

## HELICOPTERS

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### Westland Lynx (Army Version)

Notes: The Lynx is the primary light helicopter of Great Britain. The Lynx can be, and often is, armed with guns and missiles (usually TOW ATGM). No ejection seats are provided, and the helicopter is not capable of in-flight refueling.

The Lynx AH-1 was the first Army version, 1967. It was built only for the British Army. There is an attachment point on either side of the fuselage for hardpoints to mount weapons. There is also an attachment point under the fuselage for gun pods or ventral turrets. The hardpoints on the AH-1 normally do not mount missiles; the Lynx AH-1 does not really have the equipment to accurately fire them, though mounting missiles on the AH-1 is not unknown. The Lynx AH-1GT was an interim attack version until the advent of the Lynx AH-7; it has somewhat better sighting equipment.

The Lynx AH-7 was designed under the British Army's HELARM program. It is basically an AH-1 with several improvements to allow it to be more deadly and survivable on the battlefield. The exhaust has been shielded to help throw off IR-guided missiles and infrared viewers, and flare and chaff dispensers have been added. Avionics have been upgraded.

The Lynx AH-9 is a further upgrade. The engines have been replaced with more powerful ones, and the rotor blades have been replaced with ones made of stronger and lighter composites.

Twilight 2000 Notes: The AH-9 does not exist.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
AH-1	\$167,843	AvG	907 kg	4.54 tons	2+9	10	None	Enclosed
AH-1GT	\$327,230	AvG	907 kg	4.57 tons	2+9	10	Image Intensification	Enclosed
AH-7	\$352,423	AvG	907 kg	4.59 tons	2+9	12	Image Intensification	Enclosed
AH-9	\$840,655	AvG	1.36 tons	5.33 tons	2+9	14	Thermal Imaging, Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
AH-1/1GT/7	592	148	15/37	990	660	3500
AH-9	613	153	15/38	990	821	3500

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
AH-1	None	30m	None	3 Hardpoints	None
AH-1GT	None	30m	+1	3 Hardpoints	None
AH-7	Flare/Chaff Dispensers, IR Suppression	30m	+3	3 Hardpoints	None
AH-9	Flare/Chaff Dispensers, IR Suppression	30m	+4	3 Hardpoints	None

### Westland Scout

Notes: This is a light utility helicopter originally fielded by the British Army. Starting in the 1990s, after being replaced with the larger Lynx helicopter, many Scouts were being sold on the surplus market. This helicopter was once used by the British SAS in a similar manner to the A/MH-6s used by US special ops forces.

Twilight 2000 Notes: This aircraft is still being used by the British SAS.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$149,157	AvG	244 kg	2.5 tons	2+3	8	WL/IR Spotlight	Enclosed

Tr Mov	Com Mov	Mnvr/Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
386	97	45/24	343	251	3720

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
None	36m	None	2xMAG Doorguns, 2 Hardpoints	1000x7.62mm

## **AS.565 Panther**

Notes: This is the military attack version of the SA.365 Dauphin, used by France, Brazil, Saudi Arabia, and China. In this role, the helicopter does not normally carry passengers (though it may carry a few), but instead carries weapons. The Panther has an advanced sensor suite and normally carries wire-guided or laser-guided missiles. The aircraft is equipped with a laser designator and has a mast-mounted sight.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$1,340,012	AvG	1.6 tons	4.3 tons	2+6	10	Thermal Imaging, Image Intensification, Radar	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
570	143	30/36	1905	467	6000

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
IRCM, Flare/Chaff Dispensers, Secure Radios	40m	+3	2 Hardpoints	None

## AS.532 Cougar

Notes: Though mainly aimed at the civilian market, the Super Puma has been marketed to the military under the name of Cougar. Military versions have night vision and in-flight refueling capability. An optional 100-liter internal fuel tank may be fitted at the expense of cargo or passengers. No ejection seats are provided.

The AS.532 Mk 1 UC/AC is the basic military model, with a short fuselage. It is well-appointed, and though it is the short fuselage version, is still a fairly large helicopter. The rescue version, the UC, has a hoist with a capacity of 245 kg. The AS.532 Mk 1 UE is the stretched version of this helicopter. It also has upgraded avionics, including inertial navigation. The AS.532 Mk 1 UL/AL is a version of the Mk 1 UE carrying more fuel. The AS.532 Mk 2 U2 A2 is an even bigger version of the Cougar, with further upgraded avionics.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
AS.532 Mk 1 UC/AC	\$491,244	AvG	3 tons	9 tons	2+21 or 14 paratroops or 6 stretchers	20	Passive IR, Image Intensification	Enclosed
AS.532 Mk 1 UE	\$742,124	AvG	3 tons	9 tons	2+25 or 17 paratroopers or 10 stretchers	20	Passive IR, Image Intensification	Enclosed
AS.532 Mk 1 UL/AL	\$769,489	AvG	3 tons	9.4 tons	2+25 or 17 paratroopers or 10 stretchers	20	Passive IR, Image Intensification	Enclosed
AS.532 Mk II U2 A2	\$1,218,080	AvG	3.35 tons	9.75 tons	2+29 or 20 paratroops or 12 stretchers	26	FLIR, Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
AS.532 Mk 1 UC/AC & UE	550	138	50/34	1497	1388	4100
AS.532 Mk 1 UL/AL	550	138	50/34	2000	1388	4100
AS.532 Mk 2 U2 A2	555	139	50/35	2020	1531	4100

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
AS.532 Mk 1 UC/AC & UE	Flare/Chaff Dispensers, Secure Radios, RWR	55m	None	2xMAG Doorguns, 2 Hardpoints	1000x7.62mm
AS.532 Mk 2 U2 A2	Flare/Chaff Dispensers, Secure Radios, IRCM, GPS	75m	None	2xMAG Doorguns, 2 Hardpoints	1000x7.62mm

## AS.350/355/555 Ecureuil/Fennec

Notes: The Ecureuil (Squirrel) has remained in production since 1974, and is one of the most common helicopters around the world. The single-engined 350 were soon joined by the twin-engined 355, offering greater performance.

The first production version of the Ecureuil was AS.350BA. It has a single engine and only very basic appointments. It is primarily a civilian helicopter, but has some military applications as a liaison and observation helicopter. Military models are usually armed with a single light machinegun, in either the right or left door. The AS.350B2 is the same helicopter with a more powerful engine for more lifting capacity; the AS.350B3 has an even more powerful engine and electronically-assisted controls, as well as lighter construction. The AS.350L2 is an armed version of the B2, usually known as the Fennec (Fox). It has hardpoints for weapons and a gunsight.

Twin-engine versions began with the AS.355E Ecureuil. This is basically a 350BA with two engines instead of one. Again, this is primarily a civilian helicopter, but some military versions do exist. The AS.355N Ecureuil 2 is an improved version, with more powerful engines. The AS.355M2 Fennec is the French armed counterpart of the AS.355N, with hardpoints and a gunsight.

The AS.550 Fennec was the first major armed model; the AS.550C3 is the combat version. It is a military model of the AS.350. The helicopter may carry an auxiliary 475-liter fuel tank in the cabin instead of passengers for extended operations. If this is done, the doorguns are removed (there is no one to operate them). The AS.555AN is a twin-Engined Fennec; it has updated avionics.

The Z-11 is a Chinese version of the AS.350BA. It differs primarily in the engine used, an indigenous Chinese design that is not as powerful as the original engine. It is considered quite obsolete by the Chinese and is used mostly for training.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
AS.350BA	\$116,168	AvG	954 kg	2.1 tons	2+3	4	None	Enclosed
AS.350B2	\$117,528	AvG	1.08 tons	2.5 tons	2+4	4	None	Enclosed
AS.350B3	\$119,248	AvG	1.09 tons	2.25 tons	2+4	4	None	Enclosed
AS.350L2	\$154,206	AvG	1.08 tons	2.51 tons	2+3	4	None	Enclosed
AS.355E	\$137,864	AvG	1.05 tons	2.49 tons	2+4	4	None	Enclosed
AS.355N	\$138,964	AvG	1.16 tons	2.6 tons	2+4	4	None	Enclosed
AS.355M2	\$157,208	AvG	1.16 tons	2.6 tons	2+3	4	None	Enclosed
AS.550C3	\$732,989	AvG	1.16 tons	2.8 tons	2+4	8	Passive IR, Image Intensification	Enclosed
AS.555AN	\$900,620	AvG	1.4 tons	2.8 tons	2+4	8	FLIR, Image Intensification	Enclosed
Z-11	\$115,608	AvG	954 kg	2.2 tons	2+4	4	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
AS.350BA	574	144	40/36	380	228	4750
AS.350B2/L2	564	141	40/35	380	262	4750
AS.350B3	574	144	40/36	380	305	4750
AS.355E	600	150	40/38	545	297	4750
AS.355N/M2	618	154	40/39	545	329	4750
AS.550C3	574	144	40/36	540	300	5280
AS.555AN	605	151	40/38	730	340	3800

Z-11	545	136	40/34	380	214	5240
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Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
AS.350BA/B2/B3	None	40m	None	1xAAT-F1 Doorgun	500x7.62mm
AS.350L2/M2	None	40m	+1	2xAAT-F1 Doorguns, 2 Hardpoints	500x7.62mm
AS.355E/N	None	40m	None	2xAAT-F1 Doorguns	500x7.62mm
AS.550C3	Secure Radios	40m	+2	2xAAT-F1 Doorguns, 2 Hardpoints	500x7.62mm
AS.555AN	Secure Radios	40m	+3	2xAAT-F1 Doorguns, 2 Hardpoints	500x7.62mm
Z-11	None	40m	None	1xPK Doorgun	500x7.62mm

### SA.318/315 Alouette II/Lama

Notes: This is a small, light utility helicopter, useful mainly for observation and light cargo duties. Stretchers are sometimes attached to the skids with an aeroshell over them to transport wounded. The aircraft has no ejection seats, and is incapable of inflight refueling. The SA.318C is the basic helicopter; the SA.315B Lama is a version powered by the stronger engine of the Alouette III.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
SA.318C	\$92,832	AvG	600 kg	1.65 tons	2+3	4	None	Open
SA.315B	\$94,712	AvG	1.14 tons	2.3 tons	2+3	4	None	Open

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
SA.318C	410	103	15/26	316	85	2150
SA.315B	420	105	15/26	316	213	4250

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
SA.318C/315B	None	24m	None	2 Hardpoints	None

### SA.316/319 Alouette III

Notes: This helicopter is a development of the earlier, smaller, Alouette II. Over 2,200 of them were employed by 74 countries at the height of its popularity. The Alouette III flies well even at high altitude, and was even employed in the Himalayas. Various versions have been built, including observation, attack, transport, ASW, search and rescue, and armed reconnaissance. The Alouette III was one of the first helicopters sold to Third World countries. No ejection seats are provided, and the helicopter is incapable of in-flight refueling.

The SA.316A was the initial version. The SA.316B has strengthened tail and main rotors, allowing for better performance. The SA.316C has a more powerful engine, but was produced only in limited numbers. The SA.319C has an even better engine, which is more powerful and fuel efficient. The G-Car and K-Car are gunship models first produced by the former Rhodesia; the G-Car has two side-mounted heavy machineguns, while the K-Car has a single 20mm autocannon mounted on the side.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
SA.316A	\$113,322	AvG	750 kg	2.2 tons	2+5	4	None	Enclosed
SA.316B	\$114,186	AvG	750 kg	2.2 tons	2+5	4	None	Enclosed
SA.316C	\$115,093	AvG	750 kg	2.34 tons	2+5	4	None	Enclosed
SA.319B	\$114,121	AvG	770 kg	2.25 tons	2+5	4	None	Enclosed
G-Car	\$341,524	AvG	770 kg	2.75 tons	2+2	4	Image Intensification	Enclosed
K-Car	\$325,665	AvG	770 kg	2.75 tons	2+2	4	Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
SA.316A	420	105	20/26	244	194	4250
SA.316B	440	110	20/28	244	214	4250
SA.316C	447	112	20/28	244	237	4250
SA.319B/G-Car/K-Car	440	110	20/28	244	213	4250

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
SA.316/319	None	30m	None	2 Hardpoints	None
G-Car	Secure Radios	30m	+2	2xM-2HB, 2 Hardpoints	500x.50
K-Car	Secure Radios	30m	+2	20mm Rh-202 Autocannon, 2 Hardpoints	300x20mm

### SA.321 Super Frelon

Notes: This French helicopter is primarily a naval aircraft. It is used for antisubmarine and antiship warfare, and for resupply and logistic support. There are, however, cargo and other military variants, and these will be detailed below. No ejection seats are provided, and the helicopter is not capable of inflight refueling. They can, however, carry two auxiliary fuel tanks in the cabin with a capacity of up to 1000 liters, and non-droppable fuel tanks on hardpoints with a capacity of up to 500 liters on each hardpoint.

The SA.321Ga is the basic naval cargo variant. It is normally used to transport Marines or naval special operation forces. It is a variant of the SA.321G, an antiship helicopter, and has been stripped of the equipment and armament necessary to detect and attack ships. The SA.321K was the version exported to Israel. They were modified slightly, upgraded avionics and more powerful engines. SA.321L is similar, but built for South Africa. The SA.321M is also similar; it was built for Libya as a transport and SAR helicopter, and does not have the secure radios, but does have a radio direction finder and a rescue hoist with a capacity of 275 kilograms.

The Z-8A is the Army version of the Chinese Z-8 naval helicopter, the Chinese copy of the SA.321G. It is almost identical to the SA.321Ga, except for indigenously-produced engines that give the helicopter slightly different performance. The Z-8A has a rescue hoist with a capacity of 300 kg.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
SA.321Ga	\$320,247	AvG	4.5 tons	12.5 tons	2+38 or 27 paratroops or 16 stretchers	20	None	Enclosed

SA.321K/L/M	\$549,648	AvG	5 tons	13 tons	2+38 or 27 paratroops or 16 stretchers	22	None	Enclosed
Z-8A	\$525,637	AvG	5 tons	13 tons	2+39 or 27 paratroops or 15 stretchers	22	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
SA.321Ga	550	138	70/34	3975	1742	6000
SA.321K/L/M	546	136	70/34	3975	1784	6000
Z-8A	533	133	70/33	3975	1699	6000

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
SA.321Ga/Z-8A	None	56m	None	2 Hardpoints (fuel tanks only)	None
SA.321K/L	Secure Radios	56m	None	2 Hardpoints (fuel tanks only)	None
SA.321M	Radio Direction Finder	56m	None	2 Hardpoints (fuel tanks only)	None

### SA.330 Puma

Notes: This is a result of an Anglo-French helicopter program. It is an aging workhorse that has been largely succeeded by the Super Puma. No ejection seats are provided, and the helicopter is incapable of in-flight refueling.

The SA.330B is the basic transport version. The SA.330C was the export designation, but is not otherwise different. The SA.330E (Puma HC 1) is the Royal Air Force designation. The SA.330H has more powerful engines. The SA.330L is similar to the SA.330H, but uses glass-fiber rotor blades. The Romanian IAR-330L variant is perhaps the most evolved version of the Puma; it has massive upgrades in avionics, including a flight control computer, night vision, sighting systems, armament, and navigation. It is a full-fledged assault transport.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
SA.330B	\$231,176	AvG	2.77 tons	6.4 tons	2+20 or 14 paratroops or 6 stretchers	10	None	Enclosed
SA.330H	\$239,427	AvG	3.2 tons	7.4 tons	2+20 or 14 paratroops or 6 stretchers	10	None	Enclosed
IAR-330L	\$1,534,125	AvG	3.2 tons	7.4 tons	2+20 or 14 paratroops or 6 stretchers	18	FLIR, Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling

SA.330B	560	140	50/35	1544	966	6000
SA.330H	588	147	50/37	1544	1163	6000
IAR-330L	526	132	50/33	1544	1144	6000

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
SA.330B/H	None	40m	None	2xMAG, 2 Hardpoints	1000x7.62mm
IAR-330L	Secure Radios, Flare/Chaff Dispensers, RWR, LWR, IR Suppression, Auto Track	40m	+3	2xPKT Doorguns, 20mm GIAT M-621 Autocannon, 4 Hardpoints	1000x7.62mm, 850x20mm

### SA.341 Gazelle

Notes: The Gazelle is a light utility helicopter, along the same vein as the US OH-6 and OH-58. It is a joint development of France and Britain, and also used by many other countries, including Bosnia, Egypt, Iraq, Kuwait, Lebanon, Slovenia, Syria, Yugoslavia, and several African countries. The Gazelle saw combat first in the Falklands and the Persian Gulf War, and armed versions first saw combat when a Syrian Gazelle used HOT missiles against Israeli tanks in the 1982 war in Lebanon. Versions used in Northern Ireland have extensive surveillance suites, including FLIR and close circuit television. A 200-liter fuel tank can be carried in the cabin at the expense of cargo and passengers. The Gazelle has no ejection seats, and is not capable of in-flight refueling.

The SA.341 is the basic version. The SA.341B was the first version, built for the British Army (and known as the Gazelle AH-1 to them). The doorguns listed are not a standard feature, but are sometimes seen. These aircraft are a favorite of the SAS. A variant used in Northern Ireland has been fitted with a surveillance suite including CCTV, LLTV, shotgun microphones, radio direction finders, and such gear. The SA.341F is the French Army version; they have more hardpoints, no doorguns, and different avionics. The SA.341H is an export version of the SA.341F. The SA.341M is an improved ground attack version for the French Army. It is usually armed with HOT missiles, and has updated avionics, including inertial navigation.

The SA.342K is a version with uprated engines; most were exported to the Middle East. It is normally armed with HOT ATGM. The SA.342L is similar, but comes in two versions: the SA.342L1, used for ground attack and normally armed with rocket pods and gun or cannon pods (though it may also mount missiles); and the SA.342L2, designed for export to the east and mounting Russian or Eastern European weapons. The SA.342M, also known as the Viviane, was the final production model for the French and has a roof-mounted sight to allow fire and guidance of HOT missiles while hiding behind cover.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
SA.341B	\$161,803	AvG	700 kg	1.8 tons	2+3	4	None	Enclosed
SA.341B (Northern Ireland Model)	\$333,737	AvG	700 kg	1.83 tons	2+3	5	FLIR, Image Intensification	Enclosed
SA.341F	\$183,014	AvG	700 kg	1.83 tons	2+3	5	Image Intensification	Enclosed
SA.341M	\$473,976	AvG	700 kg	1.83 tons	2+3	5	Image Intensification	Enclosed
SA.342K/L	\$479,661	AvG	768 kg	1.9 tons	2+3	5	Image Intensification	Enclosed
SA-342M	\$941,769	AvG	768	2 tons	2+3	5	FLIR, Image	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
SA.341B/F/M	620	155	15/39	445	209	5100
SA.342K/L/M	650	163	15/41	445	308	5000

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
SA.341B	None	36m	None	2xMAG Doorguns, 2 Hardpoints	500x7.62mm
SA.341B (Northern Ireland Model)	Secure Radios, Datalink	36m	None	2xMAG Doorguns, 2 Hardpoints	500x7.62mm
SA.341H	IR Suppression	36m	+2	4 Hardpoints	None
SA.341M/K and SA.342K/L/M	IR Suppression	36m	+3	4 Hardpoints	None

### SA.365 Dauphin 2

Notes: The SA 365 is a French-built helicopter in civilian and military use. Civilian versions normally have no hardpoints. The helicopter is also used by the US Coast Guard, where it is known as the HH-65A Dolphin; in this role, the hardpoints are normally occupied by extra fuel tanks. No ejection seats are provided and the aircraft is not capable of in-flight refueling. The Dauphin has a rescue hoist with a capacity of 300 kg.

The first production version was the AS.365C (now known as the AS.365N2). The AS.365N is the same, but has retractable landing gear. The AS.365N1 has an improved tail rotor and a more powerful engine. The AS.365N3 has even more powerful engines.

The HH-65A Dolphin is a Dauphin 2 manufactured in the US and used by the Coast Guard. Since the contract required that a majority of the aircraft be built by US manufacturers, the engines were replaced by US-made Lycoming engines. The Dolphins' primary mission is search and rescue, but the Coast Guard's secondary mission as a quasi-military arm means that the Dolphin can be armed with a variety of weapons on 4 hardpoints, and has a decent array of defensive measures. The Dolphin also has better avionics, from radar to night vision to GPS. The Israelis also use the Dolphin.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
AS.365C	\$168,437	AvG	1.6 tons	4.25 tons	2+10	6	None	Enclosed
AS.365N1	\$170,813	AvG	1.6 tons	4.25 tons	2+10	6	None	Enclosed
AS.365N3	\$178,459	AvG	1.84 tons	4.3 tons	2+10	8	None	Enclosed
HH-65A	\$1,308,839	AvG	2 tons	4.18 tons	2+8	12	FLIR, Radar	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
AS.365C	558	139	30/35	1102	474	3700
AS.365N1	589	147	30/37	1102	529	3700
AS.365N3	613	153	30/38	1102	706	3700

HH-65A

611

153

30/38

1102

512

2289

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
AS.365C/N1/N3	None	40m	None	2 Hardpoints	None
HH-65A	Flare/Chaff Dispensers, IRCM, RWR	40m	+2	4 Hardpoints	None

## BO-105 (PAH-1)

Notes: The BO-105 is a small, astonishingly agile, and versatile helicopter. It equips the German Army and has been sold worldwide to countries such as Sweden, Canada, Bahrain, Iraq, Netherlands, Spain, and various South American and African countries. It has an all-weather flight capability, and may carry up to two optional 200-liter internal fuel tanks at the expense of cargo or passengers. No ejection seats are provided, and the helicopter is not capable of in-flight refueling.

The initial version, the BO-105C, entered service in 1968. The BO-105CB is a military light observation/utility helicopter with an uprated engine. The BO-105 CBS is a longer version able to carry more passengers; this is the sort of helicopter that German high-ranking officers tool around in. The BO-105LS is the Canadian version, powered by an Allison engine that is optimized for high altitude and hot weather. The BO-105LS A-3 is the same helicopter, but has more powerful engines. It is known as the "Super Lifter" variant.

The PAH-1 is an attack version, also known as the BO-105P. The PAH-1 has better sighting equipment and more hardpoints; they are sometimes armed with autocannons, and do not usually carry passengers. The PAH-1A1 differs in its engines and lifting capability. The Phase 2 is night attack variant, with a laser designator for use with Hellfire missiles. The BSH is a helicopter escort; it normally is armed with Stinger missiles, and carries sensors that allow it to detect and attack enemy helicopters and aircraft.

Twilight 2000 Notes: Delays in the Tiger attack helicopter meant that the PAH-1 had to see considerable service as an attack helicopter in the Twilight War. The BSH was never built.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
BO-105C	\$148,705	AvG	673 kg	2.4 tons	2+3	3	None	Enclosed
BO-105CB	\$149,354	AvG	690 kg	2.5 tons	2+3	4	None	Enclosed
BO-105CBS	\$159,202	AvG	690 kg	2.5 tons	2+5	4	None	Enclosed
BO-105LS	\$153,700	AvG	690 kg	2.58 tons	2+3	4	None	Enclosed
BO-105LS A-3	\$153,879	AvG	1.17 tons	2.6 tons	2+4	5	None	Enclosed
PAH-1	\$441,961	AvG	456 kg	1.91 tons	2+1	4	Image Intensification	Enclosed
PAH-1A1	\$443,201	AvG	690 kg	2.4 tons	2+2	4	Image Intensification	Enclosed
PAH-1 Phase 2	\$879,898	AvG	690 kg	2.43 tons	2+2	6	FLIR, Image Intensification	Enclosed
BSH	\$1,426,982	AvG	456 kg	2.15 tons	2	7	FLIR, Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
BO-105C	476	119	15/30	570	288	3050
BO-105CB/CBS	480	120	15/30	570	302	3050
BO-105LS	505	126	15/32	570	399	5000

BO-105LS A-3	506	127	15/32	570	403	5000
PAH-1/BSH	540	135	15/34	570	297	4265
PAH-1A1/Phase 2	520	130	15/33	570	322	4265

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
BO-105C/CB/CBS/LS/LS A-3	None	36m	+1	2 Hardpoints	None
PAH-1/1A1	Secure Radios	36m	+2	20mm Rh-202 Autocannon or M-134 Minigun, 2 Hardpoints	525x20mm or 1000x7.62mm
PAH-1 Phase 2	Secure Radios	36m	+3	20mm Rh-202 Autocannon or M-134 Minigun, 2 Hardpoints	525x20mm or 1000x7.62mm
BSH	Secure Radios, RWR, LWR, Target ID, Auto Track, Flare/Chaff Dispensers	36m	+3	20mm Rh-202 Autocannon, 2 Hardpoints	525x20mm

## Tiger

Notes: There are three planned versions of the Tiger. The three versions differ primarily in the avionics and the weapons mix normally carried. The HAP is the close support variant; it has a chin turret with an autocannon and hardpoints for rockets and missiles. It also has the most comprehensive avionics and sighting mix. The HAC is a dedicated antitank variant; it has no chin turret and is normally armed only with missiles; it cannot use gun pods. The UHT can be fitted with gun pods or just about anything else you could mount on a helicopter; it is a general support helicopter. The Tiger has no ejection seats and is not capable of aerial refueling.

Twilight 2000 Notes: This attack helicopter had just begun to replace the Gazelle in French service and the BO-105 in German service at the time of the Twilight War, and few made into service (perhaps 40 between the two countries). The choice of these helicopters by both Germany and France led to some interesting matchups along the Franco-German border during the French occupation of the Rhineland, with Tigers fighting each other and pilot quality being the deciding factor in these contests.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
HAC	\$1,399,469	AvG	2.5 tons	6 tons	2	20	Thermal Imaging, Image Intensification	Enclosed
HAP	\$1,748,669	AvG	2 tons	6 tons	2	22	FLIR, Thermal Imaging, Image Intensification	Enclosed
UHT	\$1,364,482	AvG	2.5 tons	6 tons	2	20	Thermal Imaging, Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
HAC/UHT	596	149	10/37	1285	889	4000
HAP	645	161	10/40	1285	889	4000

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
HAC	Secure Radios, Flare/Chaff Dispensers, Laser Designator	32m	+4	4 Hardpoints, 2xAAM hardpoints	None
HAP	Secure Radios, Flare/Chaff Dispensers, Laser Designator, RWR, LWR	32m	+4	30mm GIAT M-781 Autocannon, 4 Hardpoints, 2xAAM Hardpoints	450x30mm
UHT	Secure Radios, Flare/Chaff Dispensers, Laser Designator	32m	+3	4 Hardpoints, 2xAAM Hardpoints	None

**BK-117**

Notes: This helicopter is a joint venture between MBB of Germany and Kawasaki of Japan. It is also manufactured in Korea by Hyundai and used by Indonesia. It is a fast helicopter primarily used for Medivac duties. Clamshell doors in the rear of the fuselage make loading of stretchers easier. The BK-117 does not have ejection seats, and is not capable of aerial refueling.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$570,634	AvG	1.6 tons	3.35 tons	2+7 or 4 stretchers	16	None	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
556	139	40/35	708	557	6000

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Flare/Chaff Dispensers, IRCM, GPS	35m	None	2 Hardpoints	None

**EH.101 Merlin**

Notes: This is British helicopter is primarily a naval aircraft, though the RAF also uses it as a cargo helicopter. It was developed to replace the Sea King in British Navy service and the Wessex and Puma in Air Force service. It is also used by the Italian Navy and by Canada. The aircraft has no ejection seats and is not capable of in-flight refueling.

The RAF's versions are known by the designation HC Mk. 3 Merlin. Currently, the HC Mk. 3 is fitted with only the two standard hardpoints, but future versions may have stub wings for more weapons and a chin turret with a GAU-19/A Gatling gun. The HC Mk. 3 does have the capability for in-flight refueling, unlike most versions of the Merlin.

The Cormorant is the version of the EH-101 used by Canada. It is optimized for cold weather and bad weather. They are supplied with weather radar and have a rescue hoist with a capacity of 375 kg.

