with a special ski landing gear for landing on snow. A special helicopter modification fitted with medical equipment (including resuscitation equipment) can be used for the evacuation of casualties.

The Mi-171Sh helicopter is a military-transport version of Mi-171 helicopter from Ulan Ude Aviation Plant. Mi-171Sh helicopter was developed on the basis of comprehensive analysis of Russian helicopters' operation in combat activities in local armed conflicts. The Mi-171Sh military-transport helicopter is a considerably new helicopter for the world market–it was first sold as recently as in 2002. Nevertheless, in a range of countries in Southeastern and Central Asia, in Middle East and in Africa, in Europe (including the NATO countries) and CIS it has proved to be a reliable, effective in operation and simple in maintenance helicopter. Apart from performing combat search and rescue, the Mi-171Sh can be used for transportation and tactical assault landing of up to 36 troops; transportation of up to 12 casualties on stretchers, accompanied by medics; transportation of cargoes up to 4,000kg in cargo compartment; as well as transportation of cargoes up to 4,000kg on external sling.

SH-60 Seahawk

USN

SH-60 Seahawk

The Seahawk is a twin-engine, medium lift helicopter from Sikorsky. The helicopter is used for anti-submarine warfare, search and rescue, drug interdiction, anti-ship warfare, cargo lift, and special operations. The US Navy's SH-60B Seahawk is an airborne platform based aboard cruisers, destroyers, and frigates and deploys sonobuoys (sonic detectors) and torpedoes in an anti-submarine role. They also extend the range of the ship's radar capabilities. The navy's SH-60F is carrier-based. The HH-60H, also aboard carriers and ashore, is used for search and rescue (SAR) missions. By 2015, the only models of Seahawk in the US Navy will be the MH-60S and the MH-60R.

The US Navy received the SH- 60B Seahawk in 1983 and the SH-60F in 1988. The first MH-60S operational squadron was Helicopter Combat Support Squadron Five (HC 5), homeported in Guam. The Seahawk is powered by two General Electric T700-GE-700 or T700-GE-701C engines, each providing up to 1,940 shaft horsepower. The helicopter has range of 380nm without refuelling.■

Mi-17