Twilight 2000 Notes: The "Future" variant of the HC Mk.3 does not exist.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
HC Mk.3	\$1,395,406	AvG	6 tons	14.6 tons	2+30	24	None	Enclosed
HC Mk.3 (Future)	\$2,591,677	AvG	6 tons	14.76 tons	2+30	26	FLIR, Image Intensification	Enclosed
Cormorant	\$3,100,253	AvG	6 tons	14.6 tons	2+30	24	FLIR, Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
HC Mk.3	592	148	45/37	4300	2566	4300
Cormorant	560	140	45/37	4300	2159	4300

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
HC Mk.3	Flare/Chaff Dispensers, Secure	42m	+1	2 Hardpoints	None

Radios								
HC Mk.3 (Future)	Flare/Chaff Dispensers, Secure Radios, IRCM, RWR, LWR, GPS			42m		+2	GAU-19A Gatling gun, 6 Hardpoints	
Cormorant	Flare/Chaff Dispensers, Secure Radios, Radio Direction Finder, RWR, GPS			42m		+1	2 Hardpoints	

### NH-90 TTH

Notes: The NH-90 is an advanced fly-by-wire helicopter with simplified flight controls that are computer controlled. The NH-90 is a joint product of France, Germany, Italy, and the Netherlands, and may be used as an anti-ship and tactical transport helicopter. The TTH (Tactical Transport Helicopter) is detailed below; it is the troop and cargo carrier variant.

Twilight 2000 Notes: This new NATO cargo helicopter was just being produced before the start of the Twilight War in 1995, and is rather rare, with perhaps fewer than 30 examples being in service among all countries involved.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
2145 hp Engines	\$1,352,002	AvG	2 tons	9.1 tons	2+20 or 12 stretchers	24	Thermal Imaging	Enclosed
2400 hp Engines	\$1,642,642	AvG	2.2 tons	10.6 tons	2+20 or 12 stretchers	24	Thermal Imaging	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
2145 hp Engines	600	150	45/38	1600	1512	5000
2400 hp Engines	590	148	45/37	1600	1512	5000

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
(Both)	IRCM, ECM, Flare/Chaff Dispensers, Secure Radios	34m	+2	2xMAG or M-2HB Doorguns, 3 Hardpoints	1000x7.62mm or .50

## A-129 Mangusta

Notes: The Mangusta (mongoose) is a product of a multinational attack helicopter program. The A-129 is the primary attack helicopter of Italy. No ejection seats are provided, and the helicopter is not capable of in-flight refueling.

The A-129 IMR (International Multi-Role) is an upgraded version of the Mangusta. Improvements include a standard chin turret with a rotary autocannon, more powerful engines, 5-bladed rotor, and upgraded avionics.

Twilight 2000 Notes: The IMR exists only in small numbers, although the dwindling production of the Mangusta quickly changed almost completely over to IMR production.

Merc 2000 Notes: Most international customers of the Mangusta bought the IMR, once it was available.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
A-129	\$1,447,647	AvG	1.2 tons	4.1 tons	2	18	FLIR, Thermal Imaging, Image Intensification	Shielded
A-129 IMR	\$2,127,830	AvG	1.7 tons	5 tons	2	20	FLIR, Thermal Imaging, Image Intensification	Shielded

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
A-129	530	133	25/33	840	600	4500
A-129 IMR	556	139	25/35	840	925	4200

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
A-129	Flare/Chaff Dispensers, Laser Designator	40m	+3	4 Hardpoints	None
A-129 IMR	Flare/Chaff Dispensers, Laser Designator, RWR, LWR, Armored Cockpit, Video Recorder, GPS	40m	+4	20mm M-197 Autocannon, 4 Hardpoints, 2 AAM Hardpoints	500x20mm

## A-109 Hirundo

Notes: The Hirundo (Swallow) is an Italian helicopter available in military, civilian, and police versions. The helicopter's wheels are fully retractable. Variations include troop transport, EW aircraft, scout/attack, and antitank. The Hirundo has no aerial refueling capability, and has no ejection seats.

The A-109 was the initial production version. It is a basic light transport helicopter. The A-109EOA is the military version of that helicopter. Agusta then produced a new version, with a "wide-body" cabin, composite-construction rotor, improved transmission, and slightly lighter weight. The A-109BA was produced for one of the few export customers of the Hirundo, Belgium. The A-109BA has the ability to fire TOW ATGM.

The A-109K was produced with exports to Africa and the Middle East in mind. However, these never materialized, so they went to Italian use. The A-109KM has more powerful engines and greatly upgraded avionics in a lengthened nose. The A-109 Power is the current production version; it is used Italy and by the US Coast Guard, who flies them armed for drug interdiction. (In the US Coast Guard, they are known as the MH-68.) MH-68s also have a rescue hoist with a capacity of 204 kg. The A-109 Power is equipped with a computer-controlled glass cockpit, automatic direction finder and GPS,

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
A-109EOA	\$118,200	AvG	907 kg	2.72 tons	2+6	6	None	Enclosed
A-109CM	\$119,528	AvG	907 kg	2.71 tons	2+8	6	None	Enclosed
A-109BA	\$122,422	AvG	907 kg	2.72 tons	2+8	6	None	Enclosed
A-109KM	\$405,203	AvG	950 kg	2.85 tons	2+8	6	Thermal Imaging, Image Intensification	Enclosed
A-109 Power	\$1,019,166	AvG	1.27 tons	3 tons	2+6	14	FLIR, Image Intensification	Enclosed
MH-68	\$1,529,736	AvG	1.27 tons	3.13 tons	2+6	16	FLIR, Image Intensification, Radar	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
A-109EOA/BA	622	156	40/39	700	324	6095
A-109CM	624	156	40/39	700	324	6095
A-109KM	659	165	40/41	700	544	6095
A-109 Power/MH-68	622	156	35/39	870	517	5970

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
A-109EOA/CM	None	40m	+1	2 Hardpoints	None
A-109BA	None	40m	+2	2 Hardpoints	None

A-109KM	Inertial Navigation, RWR	40m	+2	2 Hardpoints	None
A-109 Power	GPS, Inertial Navigation, RWR	40m	+3	2 Hardpoints	None
MH-68	GPS, Inertial Navigation, RWR, LWR, Flare/Chaff Dispensers, IR Suppression	40m	+3	2 Hardpoints	None

## OH-1 Kogata Kansoku

Notes: This Japanese helicopter was designed to replace the OH-6 in the service of that country. It is similar in appearance to the Mangusta, but smaller, with a fenestron tail rotor (the rotor is in the tail). It is a light helicopter built mostly of composites. The combat system is computer-controlled and fully integrated. The aircraft has no ejection seats and is not capable of in-flight refueling.

Twilight 2000 Notes: The OH-1 entered low-rate production in 1997, and full rate production did not begin until 1998, so it is rather rare.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$1,583,796	AvG	775 kg	4 tons	2	20	FLIR, Image Intensification	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
554	139	15/35	675	590	5000

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Flare/Chaff Dispensers, IR Suppression, Laser Designator, RWR, LWR, Auto Track, Target ID, Datalink, Secure Radios, Armored Cockpit	25m	+3	2 Hardpoints	None

### W-3 Sokol

Notes: The Sokol (Falcon) is a Polish helicopter used alongside Russian-made helicopters in Polish service. It is an upgrade of the old Russian Mi-2 helicopter, with its first flight in 1979. Most of these helicopters are used for troop transport and search and rescue, but some have been armed.

The W-3 Sokol is the basic model. It has hardpoints which can mount weapons, but they are more likely to be seen carrying fuel tanks. The W-3L Traszka is a stretched and uprated version of the W-3. The W-3RM Anakonda is an armed search-and-rescue variant. The hardpoints normally carry fuel, but the Anakonda is equipped with doorguns. The Anakonda has a rescue hoist with a capacity of 300 kg.

The W-3U Salamandra is a gunship version of the Sokol; it does not normally carry passengers (though it retains the capability), and is armed with twin autocannons and missiles or rockets. It is also capable of carrying high-drag free-fall bombs. The W-3W Anakonda is also a gunship version of the Sokol; however, it is the low-cost, no-frills gunship. It is little more than a better-appointed Sokol.

The W-3A was designed with Western markets in mind; it is a Sokol brought up to date, with modern avionics and electronics. The W-3WB Huzar was produced with assistance from South Africa; it is basically the Salamandra using the weapon system from the Rooivalk.

Twilight 2000 Notes: The W-3A and W-3WB do not exist.

Merc 2000 Notes: The W-3A does not exist.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
W-3	\$165,196	AvG	2.1 tons	6.4 tons	2+12	8	None	Enclosed
W-3L	\$169,272	AvG	2.3 tons	7 tons	2+14	8	None	Enclosed
W-3RM	\$747,822	AvG	2.1 tons	6.4 tons	3+11	14	Image Intensification	Enclosed
W-3U	\$692,751	AvG	2.1 tons	6.4 tons	2+11	16	Image Intensification	Enclosed
W-3W	\$390,035	AvG	2.1 tons	6.4 tons	2+11	12	Image Intensification	Enclosed
W-3A	\$746,875	AvG	2.1 tons	6.32 tons	2+12	12	Image Intensification	Enclosed
W-3WB	\$1,248,240	AvG	2.1 tons	6.45 tons	2+11	20	FLIR, Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
W-3/3RM/U/W/A/WB	510	128	30/32	1530	620	5430
W-3L	516	129	30/32	1530	695	5430

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
W-3/3L	None	32m	+1	2 Hardpoints	None
W-3RM	Secure Radios, Flare/Chaff Dispensers, Radio Direction Finder, Inertial Navigation	32m	+1	2xPKT Doorguns, 2 Hardpoints	900x7.62mm
W-3U	Laser Designator, Flare/Chaff Dispensers, RWR, LWR	32m	+2	2x23mm Autocannons, 2 Hardpoints	400x23mm

W-3W	Flare/Chaff Dispensers	32m	+2	2xDShK, 2 Hardpoints	700x12.7mm
W-3A	Weather Radar, GPS, Secure Radios	32m	+2	2 Hardpoints	None
W-3WB	Flare/Chaff Dispensers, Helmet/ Sight Interface, Laser Designator, Auto Track, IR Suppression, RWR, LWR	32m	+4	20mm GI2, 2 Hardpoints, plus 2 AAM Hardpoints	700x20mm

## Ka-50 Hokum

Notes: This attack helicopter is known to the Russians as the Werewolf (Ka-50/50N), or Black Shark, or Erdogan (Ka-50-2) in its export version. It is unusual for an attack helicopter, being a single seat design, and for this reason target designation for its laser-guided missiles is usually done by another aircraft or a ground unit. (There is also a 2-seat version, the Ka-52 Alligator.) It is also unusual for a helicopter in that it has an ejection seat, with an explosive charge blowing off the twin rotors before the seat ejection charge is triggered.

Twilight 2000 Notes: This is a rather rare aircraft, with only 25 entering service before the war and an unknown number being manufactured after the Twilight War's commencement.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Ka-50	\$1,625,952	AvG	2.5 tons	10.8 tons	1	18	None	Shielded
Ka-50N	\$1,939,090	AvG	2.5 tons	10.83 tons	1	20	FLIR, Image Intensification	Shielded
Ka-50-2	\$1,897,903	AvG	2.5 tons	11.13 tons	2	20	FLIR, Image Intensification	Shielded
Ka-52	\$2,203,069	AvG	2.5 tons	10.8 tons	2	22	FLIR, Image Intensification, Radar	Shielded

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
Ka-50/50N	620	155	20/39	1800	1519	5500
Ka-50-2/52	700	175	20/44	1800	1519	5500

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Ka-50/50	HUD Interface, TFR, Flare/Chaff Dispensers, Laser Designator, IR Suppression, Armored Cockpit, RWR, ECM	32m	+3	30mm 2A42 Autocannon, 4 Hardpoints	460x30mm
Ka-50N	Helmet/Sight Interface, TFR, Flare/Chaff Dispensers, Laser Designator, IR Suppression, Armored Cockpit, RWR, ECM	32m	+3	30mm 2A42 Autocannon, 4 Hardpoints	460x30mm
Ka-50-2	HUD Interface, TFR, Flare/Chaff Dispensers, Laser Designator, IR Suppression, Armored Cockpit, RWR, ECM, LWR	32m	+4	20mm GIAT M621 Autocannon, 4 hardpoints	700x20mm
Ka-52	Helmet/Sight Interface, TFR, Flare/Chaff Dispensers, Laser Designator, IR Suppression, Armored Cockpit, RWR, ECM, LWR, GPS	32m	+4	30mm 2A42 Autocannon, 4 Hardpoints	240x30mm

## Mi-24 Hind

Notes: This was the first version of the infamous Hind gunship. It is used was used by Russia, and was exported to Afghanistan, Algeria, Libya, and Vietnam. Most of these helicopters were taken out of active Russian service in 1995, but they were kept in service in Category 3 and Mobilization-Only units. Though the Hind was originally meant to be a gunship that could transport an infantry squad, but it could not lift both its full armament and the squad. It is still used to insert Spetsnaz teams. The Russian name for this helicopter is Krokodil (Crocodile).

The Mi-24A (Hind-A) was the initial production version. It had a simple flexible mounting in the nose for a 12.7mm machinegun. The guidance equipment is primitive, with the ability to use only AT-2 Swatter ATGMs and simple rockets or bombs. The Mi-24F is the same helicopter with the tail rotor on the opposite side of the tail.

The Mi-24B (Hind-A) was upgunned with a 12.7mm 4-barrel Gatling gun in a chin turret. They have the ability to use the updated versions of the AT-2 Swatter ATGM with SACLOS guidance.

The Mi-24D (Hind-D) was a strange combination of old and new; the fire control and armament systems were the same as the Mi-24B, loaded into the airframe of the upcoming Mi-24V, because of delays due to problems with the new armament system of the Mi-24V. This new airframe is capable of more agility. In addition, the winglets gained the ability to carry up to two drop tanks. The Hind gained the ability to carry air-to-air missiles, in the form of AA-8 Aphids. The Hind-D (and later models) did not normally carry troops; they normally carried replacement ATGMs instead.

Mi-24V (Hind-E) has the new airframe; in addition, it has more powerful engines and a new fire control and armament system. Launchers were added to the wingtips for missiles. The standard ATGM became the new AT-6 Spiral (Shturm). A searchlight was added to the rear of the fuselage to help spot ground targets at night. The Mi-24VD had strange feature: a rear-mounted DShK in the back of the fuselage reached by squeezing down a small tunnel in the back of the crew compartment. This gunner then dangled his legs through a hole in the fuselage, which was covered by a canvas bag. This version was produced for the Russian involvement in Afghanistan. Most were converted back to standard Mi-24Vs later.

The Mi-24P (Hind-F) is similar to the Mi-24V, but has a twin 30mm autocannon mounted on the right side of the nose in place of the normal 12.7mm Gatling gun turret. There is rare version of this helicopter, the Mi-24G; this version is identical, but has the guns mounted on the left side of the nose.

The Mi-24VM and Mi-24PM are Mi-24Vs and Mi-24Ps that have been upgraded to a new standard. The engines have been upgraded for more power, and the metal rotor blades have been replaced by glass-fiber ones. The hardpoints and launchers have been replaced with ones that allow a greater variety of weapons. The landing gear is now non-retracting. The Mi-24VM is armed with a 23mm autocannon in a chin turret; the Mi-24PM retains the 30mm twin autocannons on the side of the nose. The Mi-24VP is basically the same, but armed with a GSh-23L twin 23mm autocannon in the chin turret.

The Mi-24RKhR (Hind-G1) is an NBC reconnaissance version of the Hind D. The outer winglet tips are replaced with 6 claws (3 per side), used to take soil samples from contaminated areas. This aircraft has been in service since 1983, but only with Russia. Air samples are sucked in through a vacuum pump on the left side of the passenger compartment. An NBC Suit and gas mask are included for each of the 4-man crew.

The Mi-24K (Hind-G2) is a photoreconnaissance and artillery-spotting variant of the Hind D. It has been in service with Russia only since 1983. Its hardpoints may only carry external drop tanks. It has two very large high-speed cameras in the passenger compartment and updated optics.

The Mi-24VN is a night-attack version of the Mi-24VM that has the ability to fire a very unusual weapon (for a helicopter): the AT-12 ATGM. It has a FLIR (for navigation, not targeting), and inertial navigation using color maps on LCD screens. The Mi-24PN is a PM modified in the same manner.

The Bulgarian company of Arsenal has upgraded some of Bulgaria's Mi-24Vs. Improvements include a French-supplied helmet/sight interface, a GPS system, and ballistic computer with laser rangefinder for improved accuracy.

The "Super Hind" Mk III is an upgrade of the Mi-24V by South Africa. (It is believed that Algeria is the customer.) The autocannons have been replaced by a chin turret containing a 20mm GI2 autocannon (the same turret as on the Rooivalk). The avionics and sights have been given a huge upgrade, including GPS, a radar altimeter, a radio compass, and a laser designator. The Super Hind can still use Russian weapons, but can also mount US, European, and South African weapons.

The HMSOP (Helicopter Multimission Optimized Stabilized Payload) is a modification the Israelis are doing for Indian Hinds. It is basically a modern, computerized attack platform inside an old airframe. The gunner and pilot are equipped with helmets similar to those used by Apache pilots. Night vision is state of the art, as is the weapon system and defensive system.

Twilight 2000 Notes: The following variants of the Hind do not exist: Super Hind Mk III, HMSOP, Mi-24VM, Mi-24PM, Mi-24VN, Arsenal Mi-24V.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Mi-24A/F	\$441,555	AvG	2.4	11.91	2+8	12	None	Enclosed

			tons	tons					
Mi-24B	\$512,623	AvG	2.4 tons	12 tons	2+8	12	None		Enclosed
Mi-24D	\$527,029	AvG	2.4 tons	12 tons	2+8	12	None		Enclosed
Mi-24V	\$605,747	AvG	2.4 tons	12 tons	2+8	12	WL Searchlight (Rear)		Enclosed
Mi-24VD	\$723,328	AvG	2.4 tons	12.3 tons	3+8	12	WL Searchlight (Rear)		Enclosed
Mi-24P	\$779,183	AvG	2.4 tons	12 tons	2+8	14	WL Searchlight (Rear), Image Intensification		Enclosed
Mi-24VM	\$886,508	AvG	2.4 tons	10.71 tons	2+8	18	Image Intensification		Enclosed
Mi-24PM	\$1,073,091	AvG	2.4 tons	10.84 tons	2+8	18	Image Intensification		Enclosed
Mi-24VP	\$979,568	AvG	2.4 tons	10.73 tons	2+8	18	Image Intensification		Enclosed
Mi-24RKhR	\$704,372	AvG	2.4 tons	12 tons	4	22	WL Searchlight (Rear)		Shielded
Mi-24K	\$1,343,385	AvG	2.4 tons	12 tons	2	22	FLIR, WL Searchlight (Rear), Image Intensification		Enclosed
Mi-24VN	\$1,247,948	AvG	2.4 tons	10.71 tons	2+8	18	FLIR, Image Intensification		Enclosed
Mi-24PN	\$1,423,887	AvG	2.4 tons	10.84 tons	2+8	18	FLIR, Image Intensification		Enclosed
Arsenal Mi-24V	\$1,586,851	AvG	2.4 tons	12 tons	2+8	20	FLIR, Image Intensification		Enclosed
Super Hind Mk III	\$1,760,278	AvG	2.4 tons	12 tons	2+8	22	FLIR, Image Intensification		Enclosed
Mi-24 HMOSP	\$2,322,225	AvG	2.4 tons	12.17 tons	2+8	24	FLIR, Image Intensification		Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
Mi-24A	599	150	80/37	1890	1505	4599
Mi-24D/RKhR/K/Arsenal	599	150	80/37	1890	1505	4599
Mi-24V/P/Super Hind/HMSOP	628	157	70/39	1890	1578	4599

Mi-24VM/PM/VP/VN/PN	703	176	70/44	1890	1578	4599
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Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Mi-24A	Flare/Chaff Dispensers	40m	+1	DShK, 4 hardpoints	500x12.7mm
Mi-24B	Flare/Chaff Dispensers	40m	+1	YakB 12.7mm Gatling gun, 4 Hardpoints	1470x12.7mm
Mi-24D	Flare/Chaff Dispensers, Armored Cockpit	40m	+1	YakB 12.7mm Gatling gun, 4 Hardpoints	1470x12.7mm
Mi-24V	HUD, IR Suppression, Flare/Chaff Dispensers, RWR, Armored Cockpit, IRCM	40m	+2	YakB 12.7mm Gatling gun, 6 Hardpoints	1470x12.7mm
Mi-24VD	HUD, IR Suppression, Flare/Chaff Dispensers, RWR, Armored Cockpit, IRCM	40m	+2	YakB 12.7mm Gatling gun, DShK (Rear) 6 Hardpoints	1970x12.7mm
Mi-24P	HUD, IR Suppression, Flare/Chaff Dispensers, RWR, Armored Cockpit, IRCM	40m	+2	GSh-30K-2 Twin 30mm Autocannon, 6 Hardpoints	750x30mm
Mi-24VM/VN	HUD, IR Suppression, Flare/Chaff Dispensers, RWR, Armored Cockpit, IRCM	40m	+2	GSh-23I 23mm Autocannon, 6 Hardpoints	450x23mm
Mi-24PM/PN	HUD, IR Suppression, Flare/Chaff Dispensers, RWR, Armored Cockpit, IRCM	40m	+2	GSh-30K-2 Twin 30mm Autocannon, 6 Hardpoints	750x30mm
Mi-24VP	HUD, IR Suppression, Flare/Chaff Dispensers, RWR, Armored Cockpit, IRCM	40m	+2	GSh-23L Twin 23mm Autocannon, 6 Hardpoints	450x23mm
Mi-24RKhR	Flare/Chaff Dispensers, Armored Cockpit, Soil Sampler Claws, Secure Radios, Datalink System	40m	+1	YakB 12.7mm Gatling gun, 4 Hardpoints	1470x12.7mm
Mi-24K	Flare/Chaff Dispensers, Armored Cockpit, Secure Radios, Datalink System, Cameras, IR Suppression	40m	+1	YakB 12.7mm Gatling gun, 4 Hardpoints	1470x12.7mm
Arsenal Mi-24V	Helmet/Sight Interface, Flare/Chaff Dispensers, Armored Cockpit, IR Suppression	40m	+4	YakB 12.7mm Gatling gun, 4 Hardpoints	1470x12.7mm
Super Hind Mk III	HUD Interface, IR Suppression, Flare/Chaff Dispensers, RWR, Armored Cockpit, IRCM, Laser Designator, GPS	40m	+4	20mm GI2 Autocannon, 6 Hardpoints	550x20mm
Mi-24 HMSOP	HUD Interface, IR Suppression, Flare/Chaff Dispensers (24), RWR,	40m	+4	30mm M-23 Chaingun, 6	450x30mm

**Mi-28 Havoc**

Notes: This aircraft is well known for its Paving ability (the ability to fly long distances at very low altitude), and Paving done in Havoc is only a Difficult task. Later versions have a mast-mounted sight similar in nature to the Apache Longbow version. The Havoc cannot be refueled in air, but often carries drop tanks. No ejection seats are provided. The Havoc has a small rear fuselage area that can fit two or three people (depending on their size) in a cramped manner. This is intended for the Havoc's secondary role as a rescue helicopter.

The Mi-28A (Havoc-A) is the basic version. The Mi-28N is a night attack version with upgraded sensors, like a mast-mounted radar and a FLIR in a ball mount under the nose. The engines are also more powerful.

The Mi-28NE (Havoc-C) is fully brought up to date. It has self-sealing fuel tanks, a glass cockpit, a full sensor suite, and unlike other versions of the Havoc, the Havoc-C does have ejection seats.

Twilight 2000 Notes: Due to its resemblance to the US AH-64 Apache, many tragic mistakes were made on both sides. In Russian service, the Havoc lost out to the Ka-50 Werewolf in the attack helicopter competition, but the Russians placed an order for the Havoc anyway when the Twilight War picked up to increase their supply of attack helicopters by production on two production lines. The Havoc-C does not exist.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Mi-28A	\$1,415,274	AvG	1.92 tons	11.66 tons	2	16	Image Intensification	Shielded
Mi-28N	\$2,192,539	AvG	1.92 tons	12.66 tons	2	20	FLIR, Radar, Image Intensification	Shielded
Mi-28NE	\$2,607,633	AvG	1.92 tons	12.1 tons	2	24	FLIR, Radar, Image Intensification	Shielded

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
Mi-28A	600	150	20/38	1720	1477	3603
Mi-28N	621	248	20/62	1720	1720	3603
Mi-28NE	610	153	20/38			5700

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Mi-28A	IR suppression, Flare/Chaff Dispensers, Radar Warning Receiver, Laser Designator, Armored Cockpit, HUD Interface, RWR, LWR	40m	+3	2A42 30mm Autocannon, 4 Hardpoints	250x30mm
Mi-28N	IR suppression, Flare/Chaff Dispensers, Radar Warning Receiver, Laser Designator, Armored Cockpit, HUD Interface, RWR, LWR	40m	+4	2A42 30mm Autocannon, 4 Hardpoints	250x30mm
Mi-28NE	IR suppression, Flare/Chaff Dispensers, Radar Warning Receiver, Laser Designator, Armored Cockpit, Helmet/Sight Interface,	40m	+4	2A42 30mm Autocannon, 4 Hardpoints	460x30mm



## Ka-25 Hormone

Notes: This is a Russian-designed naval helicopter, used for ASW, missile guidance, missile tracking, mine laying, and search and rescue. It went out of Russian service long ago, but is used by India, Syria, Vietnam, and Yugoslavia. The helicopter uses twin contra-rotating rotors and thus does not need a tail rotor (a common Kamov design). The aircraft does not have ejection seats, and the helicopter is not capable of in-flight refueling. The helicopter detailed here is the Ka-25PS (Hormone-C), a search and rescue/utility variant. It is not armed. It has a rescue hoist with a capacity of 300 kilograms.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$515,726	AvG	1.3 tons	7.5 tons	3+12	12	Radar	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
440	110	60/28	1090	555	4000

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Radio Direction Finder	26m	None	None	None

## Ka-27/28/32 Helix

Notes: This helicopter replaced the Hormone in Russian service, and is also used by India, Vietnam, and Yugoslavia. It is a larger version of the Hormone, and its robust design and rugged construction has made it popular with crews. It comes in versions for search and rescue, ASW, cargo, and civilian versions. The aircraft has no ejection seats and is not capable of in-flight refueling.

The Ka-27, Ka-28, and Ka-32 are closely related helicopters, despite their designations. However, we will not concern ourselves with the various naval warfare variants, concentrating on the cargo/utility versions. The Ka-27PL (Helix-A) is a basic helicopter normally used for ship-to-shore transport. It can also be fitted with submarine sensing gear. Note that though the Ka-27PL has a capacity of 6 tons, 2 tons of this is weapons in the internal weapons bay (normally torpedoes or depth charges). The Ka-28 is an export model of the Ka-27PL; it has less powerful engines.

The Ka-27PS (Helix-D) is a "SARbird," a helicopter used for search and rescue. It has a secondary role as a general utility helicopter. It is not normally armed, and is equipped with an array of sensors and communications devices to find downed airmen and the crews of sunken ships. It does have two hardpoints, but these may carry only external non-droppable fuel tanks. It has a rescue hoist with a capacity of 300 kilograms. The Ka-27PV is an armed version of the Ka-27PS.

The Ka-32S (Helix-C) is an upgraded version of the Ka-27PS, with better engines and avionics.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Ka-27PL	\$2,634,251	AvG	6 tons	12.6 tons	3+18	28	Dipping Sonar, Radar	Enclosed
Ka-27PS	\$861,706	AvG	5 tons	12.7 tons	3+18	24	Radar, WL Searchlight	Enclosed
Ka-27PV	\$980,397	AvG	5 tons	12.7 tons	3+14	24	Radar, WL Searchlight	Enclosed
Ka-32S	\$1,013,992	AvG	5 tons	12.7 tons	3+18	24	Radar, Passive IR, WL/IR Searchlight	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
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Ka-27PL/PS/PV	500	125	50/31	3700	1425	5000
Ka-28	494	123	50/31	3700	1400	5000
Ka-32S	525	131	50/33	3700	1603	5000

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Ka-27PL/Ka-28	MAD Sensor, Sonobuoy Launcher (100), Flare/Chaff Dispensers	28m	+2	Internal Weapons Bay, 2 Hardpoints	None
Ka-27PS	Radio Direction Finder, Radar Detector, Flare/Chaff Dispensers	28m	None	2 Hardpoints (External Fuel only)	None
Ka-27PV/Ka-32S	Radio Direction Finder, Radar Detector, Flare/Chaff Dispensers	28m	+2	2xPKT Doorguns, 2 Hardpoints	1000x7.62mm

## Ka-29 Helix-B

Notes: This is a gunship version of the Helix, designed to operate from carriers and amphibious landing ships to support Russian Naval Infantrymen. The Helix-B has a Gatling gun in the nose and can use ATGM. It has no ejection seats, and cannot conduct in-flight refueling. It is basically the naval counterpart to the Mi-24: a combat assault helicopter.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$1,091,883	AvG	4 tons	12.6 tons	2+16, or 7 paratroops, or 4 stretchers	24	Image Intensification	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
560	140	45/35	1765	1578	4000

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Flare/Chaff Dispensers, Laser Designator, RWR, LWR	28m	+2	PKT, 2x7.62mm Gatling Doorguns, 4 Hardpoints	1800x7.62mm plus 2000x7.62mm

## Ka-60 Kasatka

Notes: This light transport helicopter is the rough equivalent of the US UH-60 Blackhawk, but was normally used only by Air Assault Divisions and special operations units. Spetsnaz is especially fond of this helicopter due to its combination of speed, heavy armor, versatility, and maneuverability.

Twilight 2000 Notes: Special operations versions (Ka-60M) were built that have a number of improvements over standard Air Assault models. Enemies in the NATO rear began to fear and rue the appearance of these helicopters over their positions.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
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Ka-60A	\$810,407	AvG	2 tons internal or 2.75 tons slung	6.5 tons	2+14	16	Thermal Imaging	Enclosed
Ka-60M	\$2,297,700	Avg	2 tons internal or 2.75 tons slung	6.69 tons	2+14	26	FLIR, Image Intensification, WL/IR Searchlight	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
(Both)	600	150	30/38	1280	952	5150

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Ka-60A	Secure Radios, IR Suppression, Flare/Chaff Dispensers, RWR, Armored Fuselage	28m	+2	2xPKM Doorguns, 4 Hardpoints	1500x7.62mm
Ka-60M	Secure Radios, IR Suppression, Flare/Chaff Dispensers, RWR, Inertial Navigation, ECM, IRCM, Helmet/Sight Interface, Auto Track, Armored Fuselage	28m	+3	2xPKM, NSV, Kord, AGS-30, or 12.7mm Gatling Doorguns; 4 Hardpoints	1500x7.62mm or 900x12.7mm or 400x30mm

#### Ka-115B/C

Notes: This helicopter was originally designed as a light utility and executive transport helicopter, and it is one of the few helicopters able to be called "aerobatic," due to its speed and maneuverability.

Twilight 2000 Notes: Two military models were produced, the Ka-115B light observation/command helicopter and the Ka-115C light special operations helicopter. The Ka-115B filled a role in the Russian military similar to that of the OH-58, while the Ka-58C was used in a role similar to A/MH-6 Little Bird helicopters in the special operations community.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Ka-115A	\$93,200	AvG	700 kg	1.97 tons	2+4	4	None	Enclosed
Ka-115B	\$415,072	AvG	700 kg	2.05 tons	2+4	12	Image Intensification	Enclosed
Ka-115C	\$1,059,091	AvG	700 kg	2.14 tons	2+4	14	Image Intensification, FLIR	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
(All)	500	125	20/32	350	193	5765

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Ka-115A	None	20m	None	None	None
Ka-115B	Secure Radios, Flare/Chaff Dispensers, Laser Designator, RWR, Inertial Navigation	20m	+1	2 Hardpoints	None

Ka-115C	Secure Radios, Flare/Chaff Dispensers, Laser Designator, IR Suppression, RWR, Inertial Navigation	20m	+3	4 Hardpoints, 23mm Autocannon	200x23mm
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## Mi-2 Hoplite

Notes: This is one of Russia's first helicopter designs, and is still in use in the Warsaw Pact and in many Third World countries worldwide. The Polish W-3 Sokol is an upgraded version of the Mi-2. Many versions, armed and unarmed exist, including a trainer, a cropduster, a Medivac, a gunship, NBC reconnaissance, and a search and rescue.

The Mi-2T is the basic cargo/troop carrier. It is a simple machine, but its light design and powerful engines (for the time) made it useful for setting speed and altitude records. The Mi-2US Adder is a gunship/assault carrier; it is heavily armed, with an external autocannon on the left side, a two pairs of machineguns on the right side, two doorguns, and two hardpoints for rockets or bombs. (It is not equipped to carry ATGM.) It retains the ability to carry passengers. The Mi-2URN Salmandra is an armed reconnaissance helicopter with an autocannon and the ability to carry non-guided weapons on its hardpoints. All the hardpoints are on stub wings; one of the hardpoints is taken up by the autocannon installation. The Mi-2URP Anakonda is an antitank helicopter with the ability to carry AT-3 Sagger missiles, normally one per hardpoint. Four extra missiles are carried in the passenger compartment, to be reloaded during a short landing. The Mi-2URPG is the same, but can also mount SA-7 AAMs on its wingtips.

The Mi-2B is an improved version of the Mi-2T sold to the Middle East. It has improved electronics and avionics. The Mi-2D is an airborne command post; it has no less than 4 radio sets, some surveillance equipment, and the antennae necessary for the commander to keep tabs on the situation.

The Kania is a modernized Mi-2, built in the 1990s. (It is also available as an upgrade kit.) The Kania uses British-built Rolls-Royce/Allison engines with much more available power than the original ones. It also has a fully upgraded avionics and electronics package, including GPS and computer-assisted flight. The rotor blades are of composite material and have automatic de-icing equipment. It is not normally found in a militarized version, but hardpoints can be bolted on and radios changed.

Twilight/Merc 2000 Notes: The Kania does not exist.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Mi-2T	\$107,016	AvG	800 kg	3.55 tons	2+8	6	None	Enclosed
Mi-2US	\$361,652	AvG	800 kg	3.7 tons	2+8	8	None	Enclosed
Mi-2URN	\$251,966	AvG	800 kg	3.7 tons	2+4	10	None	Enclosed
Mi-2URP	\$171,188	AvG	800 kg	3.7 tons	2+4	8	None	Enclosed
Mi-2URPG	\$196,608	AvG	800 kg	3.7 tons	2+4	8	None	Enclosed
Mi-2B	\$309,739	AvG	800 kg	3.55 tons	2+8	6	None	Enclosed
Mi-2D	\$397,219	AvG	800 kg	3.55 tons	2+6	10	Image Intensification	Enclosed
Kania	\$587,148	AvG	1.2 tons	3.55 tons	2+8	6	Weather Radar	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
(All Others)	400	100	40/25	600	292	4000
Kania	413	103	40/26	600	246	4000

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo

Mi-2T	None	28m	None	2 Hardpoints	None
Mi-2US	None	28m	+1	23mm NS-23KM Autocannon, 4xPKT, 2xPKT Doorguns, 2 Hardpoints	240x23mm, 2000x7.62mm, 500x7.62mm (Doorguns)
Mi-2URN	Cameras	28m	+1	23mm NS-23KM Autocannon, 3 Hardpoints	240x23mm
Mi-2URP	None	28m	+2	4 Hardpoints	None
Mi-2URPG	None	28m	+2	4 Hardpoints, 2 AAM Hardpoints	None
Mi-2B	RWR	28m	+1	4 Hardpoints	None
Mi-2RM	Radio Direction Finder	28m	None	4 Hardpoints	None
Mi-2D	RWR, Secure Radios, Video Recorder	28m	None	2 Hardpoints	None
Kania	GPS, INS	28m	None	None	None

#### Mi-4 Hound

Notes: This is an older Russian helicopter still in use in many Third World Russian ally states. Military versions often carry a machinegun in an underfuselage pod and rocket pods on hardpoints. ASW variants carry magnetic anomaly detector and underfuselage radar. The Hound has a side door and a rear clamshell door. No ejection seats are provided, and the helicopter is not capable of in-flight refueling.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$246,960	AvG	2 tons	7.8 tons	3+8	10	None	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
420	105	50/26	600	617	4000

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
None	25m	None	3 hardpoints	None

#### Mi-6 Hook

Notes: Although it is a very old design, the Hook still functions as the Eastern Bloc's primary heavy-lift helicopter. It is used by the Warsaw Pact, Algeria, Egypt, Ethiopia, Iraq, Peru, Syria, and Vietnam. At the time of its design in 1957, it was the largest helicopter in the world, so large that it is often seen with short wings fitted to reduce strain on the rotors when carrying large loads. (These are not load-carrying wings, so they do not mount hardpoints.) The Hook is not considered stable enough in flight to deploy paratroopers.

The Mi-6T is the basic military transport. It is often seen with a flexible mount in the nose for a machinegun. The two hardpoints are in the form of stub pylons on the sides. The Mi-6VVP was the first command post version of the Hook; as such, it was basically an experiment that made it into operational status, and does not have the best fit of equipment. However, it does have at least 6 radio sets and inertial positioning. The Mi-6VZPu is an electronic warfare helicopter; it is arrayed with radar and radio jammers, detectors, and listening devices, operating on many different bands. The Mi-6BUS is a more developed command post model, also known as the

Mi-22. The Mi-6AYaSh is sort of a helicopter-based AWACS-type helicopter, a command post with an extensive radar installation.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Mi-6T	\$1,420,428	AvG	12 tons (up to 8 tons slung)	42.5 tons	5+65 or 16 stretchers	44	None	Enclosed
Mi-6V(KP	\$1,655,484	AvG	8 tons	42.5 tons	10+30	50	None	Enclosed
Mi-6VZPu	\$7,301,518	AvG	5 tons	42.5 tons	15	56	None	Enclosed
Mi-6BUS	\$2,304,624	AvG	8 tons	42.5 tons	10+30	55	None	Enclosed
Mi-6AYaSh	\$6,409,635	AvG	6 tons	43 tons	15+30	60	Radar, SLR	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
(All)	600	150	70/38	6315	4089	4500

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Mi-6T	None	35m	None	DShK, 2 Hardpoints	600x12.7mm
Mi-6V(KP	Secure Radios, INS	35m	None	DShK, 2 Hardpoints	600x12.7mm
Mi-6VZPu	ECM, Active Jamming, Radio Jamming, Flare/Chaff Dispensers (40), Radio Direction Finder, Radio Detector, RWR	35m	None	DShK, 2 Hardpoints	600x12.7mm
Mi-6BUS/AYaSh	Flare/Chaff Dispensers, Secure Radios, INS, RWR, Battle Management Computer	35m	None	DShK, 2 Hardpoints	600x12.7mm

### Mi-8 Hip

Notes: This helicopter has been a workhorse in the Russian sphere of influence since the mid-1960s. Its low price and soundness of design make it attractive to many countries. It was used extensively in the 1979-89 war in Afghanistan. In Europe, it is used mainly for unarmed cargo duties, and it is employed extensively by the UN and civilian agencies. No ejection seats are provided, and the helicopter is not capable of in-flight refueling.

The Mi-8T is the basic transport version, normally unarmed or armed only with jury-rigged doorguns. Its hardpoints are normally occupied with fuel tanks, since the fuel capacity of the Mi-8T does not get it very far and the Mi-8T has no sighting equipment. An internal auxiliary fuel tank may also be carried, with a capacity of 945 liters, at the expense of passengers or cargo. The Mi-8TPS is a command post model, basically an Mi-8T with extra radios and office-type equipment for the command personnel to work. The Mi-8MT is a version of the Mi-8T where the engines have been replaced with more powerful ones. The Mi-8TB is a combat assault transport with a machinegun in a flexible mount in the nose and the ability to fire AT-2 ATGM. The Mi-8TBK is an export version of the Mi-8TB, normally armed with AT-3 ATGM instead of AT-2 ATGM. The Mi-8V(KP is a more evolved command post. The Mi-8AMTSh is a night attack combat assault transport, armed with the most up to date ATGMs, and able to use most helicopter-borne weapons in the Russian arsenal. The passengers can open six windows in the helicopter and fire their weapons out of the windows.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Mi-8T	\$281,929	AvG	3 tons	12 tons	3+24 or 18 paratroops or 12 stretchers	14	None	Enclosed
Mi-8TPS	\$300,234	AvG	3 tons	12 tons	3+16	18	None	Enclosed
Mi-8MT	\$298,558	AvG	4 tons	12 tons	3+24 or 18 paratroops or 12 stretchers	14	None	Enclosed
Mi-8TB/TBK	\$406,596	AvG	4 tons	12.1 tons	3+24 or 18 paratroops or 12 stretchers	14	None	Enclosed
Mi-8VPK	\$584,451	AvG	2 tons	12.1 tons	4+12	20	None	Enclosed
Mi-8AMTSh	\$717,388	AvG	4 tons	13 tons	3+24 or 18 paratroops or 12 stretchers	16	WL/IR Searchlight, Passive IR, Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
Mi-8T/TPS	460	115	70/29	445	1021	4500
Mi-8MT/TB/TBK/VPK/AMTSh	500	125	70/31	445	1421	5500

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Mi-8T	None	40m	None	2 Hardpoints	None
Mi-8TPS	Secure Radios	40m	None	2 Hardpoints	None
Mi-8TB/TBK	None	40m	+1	DShK, 6 Hardpoints	700x12.7mm
Mi-8VPK	Secure Radios, Battle Management Computer	40m	None	4 Hardpoints	None
Mi-8AMTSh	Armored Cockpit, IR Suppression, RWR, Flare/Chaff Dispensers	40m	+2	PKT (Rear), 6 Hardpoints	1200x7.62mm

### Mi-10 Harke

Notes: This Russian helicopter is a development of the Mi-6 and is used for heavy lift duties in both military and civilian capacities in the nations of the Warsaw Pact. The helicopter is normally used for cargo rather than passenger service, though a small number of seats are provided. No ejection seats are provided, and the helicopter is not capable of in-flight refueling. The Harke is basically an Mi-6 with the fuselage cut in half lengthwise, and the empty space occupied with long landing gear to that the helicopter may lift large external bulk loads in a manner similar to the S-64 Skycrane. It is also one of the rarest helicopters in active service, with only 55 examples being built.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$1,118,240	AvG	11 tons	38 tons	3+28	38	None	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
520	130	80/33	6315	4121	3000

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
None	80m	None	None	None

### Mi-17 Hip-H

Notes: This helicopter is an upgraded Mi-8, and replaced that helicopter in production. It features upgraded engines, improved armament, and greater lifting capability. It is used by most of the same customers who use the Mi-8.

The Mi-17 (Hip-H) is the basic model; it is an upgraded form of the Mi-8MT. An internal auxiliary fuel tank may be carried, with a capacity of 945 liters, at the expense of passengers or cargo; they also often carry external fuel tanks. The best way to tell an Mi-17 from an Mi-8MT is that the tail rotor is on the left side of the tail instead of the right. The Mi-17 has a rescue hoist with a capacity of 150 kilograms. The front PKT is in a flexible mounting in the nose; the rear PKT is a ramp mounting fired wither by remote control (with a TV camera to the cockpit) or by a crewmember or passenger. The Mi-171 is an armed version with somewhat more powerful engines and a weapon sight. The Mi-172 is an export model of the Mi-171, with more modern electronics and avionics.

The Mi-17MD is an export variant with radar and a number of other improvements. The clamshell doors at the rear of the helicopter have been replaced with a single-piece ramp that can hinge either upward (inside the aircraft) or outside the aircraft. Doorguns have been added to the side doors, and the troops may open the six portholes and fire their weapons out of them. The cockpit has been revised with glass displays. The Mi-17MD retains the rescue hoist, and also has an RDF to allow it to better double as a SAR helicopter. The Mi-17N is a night attack version of the Mi-17MD, with night vision equipment. The Mi-17-1V is an MD with more defensive equipment and enlarged side doors.

The Mi-17FK Kittiwake (Kittyhawk) is a joint development of Russia and a Canadian company, built for international sales. It is basically an Mi-17N that has been modernized and equipped with Western-built avionics and electronics, which saves the helicopter about 100 kilograms of empty weight. Use of composite materials in many areas has further decreased the weight. The entire cockpit has been replaced with glass displays, the hoist capacity has been increased to 300 kilograms, and the cargo capacity increased.

Twilight 2000 Notes: The Mi-17N, Mi-17-1V, and Mi-17FK do not exist.

Merc 2000 Notes: The Mi-17FK does not exist.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Mi-17	\$474,737	AvG	4 tons	12 tons	3+30, or 24 paratroops, or 20 stretchers	16	None	Enclosed
Mi-17MD	\$860,537	AvG	4 tons	13 tons	3+40, or 30 paratroops, or 20 stretchers	20	Radar, WL Searchlight	Enclosed
Mi-17N	\$1,025,222	AvG	4 tons	13.2 tons	3+40, or 30 paratroops, or 20 stretchers	22	Radar, WL/IR Searchlight, FLIR	Enclosed
Mi-17KF	\$2,688,406	AvG	5 tons	12 tons	3+40, or 30 paratroops, or 20 stretchers	26	Radar, WL/IR Searchlight, FLIR	Enclosed
Mi-17-	\$1,216,450	AvG	4 tons	13.2	3+40, or 30 paratroops,	28	Radar, WL	Enclosed

1V				tons	or 20 stretchers		Searchlight	
Mi-171	\$515,650	AvG	4 tons	12 tons	3+30, or 24 paratroops, or 20 stretchers	16	None	Enclosed
Mi-172	\$1,075,839	AvG	4 tons	12.2 tons	3+30, or 24 paratroops, or 20 stretchers	20	Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
Mi-17/17MD/N/KF	500	125	70/31	445	1628	4000
Mi-171	524	131	70/33	445	1628	5700
Mi-172	500	125	70/31	445	1628	5650

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Mi-17	None	40m	+1	2xPKT (Front, Rear), 6 Hardpoints	1400x7.62mm
Mi-17MD/N	Radio Direction Finder, Armored Cockpit, Armored Lower Fuselage, Flare/Chaff Dispensers	40m	+2	2xPKT (Front, Rear), 2xPKT (Doorguns), 6 Hardpoints	2400x7.62mm
Mi-17KF	Radio Direction Finder, Armored Cockpit, Armored Lower Fuselage, Flare/Chaff Dispensers, RWR	40m	+3	2xPKT (Front, Rear), 2xPKT (Doorguns), 6 Hardpoints	2400x7.62mm
Mi-17-1V	Radio Direction Finder, Armored Cockpit, Armored Lower Fuselage, Flare/Chaff Dispensers, RWR, ECM, IRCM	40m	+2	2xPKT (Front, Rear), 2xPKT (Doorguns), 6 Hardpoints	2400x7.62mm
Mi-171	None	40m	+2	2xPKT (Front, Rear), 6 Hardpoints	1400x7.62mm
Mi-171	Flare/Chaff Dispensers, RWR, INS	40m	+2	2xPKT (Front, Rear), 6 Hardpoints	1400x7.62mm

### Mi-26 Halo

Notes: The Mi-26 is the largest production helicopter in the world, with a cargo capacity similar to the C-130 Hercules aircraft. It is operated by Russia, India, Peru, and the UN. It is the first successful helicopter design with an 8-bladed rotor. The Halo has two passenger doors on the port side, one starboard, and a rear cargo ramp. It is not normally armed, no ejection seats are provided, and the helicopter is not capable of in-flight refueling. The two versions presented here are the original Mi-26T cargo variant, and the upgraded Mi-26M, with new engines, increased cargo capacity, and better avionics.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Mi-26T	\$3,239,105	AvG	20 tons	56 tons	5+80, or 68 paratroopers, or 60 stretchers	62	None	Enclosed

Mi-26M	\$4,606,891	AvG	22 tons	58 tons	5+80, or 68 paratroopers, or 60 stretchers	78	None	Enclosed
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Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn		Fuel Cap	Fuel Cons	Ceiling
Mi-26T	590	148	150/37		11900	7439	4600
Mi-26M	639	160	150/40		11900	7439	4600

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Mi-26T	None	80m	None	None	None
Mi-26M	Flare/Chaff Dispensers, RWR, GPS	80m	None	None	None

### Mi-34 Hermit

This light utility helicopter is one of Russia's newest designs, entering production shortly before the Twilight War. It is very agile, being Russia's first helicopter able to execute a loop or roll. It is designed for commanders, aerial observers, police, and border guards. The aircraft has no ejection seats and is not capable of in-flight refueling. The Mi-34TV is a twin-engine model.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Mi-34T	\$622,029	AvG	550 kg	1.35 tons	2+4	6	Image Intensification	Enclosed
Mi-34TV	\$624,326	AvG	550 kg	1.52 tons	2+4	6	Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
Mi-34T	420	105	15/26	150	65	4500
Mi-34TV	468	117	15/29	150	112	4500

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
(Both)	Flare/Chaff Dispensers, IR Suppression, Laser Designator, RWR, GPS	20m	None	None	None

### Mi-38

Notes: This medium-lift helicopter was designed to replace the Mi-8/Mi-17 series. It is similar in appearance to the EH.101 Merlin. The Mi-38 has a large 6-bladed rotor for greater lifting capabilities than is normal for an engine of its horsepower, a tail similar to the Mi-28 attack helicopter, CRT cockpit displays, and a large use of composites to save weight. There is a door on either side of the helicopter to the rear of the cockpit, and a large clamshell door with an extendible ramp in the rear of the helicopter for cargo loading and paratrooper exit. There are no ejection seats and only about a third of Mi-38s were equipped with in-flight refueling gear.

Twilight 2000 Notes: Perhaps some 40 examples of this helicopter were produced before the Twilight War, mostly for use by Russian special operations forces.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$1,702,426	AvG	5 tons	14.5	2+32 or 26 paratroopers, or 16	26	Image	Enclosed

tons

stretchers

Intensification

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
625	156	60/39	5745	1677	5000

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Flare/Chaff Dispensers, RWR, IR Suppression, GPS, INS	48m	+2	DShK, DShK (Rear), 4 Hardpoints	2000x12.7mm

### Mi-40

Notes: Designed specifically for special operations needs, the Mi-40 is an assault helicopter variant of the M-28 attack helicopter. The Mi-40 uses the same engines, transmission, and rotors as the Mi-28, and the rear fuselage boom is nearly identical. The Mi-38 carries an extensive sensor suite, including a mast-mounted sight for covert reconnaissance of objectives before assaults. There are large sliding doors on either side of the fuselage and a clamshell door in the rear. The sensors are located on a mast-mounted sight, with backups for the image Intensifier and FLIR in the nose. The aircraft has no ejection seats, but is equipped for in-flight refueling.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$2,772,282	AvG	1.8 tons	11.4 tons	2+12 or 10 paratroopers	30	FLIR, Radar, Image Intensification	Shielded

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
580	145	25/36	1800	1436	5300

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Flare/Chaff Dispensers, IR Suppression, Radar Warning Receiver, Laser Designator, IRCM, ECM	40m	+3	23mm NS-23KM Autocannon, 2xDShK Doorguns, 6xHardpoints	550x23mm, 2000x12.7mm

## AH-2A Rooivalk

Notes: This is the new South African attack helicopter, produced with experience from their brush wars of the 1980s and 90s. It was designed for long-range flight and long loiter time for prolonged operations. A number of these aircraft were also purchased by Malaysia. The aircraft has no ejection seats and cannot be refueled in air.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$2,453,640	AvG	1.31 tons	8.75 tons	2	28	FLIR, Image Intensification	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
556	139	15/35	1851	954	5852

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Flare/Chaff Dispensers, Helmet/ Sight Interface, Laser Designator, Auto Track, Armored Cockpit, IR Suppression, RWR, LWR, ECM	32m	+4	20mm GI2, 4 Hardpoints, plus 2 AAM Hardpoints	700x20mmKAA

## AH-1 Cobra

Notes: The AH-1G Cobra is the former standard US attack helicopter, developed in Vietnam, and still in service with many western-aligned nations, as well as former US allies such as Iran. The AH-1G has a single engine. It is not equipped with the guidance equipment necessary for using ATGMs or the sensors necessary for using air-to-air missiles. No ejection seats are provided, and the aircraft is not capable of in-flight refueling.

The AH-1J SeaCobra was the first version for the US Marines. It uses a two engines instead of one, and though it was not initially capable of using the TOW ATGM, this capability was retrofitted later. The minigun and grenade launcher was replaced by a 3-barreled 20mm M-197 autocannon.

The AH-1Q is an AH-1G with additional sighting and armament systems to enable it to carry and use the TOW ATGM.

The AH-1S is the result of continual improvements in the AH-1G, in service with the US Army until the advent of the Apache. It is still in service with many present and former US allies, as well as Reserve and National Guard units. The rounded canopy glass was highly reflective, so it was replaced by flat glass panels. It was equipped to carry TOW ATGM.

The AH-1E is not, as the designation might lead you to believe, an earlier model of the Cobra. It is also known as the "upgunned AH-1S," and differs from the standard AH-1S primarily in the replacement of the minigun/grenade launcher chin turret with one mounting a 3-barreled 20mm M-197 autocannon, as on the SeaCobra. It has a composite rotor with diagonal tips.

Like the AH-1E, the AH-1F SuperCobra is not an early model of Cobra. It is a further upgraded AH-1E, also known as the "Modernized AH-1S." It has some of the latest attack helicopter hardware and computer software, and is capable of using Hellfire missiles.

The AH-1P is also a version of the AH-1S; it is an AH-1S equipped with a new composite rotor, improved instrument panel layout, inertial navigation, radar altimeter, and better radios.

The AH-1R is an AH-1G with a more powerful engine.

The AH-1T Improved SeaCobra is a version of the AH-1J, with more sophisticated combat equipment and a more powerful and fuel-efficient engine, and an armored cockpit and Kevlar anti-spall liner.

The AH-1T+ SuperCobra is an AH-1T with more powerful engines and the ability to use Hellfire missiles and air-to-air missiles.

The AH-1W SuperCobra is a version of the Cobra, used by the US Marines, who believe it is every bit as good as the Apache. It has all the improvements of the AH-1T, and has twin engines and an EW suite in addition to those improvements. The aircraft has no ejection seats and cannot be refueled in air.

The AH-1Z King Cobra has a 4-bladed rotor and upgraded avionics, including a fully computerized and integrated attack and defense suite, and GPS. Composite construction makes it considerably lighter.

Twilight 2000 Notes: The AH-1T+, AH-1E, AH-1P, and AH-1Z do not exist.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
AH-1E	\$1,167,090	AvG	1.12 tons	6.64 tons	2	13	Image Intensification, Passive IR	Enclosed
AH-1F	\$1,918,354	AvG	1.12 tons	6.69 tons	2	14	FLIR, Image Intensification	Enclosed
AH-1G	\$814,894	AvG	775 kg	4.31 tons	2	12	Passive IR	Enclosed
AH-1J	\$553,078	AvG	419 kg	4.54 tons	2	12	Passive IR	Enclosed
AH-1P	\$1,037,586	AvG	775 kg	4.31 tons	2	12	Passive IR, Image Intensification	Enclosed

AH-1Q	\$1,002,135	AvG	775 kg	4.34 tons	2	12	Passive IR, Image Intensification	Enclosed
AH-1R	\$824,622	AvG	775 kg	4.82 tons	2	12	Passive IR	Enclosed
AH-1S	\$1,006,730	AvG	775 kg	4.44 tons	2	14	Image Intensification, Passive IR	Enclosed
AH-1T	\$1,794,324	AvG	1.45 tons	6.53 tons	2	12	FLIR, Image Intensification	Enclosed
AH-1T+	\$1,798,306	AvG	1.45 tons	6.98 tons	2	12	FLIR, Image Intensification	Enclosed
AH-1W	\$2,472,041	AvG	755 kg	7.62 tons	2	16	FLIR, Image Intensification	Enclosed
AH-1Z	\$2,695,650	AvG	2.62 tons	8.41 tons	2	17	FLIR, Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
AH-1E/F	554	139	25/35	1192	550	4720
AH-1G/P/Q	554	139	25/35	1014	505	3475
AH-1J	666	167	25/42	1014	1330	3215
AH-1R	595	149	25/37	1014	654	3215
AH-1S	640	160	25/40	1014	604	3720
AH-1T	554	139	25/35	1158	1274	7400
AH-1T+	581	145	25/36	1156	1339	7400
AH-1W/Z	574	144	20/36	1563	1091	7400

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
AH-1E	Secure Radio, Flare/Chaff Dispensers	40m	+2	20mm M-197 Autocannon, 4 Hardpoints	750x20mm
AH-1F	Secure Radio, Flare/Chaff Dispensers, HUD, Laser Rangefinder, IR Suppression, IRCM, Laser Designator	40m	+4	20mm M-197 Autocannon, 4 Hardpoints	750x20mm
AH-1G	Secure Radio	40m	+1	M-134, Mk19, 4 Hardpoints	2000x7.62mm and 150x40mm
AH-1J	Secure Radio	40m	+1	20mm M-197	750x20mm

				Autocannon, 4 Hardpoints	
AH-1P	Secure Radio, Flare/Chaff Dispensers	40m	+2	M-134, Mk19, 4 Hardpoints	2000x7.62mm and 150x40mm
AH-1Q	Secure Radio	40m	+2	M-134, Mk19, 4 Hardpoints	2000x7.62mm and 150x40mm
AH-1R	Secure Radio	40m	+1	M-134, Mk19, 4 Hardpoints	2000x7.62mm and 150x40mm
AH-1S	Secure Radio, Flare/Chaff Dispensers	40m	+2	M-134, Mk19, 4 Hardpoints	2000x7.62mm and 150x40mm
AH-1T/T+	Secure Radio, Flare/Chaff Dispensers, Helmet Sight Interface, Laser Designator	40m	+3	20mm M-197 Autocannon, 4 Hardpoints	750x20mm
AH-1W	Secure Radio, Flare/Chaff Dispensers, Helmet Sight Interface, Laser Designator, RWR, ECM	40m	+4	20mm M-197 Autocannon, 4 Hardpoints, plus 2 AAM Hardpoints	750x20mm
AH-1Z	Secure Radio, Flare/Chaff Dispensers, Helmet/Sight Interface, Laser Designator, ECM, RWR, LWR, Auto Track	40m	+5	20mm M-197 Autocannon, 4 Hardpoints, plus 2 AAM Hardpoints	750x20mm

### AH-64 Apache

Notes: The AH-64 Apache is the US Army's primary attack helicopter, first used in combat in the 1989 conflict in Panama, and used to great effect during the 1991 Persian Gulf War. The Apache has also been exported to several NATO countries, to Kuwait, and to Israel. The helicopter has no ejection seats and is not capable of in-flight refueling. European Apaches are often armed with Mistral missiles.

The AH-64A is the first model, and the US Army, Israel, and some other countries using the Apache intend to update their existing AH-64s to the AH-64D or AH-64D Longbow configuration. The primary armament of the Apache is the Hellfire missile, along with the M-230 Chaingun. The AH-64B is an AH-64 with a few modifications to make it more suitable for Desert Storm; these include a GPS receiver, an improved autopilot, and more powerful and compact radios.

The AH-64C is called a "near AH-64D standard." They have an engine upgrade, and the airframe upgrades of the AH-64D, but not the radar or the fire control upgrades.

The AH-64 Longbow version of the Apache adds a mast above the rotor blades for sensors, and interfaces for reporting information and receiving information from higher headquarters. An additional 490-liter fuel tank may be added at the expense of 880 rounds of 30mm ammunition. It has a fully glass cockpit.

The WAH-64 is a British variant that is the same as the AH-64D Longbow (in game terms; internal components are different in some cases), except for the more powerful engines and strengthened airframe and rotor blades to take the extra power.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
AH-64A	\$2,449,533	AvG	3.28 tons	9.53 tons	2	16	FLIR, Image Intensification	Shielded
AH-64B	\$2,876,128	AvG	3.28 tons	9.53 tons	2	18	FLIR, Image Intensification	Shielded

AH-64C	\$2,885,536	AvG	3.28 tons	9.74 tons	2	18	FLIR, Image Intensification	Shielded
AH-64D	\$3,180,988	AvG	4.23 tons	10.13 tons	2	18	FLIR, Image Intensification	Shielded
AH-64D Longbow	\$3,376,788	AvG	4.23 tons	10.13 tons	2	20	FLIR, Image Intensification, Radar	Shielded
WAH-64	\$3,392,340	AvG	4.23 tons	10.42 tons	2	20	FLIR, Image Intensification, Radar	Shielded

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
AH-64A/B	599	150	20/37	1420	1096	4339
AH-64C	623	156	20/39	1420	1216	3598
AH-64D	546	137	15/34	1420	1213	3598
AH-64D Longbow	530	133	15/33	1420	1210	3598
WAH-64	559	140	15/35	1420	1390	3500

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
AH-64A	Flare/Chaff Dispensers, Secure Radios, IR Suppression, Laser Designator, Helmet Sight Interface, RWR, Armored Cockpit	48m	+3	30mm M-230 Chaingun, 4 Hardpoints, 2 AAM Hardpoints	1200x30mm
AH-64C	Flare/Chaff Dispensers, Secure Radios, IR Suppression, Laser Designator, Helmet Sight Interface, RWR, Armored Cockpit, GPS	48m	+3	30mm M-230 Chaingun, 4 Hardpoints, 2 AAM Hardpoints	1200x30mm
AH-64D	Flare/Chaff Dispensers, Secure Radios, IR Suppression, Laser Designator, Helmet Sight Interface, RWR, Armored Cockpit, GPS, IRCM, ECM	48m	+4	30mm M-230 Chaingun, 4 Hardpoints, 2 AAM Hardpoints	1200x30mm
AH-64D Longbow/WAH-64	Flare/Chaff Dispensers, Secure Radios, IR Suppression, Laser Designator, Helmet Sight Interface, RWR, Armored Cockpit, GPS, IRCM, ECM, Target ID, Auto Track	48m	+5	30mm M-230 Chaingun, 4 Hardpoints, 2 AAM Hardpoints	1200x30mm

### UH-2C Tomahawk

Notes: The UH-2C is the armed rescue version of the SH-2 Seasprite. It began life as the "Interim Attack Helicopter," and the UH-2A version saw very brief service in Vietnam. It was one of the Vietnam-era forerunners of helicopters like the UH-60. It carries four passengers, and is equipped with two M-60D doorguns, one M-134 Minigun in a chin turret, and armor plating. In addition, these old CIA helos have been upgraded to include one missile hardpoint, which can mount an AIM-7 Sparrow, an AIM-9 Sidewinder, or AGM-65 Maverick. The UH-2C does not have ejection seats, and is not capable of in-flight refueling.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$1,147,986	AvG	2.3 tons	6.12 tons	2+4	18	Radar	Enclosed

Tr Mov	Com Mov	Mnvr/Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
512	128	50/32	1800	1360	6128

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Flare/Chaff Dispensers, Laser Designator, RWR, LWR	40m	+1	M-134, 2xM-60E2 Door Guns, 1xAIM-7, AIM-9, or Maverick Launcher	4000x7.62mm, 2000x7.62mm (Doorguns)

### **MD-500 Defender**

Notes: The Defender is a low-cost, no frills gunship sold to many third-world countries. An optional 80-liter internal fuel tank may be installed at the expense of passengers. The Defender is very nimble and accelerates rapidly. The Defender is not capable of aerial refueling and has no ejection seats.

The MD-500MD is the most basic version; it carries only a minigun in a nose sponson and has two hardpoints that may not mount missiles. The MD-500E Scout Defender is similar to the MD-500MD, but has a wider choice of weapons. The MD-500E TOW Defender is the same, but has the sighting and guidance equipment to use TOW missiles. The engine on the Scout and TOW Defenders is a bit less powerful. The MD-500MG Defender II is the "Cadillac" version; it has stub wings to allow two more hardpoints, and can potentially carry any sort of weapon or pod on its hardpoints. It has better sighting, optics, and avionics, and a more powerful engine.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
MD-500MD	\$316,682	AvG	568 kg	1.36 tons	2+2	4	None	Enclosed
MD-500E Scout	\$432,459	AvG	568 kg	1.36 tons	2+2	4	None	Enclosed
MD-500E TOW	\$498,944	AvG	568 kg	1.36 tons	2+2	5	Image Intensification	Enclosed
MD-500MG	\$1,104,102	AvG	672 kg	1.61 tons	2+5	5	FLIR, Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
MD-500MD	480	120	15/30	340	90	4275
MD-500E	490	123	15/31	340	80	4275
MD-500MG	518	130	15/32	340	106	4300

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
MD-500MD	None	32m	+1	M-134 Minigun, 2 Hardpoints	2000x7.62mm

MD-500E Scout/TOW	None	32m	+1	2xEX-34 Chainguns or M-134 Minigun or 30mm M-230 Autocannon, or 2xM-2HB, 2 Hardpoints	2000x7.62mm or 250x30mm or 500x.50
MD-500MG	Inertial Navigation	32m	+3	2xEX-34 Chainguns or M-134 or 30mm Chaingun or 2xM-60E2 or 2xM-2HB, 4 Hardpoints	2000x7.62mm or 250x30mm or 500x.50

## Bell 206 JetRanger

Notes: This helicopter was originally sold as the civil equivalent of the OH-58A Kiowa military helicopter, but with improvements, was taken into service as a military helicopter in over 20 countries, primarily as a training helicopter or liaison or observation craft. Unlike the Kiowa, it has no hardpoints and is strictly a cargo helicopter. A JetRanger, fitted with an aerial refueling boom (not standard), was the first helicopter to fly around the world. The JetRanger is reputedly a very easy and forgiving helicopter to fly and has set records for aviation safety. The standard version has no ejection seats and cannot be refueled in air.

The Bell 206A was the first model of the JetRanger. This was superseded by the Bell 206B JetRanger II, with a less powerful but more efficient engine; it is used by the US Navy as a trainer under the designation TH-57B SeaRanger. The Bell 206B-3 JetRanger III was the next version, with a more powerful engine; it is used as a training helicopter by the US Army with the designation TH-67 Creek, and by the US Navy for the same purpose as the TH-57C SeaRanger. The Bell 206L-1 LongRanger was the first stretched version of the JetRanger, based on the JetRanger III. The 206L-2 increased the engine power, and the 206L-3 increases it even further. The Bell 206L-4 is a Canadian built version of the LongRanger; it uses a different engine and avionics.

Finally, the Iranians use a light gunship called the Zafar 300, based on the Bell 206B.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Bell 206A	\$78,872	AvG	680 kg	1.47 tons	2+3	4	None	Enclosed
Bell 206B	\$78,492	AvG	680 kg	1.39 tons	2+3	4	None	Enclosed
Bell 206B-3	\$78,792	AvG	680 kg	1.45 tons	2+3	4	None	Enclosed
Bell 206L-1	\$80,008	AvG	907 kg	1.84 tons	2+5 or 2 stretchers	4	None	Enclosed
Bell 206L-2	\$81,408	AvG	907 kg	1.86 tons	2+5 or 2 stretchers	4	None	Enclosed
Bell 206L-3	\$83,448	AvG	907 kg	1.96 tons	2+5 or 2 stretchers	4	None	Enclosed
Bell 206L-4	\$84,558	AvG	1.04 tons	2.06 tons	2+5 or 2 stretchers	4	None	Enclosed
Bell 206LT	\$89,148	AvG	772 kg	2.01 tons	2+5 or 2 stretchers	4	None	Enclosed
Zafar 300	\$222,590	AvG	680 kg	1.49 tons	2+2	4	Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
Bell 206A	452	113	20/28	270	148	4602
Bell 206B/Zafar 300	445	111	20/28	270	139	4602
Bell 206B-3	450	113	20/28	270	146	4602
Bell 206L-1	425	106	20/27	270	146	4602
Bell 206L-2	441	110	20/28	270	172	4602

Bell 206L-3	447	112	20/28	270	260	4602
Bell 206L-4	453	113	20/28	270	260	4602
Bell 206LT	482	121	20/30	270	375	6096

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
(All Others)	None	22m	None	None	None
Zafar 300	None	23m	+2	M-134 Minigun, 2 Hardpoints	1000x7.62mm

### Bell 214A

Notes: The Bell 214 is a development of the Bell "Huey" series was designed for "hot and high" conditions – high altitude and hot weather, where helicopters normally don't function nearly as well as otherwise. It was first produced for the armed forces of the Shah of Iran. The design features a longer fuselage and more powerful engines. The helicopter has no ejection seats, and is not capable of in-flight refueling.

The Bell 214A Isfahan was the first of the 214 series. These helicopters were taken over by Revolutionary Iran's forces and later built without license. Bell then sold the helicopter to other countries, including Brunei, Columbia, Ecuador, Iraq, Oman, Peru, Philippines, Thailand, the UAE, and Venezuela. At least one captured model of this helicopter is flown by the 82<sup>nd</sup> Airborne Division's commander in Iran. The Bell 214B BigLifter is a civilian version of the 214A; the 214C is a search and rescue variant with a rescue hoist that has a capacity of 275 kg. The 214ST is a twin engined variant of the Bell 214, normally used by civilians.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
Bell 214A	\$284,072	AvG	2.18 tons	7.48 tons	2+16	10	None	Enclosed
Bell 214B	\$141,548	AvG	2.18 tons	7.26 tons	2+16	8	None	Enclosed
Bell 214C	\$254,418	AvG	2.18 tons	7.44 tons	3+15	8	None	Enclosed
Bell 214ST	\$159,468	AvG	2.49 tons	9.45 tons	2+16	10	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
Bell 214A/B/C	522	130	45/33	1647	753	4500
Bell 214ST	576	144	45/36	1647	1201	4500

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Bell 214A	Flare/Chaff Dispensers	32m	+1	2xM-60E2 Doorguns, 2 Hardpoints	1200x7.62mm
Bell 214B	None	32m	None	None	None
Bell 214C	Radio Direction Finder, Flare/Chaff Dispensers	32m	None	2xM-60E2 Doorguns	800x7.62mm

Bell 214ST	None	32m	None	None	None
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### Bell 412

Notes: This is the latest variant of the UH-1 Huey series. It features the most powerful engines available on a Huey helicopter, and a 4-bladed rotor. It is used by a large number of nations, including countries on all continents except Antarctica. It uses the large sliding doors on either side of all Hueys, and has twin engines.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$186,212	AvG	2.29 tons	5.4 tons	2+13	8	None	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
536	134	45/33	1251	660	5304

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
None	30m	None	None	None

### CH-34 Seahorse/Choctaw

Notes: This is the military version of the S-58 helicopter. The CH-34 version is called the Choctaw, while the UH-34 is called the Seahorse. These are very old helicopters that saw their last active US service in Vietnam, but continue to be used in South America and Southeast Asia. They are large and slow helicopters that nonetheless seem to get the job done.

The CH-34 was the first military version, first flown shortly after the Korean War. They were often armed and used as gunships until the advent of gunship versions of the UH-1. The UH-34 was the Marine version of the CH-34, but differed little from the CH-34. The S-58T is a twin-engine development of the civilian S-58, little used by the military.

Westland of Great Britain acquired a license to build the S-58 in 1956; they built a version known as the Wessex. The HC-2 version is a standard sort of utility/cargo helicopter, a counterpart to the CH-34 Choctaw. It uses two British-made engines instead of the one engine of the American version. It can be distinguished by the large exhaust pipe on either side of the nose (the engines are in the nose).

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
CH-34	\$380,467	AvG	2.77 tons	6.35 tons	3+16 or 8 stretchers	8	None	Enclosed
S-58T	\$285,432	AvG	3.63 tons	5.9 tons	3+16 or 8 stretchers	8	None	Enclosed
HC-2	\$399,108	AvG	3.63 tons	6.12 tons	3+16 or 8 stretchers	10	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
CH/UH-34	396	99	85/25	615	529	3000
S-58T	444	111	85/28	615	654	3000
HC-2	452	113	85/28	615	961	3000

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
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CH/UH-34	None	40m	None	2xM-60E2 (right door, left rear window), 2 Hardpoints	2000x7.62mm
S-58T	None	40m	None	None	None
HC-2	None	40m	None	2xMAG (right door, left rear window), 2 Hardpoints	2000x7.62mm

### CH-46 Sea Knight

Notes: Also known to the Marines as the Frog, it is also flown by Canada (where it is known as the CH-113), Japan (where it is known as the KV-107), and Sweden (where it is known as the HKP-4). It is often mistaken for the Chinook, but the CH-46 has three wheels instead of the four the Chinook usually has and the Chinook is larger.

The original model is the CH-46A. The SAR version of this helicopter is the HH-46A; it has Doppler search radar and a radio beacon finder, as well as a hoist with a capacity of 300 kg. The next operational transport was the CH-46D, with better engines; the HH-46D is the SAR version of this aircraft, and equipped in a similar manner to the HH-46A. The CH-47E was to be the final version of the Sea Knight (it was to be replaced by the Osprey); it has even more powerful engines. Due to the delays in the Osprey program, the US Marines updated their CH-47Ds and Es with better avionics and some defensive systems.

Twilight 2000 Notes: This helicopter was replaced in US Marines service by the V-22 Osprey series, but many were recalled to service during the Twilight War to replace Osprey losses. The CH-46E and CH-46F do not exist.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
CH-46A	\$185,736	AvG	3.8 tons	9.71 tons	3+25	14	None	Enclosed
HH-46A	\$373,395	AvG	3.8 tons	9.71 tons	3+24	16	Radar, WL Searchlight	Enclosed
CH-46D	\$190,216	AvG	4.08 tons	10.43 tons	3+25	14	None	Enclosed
HH-46D	\$378,233	AvG	4.08 tons	10.43 tons	3+24	16	Radar, WL Searchlight	Enclosed
CH-46E	\$253,920	AvG	4.08 tons	10.43 tons	3+25	14	None	Enclosed
CH-46F	\$633,861	AvG	4.08 tons	10.55 tons	3+25	18	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
CH-46A/HH-46A	498	125	45/31	1032	918	4267
CH-46D/HH-46D	505	126	45/32	1032	1032	4267
CH-46E/F	512	128	45/32	1032	1382	3350

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
CH-46A/D/E	None	45m	None	2xM-60 Doorguns	2000x7.62mm
HH-46A/E	Radio Direction Finder	45m	None	2xM-60 Doorguns	2000x7.62mm
CH-46F	Flare/Chaff Dispensers, RWR, LWR, GPS	45m	None	2xM-60 Doorguns	2000x7.62mm

## **CH-47D Chinook**

Notes: The CH-47D Chinook is the US armed forces standard medium-lift helicopter and is also found in service with many other nations in both military and civilian versions. There is one door behind the cabin on either side and a rear cargo ramp. The helicopter is capable of water landings without special floatation devices and has an integral hydraulic rescue winch and cargo hooks for slung loads.

The CH-47A was the first model, first used in 1961. This was followed by the increased-capability CH-47B. The CH-47C was the most powerful of the Chinooks, with extra fuel capacity, but it was also quite slow and fuel-hungry and was withdrawn. The CH-47D is the most produced version, and currently the standard US Army version. The CH-47F is the new version, with engines that function better in "hot and high" environments. They have improved avionics and survivability. The CH-47SD (Super-D) is a modernization of the CH-47D with radar and considerable defensive avionics.

Twilight 2000 Notes: The CH-47F is a rare variant, and the CH-47SD does not exist.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
CH-47A	\$658,674	AvG	10.21 tons (up to 5.76 tons internal)	20.24 tons	3+33 or 25 paratroops or 18 stretchers	22	None	Enclosed
CH-47B	\$685,391	AvG	13.22 tons (up to 7.46 tons internal)	24.99 tons	3+44 or 33 paratroops or 24 stretchers	26	None	Enclosed
CH-47C	\$722,430	AvG	15.56 tons (up to 8.78 tons internal)	27.93 tons	3+44 or 33 paratroops or 24 stretchers	30	None	Enclosed
CH-47D	\$920,899	AvG	13.92 tons (up to 7.85 tons internal)	24.49 tons	3+44 or 33 paratroops or 24 stretchers	28	None	Enclosed
CH-47F	\$1,239,172	AvG	13.92 tons (up to 7.85 tons internal)	22.68 tons	3+44 or 33 paratroops or 24 stretchers	32	None	Enclosed
CH-47SD	\$1,985,682	AvG	12.94 tons (up to 7.3 tons internal)	24.49 tons	3+44 or 33 paratroops or 24 stretchers	34	Radar	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
CH-47A	418	105	60/26	3900	1623	2575
CH-47B	531	133	60/33	3900	2107	2575
CH-47C	482	121	65/30	3900	2778	2575
CH-47D	538	135	60/34	4200	2219	2575
CH-47F	589	147	60/37	3900	3610	4800
CH-47SD	574	144	55/36	7828	3390	3383

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
CH-47A/B/C	None	80m	None	3xM-60 (2xright side door, 1xleft side window)	3000x7.62mm
CH-47D	Flare/Chaff Dispensers	80m	None	3xM-60 (2xright side door, 1xleft side window)	3000x7.62mm
CH-47F	Flare/Chaff Dispensers (32), Secure Radios, RWR	80m	None	3xM-60 (2xright side door, 1xleft side window)	3000x7.62mm
CH-47SD	Flare/Chaff Dispensers (32), Secure Radios, RWR, LWR, ECM, Armored Cockpit	80m	None	3xM-60 (2xright side door, 1xleft side window)	3000x7.62mm

### CH-53 Sea Stallion

Notes: This helicopter is used as a medium lift helicopter by the US Marines, though it has been largely supplanted by the CH-53E Super Stallion. It is also in use by other armed forces worldwide. It has a rear ramp and a side door. Optionally, twin drop tanks may be carried for an extra 3406 liters of fuel. It is capable of amphibious landings.

The CH-53A was the first model, first flown in 1964. Its hardpoints may only be used for drop tanks. The HH-53B, also known as the Super Jolly, is a search and rescue variant used by the USAF, with a rescue hoist that has a capacity of 272 kg, and equipment to aid its searches. It also has a probe for aerial refueling, and jettisonable extra fuel tanks. The engines are not as powerful as those on the CH-53A, but this further extends range. The HH-53C brings more powerful engines back. The CH-53D is a further improvement of the CH-53A, with more powerful engines. The Ya'sur 2000 is the result of an Israeli modernization program for the CH-53D; it is estimated to have extended the life of the CH-53D in Israeli service by 20 years.

Twilight 2000 Notes: The Ya'sur 2000 does not exist, but the Israelis did acquire some extra CH-53E Super Stallions instead.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
CH-53A	\$868,095	AvG	5.9 tons	19.05 tons	3+37 or 28 paratroops or 24 stretchers	26	None	Enclosed
HH-53B	\$1,187,093	AvG	5.9 tons	19.05 tons	3+37	26	None	Enclosed
HH-53C	\$1,246,323	AvG	5.9 tons	19.05 tons	3+37	28	None	Enclosed
CH-53D	\$1,559,779	AvG	5.9 tons	19.05 tons	3+37 or 28 paratroops or 24 stretchers	28	None	Enclosed
Ya'sur 2000	\$2,519,548	AvG	5.9 tons	19.05 tons	3+37 or 28 paratroops or 24 stretchers	28	Weather Radar	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
CH-53A	628	157	55/39	4500	2549	3400
HH-53B	611	153	55/38	7906	2279	3400
HH-53C	649	162	55/41	7906	2909	3400

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
CH-53A	None	40m	None	2xM-2HB (Rear, Left Side Door), 2 Hardpoints	1500x.50
HH-53B/C	Radio Direction Finder	40m	None	2xM-2HB (Rear, Left Side Door)	1500x.50
CH-53D	Armored Cockpit, Flare/Chaff Dispensers	50m	None	2xM-2HB (Rear, Left Side Door), 2 Hardpoints	1500x.50
Ya'sur 2000	Armored Cockpit, Flare/Chaff Dispensers, RWR, GPS	50m	None	2xM-2HB (Rear, Left Side Door), 2 Hardpoints	1500x.50

## CH-53E Super Stallion

Notes: This is a stretched and up-engined version of the Sea Stallion. The Super Stallion has a total of three engines for superior lifting capability. The Super Stallion also has a rear ramp, but has two side doors, each with a door gun. Optionally, twin drop tanks may be carried for an extra 4290 liters of fuel, and may also carry an internal extra fuel tank for an additional 8265 liters of fuel. The Super Stallion is capable of in-flight refueling and buddy refueling, and is capable of amphibious landings. It may be noted that while US Super Stallions normally mount only drop tanks on the hardpoints, the Israelis regularly mount weapons.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$3,548,199	AvG	16.33 tons (up to 13.26 tons internal)	33.34 tons	3+55	42	Weather Radar	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
630	157	55/39	8619	5865	4000

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Armored Cockpit, Flare/Chaff Dispensers, IRCM, RWR	40m	None	3xM-2HB (Right, Left, Rear), 2 Hardpoints	2250x.50

## CH-54 Tarhe

Notes: This heavy-lift helicopter is in both military and civilian use (and known as the Skycrane in its civilian guise). It normally uses an external cargo pod, but also has a lifting winch. The Tarhe has long landing gear that enables it to straddle and lift its cargo. Normal cargo pods are 9-ton capacity pods that contain mobile hospitals, command posts, barracks, and other special loads. A common use in Vietnam was to retrieve crash-landed aircraft. The third crewmember is a loadmaster that faces rearward to direct loading and winching operations.

Twilight 2000 Notes: Most stocks of Tarhes were relegated to Reserve status before the Twilight War, but many were reactivated as the war intensified.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
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CH-54A	\$291,568	AvG	300 kg internal, plus 8.78 tons external	19.05 tons	3+Special (up to 45 or 24 stretchers in pod)	28	None	Enclosed
CH-54B	\$300,508	AvG	300 kg internal, plus 9.07 tons external	21.32 tons	3+Special (up to 45 or 24 stretchers in pod)	30	None	Enclosed
CH-54E	\$388,588	AvG	300 kg internal, plus 12.5 tons external	24.75 tons	3+Special (up to 90 or 48 stretchers in pod)	58	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
CH-54A	346	86	80/22	4350	3343	4000
CH-54B	338	85	80/21	4350	3567	4000
CH-54E	301	75	80/19	4350	3269	4000

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
(All)	None	55m	None	None	None

### H-13/UH-13 Sioux

Notes: This light helicopter was one of the first service helicopters anywhere in the world, first built in 1943. It's most famous use is as a medivac in the Korean War, often seen in the TV series MASH. It is still used as a liaison and observation helicopter by some Third World countries, but is most often found in civil use or as restored aircraft flown by private civilian operators. It is a light aircraft with a limited payload. The UH-13 is longer with extra seats.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
H-13	\$40,318	AvG	240 kg	1.34 tons	2+1	4	None	Open
UH-13	\$40,518	AvG	300 kg	1.73 tons	2+2	4	None	Open

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
H-13	340	85	30/21	170	99	5394
UH-13	338	85	30/21	170		

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
(Both)	None	25m	None	None	None

### HH-3E Jolly Green Giant

Notes: This is a large cargo helicopter used by Italy and formerly used by the US Air Force and Army for large combat operations and loads. (In US service, it has been largely replaced by the CH-53.) The Jolly Green Giant is heavily armored and armed. It has a rear ramp, a door on the starboard side behind the cockpit, and 450-kg capacity winch on the side door. The Jolly Green is still used by the

US Coast Guard (where it is known as the Pelican), as it is capable of amphibious landings. The Jolly Green has no ejection seats, but is capable of in-flight refueling.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$833,445	AvG	4.8 tons (up to 2.25 tons internal)	9.92 tons	4+25 or 15 stretchers	16	None	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
525	131	40/33	2880	1106	3636

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Flare/Chaff Dispensers, Armored Cockpit, INS	50m	None	M-2HB (Right Door), M-2HB (Rear), 2 Hardpoints	2000x.50

### OH-6 Cayuse

Notes: This light observation helicopter was replaced in active US Army service by the OH-58, but is still used in Reserve and National Guard service and in many other countries. Countries using it include Argentina, Chile, Columbia, Mexico, Philippines, and Vietnam. In US service it is usually known as the Loach (for the initials of Light Observation/Cargo Helicopter, LOCH).

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
OH-6A	\$316,687	AvG	455 kg	1.09 tons	2+2	4	None	Enclosed
OH-6B	\$702,074	AvG	520 kg	1.49 tons	2+2	4	FLIR	Enclosed
OH-6D	\$702,598	AvG	525 kg	1.57 tons	2+2	4	FLIR	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
OH-6A	480	120	20/30	340	44	4380
OH-6B	546	136	20/34	340	105	4380
OH-6D	553	138	20/35	340	116	4380

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
(All)	Flare/Chaff Dispensers	24m	+1	2 Hardpoints	None

### OH-58 Kiowa/Kiowa Warrior

Notes: This is the original version of the Kiowa, first being used by the US Army in Vietnam in 1969. It is normally used as a scout helicopter, and by the 2000 was still being used by Austria, Australia, and Canada, and could still be found in many US Army National Guard units.

The OH-58A was first fielded in 1969. It was used to find targets for AH-1 Cobra gunships and to scout landing zones. One of the weapons first mounted to the Kiowa was the M-134 Minigun, but it was found that the vibration was too great and this practice

stopped. In the late 1990s, the OH-58A was retrofitted with a GPS system.

The OH-58C has much more powerful engines. It is also fitted with non-reflective flat glass panels instead of the curved window sections of the OH-58A. In addition to being retrofitted with GPS, some OH-58Cs were also retrofitted with launchers for Stinger missiles.

The OH-58C is based on the Bell 406 airframe. It is fitted with an extensive sensor suite to allow it to work with Apache attack helicopters. The standard OH-58D was later fitted with a mast-mounted sight under the Armed Helicopter Improvement Program (AHIP), to allow it to spot and track targets while hiding behind terrain. The OH-58D is known as the Kiowa Warrior, due to its weapons fit.

The MH-58D is a Saudi version of the OH-58D; it has a 20mm autocannon under the belly, but no mast-mounted sight.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
OH-58A	\$456,632	AvG	345 kg	1.36 tons	2+3	4	Image Intensification	Enclosed
OH-58C	\$458,404	AvG	397 kg	1.62 tons	2+3	4	Image Intensification	Enclosed
OH-58D	\$990,967	AvG	907 kg	2.5 tons	2	6	FLIR, Image Intensification	Enclosed
OH-58D AHIP	\$1,294,898	AvG	907 kg	2.5 tons	2	8	Radar, FLIR, Image Intensification	Enclosed
MH-58D	\$1,073,485	AvG	907 kg	2.56 tons	2	6	FLIR, Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
OH-58A	444	111	15/28	185	103	3500
OH-58C	475	119	15/30	185	141	3500
OH-58D/AHIP	474	119	15/30	305	186	3500
MH-58D	469	117	15/29	305	186	3500

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
OH-58A/C	Flare/Chaff Dispensers	36m	+1	2 Hardpoints	None
OH-58D	Flare/Chaff Dispensers, IR Suppression, Laser Designator, RWR, Datalink	38m	+3	2 Hardpoints	None
OH-58D AHIP	Flare/Chaff Dispensers, IR Suppression, Laser Designator, Datalink, RWR, LWR, IRCM	38m	+3	2 Hardpoints	None
MH-58D	Flare/Chaff Dispensers, IR Suppression, Laser Designator, RWR, Datalink	38m	+3	20mm GIAT M-621 Autocannon, 2 Hardpoints	250x20mm

#### S-76 Spirit/Eagle

Notes: This was a private venture by Sikorsky, incorporating technology from the company's S-70 Blackhawk. The Spirit was directed at both the civilian and military markets, but found most of its sales in the civilian market.

The original S-76 was developed in the late 1970s. The S-76 Mk II is a version with improved avionics. It has an external cargo hook for sling loads. The S-76A has uprated engines, and the S-76B has even more powerful engines.

The AUH-76 is an armed assault helicopter version of the S-76 Mk II. It is known as the Eagle, as are all military models. It has equipment necessary to turn it into an assault craft, including gunsights, hardpoints, and defensive equipment, and miniaturization makes it light. The H-76B is a basic military transport version of the S-76B.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
S-76/S-76 Mk II	\$284,012	AvG	1.07 tons	4.67 tons	2+12	8	None	Enclosed
S-76A	\$286,172	AvG	1.2 tons	5.04 tons	2+12	8	None	Enclosed
S-76B	\$418,276	AvG	1.61 tons	5.31 tons	2+14	8	None	Enclosed
AUH-76	\$1,679,429	AvG	1.28 tons	4.46 tons	2+12	16	Image Intensification, FLIR	Enclosed
H-76B	\$1,201,216	AvG	1.61 tons	5.31 tons	2+12	12	Image Intensification, FLIR	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
S-76/S-76 Mk II/AUH-76	538	135	40/34	1080	429	4572
S-76A	549	137	40/34	1080	483	4572
S-76B/H-76B	574	144	40/36	1080	674	4572

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
S-76/Mk II/A/B/C	None	40m	None	None	None
AUH-76	Secure Radios, Chaff/Flare Dispensers, Armored Cockpit, RWR, LWR, GPS, Laser Designator	40m	+3	2xM-60E2 Doorguns, 4 Hardpoints, 2 AAM Hardpoints	1000x7.62mm
H-76B	Flare/Chaff Dispensers, Armored Cockpit	40m	+2	2xM-60E2 Doorguns, 4 Hardpoints	1000x7.62mm

### SH-2 Seasprite

Notes: The Seasprite is known by the US Navy as a LAMPS (Light Airborne Multi-Purpose System) helicopter. It is used for liaison duties and for ASW and search and rescue duties. The Seasprite is normally armed with only anti-ship weapons or none at all, but may be armed with a single M-60E2 doorgun, with a gunner carried at the expense of a passenger. No ejection seats are provided, and the aircraft is not capable of in-flight refueling. The Seasprite is used by the US Navy (put back in production in 1981), Australia,

Egypt, Taiwan, and New Zealand.

The UH-2B is the standard utility version, used to transport personnel and cargo back and forth from ships. It is not normally used as an assault transport. This is the version detailed below.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
	AvG	1.81 tons	6.08 tons	3+8	8	None	Enclosed

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
554	139	50/35	1800	1062	3075

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
None	45m	None	M-60E2, 2 hardpoints	500x7.62mm

### SH-3H Sea King

Notes: The first SH-3 made its first flight in 1959, and since then they have been steadily upgraded. It is used throughout the US Navy and NATO service, as well as Argentina, Australia, Brazil, Egypt, India, Iraq, Iran, Japan, Pakistan, Peru, Qatar, Saudi Arabia, Thailand, and Venezuela. It is primarily used for transport and liaison duties, and is seldom armed. A door gun can be fitted and a gunner carried at the expense of one passenger. ASW and search and rescue variants also exist. A version of this helicopter, known as the V-3D, functions as a presidential transport (Marine One and Two).

The various antisubmarine/antishipping versions will not be detailed here. The utility versions include the UH-3A, a cargo helicopter modified from the SH-3A; the HH-3B, a UH-3A with upgraded avionics, and the UH-3H, a fully modernized version of the UH-3. The HH-3A is a combat SAR version of the CH-3A. It has various improvements to allow it to find and rescue downed aircrew and survivors of sunken ships, and protect them if necessary, including a rescue hoist with a capacity of 272 kg. The British counterpart is the Sea King HAR.5; it is basically similar for game purposes, but has different armament and different engines.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
CH-3A	\$500,283	AvG	3.44 tons	8.63 tons	3+26	14	None	Enclosed
HH-3A	\$2,215,494	AvG	3.44 tons	9.18 tons	3+15	18	Radar	Enclosed
UH-3H	\$604,359	AvG	3.63 tons	9.53 tons	3+26	14	None	Enclosed
HAR.5	\$2,222,087	AvG	3.63 tons	9.75 tons	3+15	18	Radar	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
UH-3A/B/HH-3A	506	126	60/32	2800	460	3000
UH-3H	534	134	60/33	2800	513	3000
HAR.5	537	134	60/34	2800	487	3000

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
UH-3A/B	None	40m	None	M-60E2 Doorgun, 2 Hardpoints	1000x7.62mm

HH-3A	Flare/Chaff Dispensers, Radio Direction Finder, RWR	40m	+2	M-134 Minigun, 2 Hardpoints	2000x7.62mm
UH-3H	Flare/Chaff Dispensers	40m	+1	M-60E2 Doorgun, 2 Hardpoints	1000x7.62mm
HAR.5	Flare/Chaff Dispensers, Radio Direction Finder, RWR	40m	+2	MAG Doorgun, 2 Hardpoints	2000x7.62mm

### TH-55/H-55 Osage

Notes: This light helicopter was used until the as the US Army's basic training helicopter until the early 1980s, when it was replaced by the UH-1H Iroquois. With large numbers of the UH-1H taken back into service as troop transport helicopters during the Twilight War, the TH-55 was brought back as a training helicopter. Later, they were used in the United States as light observation and artillery spotting helicopters. It is a simple, light, no-frills helicopter that is easy to maintain, simple to fly, and cheap to operate. The H-55 version is used as a utility helicopter or training helicopter by Algeria, Brazil, Colombia, Ghana, Haiti, Japan, Kenya, Nicaragua, Sierra Leone, Spain, and Sweden, and is also in wide use by civilian operators and police departments worldwide.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$73,588	AvG	267 kg	725 kg	2		None	Open

Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
276	69	20/17	125	62	3625

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
None	16m	None	None	None

## **UH-1 Iroquois – The First Hueys**

Notes: The famous “Huey” (the nickname based on its original US Army designation, the HU-1A) has seen action in conflicts all over the globe, including its most famous use by the US in Vietnam. It still serves to this day with the US Marines, who consider the UH-1N and UH-1Y to be better than the Blackhawk, as well as scores of countries worldwide, not to mention thousands of civilian operators. It is perhaps the most common helicopter in the world today. The UH-1A was ordered into production to equip what was to become the 1<sup>st</sup> AirCav division. Some 7000 UH-1s alone served in the US Army, primarily in the Vietnam War. The original designation for the UH-1A was the HU-1A, leading to the appellation “Huey;” it was so common a nickname that Bell began casting the pedals on UH-1Bs and later with the name “Huey.”

The UH-1A was the original US Army version, based on the Bell 204 airframe. The Bell 204 was designed specifically to meet this Army requirement, and they also hoped for some civilian sales as well. (And got them, in spades.) The UH-1 was the first turbine-powered helicopter, and therefore the turboshaft engine was able to produce a much greater power-to-weight ratio than earlier designs. The UH-1A, however, was still underpowered, with its 770 horsepower engine. Even as the first 100 UH-1As were being delivered, the Army stressed a need for more power if they were going to accept any more UH-1s.

Bell responded with the UH-1B, with an engine developing 960 horsepower, and a longer cabin that could carry seven passengers (though in Vietnam, they would often be involved in extractions that left them barely able to take off), or four stretchers and a medical attendant. The UH-1B began delivery in 1961. Later, more powerful 1100-horsepower engines were installed in the UH-1Bs, making them some of the fastest cargo helicopters in the Vietnam War.

The next UH-1 would test a new concept in helicopters: armed aerial gunships. This was the UH-1C, with the engine power increased to 1100 horsepower to carry the weapons systems required. And they were many such weapons systems and arrangements. (Wikipedia has an entire section just on UH-1 weapon systems.) The stats below show just one of these, a typical armament package. The UH-1C could also be stripped of its external armament and used as a troop carrier or dustoff, but this was rare, despite the fact that the UH-1C was originally meant to address power and control problems in the UH-1B. The UH-1C also carried 920 liters more fuel than the UH-1B and it had a larger cargo/weapons load. In general, the UH-1C would fly hunter-killer missions with OH-6s. The UH-1C has larger rotor blades, which led to a more swept-back vertical stabilizer.

The prototype for the UH-1D was the civilian Bell 205. The big difference in the UH-1D was the lengthening of the fuselage by 104 centimeters, allowing for one more solder to be seated facing out on each side. The engine was a variant of the UH-1C's Lycoming T53-L-9 engine, the T53-L-11, which could burn gasoline as well as aviation gasoline in addition to JP8. This allowed for a crew and passenger complement of 15, including two pilots and two door gunners (one of which is also the crew chief). The chief complaints were lack of interior room; they were partially successful, but many long-body variants ensued, with ever-higher engine power and larger rotor diameters. The UH-1D required a fuselage plug of 104 centimeters. The UH-1D was large enough to carry an infantry squad of 8-10, two door gunners, and the aircrew. The large cabin could also accommodate six stretchers and two attendants.

In 1966, Bell combined the UH-1D body with a 1400-horsepower Lycoming T53-L-13 engine, giving a good increase in power. As the same time, the pitot tube was moved from the nose to the forward roof, to prevent damage to the tube. (This was a problem with earlier versions.) This version was called the UH-1H.

In 1962, the USMC was looking for a general-purpose helicopter to replace its Cessna O-1s and Kaman OH-43D helicopters. This was the OH-1E. These were essentially cargo-carrying Cs with the 1100-horsepower engine from the UH-1C. Later, Many of these Es were changed to upgraded to a 1400-horsepower engine, making them a better match to the UH-1Ms, a more powerful armed Huey. the Changes included more weather and humidity-resistant radios and avionics, and equipment useful for shipboard use such as a rotor brake to stop rotation faster after landing, and a roof-mounted rescue hoist with a capacity 200 kilograms. However...The first 34 were modified UH-1Bs, taken from aircraft that were formerly built for the Army. These were given the same changes for their UH-1H, but had Lycoming T-53-L-13 1100-horsepower engines. Later UH-1Hs used a Lycoming T53-L-13 1400-horsepower engine.

The UH-1F was designed to produce an aircraft for surveillance at missile silos in the US. These were built from 1964-1967. Bell proposed a standard UH-1B with extra equipment, and more powerful engine, but the Air Force wanted even more power, and they did not need anything bigger than a UH-1B. They chose the GE T-58 engine, producing 1250 horsepower. The aircraft was equipped with a FLIR and low-power radar, and often flew armed, like the UH-1C. In the end, few were actually delivered to the missile silos; most were converted to UH-1P enhanced gunships, serving with the 20th SOF Squadron. The FLIR and Radar are scopes on the instrument panel. The YUH-1G tested a further extension of this concept, but was passed on by the Air Force.

The UH-1H was basically a modernized UH-1D, with a powerful Lycoming T53-L-13 1400-horsepower engine. The pitot tube was also moved to the roof from the nose to reduce damage. The “Hotel Huey” was produced in greater numbers than any other Huey, as it was exported widely and used by all five branches of US service. Canadian UH-1Hs were designated CF-118, refitted for SAR work, and served until 1995, both as trainers and SARbirds. (As the Twin Hueys were available the CF-118 was not considered acceptable for insertion of combat forces.) The UH-1J is a Japanese-built version of the UH-1H.

The HH-1H was designed for quick rescue of downed test aircraft; other than mission and paint (such as high-visibility markings, paint, and mission equipment such as a floodlight and a FLIR), it was identical to the UH-1H.

The HH-1K was designed for US Navy SAR and was based on a UH-1E, but with a 1400-horsepower Lycoming T53-L-13 engine. The HH-1K has FLIR and radar, as well as a floodlight. Some 27 were produced. The purpose is as a SARbird.

The EH-1H was an electronic and signals warfare helicopter based on a UH-1H. It bristled with antennas for sending and receiving radio, radar, and jamming signals, including a large extending one centerline that gathered the main signals intelligence, such as radio and radar detection. Such detection could be done on three radio and radar bands simultaneously, from up to seven bands. ECM, ECCM, and radio jamming was a relatively minor capability and primarily defensive. It was not a passenger-carrying version, though

one passenger could be carried in a seat behind and between the two pilot seats. The EH-1X is the same aircraft, with electronics more focused on jamming, though it does have some minor signals intelligence ability. These were actually post-Vietnam warbirds, seeing their only combat service in Grenada. The JUH-1 was essentially another radar-equipped version, optimizing its powerful radio set (and a retractable radar boom and skids), and retaining no ECM, ECCM, and signals intelligence.

The UH-1L is basically a late UH-1E, made for the Marines and Navy, with the addition of a rescue hoist and an air particulate filter for the engine. Two hardpoints outside on the skids could carry LMPs or four M-60Cs, or 2x230 kg bombs and 2x230 FAE bombs, or door guns; if you tried to use door gun and stores at the same time, you'd run them into each other. The "Mike Huey," also called the "Mike Monster," was essentially a Marine variant of the UH-1C Huey Gunship. It was designed as a gunship, but by removing the weapon load, you convert it to a "slick," a plain vanilla transport helicopter. The UH-1M also has FLIR and low-power radar, as well as the typical 40mm AGL Turret.

The UH-1P was a part of a number of misled unproven, and generally shanghaied by a regard to a mix unsavory characters – to form the 20<sup>th</sup> Special Operations Squadron, ancestors of today's Night Stalkers. The UH-1Ps were seized wholesale. The UH-1M quickly was modified into a more gunship weapons.

The UH-1V is a UH-1H, and were used as Medevac and had lifesaving gear and supplies similar to the best-equipped ground vehicular assortment, times three the amount normally carried. The helicopter can carry six stretchers and two in oxygen tents. The UH-1V generally made quick touchdowns, with casualties being loaded by throwing them in and the attendants got them to them.

Twilight 2000 Notes: The following variants do not

UH-1A	\$139,047	JP8	1.18 tons	3.27 tons	4+4	16	None	Enclosed
UH-1B (Early)	\$100,900	JP8	1.36 tons	3.45 tons	4+5	16	None	Enclosed
UH-1B (Late)	\$147,766	JP8	1.2 tons	3.9 tons	4+5	16	None	Enclosed
UH-1C	\$788,908	JP8	1.2 tons	4.3 tons	4+2	20	None	Enclosed
UH-1D	\$161,033	JP8	3.65 tons	4.3 tons	4+10	16	None	Enclosed
UH-1E (Early)	\$276,873	JP8	3.04 tons	3.78 tons	4+10	16	WL Floodlight*	Enclosed
UH-1E (Late)	\$284,945	JP8	3.14 tons	3.78 tons	4+10	16	WL Floodlight*	Enclosed
UH-1F	\$2,171,990	JP8	1.4 tons	3.9 tons	4+2	20	FLIR, Radar, WL Floodlight*	Enclosed
UH-1H	\$171,169	JP8	3.65 tons	4.3 tons	4+10	16	None*	Enclosed
HH-1H	\$893,040	JP8	1.26 tons	4.4 tons	4+10	18	FLIR, WL Floodlight, WL Spotlight*	Enclosed
HH-1K	\$1,658,728	JP8	3.04 tons	3.88 tons	4+10	19	FLIR, Radar, WL Floodlight*	Enclosed
EH-1H	\$5,915,029	JP8	1 ton	4.6 tons	4+1	22	None*	Enclosed
EH-1X	\$8,740,404	JP8	1 ton	4.6 tons	4+1	22	None*	Enclosed
JUH-1	\$10,375,985	JP8	1 ton	4.6 tons	4+1	22	Radar*	Enclosed
UH-1L	\$336,697	JP8	3.65 tons	4.3 tons	4+10	16	None*	Enclosed
UH-1M	\$4,627,392	JP8	1.0 ton	4.02 tons	4+3	20	FLIR, Radar*	Enclosed
UH-1P	\$273,108	JP8	3.65 tons	4.3 tons	4+10	16	None*	Enclosed
UH-1V	\$2,266,504	JP8	1.7 tons	4.7 tons	4+10	24	None*	Enclosed

UH-1A	708	330	50/70	650	325	3600
UH-1B (Early)	611	285	50/70	650	341	3505
UH-1B (Late)	765	355	50/70	650	473	3840
UH-1C	676	365	50/30	916	475	3505
UH-1D	676	315	50/23	650	373	3840
UH-1E (Early)	764	355	50/30	916	373	3505
UH-1E (Late)	970	450	50/30	916	606	3505
UH-1F	842	390	50/31	650	340	3505
UH-1H	855	395	50/26	945	605	6100
HH-1H	850	395	50/26	945	605	6100
HH-1K	941	435	50/30	916	606	3505
EH-1H	802	370	50/26	945	605	6100
EH-1X	802	370	50/26	945	605	6100
JUH-1	802	370	50/26	945	605	6100
UH-1L	856	395	50/26	945	605	6100

UH-1M	856	395	50/26	945	600	6100
UH-1P	804	370	50/30	945	605	6100
UH-1V	787	365	50/30	945	607	6100

UH-1A	None	34m	None	2xM-60 Doorguns	1000x7.62mm
UH-1B	Secure Radios	36m	None	2xM-60 Doorguns	1000x7.62mm
UH-1C	Secure Radios	40m	+1	4xM-60C Guns on Flexible Mount or 2 2.75" LRP, plus Turret w/M-75 40mm AGL or AGL plus 2xM-60C and 2x2.75" SRP	2000x7.62mm, 48x2.75" Rockets, 302x40mm or 302x40mm plus 2000x7.62mm and 14x2.75" Rockets
UH-1D/H	Secure Radios, RWS	40m	+1	2xM-60 Doorguns, 2 Hardpoints	2000x7.62mm
UH-1E	Secure Radios, RWS, 272 kg Rescue Hoist	40m	+1	2xM-60 Doorguns, 2 Hardpoints	2000x7.62mm
UH-1F	Secure Radios, IFF	40m	+1	4xM-60C Guns on Flexible Mount or 2 2.75" LRP, plus Turret w/M-75 40mm AGL or AGL plus 2xM-60C and 2x2.75" SRP	2000x7.62mm, 48x2.75" Rockets, 302x40mm or 302x40mm plus 2000x7.62mm and 14x2.75" Rockets
HH-1H	Secure Radios, RWS, IFF, 272 kg Rescue Hoist	40m	None	None	None
HH-1K	Secure Radios, RWS, IFF, 272 kg Rescue Hoist	40m	+1	2xM-60 Doorguns, 2 Hardpoints	2000x7.62mm
EH-1H	Secure Radios, RWS, IFF, Radio Jamming (-3), Radar Jamming (-2), Radio Direction Finder (3/7) , Radar Direction Finder (3/7) Chaff (30), Flares (30), ECCM (-3)	40m	None	None	None
EH-1X	Secure Radios, RWS, IFF, Radio Jamming (-5), Radar Jamming (-4), Radio Direction Finder (1/3) , Radar Direction Finder (1/3) Chaff (30), Flares (30), ECCM (-3)	40m	None	None	None
JUH-1	Secure Radios, RWS	40m	+1	2xM-60 Doorguns, 2 Hardpoints	2000x7.62mm
UH-1L	Secure Radios, RWS, IFF, 272 kg Rescue Hoist, Chaff (20), Flares (20)	40m	+1	2xM-60 Doorguns, 2 Hardpoints	2000x7.62mm
UH-1M	Secure Radios, RWS, IFF, 272 kg Rescue Hoist, Chaff (20), Flares (20)	40m	+1	4xM-60C Guns on Flexible Mount or 2 2.75" LRP, plus Turret w/M-75 40mm AGL or AGL plus 2xM-60C and 2x2.75" SRP	2000x7.62mm, 48x2.75" Rockets, 302x40mm or 302x40mm plus 2000x7.62mm and 14x2.75" Rockets, or 2x230 kg and 230 kg FAE
UH-1P	Secure Radios, RWS, IFF, 272	40m	+1	2xM-60 Doorguns, 2	2000x7.62mm

UH-1V	kg Rescue Hoist Secure Radios, RWS, IFF, 272 kg Rescue Hoist	40m	None	Hardpoints 2xMAG Doorguns	1000x7.62mm
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\*The instruments can be seen by pilots wearing night vision goggles.

### **The Next Hueys - The Twins**

Notes: Considering the astounding amount of variants of the UH-1/Bell 204/Bell 205, the variants of the Twin Huey are not so many -- at first consideration. The UH-1N was based on the Bell 212 Twin Huey; this was itself based on the Bell 205, upon which the stretched UH-1D was based. Though designed at first for the US military, the Model 212 and its descendants were quickly marketed to police and military concerns. The first military users were actually the then-Canadian Army, who took delivery of the CUN-1H, later redesignated the CH-135, in 1968.

The beginning of the Twin Huey program can be traced to an experimental UH-1D in 1965, upgraded with a Continental XT-67-T-1 engine cell, each of which was composed of two T72-T-2 turboshafts driving across a common gearbox. This essentially produced a twin-engined UH-1D with 1530-horsepower engine (and this was itself an experimental engine at the time). The US Navy and Marines were especially interested in a twin-engined design, as there was an issue of an engine failure over water, not to mention combat damage.

Bell began deliveries to the Air Force in 1970, who at first obtained 79 for special operations, including the recovery of troops from hostile LZs and recovery of downed aircrews. The engine used was essentially the same as the previous engine pack. Marine UH-1Ns would come to be better and better equipped, including FLIR, a rescue hoist, a floodlight, flares, chaff, and radar. Most Model 212's had the pitot tube on the nose, Marine UH-1Ns had the pitot tube above the canopy. The Marines would later convert two to the VH-1N Presidential VIP helicopters, and build six more to this standard as well; details on these helicopters is highly speculative, and I admit to be guessing by almost whole cloth. One can see in photos that the left side had two opposing doors instead of a large sliding door.

One of the other larger users was US Air Force and its HH-1N. a UH-1N outfitted more like an HH-1H. Some 52 of these were acquired, and used for general SAR work as well as some crew rescues in North Vietnam. They were large enough and powerful enough to carry two stretchers and a medical attendant in place of five passengers.

A littler note on power levels: though in most cases, the individual power of each turboshaft is more than the actual summed power rating, this is because the aircraft structure was unable to take the strain of both turboshafts going full at once. The engines were derated as a result. In other cases (most notably the 410 series), the engines have been derated in the interests of flight smoothness.

However, the Twin Hueys' story does not end here. Some foreign users of the Twin Huey, as well as some civilian users, wanted something with more power and upgrade capabilities, able to take the proven Huey platform in a variety of new ways. These might include specially-outfitted air ambulances, oil rig access vehicles, VIP choppers and air limousines, and expedition helicopters. The Model 412 was this design. It was a 212 with a four-bladed composite rotor for smoother and more efficient flight handling characteristics. The Model 412 had crashworthy seats and fuel tanks, and was much easier to service. The Model 414 is powered by a PWC PT6T-3B-1 Twin Pac developing 1310 horsepower.

The Model 412 will be presented in a plain vanilla form first and some other cargo carriers next; this should allow GMs to come up with similar helicopters as necessary. Military 412s can generally carry 6 stretchers and six medical attendants instead. the Model 412SP has larger fuel tanks and is thus a bit heavier, but has more range. The Model 412HP has an improved transmission, giving better acceleration. The Model 412EP is equipped with a powerful new PT6T-3D 1800 horsepower engine. as well as redundant digital flight controls. The Model 412EP Sentinel is a version of the 412EP modified heavily for ASW.

The Model 412AH was a proposed ground attack/antiarmor variant, with a Lucas Aerospace nose turret with an M3M machinegun. High-capacity winglets allow a large number of stores to be carried, and the reduction in passengers to zero allows a greater load to be carried.

Next, the CH-146 Griffon, the Canadian Forces. The Canadians have treated their Griffons as basically modular vehicles, allowing equipment to be added on as necessary or not. The Griffon is based on the 412EP. The Griffon has two versions, the Combat Support Squadron (CSS) version, which is a SARbird, and the Utility Tactical Transport Helicopter (UTTH), which carries an 8-man squad, its equipment and weapons (including things like full rucksacks and heavy weapons like missile launchers), the pilots, and two door gunners. The Griffon can carry several bolt-on equipment kits, from missile pods to gun pods to fuel tanks. These are normally carried on winglets bolted to the sides. This leads to an unofficial version -- the AF, Aerial Firepower version, armed with gun pods, missile pods, rocket pods, and fuel tanks on heavy winglet hardpoints.

Twilight 2000 Notes: HMX-1 still has four VH-1Ns in operation, though they are dispersed around the country at the time. The CH-146 is in short supply; most have been rendered unflyable due to cannibalization. Most such survivors are found in Quebec, Ontario, and British Columbia.

UH-1N	\$355,308	JP8	3.64 tons	4.54 tons	4+10	16	None*	Enclosed
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HH-1N	\$797,720	JP8	1.23 tons	4.65 tons	4+10	24	FLIR, WL Floodlight, WL Spotlight*	Enclosed
UH-1N (Late Marine)	\$1,983,434	JP8	2.73 tons	5.11 tons	4+10	26	FLIR, Radar, WL/IR Floodlight, WL/IR Spotlight*	Enclosed
VH-1N Bell 412 (Military)	\$2,117,802 \$558,970	JP8	1.37 tons 3.1 tons	5.3 tons 5.4 tons	4+6 4+14	30 18	FLIR, Radar* WL/IR Floodlight, WL/IR Spotlight*	Enclosed Enclosed
Bell 412SP	\$495,082	JP8	3.07 tons	5.5 tons	4+14	18	WL/IR Floodlight, WL/IR Spotlight*	Enclosed
Bell 412HP	\$544,590	JP8	3.07 tons	5.5 tons	4+14	18	WL/IR Floodlight, WL/IR Spotlight*	Enclosed
Bell 412EP	\$1,801,795	JP8	3 tons	5.6 tons	4+14	20	FLIR, WL/IR Floodlight, WL/IR Spotlight*	Enclosed
Bell 412EP Sentinel	\$2,828,950	JP8	1.5 tons	5.9 tons	4+4	26	Sonar, Dipping Sonar, Radar, FLIR, WL/IR Floodlight, WL/IR Spotlight*	Enclosed
Bell 412AH	\$1,968,052	JP8	4.4 tons	6 tons	2	20	FLIR, 2nd Gen Image Intensification*	Enclosed
CH-146 CSS	\$1,493,952	JP8	3 tons	5.6 tons	4+6	21	FLIR, WL/IR Floodlight, WL/IR Spotlight*	Enclosed
CH-146 UTTH	\$1,866,793	JP8	3.2 tons	5.6 tons	4+8	18	FLIR*	Enclosed
CH-146 AF	\$7,115,447	JP8	2.6 tons	6 tons	2	20	FLIR, Radar*	Enclosed

UH-1N	889	410	50/23	766	665	5275
HH-1N	888	410	50/23	766	680	5275
UH-1N (Late Marine)	811	375	50/31	766	680	5275
VH-1N	796	369	55/20	766	693	5275
Bell 412 (Military)	763	355	50/20	982	674	3100
Bell 412SP	756	350	50/20	1082	680	3100
Bell 412HP	756	350	55/20	1082	680	3100
Bell 412EP	885	410	55/20	1082	802	3100
Bell 412EP Sentinel	827	385	55/22	1082	801	3100
Bell 412AH	814	375	50/20	1082	801	3100
CH-146 CSS/UTTH	885	410	55/20	1082	802	3100
CH-146 AF	814	375	50/20	1082	801	3100

UH-1N	Secure Radios, RWS, Flares, Chaff (40 Each)	48m	+1	2xM-60 Doorguns, 2 Hardpoints	2000x7.62mm
HH-1H	Secure Radios, RWS, IFF, 272 kg Rescue Hoist	48m	None	None	None
UH-1N (Late Marine)	Secure Radios, RWS, IFF, 272 kg Rescue Hoist, Chaff (50), Flares (50)	48m	+1	2xM-60 Doorguns, 2 Hardpoints	2000x7.62mm
VH-1N	Secure Radios, Long-Range Secure Data-Capable Radio. Commercial TV Set, Commercial Stereo, Laptop Computer, RWS, IFF, Chaff (50), Flares (50), ECM (-3), ECCM (+3), IRCM (-2)	48m	None	None	None
Bell 412 (Military)/412SP/HP/SP	Secure Radios, RWS, IFF, 272 kg Rescue Hoist, Chaff,	48m	+1	2xMAG Doorguns, 2 Hardpoints	2000x7.62mm

Bell 412SP Sentinel	Flares (20 each) Secure Radios, RWS, IFF, Chaff, Flares (40 each), Sonobuoys (50)	48m	+2	6 Hardpoints	None
Bell 412AH	Secure Radios, RWS, IFF, Chaff, Flares (40 each), Laser Rangefinder, Inertial Navigation, GPS	48m	+2	10 Hardpoints, M-3M nose gun	827x.50
CH-146 CSS	Secure Radios, RWS, IFF, 272 kg Rescue Hoist, Inertial Navigation	48m	None	None	None
CH-146 UTTH	Secure Radios, RWS, IFF, Chaff, Flares (40 each)	48m	+1	2xMAG Doorguns, 2 Hardpoints	2000x7.62mm
CH-146 AF	Secure Radios, RWS, IFF, Chaff, Flares (40 each), Laser Designator, GPS	48m	+2	10 Hardpoints, M-240 25mm Nose Gun	500x25mm, 8xHOT 2 ATGM, 4x19-round Hydra-70 RP

\*The instruments can be seen by pilots wearing night vision goggles.

### Bell-Boeing UH-1Y Venom

Notes: The Venom is the result of the US Marines' H-1 Upgrade Program (which also included the AH-1Z), and in early iterations known as the Yankee or the YankeeHuey. The Venom has almost totally replaced the UH-1N in service and has replaced it in production, though early Venoms were heavily-modified UH-1Ns, particularly experimental and LRIP YUH-1Y models. The UH-1Y modifications includes a large amount of composites, particularly in the rotors, to decrease weight, an extended tailboom to enhance stability and maneuverability, masked intakes and exhausts, and 84% parts commonality with the AH-1Z at its conception. In time, still newer avionics were added, and mission-specific elements were added. Perhaps the most obvious change was the four-bladed main and tail rotors, which further increase stability and maneuverability as well as eliminating the distinctive "whop-whop" of the Huey's twin rotors. The rotors were also extended, and the whole increased lift and power. Modern door guns were added and safety improvements made.

The Venom has an all-glass cockpit, this allows for software upgrades as necessary, makes displays clearer, allows for use of a HUD, and makes the instrument panel fully readable by IR goggles. The Venom has the addition of a 3rd-Gen FLIR, radar altimeter, and a short-range SAR module. Mission details and maps were integrated into the pilots' displays. A CCD LLTV was also integrated into the pilots' displays. Perhaps the most dramatic performance increase is in power, with the new engines delivering 1546 horsepower, with 2.5-minute 1828-horsepower bursts available every 6 turns.

The Venom has 10 crashworthy squad seats and 2 crashworthy door gunner seats, plus the two pilots' seats. Six litters or equivalent cargo may be carried instead.

Twilight 2000 Notes: The Venom is a rare commodity in the Twilight 2000 timeline, with some 30 in service at the beginning of the war.

UH-1Y	\$2,295,790	JP8	3.02 tons	8.39 tons	4+8	20	3rd Gen FLIR, Radar, 2nd Gen Image Intensification, Radar*	Enclosed
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UH-1Y	512	275	50/20	766	646	3100
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UH-1Y	Secure Radios, RWS, IFF, Chaff, Flares (40 each), GPS, Radar Altimeter	49m	+1	2xM-240 or M-134 or GAU-19/A Doorguns, 2 Hardpoints	4000x7.62mm or 2400x.50
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### The Civilian Bells and their Variants

Notes: The Bell 204/205, from which the entire UH-1 series arose, did in fact result from a Bell Company private project, though one they were fairly certain that would be attractive to the US military. However, this did also lead to a number of civilian types based

on the military choppers, as well as some military versions based on those civilian models (sort of backwards seeding, so to speak), and civilian and military aircraft types went back and forth, and continue to do so. Civilian versions may have cargo-carrying interiors, be set up like military aircraft (such as oil worker transport versions), or fully plush versions with deluxe seating, stereo systems, video systems, etc. GMs will have to take my figures and come up with the specific types they want.

### **The Model 204/205**

The Model 204 is a group including the Model 204B, the Model 204 (UH-1B Iroquois), the Agusta-Bell AB-204, built in license in Italy, and the Fuji-Bell 204B-2 (called in its military guise by JGSDF the Hiyodori), built under license in Japan. At their base, for game purposes, they are identical to the UH-1B. The Model 205 is, again, a blanket description for several helicopters with the same basic design. This includes the UH-1H, the Bell 205 and the Agusta-Bell AB-205, civilian versions, with an 1100-horsepower T53-11A engine. The Bell 205A-1 has a 1400-horsepower engine, the T53-13B. The AB-205A-1 and FB-205A1 are Italian and Japanese license-produced variants.

### **Model 205B**

The Model 205B was an early version of the Model 210, and only 59 were built for field test purposes; these were used as testbeds for various concepts and alternate designs. The Model 210 used a Model 217 nose and 1500-horsepower T-53-17, a K-Flex drive shaft, and the rotor blades of the Model 212. The Bell 212 is a UH-1H remanufactured as a Model 205B.

Experimental versions of this design include the AB-205BG, which was fitted with two Gnome H-1200 turboshafts developing 1200 horsepower each. The AB-205TA used two Turbomeca Astazous turboshafts at 978 horsepower each. The Bell 208 was the prototype for the original UH-1N Twin Huey; this was a company project, but resulted in large military orders and civilian orders. All three had problems with the transmission and the airframe with the power of the engines, and were either dropped or the engines derated.

In several models, special modifications were carried out on certain aircraft to test concepts. The Model 205A++ was a field-upgraded Model 205A using a 1500 horsepower engine -- about the limit for a single engine design for the period. In practice, it did not offer sufficient improvements over the Models 205B and 210. The FB Advanced 205B was a testbed only; I have been unable to determine performance. The Golden Eagle is a Canadian modification using two total 1940-horsepower engines on a Model 210 base; though measures were made to reduce fuel consumption, in the end, the high fuel cost did it in. The Huey 800 is an upgraded commercial version fitted with an LHTEC T800 1563-horsepower engine, one that enjoyed some commercial success, as a variant of the Model 205.

The Iranians, before the Revolution, bought the Model 205 as a VIP helicopter. Years later, these Models 205 have been undergoing unlicensed production since 2002 as the Panha Shabaviz 2-75. It is essentially the Model 205, with the addition of a pair of hardpoints and posts for locally-manufactured MG-3 doorguns.

### **Model 214**

The Model 214 is another heavy-lift Huey that started out as a company project. The Model 214 was sometimes called the HueyPlus. The Model 214 was based on the Model 205/UH-1H. It featured a 1900-horsepower engine, along with the new Nodomatic rotor system that allowed the rotors to take the full power of the engine without undue wear or stress. Loadouts could range from basic military to plush civilian. It primarily served as a stepping-stone to later models, but also saw production. The Model 214A was developed primarily for the Imperial Iranian Armed forces. Most production took place in Dallas, though Iranian production was to start in 1979; the Iranian Revolution scuttled this. It was revealed in the early 2000s, however, that the Iranians were producing the Model 214A on a non-licensed basis and had been for some time. Called Isfahan by the Iranians, they remain the primary user of the type, and are produced as the Model 214A, a military variant, and the Model 214C, a SARbird.

The Model 214B BigLifter was designed for civilian use and has no military or police users as of yet, since production began in 1976. The BigLifter differs primarily in having emergency escape windows in the cargo doors, an engine automatic fire extinguisher, and avionics suitable for a civilian helicopter rather than a military helicopter. Two primary versions of the BigLifter are available: a personnel transport, and as a cargo lifter, with an interior suited primarily for cargo and little room for personnel. It has a sling-load point under the fuselage. Other, less common versions include a cropduster, and a firefighter able to carry 2275 kilograms of water or flame retardant. A model 214B-1 was certified, using a cargo or personnel versions only, and lighter than the standard 214B. Though the engine is nominally rated at 2930 horsepower, the engine is derated to 2050 horsepower, since even new rotor system cannot handle the full power of the engines. This is despite the addition of an advanced rotor hub, with elastomeric bearings, an automatic flight control system, and avionics normally reserved for fixed-wing aircraft such as a radar altimeter, radar approach system, and IFR flight.

The Model 214ST is more of a "related" helicopter; though it shares much of its systems with the Huey and has a marked family resemblance to the Huey (it looks somewhat like a streamlined Huey). Originally designed for the Shah's Military, those orders were cancelled, and most of these choppers ended up in the Armed Forces of Peru, Brunei, Iraq and Thailand. Before this was some civilian production. The fuselage is larger and stretched to carry a large number of potential passengers. It has rotor and transmission able to take advantage of its full 1625 horses. A large fuel tank is fitted, and even civilian models have wet hardpoints. Though still produced by the Dallas production line, the Model 214ST was replaced at the Mirabel Production Facility by the Model 230.

Bell 204B	\$104,929	JP8	1.36 tons	3 tons	2+9	16	None	Enclosed
Bell 205B	\$114,222	JP8	3.95 tons	4 tons	2+10	16	None	Enclosed
Bell 208	\$174,789	JP8	3.65 tons	4.3 tons	4+10	16	None	Enclosed
Agusta-Bell AB-205BG	\$299,715	JP8	3.65 tons	4.6 tons	2+10	19	None	Enclosed
Agusta-Bell AB-205TA	\$287,373	JP8	3.75 tons	4.6 tons	2+10	18	None	Enclosed
Bell 205A++	\$275,031	JP8	3.95 tons	4 tons	2+10	17	None	Enclosed
Canadair/Bell Golden Eagle	\$287,010	JP8	3.65 tons	4.3 tons	2+10	16	None	Enclosed
Bell Huey 500	\$276,846	JP8	3.4 tons	4.44 tons	2+9	18	None*	Enclosed
Panha Shabaviz 2-75	\$313,066	JP8	2.95 tons	5 tons	4+8	20	None*	Enclosed
Bell 214A Isfahan	\$619,754	JP8	2.82 tons	6.26 tons	2+12	18	None*	Enclosed
Bell 214C Isfahan	\$1,154,504	JP8	1.97 tons	6.1 tons	4+6	22	FLIR, Weather Radar*	Enclosed
Bell 214B BigLifter	\$795,352	JP8	3.63 tons	6.42 tons	2+14	18	None	Enclosed
Bell 214B-1 BigLifter	\$839,386	JP8	3.79 tons	5.78 tons	2+14	18	None	Enclosed
Bell 214ST	\$775,347	JP8	2.42 tons	6.66 tons	2+16	20	Weather Radar	Enclosed

Bell 204B	697	325	50/70	650	341	3505
Bell 205B	756	350	50/70	650	345	6100
Bell 208	936	435	53/23	650	665	3840
Agusta-Bell AB-205BG	1365	639	50/30	650	1050	4000
Agusta-Bell AB-205TA	1106	510	50/25	650	845	4000
Bell 205A++	847	390	50/23	650	641	6100
Canadair/Bell Golden Eagle	1173	545	52/22	650	841	6100
Bell Huey 500	916	425	50/26	650	671	6100
Panha Shabaviz 2-75	604	280	50/70	650	388	6100
Model 214A Isfahan	825	380	45/20	905	848	5000
Model 214C Isfahan	846	390	45/20	905	848	5000
Model 214B BigLifter	728	335	55/70	905	763	5000
Model 214B-1 BigLifter	804	370	55/70	905	763	5000
Bell 214ST	667	310	45/25	996	722	6000

Bell 204/205B/208	None	40m	None	None	None
Agusta-Bell AB-205BG/TA	Radar Altimeter, Transponder	55m	None	None	None
Bell 205A++/Golden Eagle/Huey 800	Radar Altimeter, Transponder	45m	None	None	None
Panha Shabaviz 2-75	Secure Radios, RWS, IFF, Chaff, Flares (20 each)	55m	+1	2xMG-3 Doorguns, 2 Hardpoints	2000x7.62mm

Model 214A	Secure Radios, RWS, IFF, Chaff, Flares (40 each)	55m	+1	2xMG-3 Doorguns, 2 Hardpoints	2000x7.62mm
Model 214C	Secure Radios, RWS, IFF, Chaff, Flares (40 each), 300 kg Rescue Hoist	55m	None	None	None
Model 214B/B-1 BigLifter	Radar Altimeter, Transponder	65m	None	None	None
Bell 214ST	Radar Altimeter, Transponder, IFF, Secure Radios, RWS	55m	None	2 Hardpoints	None

\*The instruments can be seen by pilots wearing night vision goggles.

## **Sikorsky UH-60 Black Hawk**

Notes: The UH-60 is the US military's primary troop transport and assault helicopter, and is also used by Australia, Bahrain, Brazil, China, Egypt, Israel, Greece, Japan, Jordan, and Mexico. It replaced the UH-1 in the service of most of those countries, bringing improvements in cargo carrying, crashworthiness, and maneuverability. The Black Hawk has no ejection seats, and is not capable of in-flight refueling except on certain models. The UH-60 is the result of an Army program for a new light general-purpose helicopter, called the UTTAS (Utility Tactical Transport Aircraft System) program, started in 1972. Several designs were initially submitted, but in short order the competition came down to the YUH-60A (the prototype Black Hawk), and the Boeing/Vertol YUH-61. After numerous fly-offs, field tests, and use of limited numbers by the 1<sup>st</sup> Air Cav and 101<sup>st</sup> Air Assault divisions, the YUH-60A was chosen and became the UH-60A Black Hawk, and entered mass production and service. Within a few years, it has almost totally replaced the Huey in the Regular Army, and a little later in the National Guard and Reserves. Civilians also use the S-70 (the parent model of the Black Hawk); they are common Air Life helicopters and are also used for roles ranging from construction in inaccessible areas (such as putting in power scaffolds on top of mountains and ridges), and with luxury models, are used as executive transportation. One UH-60A was kept by Sikorsky for internal, company research. Initial LRIP began in October 1978 and full production and service started in June 1979.

### **Base Black Hawks**

The original version of the Black Hawk was the UH-60A, produced from 1977-1989. It carried a crew of four, including two door gunners/crew chiefs and the pilot and co-pilot. It also could carry up to 11 fully-equipped infantrymen, 14 in a high-load and reduced-equipment capacity, or six Medevac patients. *In extremis*, up to 20 lightly-equipped troops may be squeezed into the passenger cabin. When used as a Medevac, the crew is increased to six, with a doctor or PA and a nurse or med tech added to the crew. It was equipped with two General Electric T700-GE-701 gas turbine engines developing 1622 shaft horsepower each. The rotor blades are armored against hits of up to a 23mm weapon, with a floor able to withstand a 14.5mm machinegun round. The rotors are made from a composite of titanium and fiberglass, and the UH-60s have four rotors blades. The blades are "cable cutter" blades, designed to cut through struck power wires or other aerial cables instead of tangling on them. The UH-60A can carry up to 3.63 tons on an external hook under the helicopter, or 2.54 tons internally. The Black Hawk uses a wheeled landing gear configuration; these do not retract for flight. The landing gear consists of two wheels on struts behind the cargo cabin, and a rear "tail dragger" small wheel near the end of the fuselage. For arctic/snow operations, a pair of skis can be attached to the main gear. On each side of the cargo cabin is a sliding lockable door; these are almost always kept open on cargo and infantry-transport versions to allow the door gunners to operate. Medevac Black Hawks are a notable exception, and normally operate with the doors shut. The internal fuel tanks are self-sealing and designed to not catch fire in a crash. The UH-60A is equipped with one VHF-FM, one UHF-FM, and one VHF-AM/FM radios. Internal de-icer are provided for the rotors as well as the windshield.

The UH-60A can be equipped with an ESSS (External Stores Support System). This consists of a graphite-epoxy composite wing-like assembly added to each side of the aircraft above the cargo compartment doors, and weighs 300 kilograms each. Each wing has two hardpoints, which may carry an 872-liter and a 1703-liter self-sealing external fuel tank on each winglet. Alternatively, each hardpoint may carry eight Hellfire missiles, a 19-round 2.75-inch FFAR pod, two Stinger SAMs, M-240, M-60, or M-3M machineguns, or an M-230 30mm Chaingun and ammunition (on one outer hardpoint, with the inner hardpoint carrying the ammunition), making the Black Hawk a sort of *ad hoc* attack helicopter. (It should be noted that if the UH-60 is equipped with Hellfires, some other unit of vehicle must designate the target, or the Black Hawk must carry a laser designation pod on its winglets; the UH-60 itself has no designation capability.) Every UH-60 has the internal connections to mount the ESSS, even if the ESSS is not mounted. At first, these winglets were angled down, to reduce the Black Hawk's footprint; however, it was discovered that when there were external fuel tanks were carried on the outer hardpoints, the fuel tanks obstructed the operation of the door guns. They were replaced with winglets that stretched straight out. In the cargo compartment, the Black Hawk may carry a 700-liter fuel tank, with only the door gunners normally being carried in the back, though two lightly-equipped soldiers can squeeze in; alternatively, extra ammunition for what is carried on the ESSS may be carried to reload weapons. Underneath, instead of cargo, the UH-60A can carry an aerial mine delivery system such as the Volcano and M-56 systems.

The UH-60A (and later Black Hawks) has a 75kW (100 hp) APU to provide power for self-starting and for ground power.

In the 1980s, there were a spate of crashes on Army UH-60As. (This was before any had been exported.) The Black Hawk started being called by the troops things like "Crash Hawk" and "Lawn Dart." This was traced to the UH-60As electronically-controlled flight systems, which proved to be susceptible to radio frequency interference (RFI), from sources ranging from radar antennas, cell phone towers, to illegal high-power CB radio setups. Shielding was retrofitted, based on the Navy's EMP shielding, and this solved the problem with RFI, in addition to giving the Black Hawk EMP resistance.

The UH-60L is an updated version of the UH-60A; the primary difference between the two is that the UH-60L has two T-700-GE-401C engines, each with a rating of 1857 shaft horsepower. The UH-60L version of the Black Hawk was designed for airmobile assaults, with uprated engines and an improved gearbox for improved lifting capability. The UH-60L has a Hover IR Suppression System (HIRSS), which cools the exhaust of the Black Hawk in both Hover mode and regular forward flight, giving IR missiles trying to hit the UH-60L a one level penalty. (The earlier UH-60A's exhaust cooling was not very effective during hover operations.) With the new engines and a new cargo sling load attachment system, the UH-60L is able to sling load 4.08 tons. Recently, the Goodrich Integrated Mechanical Diagnostic Health and Usage Management System (IMD-HUMS0, which tells the crew the mechanical integrity of the helicopter, including fuel systems, hydraulics, and battle damage. US UH-60Ls are equipped with this system as of 2011; some

foreign sales have been UH-60Ls with the system, such as Korea, Japan, and Korea. Israeli UH-60Ls have an aerial refueling probe.

The UH-60V is essentially a UH-60L with the glass cockpit of the UH-60M and an AFCS installed. Another small flight computer was added, allowing for the glass cockpit to be programmed and further software improvements to be made. It is essentially a stopgap chopper between the UH-60L and UH-60M.

The CH-60E was a proposed variant of the UH-60A, for use by the Marine Corps. It had sand shields for the engine intakes, a weather radar, a FLIR viewer, and a GPS, in addition to the normal configuration of the UH-60A. The Marines chose instead to go with the heavily-upgraded UH-1Y Venom, and the CH-60E did not make it off the drawing boards and computer simulations. Its inclusion below is a “what-if.”

The UH-60M is the latest variant of the Black Hawk GP platform. One of the improvements was added after experience with the UH-60s in Afghanistan’s highlands; functional altitude was increased by 25%, while speed was improved by 16%. The engines were upgraded to T700-GE-701D engines that developed 2000 Shaft Horsepower per engine. The new engines and new wide-chord blades allow for an increase in cargo capacity of 454 kilograms. The controls were modified; pilots had problems with the UH-60A control suite when using the new engines on the UH-60L. Originally four types were built; one was an upgrade from the UH-60A to UH-60M standard, another was an upgrade from UH-60L to the UH-60M standard. The third was a conversion of the HH-60L to the HH-60M standard, and the fourth was a new-built UH-60M.

The UH-60M has two flight computers, one as a backup for the other. The UH-60M has an improved tactical modem, making the UH-60M part of the “Tactical Internet.” This includes the IMD-HUMS. The UH-60M has a glass cockpit, with most aircraft information presented on multifunction displays, and few actual gauges. There is a cockpit and flight recorder; these are versions of off-the-shelf technology. The UH-60M has a GPS with INS backup, and mission plans can be digitally loaded onto the flight computers as software. The UH-60M has enhanced radios and a new AFCS. They have a ruggedized gearbox, with wide-chord blades for improved lifting and performance at high altitude, and modifications for “hot and high” operations. (These blades were designed originally for the S-92 Sikorsky Company project, trimmed down in radius a bit.) They have a mapping module to show the pilots exactly where they are at any time. UH-60As and UH-60L began, starting in 2008, to be upgraded to the UH-60M standard, with most of the earlier standard having been converted to the new standard by 2015, and full conversion expected by 2018.

About 193 UH-60As received an “interim upgrade,” consisting of the installation of UH-60L engines, some of the avionics (mostly in the cockpit), and the new UH-60L tail. About half the UH-60As also lacked an ESSS capability, and this has been added to those who were not capable. Since the UH-60As required more refitting than the UH-60L to bring it up to UH-60M standard, their upgrades were done in a piecemeal (though planned) upgrade path, and these UH-60As were some of the last Black Hawks fully upgraded. As many of the new features were sort of “tacked on” at first, these partially-updated UH-60A+s were often known to pilots and air assault units as “Velcro Hawks,” though it is still officially known as a Black Hawk. The A+s are, surprisingly, one of the fastest versions of the Black Hawk.

At first, the US Army looked beyond the UH-60M, to what was then known as the UH-60X. However, the Army has moved on from (though Sikorsky is still in the running) the UH-60-Based platform for the 2020s, to the Joint future MultiRole (JMR) program and Future Lift Program (FLP). Whether or not the new Army helicopter will be Sikorsky-based, it will be a new platform, with at least higher tech in both the flying system and cockpit systems, and more powerful engines.

For now, however, the US Army, Air Force, and Navy have begun the Improved Turbine Engine Program (ITEP), often called the UH-60M+, to re-engine many current Black Hawks to engines with a power of 3000 shaft horsepower each. The new engines are also to have lesser fuel consumption than one would expect from an engine of their power. A Black Hawk with the improved engines is not expected in prototype form until 2018, with LRIP starting in 2021, and full production and service by 2027 by the latest. This may, of course, run afoul of the JMR and FLP programs.

### **Electronic Warfare or “EH” Black Hawks**

Some of the variants of the UH-60A include the EH-60A Quick Fix (named for the code-name of its EW suite), and the EH-60L Advanced Quick Fix, based on the UH-60L platform. They can be immediately spotted by the ladder-type antennas extending from the sides of the aircraft, and the swing-down dipole antenna, which is some 22 meters long when extended. These carried the Quick Fix IIB EW suite, which was designed to locate, monitor, and jam enemy communications. Though details on the Quick Fix suites are still classified, estimates include jamming of HF, VHF, and UHF radios, with a successful Difficult: Electronics or Difficult: Intelligence roll on the part of the EW specialists (either one) making radio enemy communications impossible for five minutes. Outstanding success means that communications are impossible for 10 minutes. Each roll jams 100 radios per roll, and as many rolls per minute may be made as desired as long as they are within jamming range (30 kilometers). Before jamming may be attempted, the radios to be affected must be found; this also is rolled for 100 radios at a time, and takes a separate Difficult: Electronics or Intelligence roll. The EH-60 may also intercept enemy radio communications; this also uses a Difficult roll, but the computers on the Quick Fix do this by scanning communications and reporting intercepts to the EW specialists. The Quick Fix may also conduct intrusion operations on a single enemy radio net at a time; this requires an Impossible roll (as well as some Language skills). Meaconing may also be attempted; this also takes an Impossible roll. The Quick Fix may be linked with a friendly ground intelligence unit, and automatically send its interception, intrusion, and meaconing findings to that ground station. The ground station may then attempt its own intrusion and meaconing attempt, relayed through the Quick Fix. It can also relay direction-finding and location capabilities; direction finding is an Average task, while location is an Impossible task. Two cameras are also carried by the EH-60A and L; these have a range of 30km, and one is a motion picture camera. The EH-60As cameras are film, while the EH-60L’s cameras are digital. Both have a capacity of 1048 photos and 3 minutes of motion pictures (and can be stopped and started by one the EW Specialist); getting clear

photos or motion pictures is an Average: Electronics or Intelligence task. 66 EH-60As and seven EH-60Ls were converted from UH-60As and UH-60Ls, but starting in 2005, the EH-60As were taken out of service and converted back to their base airframes; it is not known whether the EH-60Ls ever reached active service.

The YEH-60B SOTAS was another EW version of the UH-60A; it was designed to detect moving targets on the battlefield and downlink the information to Army ground stations for target disposition. The SOTAS (Stand-Off Target Acquisition System) had its main landing gear modified to allow it to be pulled up and against the fuselage, allowing the large, rectangular radar fairing to rotate under the fuselage. The radar is all-weather and can detect, locate, track, and classify up to 40 targets at one. It has a range of 60 kilometers. At the same time, the Air Force designed the Pave Mover, which was essentially the same aircraft with some slight differences. The DoD recognized that this was redundant and at the same time, the Joint STARS (Surveillance and Target Attack Radar System) put the radar into a smaller footprint. In 1982, the YEH-60B and the original Pave Mover were cancelled, and replaced with the EH-60B Pave Mover.

The EH-60C Command Hawk is a special Airborne Command and Control System (A2C2S) variant of the UH-60A, built for commanders at Brigade-level and above to monitor the battlefield situation with a large overview. It is based on the UH-60A. It was originally designated the UH-60C. The electronics on the helicopter are designed to monitor multiple radio nets at one, with computers and a skilled radio operator to glean the important information for the commanders. Other crewmembers include the commander, an intelligence officer, an Operations Officer, and a fire support operator. Exact crewmembers will vary with the situation. Each has a radio to allow him to communicate with their ground counterparts. The platform allows the commanders to achieve enhanced results in mission planning, mission execution, and mission support. The helicopter is equipped with a BMS and a GPS system, tied into the navigation system. It is equipped with the same AFCS as the VH-60N (roughly). All radios are data-capable. The EH-60C is also equipped with an Army Tactical Command and Control System (ATCCS; sort of an enhanced BMS). The EH-60C can also obtain a feed from other helicopters in the vicinity, including Apaches and drones. For civilian relief functions, the EH-60C can obtain feed from TV broadcasts, radio broadcasts, the Internet, relief agency communications, and if permitted, military transmissions from the host country. The EH-60C can detect false radio signals, or false GPS signals, and jam such communications within 30 kilometers (normal range is 50 kilometers for other Prophet functions). It can do some minor SIGINT, detecting and locating radio, radar (especially counterbattery radar) and radios and jamming sources (though it cannot counterjam them). This entire suite of equipment goes under the code name of AN/MLQ-40 Prophet. Information-gathering capabilities have a range of 50km. Special Operations have a version of this helicopter; this will be covered elsewhere. The EH-60C was later upgraded to the UH-60L configuration, receiving the designation of EUH-60L, along with a total glass cockpit and displays for the command crew.

### **The “Presidential Hawk”**

Despite its designation, the VH-60N White Hawk is a heavily-modified variant of the UH-60A. Originally known as the VH-60A, they were redesignated to avoid confusion with the UH-60A. These helicopters are flown only by the US Marines and are used to fly the President of the United States and other VIPs important to the US on short-range flights where larger helicopters would not be necessary or expedient. Only nine of these variants exist. They start out as standard UH-60As, but (and most of the modifications are classified), have upgraded engines, a powerful communications suite, with a communications officer's position; EMP protection, biological/chemical warfare protection, a small weather radar on a chin mount, exhaust shields to protect against IR-guided missiles, a soundproofed, luxury cabin, and some minor ECM and IRCM protection. Other modifications include a position added in the crew cabin for a communications specialist, the installation of the Seahawk's Automatic Flight Control System (AFCS). As one might guess, the passenger cabin is luxurious and soundproofed, with a small TV, civilian radio, MP3 player with hard drive, and things like a small refrigerator and suchlike. The White Hawk has a sort of BMS installed, primarily to find the location of friendly assets and units, as well as fuel sources and to plot possible threats, and known locations of the civilian chain of command and cabinet secretaries. It can use the radio to make phone calls, to landlines or cell phones. No armament, or provision for it, is carried, however, it is not known whether it can mount the ESSS system. (If it can, it is most likely to use the hardpoints to carry fuel tanks and baggage pods.) It has also not been publicized whether the VH-60Ns have been upgraded to the UH-60L (or M) standard, but most likely the tail update, the glass cockpit, and the flight computers have been updated. The helicopter carrying the president always carries the call sign of Marine One; if carrying the Vice-President, it will carry the call sign of Marine Two. If other VIPs are carried and the President or Vice-President are not aboard, it receives a call sign based on its tail numbers. These are the only Black Hawks flown by the US Marines, and they are generally known as “Presidential Hawks.”

### **Dustoff Hawks**

The UH-60Q Dustoff Hawk is a Medevac variant of the UH-60A. It was specially-designed internally for this role, including the ability to carry six litter patients on swing-out litter stands as well as three sitting patients. It carries a doctor or PA or Nurse Practitioner, as well as a nurse (if a doctor is carried), or nurse or nurse practitioner or med tech (if a PA is the primary caregiver); they are normally trained in emergency medicine. The UH-60Q carries an oxygen generation system (enough for all six litter patients), an IV solution cooling and warming unit, cardiac monitoring systems for the six litter patients, two defibrillators, a powered litter lift system, outlets for electrical power, and NOD-compatible cabin lighting. The UH-60Q has all the medicines and equipment necessary to take care of nine patients, from bandages, splints, and burn dressings to morphine, antibiotics (in several forms), and IVs. A small refrigerator carries whole blood, platelets, and plasma, as well as medicines that need to be refrigerated. A small oven is used to heat blankets if necessary. The cockpit has a FLIR system, primarily to locate landing sites and groups of soldiers with casualties. It also has weather radar, SATCOM radios, and a GPS. It normally carries the ESSS with two large external fuel tanks (though the other two

inner hardpoints are still present; they are not normally occupied as they get in the way of loading patients). The UH-60Q was later replaced by the HH-60L, with an airframe and engines built to the UH-60L standard.

The US Air Force got off to an inauspicious start in its Dustoff Black Hawks. They at first wanted what was essentially a regular operations version of a special operations Black Hawk, the MH-60D; this was flatly turned down by the Defense Appropriations Committee, and both were killed in funding. They then developed a sort of MH-60D minus, the HH-60E; this largely lacked the night/adverse weather flying suite and had everything else, and it too was killed quickly. The Air Force then tried a new prototype, sort of a stripped down HH-60E, but this too was not funded. Therefore, the first USAF UH-60 Dustoff was the UH-60A Credible Hawk. The Credible Hawk was the actual name of the helicopter, but was sort of a sarcastic name supplied to the DAC, "it may not be what we wanted or needed, but it's good for now." The Credible Hawk has an extendible external refueling probe, a 443 liter additional fuel tank in the cargo bay, with one stretcher case carried atop the tank (and incidentally removing space for one other stretcher case). They had HIRSS exhaust shields (a better version of the standard IR Suppression), and room for door gunner positions on either side (something not found on most dustoffs as a standard fit), as well as medical equipment like oxygen gear, defibrillators, IV Infusion systems and many IV bags and medications, as well as a small refrigerator for temperature-sensitive medicines. The Credible Hawk can carry up to five stretcher cases, or three stretchers and three sitting patients. It is staffed with a Doctor, PA, or Nurse Practitioner, and two medical techs. If the doors are shut and locked, the Credible Hawk has the benefits of NBC Overpressure. Some 82 Credible Hawks are known to have converted from standard UH-60As, others may have been converted on a temporary basis.

The HH-60W 60-Whiskey is an improved variant of the UH-60A Credible Hawk, and it is also based on the HH-60M: it's primary improvement is larger and relocated internal fuel tanks, giving the 60-Whiskey more range and more internal cabin space. This allows for the carriage of two more sitting medical cases, or an additional medical specialist or other passenger. It carries some additional medical equipment, and can operate one stretcher case as a small surgical suite. It has small freezers to cool the chill blankets, as well as a small refrigerator for temperature-sensitive medicines. In addition, it has a blanket warmer for hypothermia victims. It a rearranged interior able to carry an amount of medical supplies that would make a hospital emergency room proud. It has power slide out and lift stretcher tables of the, meaning that the crew do not have to do so much manhandling of a stretcher case or back-breaking lifting. The 60-Whiskey has the instruments to do surgery aboard the aircraft (if the ride is smooth enough to allow surgery; usually, only life-saving surgery is conducted aboard the aircraft). Full patient monitoring can be placed on the patient, whether on litters or sitting. The HH-60W has medical suction devices with an internal tank for medical and hazardous waste, as well as bins for soiled bandages, gauze, sponges, bit of uniform cut away, etc. In addition to normal vessels, the HH-60W can also land aboard hospital ships. It should be noted that no equipment is removed from the HH-60W despite its changing internal configuration. The cabin light may generate high-intensity lighting for surgical or treatment use or lower lighting which is also NOD-compatible. The HH-60W can also take 4 sitting patients, or the litter tables can be swung up against the front and back of the cabin and the HH-60W can take up to 11 troops, plus the crew, or bulk cargo. The 60-Whiskey also has increased maneuverability when compared to the UH-60A and UH-60Q. 60-Whiskeys are new-built aircraft with corrosion-resistant main structures, and, when delivered, will be zero-flight airframes. The 60-Whiskey has a new system called 3D LZ, able to allow the aircraft in degraded flight conditions like sandstorms or adverse weather conditions; it is sort of an enhanced FLIR system crossed with an advanced Image Intensification system. It is also capable of carrying weapons on its ESSS, but rarely does so, carrying fuel tanks instead. The HH-60W has the TopOwl helmet sensor system and the Pathfinder electro-optical suite. The TopOwl system also shows on the helmet visor the location of friendly assets, combat information, and overlays of information from the Pathfinder suite, the ISAR radar, and the video and photo links to headquarters. The avionics have been miniaturized in some cases, and some new gadgets and avionics have been added in. The lasers are on a turret in the nose of the aircraft, as are a near-infrared sensor, a color TV day/night camera. Sponsons are fitted, carrying 700 liter of fuel apiece. This sight interface can also slave the weapons to a laser designator and laser rangefinder. Unlike earlier Dustoff Hawks, the 60-Whiskey has room for window guns, including M-240s, M-134s, or GAU-19/As; it is made for a more CSAR role. It has a long retractable probe for aerial refueling. The HH-60W has a BMS system and is fully integrated with Link 16 and BFT. The HH-60W has more powerful T-700-GE-401D engines, developing 1940 shaft horsepower each. Deliveries will begin in 2019. These aircraft will replace aging HH-60Gs. Unlike similar special ops CSAR helicopter variants of the Black Hawk, the HH-60W will not replace special ops HH-60s. Some 112 HH-60Ws are on order as of February 2017, though full-rate production is not expected to begin until 2023.

### The AH-60 Battle Hawk

The Battle Hawk was designed specifically for combat, ie, as a gunship. It is a variant of the UH-60A. This replaces the crew with reloads for its weapons, with the exception of two door gunners for side shots and for pop-up targets. The Battle Hawk carries the ESSS, and on it, generally a pair of 30mm M-230 Chainguns on the outer hard points, and ammunition for the M-230s on the inside hardpoints. A third hardpoint is attached to the end of each ESSS, where a pair of 10-round Hydra-70 launchers, four Hellfire missiles, or four Stinger missiles. The main landing gear are extended in length; this prevents the Hellfire missiles or rocket launchers on the wingtip hardpoints, when mounted, from bumping the ground. The door gunner's M-134s are able to be locked just slightly less than forward to contribute to strafing and benefit from the sights of the Battle Hawk.

This variant was not proceeded with by the US; however, the technology was later resurrected for the MH-60L DAP and certain Columbian and Australian aircraft. Sikorsky has ungraded the Battle Hawk to the CH-60M standard; though available as a kit or full build, there have been no takers as of yet.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
UH-60A	\$1,181,354	JP8	3.63 tons	10.25 tons	4+11	20	None	Enclosed

Black Hawk									
UH-60L Black Hawk	\$1,770,157	JP8	4.39 tons	12.37 tons	4+11	24	None		Enclosed
UH-60M Black Hawk	\$1,887,508	JP8	4.44 tons	12.67 tons	4+11	32	None		Enclosed
UH-60A+ Black Hawk	\$1,565,433	JP8	4.39 tons	11.31 tons	4+11	24	None		Enclosed
UH-60V Black Hawk	\$1,417,173	JP8	4.39 tons	12.4 tons	4+11	32	None		Enclosed
CH-60E Black Hawk	\$2,746,909	JP8	3.62 tons	10.28 tons	4+11	22	FLIR, Weather Radar (150 km)		Enclosed
UH-60M+ ITEP	\$1,902,408	JP8	5.55 tons	14.33 tons	4+11	32	None		Enclosed
EH-60A Quick Fix	\$35,185,809	JP8	2.3 tons	15.56 tons	6	35	Radar (30km)		Enclosed
EH-60L Advanced Quick Fix	\$35,203,589	JP8	3.06 tons	17.68 tons	6	39	Radar (30km)		Enclosed
EH-60B Pave Mover	\$4,259,768	JP8	3.52 tons	10.69 tons	4	30	Radar (60km)		Enclosed
EH-60C Command Hawk	\$11,244,189	JP8	3.27 tons	11.68 tons	9	35	Radar (50km)	Shielded (Doors Closed)	Shielded (Doors Closed)
EUH-60L Command Hawk	\$11,127,644	JP8	2.96 tons	13.95 tons	9	39	Radar (50km)	Shielded (Doors Closed)	Shielded (Doors Closed)
VH-60N White Hawk	\$14,074,252	JP8	2.21 tons	15.94 tons	3+6	44	FLIR, Weather Radar (150km), Radar (40km)	Shielded	Shielded
UH-60Q Dustoff Hawk	\$2,505,070	JP8	3.35 tons	11.37 tons	2+6 Stretcher Cases and 3 Sitting Patients 2+6 Stretcher Cases and 3 Sitting Patients	36	FLIR, Weather Radar (100km)		Enclosed
HH-60L Dustoff Hawk	\$7,837,577	JP8	4.05 tons	13.36 tons		40	FLIR, Weather Radar (100km)		Enclosed
UH-60A Credible Hawk	\$2,964,048	JP8	3.05 tons	12.57 tons	4+5 Stretcher cases or 3 Stretchers and 3 Sitting Patients 4+6 Stretcher Cases and 3 Sitting Patients	26	None	Shielded (Doors Closed)	Shielded (Doors Closed)
HH-60W 60- Whiskey	\$16,821,354	JP8	2.8 tons	15.94 tons		28	3 <sup>rd</sup> Gen FLIR, 3 <sup>rd</sup> Gen Image Intensification, Weather Radar (150km), Radar (40km), TFR, Day/Night CCTV	Shielded (Doors Closed)	Shielded (Doors Closed)
AH-60A Battle Hawk	\$12,250,497	JP8	1.59 tons	12.02 tons	5+3	34	2 <sup>nd</sup> Gen FLIR, 2 <sup>nd</sup> Gen Image Intensification, Radar (30km)		Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc	Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
UH-60A Black Hawk	448	210	43/40		2756	1436	5790

UH-60L	467	215	45/40	2756	1659	5790
Black Hawk						
UH-60M	542	249	52/35	3032	1880	7238
Black Hawk						
UH-60A+	489	225	47/40	2756	1659	5790
Black Hawk						
UH-60V	496	230	48/40	2756	1772	5790
Black Hawk						
CH-60E	448	210	43/40	2756	1436	5790
Black Hawk						
UH-60M+ ITEP	677	315	54/35	3800	2678	7000
EH-60A	365	170	35/40	2756	1448	5790
Quick Fix						
EH-60L	380	175	37/40	2756	1673	5790
Advanced						
Quick Fix						
EH-60B	441	205	42/40	2756	1442	5790
Pave Mover						
EH-60C	424	195	41/40	2756	1448	5790
Command						
Hawk						
EUH-60L	439	202	43/40	2756	1673	5790
Command						
Hawk						
VH-60N	355	165	32/40	3097	1448	5790
White Hawk						
UH-60Q	430	200	41/40	2756	1448	5790
Dustoff						
Hawk						
UH-60A	397	185	38/40	3197	1404	5790
Credible						
Hawk						
HH-60W	421	196	40/35	4432	1641	7238
60-Whiskey						
AH-60A	395	185	38/40	2756	1359	5790
Battle Hawk						

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
UH-60A	IFF, Flare/Chaff Dispensers (40/30), RWR, GPS	40m	None	2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm or 2400x.50
Black Hawk				2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	
UH-60L	IFF, IR Suppression, Flare/Chaff Dispensers (40/40), RWR, GPS, IRCM	40m	None	2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm or 2400x.50
Black Hawk				2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	
UH-60M	IFF, Secure Radios, Flare/Chaff Dispensers (40/40), RWR, GPS/INS, ECM, IRCM, BMS	40m	None	2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4100x7.62mm or 2460x.50
Black Hawk				2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	
UH-60A+	IR Suppression, Flare/Chaff Dispensers (30/30), IFF, RWR, GPS, Secure Radios	40m	None	2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm or 2400x.50
Black Hawk				2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	
UH-60V	IFF, IR Suppression, Flare/Chaff Dispensers (40/40), RWR, GPS/INS, Secure Radios	40m	None	2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm or 2400x.50
Black Hawk				2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	
CH-60E	IFF, Flare/Chaff Dispensers (40/30), RWR, GPS/INS	40m	+1 (w/ESSS Weapons Only)	2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm or 2400x.50
Black Hawk				2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	
UH-60M+ ITEP	Secure Radios, Flare/Chaff Dispensers (40/40), RWR, GPS/INS, ECM, IRCM, BMS	40m	None	2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm or 2400x.50
				2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	

EH-60A/EH-60L Quick Fix	IFF, Flare/Chaff Dispensers (40/30), RWR, GPS, IRCM, ECM, Secure Radios, Radio Jammers (30km), Radio Intrusion Gear (30km), ECM	40m	None	2xMAG, M-60, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	2000x7.62mm
EH-60B Pave Mover	IFF, Flare/Chaff Dispensers (40/30), RWR, GPS, IRCM, ECM, RLF	40m	None	4 Hardpoints (w/ESSS)	None
EH-60C Command Hawk	IFF, Flare/Chaff Dispensers (40/30), RWR, GPS, ECM, ECCM, BMS, Secure Radios, RLF, Radar LF	40m	None	2xMAG, M-60, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm
EUH-60L Command Hawk	IFF, Flare/Chaff Dispensers (40/40), RWR, GPS/INS, ECM, ECCM, BMS, Secure Radios, RLF, IR Suppression, IRCM, Radar LF	40m	None	2xMAG, M-60, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm
VH-60N White Hawk	IFF, IR Suppression, Flare/Chaff Dispensers (60/60/30), RWR, GPS/INS, ECM, ECCM, IRCM, Secure Radios, Satcom Radio, Radio Jammer (15 km)	40m	None	4 Hardpoints (w/ESSS)	None
UH-60Q Dustoff Hawk	IFF, Flare/Chaff Dispensers (40/30), RWR, GPS, Secure Radios, Satcom Radio, Refueling Probe	40m	None	4 Hardpoints (w/ESSS)	None
UH-60A Credible Hawk	IFF, Flare/Chaff Dispensers (40/30), RWR, GPS, IR Suppression, Secure Radios, Refueling Probe	40m	None	2xMAG or M-60 Doorguns, 4 Hardpoints (w/ESSS)	2000x7.62mm
HH-60W 60-Whiskey	IFF, IR Suppression, Flare/Chaff Dispensers (60/60/10), RWR, LWR, GPS/INS, ECM (30km), ECCM (30km), IRCM (30), BMS, Secure Radios, Satcom Radio, Refueling Probe, HUD, Helmet/Sight Interface, HIRSS IR Suppression	40m	None	2xMAG, M-60, GAU-19/A, or M-134 Window Guns; 4 Hardpoints (w/ESSS)	4000x7.62mm or 2400x.50
AH-60A Battle Hawk	IFF, Flare/Chaff Dispensers (60/60/20), RWR, GPS, ECM, ECCM, IRCM, BMS, Secure Radios, Laser Designator	40m	+3 (Except Side Guns when Manned)	GAU-19/A, or M-134 Doorguns; 2 Hardpoints (w/ESSS), 2xM-230 Chaingun	7500x7.62mm or 4500x.50, 1900x30mm

### Foreign Black Hawks

Notes: About a score of countries have adopted the Black Hawk in a military role. Most of these differ little from their parent aircraft, other than language on controls and avionics and suchlike. Civilian S-70s may be built at Sikorsky's plant in the US or its subordinate plant in Poland.

The British actually went into the testing phase with three Black Hawks; these has Rolls-Royce Turbomeca RTM-322 engines developing 2270 shaft horsepower each, and were designated WS-70 Black Hawk. Their more powerful engines gave them fantastic performance (though also fantastically-high fuel consumption) than the UH-60As upon which they were based, though eventually the British Army decided to go with Eurocopter-produced helicopters (and they wanted a chopper that could carry units like their antitank, SAM, forward observation, and intelligence/reconnaissance teams, which carry a lot of out-sized equipment), and the WS-70s were returned to the US and converted back to UH-60As, and then one was sold to Bahrain. Only one WS-70 was actually used for tests and it had to be refurbished before it was sold to Bahrain, though it kept the British engines. Bahrain did not use their new Black Hawk as a military aircraft; they used it in a manner similar to the US's VH-60N, and outfitted in a similar manner. The Bahraini Black Hawk has been upgraded, and is now using the UH-60L standard. Their Black Hawk was designated the S-70A-14 Black Hawk and the upgraded one the S-70L-14. The VIP models kept their Westland engines, but used US-made cockpits and avionics, with a Middle Eastern luxury suite and labels on the cockpit and in the cabin. The S-70L-14 also kept its Westland engines

The Egyptians are some of the largest foreign users of the Black Hawk, with a fleet of 70 UH-60As. They are designated S-70A-21s. Hong Kong also uses two, designated S-70A-27. Jordan operates the UH-60A as their primary medium-lift helicopter; it is designated the S-70A-11. Mexico has two, designated S-70A-24. Morocco has two, designated S-70A-26. Philippines have two, designated S-70A-5. Thailand has four; two are utility transports, UH-60As designated S-70A-6; they also have two S-70A-20 VIP Transports, in many ways similar to the VH-60N, but without much of the avionics. Turkey has 12 UH-60As, designated S-70A-17 Yarasa, used by police SRT units. The Turkish government also use two VIP models, again similar to the VH-60N except for the avionics. In 2011, Turkey selected the UH-60L in its Turkish Utility Helicopter Program, and they intend to have a force of 121 UH-60Ls. The Argentines have one VH-60N as their presidential transport, identical to the US VH-60N for game purposes, though specific outfitting will be with Argentine luxuries instead of US-type. The Greeks have an amount of Black Hawks, which are designated UH-60A Aegean Hawk. Brazil and Poland both build the UH-60A under license; however, Poland does not actually use the UH-60A, instead re-selling them to countries where sales of the UH-60A may be a little more politically sensitive for the US. In 2015, Tunisia bought 12 UH-60Ms.

The UH-60L is used by South Korea. These were license-built in the ROK by Korean Air, and have some additional avionics and

ECM. Their variant is called the UH-60P, and they are the largest foreign user, with some 150 built and used by the ROK Army and Marines. The HH-60H is used by the ROK Navy, and is designated the HH-60P; it is identical to the HH-60H for game purposes.

The S-70C series is not actually a different helicopter (it is a UH-60A), but the designation was used when selling Black Hawks to countries where the sale to them may be politically sensitive. Brunei has one S-70C, fitted out as a VIP transport; it is the same as the VH-60N for game purposes, except for luxury items and labeling. The PRC has 24 S-70C-2, where they are the most powerful rotorcraft in the Chinese inventory for their size. They are modified for high/hot operations. Obtaining spares have been difficult since the 1989 Tiananmen Square massacre, and they appear to be locally making spares. Taiwan has 14 S-70Cs; these are for SAR duties and have a 250kg rescue hoist with 60 meters of cable, food items like PowerBars and soup, some drinks (mostly chilled or hot water), and an oven for six heated blankets. SARBirds are designated Blue Hawks, while military versions are stock and designated Thunder Hawk.

The UH-60J is the version for the Japanese JASDF. It is based on the UH-60A, but has T700-IHI-701A engines developing 1720 shaft horsepower each. Most of these are equivalent to UH-60Qs. The JASDF ordered 30 for the Ground Forces; another 20 were ordered by the Maritime Forces and will be covered under Foreign Naval Variants. In 1995, the JGSDF ordered a version of the UH-60L, with domestically-produced T700-IHI-701C engines developing 1800 shaft horsepower, and designated the UH-60JA. The UH-60JA has upgraded avionics compared to its US counterparts, with a FLIR camera, color weather radar, GPS with an INS backup, and a NOD-compatible cockpit and cabin lighting. Japanese UH-60s and their variants are produced by Mitsubishi.

Australia was given a single UH-60L by Sikorsky for evaluation, leading to license-production of 38 more by Hawker/de Havilland domestically. They were originally assigned to the RAAF, but were later shifted to the Australian Army. They are for the most part UH-60Ls with advanced IR Suppression (HIRSS), cable-cutting blades, the Seahawk's AFCS, a folding stabilator, an external rescue hoist with a capacity of 400 kilograms and 60 meters of cable, and some Australian-designed avionics in place of American designed components. They are designated CH-60L. The Australian Army are in the process of buying AH-60L Battle Hawks; however, Australian versions will have a chin-mounted 20mm Gatling gun turret, along with the FLIR, laser designator, targeting computer, and laser rangefinder; the wingtip hardpoints are omitted. They have a laser rangefinder, laser designator, laser warning receiver, and are able to fire rockets that use the Advanced Precision Kill Weapon System. They are sort of like the Australian's "Hind", able to carry an 8-man infantry squad or extra ammunition. They are used for armed reconnaissance.

Israel received, free of charge, ten US Army surplus UH-60As in 1994. The IAF later bought 24 new-build UH-60Ls. These are identical to their parent designs, except for some Israeli-designed electronics, additional ECM, ECCM and IRCM, larger flare and chaff dispensers, and some Israeli-designed avionics in place of their US-designed counterparts, made by Elbit. Cockpit labels are in English and Hebrew. The Israelis are in the process of buying ten AH-60L Battle Hawks, similar to the AH-60A but based on the UH-60L, with appointments similar to the Australian AH-60L, and with a single-barreled 20mm cannon instead of a Gatling gun. It has a rotor blade/tail rotor system similar to the US UH-60M. The Israeli AH-60Ls normally carry .50-caliber machineguns on their wingtip hardpoints. The M3M system is unitary. In a pod, and does not need a separate hardpoint to carry the ammunition.

Saudi Arabia has 21 UH-60As for utility transport, which they call S-70A-1 Desert Hawks. They have sand shields on their intakes, but are otherwise stock. Eight more are Medevac versions identical to the UH-60Q Dustoff Hawk, and one is decked out as a VIP transport, and similar to the VH-60N. The Saudis intend to have a total UH-60 force of 72, a mix of UH-60As, UH-60Ls, and UH-60Ms, and several of their subtypes.

Columbia also operates the UH-60L, which they call the Arpia. These have additional electronics and avionics. They also operate a version of the AH-60L Battle Hawk, which they call the Arpia III; these carry M-3M machineguns on their third (wingtip) hardpoint, with ammunition feed from a canister on the second hardpoint. The UAE also operates three of this AH-60L version, in addition to 12 UH-60Ls and 40 UH-60Ms. The AH-60Ls are outfitted similarly to the Israeli Battle Hawks. In addition to normal avionics, their UH-60s have a laser warning receiver (LWR) and some night vision. They also call their UH-60s Desert Hawks. UAE have modified engines which allow for hot/high operations, a by-product of the UH-60M engines.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
WS-70 Black Hawk	\$1,110,895	JP8	3.63 tons	10.26 tons	4+11	20	None	Enclosed
S-70A-14 Black Hawk	\$14,118,448	JP8	2.2 tons	15.9 tons	3+6	44	FLIR, Weather Radar (150km), Radar (40km)	Shielded
S-70L-14 Black Hawk	\$19,000,328	JP8	2.08 tons	16.38 tons	3+6	46	FLIR, Weather Radar (150km), Radar (40km)	Shielded
S-70A-20 Black Hawk	\$7,578,710	JP8	2.54 tons	14.53 tons	3+6	41	2 <sup>nd</sup> Gen Image Intensification, Weather Radar (100km), Radar (30km)	Shielded
S-70A-18 Black Hawk	\$8,418,968	JP8	2.37 tons	15.2 tons	3+6	46	FLIR, Weather Radar (100km), Radar (40km)	Shielded
UH-60P Black Hawk	\$6,111,881	JP8	4.04 tons	13.76 tons	4+11	29	2 <sup>nd</sup> Gen Image Intensification, Thermal Imaging, Weather Radar	Enclosed

S-70C-2 Black Hawk	\$1,299,490	JP8	3.63 tons	10.25 tons	4+11	20	(100km) None	Enclosed
S-70C-1 Black Hawk	\$1,169,691	JP8	3.61 tons	10.34 tons	4+11 or Six Stretcher Patients and Two Sitting Patients	22	None	Enclosed
UH-60J Black Hawk	\$2,505,070	JP8	3.35 tons	11.37 tons	2+6 Stretcher Cases and 3 Sitting Patients	36	FLIR, Weather Radar (100km)	Enclosed
UH-60JA Black Hawk	\$9,337,884	JP8	4.01 tons	13.89 tons	4+11	24	FLIR, Weather Radar (150km)	Enclosed
CH-60L Black Hawk	\$11,441,309	JP8	3.96 tons	13.07 tons	4+11	27	None	Enclosed
AH-60L Battle Hawk	\$17,547,550	JP8	1.65 tons	15.08 tons	5+7	38	2 <sup>nd</sup> Gen FLIR, 2 <sup>nd</sup> Gen Image Intensification, MMW Radar (30km)	Enclosed
UH-60L (IAF) Black Hawk	\$11,513,343	JP8	4.05 tons	13.72 tons	4+11	24	None	Enclosed
AH-60L Battle Hawk (IAF)	\$17,736,363	JP8	1.24 tons	14.25 tons	5+6	35	2 <sup>nd</sup> Gen FLIR, 2 <sup>nd</sup> Gen Image Intensification, MMW Radar (40km)	Enclosed
UH-60L Arpia	\$1,881,714	JP8	4.37 tons	12.45 tons	4+11	26	FLIR	Enclosed
AH-60L Arpia III	\$11,526,048	JP8	2.02 tons	13.59 tons	5+6	37	FLIR, 2 <sup>nd</sup> Gen Image Intensification, MMW Radar (30km)	Enclosed
UH-60L Desert Hawk	\$5,992,247	JP8	4.09 tons	13.59 tons	4+11	26	2 <sup>nd</sup> Gen Image Intensification	Enclosed
UH-60M Desert Hawk	\$3,442,823	JP8	4.09 tons	13.61 tons	4+11	27	2 <sup>nd</sup> Gen Image Intensification	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
WS-70 Black Hawk	616	285	59/40	2756	2018	6243
S-70A-14 Black Hawk	421	197	41/40	3097	2299	5790
S-70L-14 Black Hawk	413	193	39/40	3097	2320	5790
S-70A-20 Black Hawk	446	208	42/40	3097	2157	5790
S-70A-18 Black Hawk	433	214	43/40	3097	2215	5790
UH-60P Black Hawk	434	201	42/40	2756	1762	5760
S-70C-2 Black Hawk	448	210	43/40	2756	1508	7200
S-70C-1 Black Hawk	446	209	43/40	2756	1514	5790
UH-60J Black Hawk	458	213	44/40	2756	1495	5790
UH-60JA Black Hawk	440	203	42/40	2756	1770	5790

CH-60L Black Hawk	437	206	43/35	2756	1685	6017
AH-60L Battle Hawk	372	174	36/35	2756	1454	5790
UH-60L (IAF) Black Hawk	445	205	43/40	2756	1741	5790
AH-60L Battle Hawk (IAF)	386	180	37/35	2756	1406	5790
UH-60L Arpia	465	214	45/40	2756	1666	5790
AH-60L Arpia III	394	184	38/40	2756	1540	5790
UH-60L Desert Hawk	447	205	43/40	2756	1737	5790
UH-60M Desert Hawk	541	249	52/35	3032	1992	7238

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
WS-70 Black Hawk	IFF, Flare/Chaff Dispensers (40/30), RWR, GPS	40m	None	2xL-7A2 or M-134 Doorguns, 4 Hardpoints (w/ESSS)	4000x7.62mm
S-70A-14 Black Hawk	IR Suppression, Flare/Chaff Dispensers (60/60/30), RWR, GPS/INS, ECM, ECCM, IRCM, Secure Radios, Radio Jammer (15 km)	40m	None	4 Hardpoints (w/ESSS)	None
S-70L-14 Black Hawk	Advanced IR Suppression, Flare/Chaff Dispensers (60/60/30), RWR, GPS/INS, ECM, ECCM, IRCM, SATCOM Radio, Secure Radios, Radio Jammer (15 km)	40m	None	4 Hardpoints (w/ESSS)	None
S-70A-20 Black Hawk	IR Suppression, Flare/Chaff Dispensers (40/30), RWR, INS, ECM, Secure Radios	40m	None	4 Hardpoints (w/ESSS)	None
S-70A-18 Black Hawk	IR Suppression, Flare/Chaff Dispensers (40/40), RWR, GPS, ECM, IRCM, SATCOM Radio, Secure Radios, Radio Jammer (15 km)	40m	None	4 Hardpoints (w/ESSS)	None
UH-60P Black Hawk	IFF, IR Suppression, Flare/Chaff Dispensers (40/40), RWR, GPS, IRCM, ECM, ECCM, LWR, RL, Secure Radios	40m	None	2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm or 2400x.50
S-70C-2 Black Hawk	IFF, Flare/Chaff Dispensers (40/30), RWR, GPS	40m	None	2xType 80 or Type 89 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm or 2400x12.7mm
S-70C-2 Black Hawk	IFF, Flare/Chaff Dispensers (40/30), RWR, GPS, Rescue Hoist (250kg/60m)	40m	None	2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm or 2400x.50
UH-60J Black Hawk	IFF, Flare/Chaff Dispensers (40/30), RWR, GPS, Secure Radios, Satcom Radio, Refueling Probe	40m	None	4 Hardpoints (w/ESSS)	None
UH-60JA Black Hawk	IFF, Advanced IR Suppression, Flare/Chaff Dispensers (40/40), RWR, GPS, IRCM, ECM, Secure Radios	40m	None	2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm or 2400x.50
CH-60L Black Hawk	IFF, Advanced IR Suppression, Flare/Chaff Dispensers (50/50), RWR, GPS/INS, IRCM, ECM, Secure Radios,	40m	None	2xMAG, M-60, GAU-19/A, or M-134	4000x7.62mm or 2400x.50

	SATCOM Radios, Rescue Hoist (400 kg/60m), AFCS				Doorguns; 4 Hardpoints (w/ESSS)	
AH-60L Battle Hawk	IFF, Flare/Chaff Dispensers (60/60), RWR, GPS, ECM, ECCM, IRCM, BMS, LWR, Secure Radios, Laser Designator, Advanced IR Suppression, APKWS, AFCS, Helmet-Sight Interface, Cable Cutters	40m	+3 (Except Side Guns when Manned)	GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS), 20mm M-193 Gatling Gun	7500x7.62mm or 4500x.50, 2800x20mm	
UH-60L (IAF) Black Hawk	IFF, IR Suppression, Flare/Chaff Dispensers (50/50/15), RWR, GPS, IRCM, ECM, ECCM, Secure Radios	40m	None	2xMAG, Negev, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm or 5500x5.56mm, or 2400x.50	
AH-60L Battle Hawk (IAF)	IFF, Flare/Chaff Dispensers (60/60), RWR, GPS, ECM, ECCM, IRCM, BMS, LWR, Secure Radios, Laser Designator, Advanced IR Suppression, APKWS, AFCS, Helmet-Sight Interface, Cable Cutters	40m	+3 (Except Side Guns when Manned)	2xMAG, Negev, GAU-19/A, or M-134 Doorguns; 3 Hardpoints, M3M (x2), 20mm M-693 Autocannon	7500x7.62mm or 10000x5.56mm, 15000x.50, 3000x20mm	
UH-60L Arpia	IFF, IR Suppression, Flare/Chaff Dispensers (40/40), RWR, GPS, IRCM, ECM, LWR	40m	None	M-60 or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm	
AH-60L Arpia III	IFF, Flare/Chaff Dispensers (60/60), RWR, GPS, ECM, IRCM, LWR, Secure Radios, Laser Designator, IR Suppression, AFCS, Helmet-Sight Interface	40m	+3 (Except Side Guns when Manned)	GAU-19/A, or M-134 Doorguns; 2 Hardpoints (w/ESSS), 2xM-3M Machineguns	7500x7.62mm or 4500x.50, 7500x.50	
UH-60L Desert Hawk	IFF, IR Suppression, Flare/Chaff Dispensers (40/40), RWR, GPS, IRCM, LWR, Sand Shields	40m	None	2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm or 2400x12.7mm	
UH-60M Desert Hawk	IFF, Secure Radios, Flare/Chaff Dispensers (40/40), RWR, GPS/INS, ECM, IRCM, LWR, Sand Shields, Refueling Probe	40m	None	2xMAG, M-60, GAU-19/A, or M-134 Doorguns; 4 Hardpoints (w/ESSS)	4000x7.62mm or 2400x12.7mm	

### Civilian Black Hawks

Notes: Civilian Black Hawks are present in more numbers than military Black Hawks, but not as much as you think; the Black Hawks supplied to civilian agencies are minimally modified for their role and as they are designed as military helicopters, are more expensive IRL than their civilian helicopter counterparts, though more robust and generally with better avionics. Civilian Black Hawks are generally not designated as Black Hawks except on an informal basis, and are designated S-70 instead of UH-60. Most civilian S-70s are used for Medevac due to their high speed and ample cargo cabin, and are generally outfitted as per the UH-60Q, HH-60L, or HH-60M (without refueling probes and without door guns). Most fly with side doors closed. They retain armored seats, armored rotors, and general aircraft armor, something police aviators using Black Hawks appreciate. They usually mount a searchlight in the nose, and are often mounted with 2<sup>nd</sup> Gen FLIR. They do not usually have secure or SATCOM radios. They generally have more powerful 1890-shaft horsepower engines than those on military Black Hawks, and are sometimes used as straight cargo birds. Other common uses are firefighting water-dropping vehicles and helicopters to drop fire jumpers. (Firefighting and their support S-70s are often called Fire Hawks.)

Some are outfitted as VIP transports, with somewhat less avionics than the VH-60N. Other outfits include Movie/TV production, charter VIP aircraft, and aerial lift of cumbersome cargoes. (Examples are necessarily general.)

Fire Hawks who are water bombers can carry a 3407-liter Bambi Bucket, 3208-liter bucket, 2498-liter bucket, or 2044-liter bucket, or unitary water bins, which can be reloaded by a dip/vacuum system or from the ground. (The unitary water bins have the advantage of being capable of more precise water bombing, the ability to drop water in more than one place until the bin is empty, and can carry fire retardant whereas buckets cannot, but are more complicated to fill up). The Fire Hawks can be loaded with water or fire retardant,

though the use of fire retardant will require one or more flushes with water before water may be used again. Fire Hawks using buckets generally come with those buckets separately; those with unitary water/retardant bins have them built onto the underside of the aircraft, and have extended landing gear. (Water is 1 kilogram per liter; fire retardant is about 1.1 kilograms per liter.) The bins can be filled at the airfield or forward facility, or they may pick up water by dropping a vacuum hose into a lake or pond. (Some firefighting helicopters have even refilled through swimming pools!) The figures below are with empty bins; speed and agility will decrease accordingly as water or retardant is loaded. Fire Hawks which drop Smoke Jumpers are specially set up for this role, but can also drop water through the use of a bucket. Fire Hawks are designated SK-70s. They are generally painted bright red, or largely bright red.

Aerial TV/Movie platforms have the virtue of giving the companies a low-vibration platform, and can mount cameras in a chin turret or from the doors. Several cameras of different sizes, speeds, or light sensitivity (or night vision) can be carried, shooting out the door; even large I-MAX camera setups can be accommodated. Movies include *Universal Soldier*, *The Manchurian Candidate*, *Wolverine*, *Act of Valor*, *Pirates of the Caribbean*, and *Salt*. TV credits are too numerous to be mentioned here.

Some Police departments use the S-70; kit-outs include FLIR, 2<sup>nd</sup> Generation FLIR, 2<sup>nd</sup> Gen Image Intensification, Radar, and the lifting of aerial snipers, shooters and spotters. (They are not often used by police forces, however, due to their size and expense.) Those departments who use them generally call them Blue Hawks. They also have loudspeaker systems. They do not normally carry doorguns or doorgunners; the extra crewmen normally operate the cameras, searchlight, and night vision or other listening devices. "High-Tech" versions (for lack of another term) are police versions with extra avionics and equipment, normally used for reconnaissance and for chasing down dangerous suspects and vehicles. They retain many of the features of military Black Hawks.

Many designations in this section are provisional, used to help differentiate the helicopters, and are not real designations. Most civilian Black Hawks are based on the UH-60A airframe and for some of the components; however, they generally have updated electrical systems, hydraulics, running gear, and the aforementioned higher-power turboshafts. They may also have modifications like chin turrets, belly turrets, bulges, domes, the tail modification of the UH-60L, the glass cockpit of a UH-60M, etc.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
S-70AQ Dustoff Hawk	\$1,702,278	JP8	3.74 tons	10.63 tons	2+6 Stretcher Cases and 3 Sitting Patients	33	FLIR, WL Searchlight	Enclosed
S-70P Blue Hawk	\$2,577,543	JP8	3.75 tons	10.55 tons	4+11	28	FLIR, 2 <sup>nd</sup> Gen Image Intensification, WL/IR Searchlight	Enclosed
S-70P Blue Hawk (High-Tech)	\$7,710,054	JP8	3.57 tons	11.27 tons	4+11	32	2 <sup>nd</sup> Gen FLIR, 2 <sup>nd</sup> Gen Image Intensification, WL/IR Searchlight, MMW Radar (5 km)	Enclosed
SK-70 Fire Hawk (3407-liter bin)	\$933,044	JP8	3.73 tons	10.65 tons	3	19	FLIR, WL/IR Searchlight	Enclosed
SK-70 Fire Hawk (3208-liter bin)	\$933,039	JP8	3.73 tons	10.63 tons	3	19	FLIR, WL/IR Searchlight	Enclosed
SK-70 Fire Hawk (2498-liter bin)	\$933,024	JP8	3.8 tons	10.56 tons	3	19	FLIR, WL/IR Searchlight	Enclosed
SK-70 Fire Hawk (2044-liter bin)	\$933,014	JP8	3.83 tons	10.51 tons	3	19	FLIR, WL/IR Searchlight	Enclosed
SK-70 Fire Hawk (Smoke Jumper)	\$1,014,609	JP8	3.67 tons	10.41 tons	2+6	19	FLIR, WL/IR Searchlight, Radar (5 km)	Enclosed
S-70A Civilian VIP	\$8,874,750	JP8	2.59 tons	14.44 tons	2+ Up To 8	40	FLIR, Weather Radar (150km)	Enclosed
S-70A	\$2,021,327	JP8	3.55 tons	11.57 tons	4	26	2 <sup>nd</sup> Gen Image	Enclosed

Aerial Movie/TV Camera Mount					Intensification, 2 Standard Motion Picture Cameras, 1 HD Camera, 1 High-Speed Camera, 2 Night Vision Cameras (400m and 4000m)	
S-70 Civilian Base	JP8	3.88 tons	10.25 tons	2+13	None	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
S-70AQ Dustoff	514	240	49/40	2756	1626	5790
S-70P Blue Hawk	502	235	48/40	2756	1665	5790
S-70P Blue Hawk (High-Tech)	492	231	47/35	2756	1699	5790
SK-70 Fire Hawk (3407-liter bin)	500	230	48/40	2756	1642	5790
SK-70 Fire Hawk (3208-liter bin)	501	230	48/40	2756	1658	5790
SK-70 Fire Hawk (2498-liter bin)	502	230	48/40	2756	1665	5790
SK-70 Fire Hawk (2044-liter bin)	503	230	40/40	2756	1668	5790
SK-70 Fire Hawk (Smoke Jumper)	514	238	49/40	2756	1626	5790
S-70A Civilian VIP	447	208	40/40	3097	1636	5790
S-70A Aerial Movie/TV Camera Mount	490	229	47/35	2756	1668	5790
S-70 Civilian Base	520	243	50/40	2756	1645	5790

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
S-70AQ Dustoff	GPS, Transponder	40m	None	4 Hardpoints (w/ESSS)	None
S-70P Blue Hawk	IFF, GPS, Transponder, LED Vision Dazzler, Loudspeaker	40m	None	4 Hardpoints (w/ESSS)	None
S-70P Blue Hawk (High-Tech)	IFF, GPS, Transponder, LED Vision Dazzler, IR Suppression, ECM, Flares (30), Secure Radios, Loudspeaker	40m	None	4 Hardpoints (w/ESSS)	None
SK-70 Fire Hawk	GPS, Transponder, Water/Fire Retardant Unitary Bin, Secure Radios	40m	None	4 Hardpoints (w/ESSS)	None
SK-70 Fire Hawk (Smoke Jumper)	GPS, Transponder, Secure Radios	40m	None	4 Hardpoints (w/ESSS)	None
S-70A Civilian VIP	IFF, IR Suppression, RWR, GPS, Secure Radios, Satcom Radio	40m	None	4 Hardpoints (w/ESSS)	None
S-70A Aerial	GPS, Transponder, 75 Film Canisters, Laser Rangefinder	40m	None	4 Hardpoints (w/ESSS)	None

Movie/TV  
Camera  
Mount  
S-70  
Civilian  
Base

GPS, Transponder

40m

None

4 Hardpoints  
(w/ESSS)

None

## Naval SH-60 Seahawks

Notes: In 1977, the US Navy had a problem. Their LAMPS (Light Airborne Multipurpose System) had been developed into a Mark II configuration, but the Navy's ASW helicopter at the time, the Kaman Seasprite, was not big enough or powerful enough to be equipped with the Mark II version of LAMPS. Soon thereafter, the Mk II was improved into a Mk III version (LAMPS III) by IBM Federal Systems, and the Seasprite definitely could not handle it. The Army had a big, powerful helicopter in the Black Hawk, so the Navy decided to develop their own version, to be designated the SH-60B Seahawk. They selected the SH-70B in 1977, with full production ordered in February 1978; the first production SH-60B flew in February 1983, and operational service began in 1984, with operational deployment beginning in 1985. The lines and specs of the SH-60B are very similar to the Army's UH-60A, and the two have 83% parts commonality. Foreign users of the basic SH-60B include Spain, India, and Singapore. Israel also uses the SH-60B Block I helicopters.

A LAMPS helicopter is meant to be a modular multipurpose helicopter, which means that it is designed to perform a variety of roles; in this case, the Seahawk performs roles ranging from cargo and personnel transport to antisubmarine warfare. The primary difference between the SH-60B and the Army's UH-60A are its equipment package and that most of the airframe of the SH-60B is treated to be corrosion-resistant in the salty air environment. SH-60B-specific equipment includes the RAST (Recovery Assist Secure and Traverse) system, which allows the Seahawk to land on ships with only a small landing platform by dropping a cable with a hook on a reel. This allows the helicopter, once the cable is secured to the landing pad, to reel itself onto surprisingly small pads, even in rough weather. (Crews call this "harpoon" gear.) The main rotor folds so that it lies down the center of the rear of the aircraft. The stabilator and tailfin also fold, and the Seahawk's stabilator is rectangular instead of having a swept rear edge, and folds up on each side of the tailfin. The entire tail can also be unbolted and removed for air transport or sling loading. The Seahawk may also be distinguished by the landing gear; the tail gear is moved to the rear of the fuselage instead of being on the tail boom, and has two wheels instead of one. The landing gear is also taller than the standard Black Hawk, and does not have the heavy-duty shock absorber system of the UH-60 series.

The crew seats are unarmored to lighten the structure, and the cockpit doors and cabin doors are jettisonable with explosive bolts, to assist crew escape in case of ditching. When ditching, floats deploy, which keep the Seahawk on the surface for up to 3 hours (depending on the sea state and the violence of the ditching). The Seahawk not only has secure radios, but has a secure datalink that is able to transmit video (if so equipped) radio transcripts, and other data as generated by its instruments. The datalink antenna is in a dome under the tail boom. The Seahawk has a very efficient autopilot, allowing the aircraft even to hover while maintaining altitude, attitude, and position automatically; this is the AFCS (Automatic Flight Control System). The Seahawk is air conditioned, not for the benefit of the crew, but for the avionics suite. Fuel capacity is increased, and the Seahawk has a HIFS (Hover In-Flight System) allows the Seahawk to hover above or alongside a ship and be refueled. The SH-60 normally uses the ESSS winglets, and generally carries weapons on them, though drop tanks or ECM/IRCM pods may also be carried. The SH-70B has a 270-kilogram rescue hoist on the right side of the cabin, with 60 meters of cable, though this is removable to save weight. (The stats below reflect the SH-60B with the hoist installed.) There is a sling load hook beneath the Seahawk, as on the Black Hawk.

Of course, the primary feature of the SH-60B is the LAMPS III suite, which includes a powerful radar in a chin drum mount; this radar is able to look 360 degrees around the aircraft, and at normal search altitude (about 150 meters), has a range of 240 kilometers. In four boxes in the chin and rear fuselage are the ESM (Electronic Support Measures), also known as the ELS (Emitter Location System), which locates electronic and IR emissions from ships and sometimes submarines. The Seahawk has a MAD (Magnetic Anomaly Detector) system to assist in locating and identifying submarines and surface ships. It may be extended on a short boom or towed up to 25 meters behind the Seahawk, which is better for detecting submarines and USVs. This is in a tube on the right side of the fuselage. The Seahawk has sonobuoy tubes; the SH-60B carries 125 sonobuoys (25 in each of five tubes), and these are dropped from the rear of the fuselage in a pattern which may be automatic or controlled by the crew. The Seahawk carries both active and passive sonobuoys. The SH-60B has a stub pylon on the side and to the rear of the cabin doors to carry either two Mk 46 homing torpedoes or two 455-liter fuel tanks.

All this equipment makes the SH-60B considerably heavier than the UH-60A. To counter this, the SH-60B has more powerful T700-GE-401 engines, which develop 1690 shaft horsepower each. The transmission is also modified to handle the more powerful engines. The engines and the transmission are also treated to be corrosion resistant in salt air. Despite the more powerful engines, the SH-60B is not as fast as the UH-60B and has less maneuverability, due to the weight and drag caused by the radar and various bulges and clutter on the aircraft.

Due to operations in the Persian Gulf from 1987 and before, the Middle East Force Modification (MEF-MOD), was done, leading to these SH-60Bs being referred to as the "Mideast Seahawk." It has become the standard iteration of the SH-60B. Modifications include more powerful T700-GE-401C engines with 1900 shaft horsepower each, and the appropriate transmission, improving performance considerably. They were equipped with a laser jammer similar to that of the Stingray Bradley (see US Tracked Armored Personnel Carriers, generally referred to as a "disco light jammer"), flare and chaff dispensers, a radar warning system to alert the crew of missile launches and approaches, M-60D door guns, FLIR, and stabilized binoculars. Some 25 were given these modifications.

Just before the 1991 Gulf War, the Block I modifications were underway, and most SH-60Bs were upgraded to this standard. Once again, no special designation was allotted to the newly-modified SH-60Bs. The Block I SH-60B includes the MEF-MOD package, as well as the installation of GPS, a more powerful flight computer, the replacement of the M-60D door guns with GAU-19/As, and dual digital avionics buses. One of the primary goals for the Block I was to allow the SH-60B to carry and fire more modern ASW weapons, including the Mk 50 Barracuda torpedo, and the AGM-199 Penguin antiship missile. In addition to the standard flare and chaff dispensers, the Block I carries an oversized chaff bundle (about the equivalent of ten normal chaff bundles) called an AIRBAC that is ejected from a sonobuoy tube (removing the capacity to carry 25 of its sonobuoys). It is dropped in the path of an incoming antiship missile to decoy the missile from its ship target. The left ESSS was also extended to include one more hardpoint. (The right side ESSS could not be extended, since the stores would get in the way of the rescue hoist.)

The SH-60F Ocean Hawk (it is known to its crews as Ocean Hawk, though its official DoD name is still Seahawk) was designed to replace the SH-3 Sea King ASW/SAR helicopter. It may be thought of as a "stripped" version of the MEF-MOD (though not the Block I) SH-60B. It is designed primarily for "Angel" service (rescuing those aviators who have to ditch soon after takeoff or landing, also known as Plane Guards), but may also be used for general SAR service and close-in antisubmarine and antishipping duties. The Ocean Hawk deletes the RAST gear, since it is not required to land on the pads of small ships, and the LAMPS III suite is replaced with a less sophisticated and comprehensive suite. It adds a dipping sonar, but the sonobuoy launchers are removed, replaced by a single sonobuoy launcher with 8 sonobuoys in a rack and the launcher loaded manually. The left winglet is extended to include one more hardpoint, but as the Ocean Hawk retains the SAR hoist, the right winglet is not extended, as on the SH-60B Block I. The Ocean Hawk also has a sling hook under the fuselage to allow it to transport cargo; this hook is able to hoist up to the maximum cargo capacity of the SH-60F. One more crewmember is added, an acoustic sensor operator (ASO). The Ocean Hawk can carry fuel tanks or Mk 46, Mk 50, or Mk 54 torpedoes, but not antiship missiles. The door guns are limited to M-60Ds, M-240Ds, or M-2HBs, on each side of the cabin. The SH-60F has an extra fuel tank, located behind the pilot and in front of the TSO's (Tactical Systems Operator) position. The SH-60F went into service just before the 1991 Gulf War. In addition to the US Navy, the SH-60F is used by Israel, Spain, and the US Coast Guard. In the US Navy, the SH-60F was replaced by the MH-60S Knight Hawk, in the Coast Guard, they were replaced by a variant of the MH-60S. The SH-60Fs were modified for naval VIP duties, unofficially designated the SH-60I, and moved to the Coast Guard, in the early 2000s.

The HH-60H was developed in conjunction with the Coast Guard's HH-60J, and both are based on the SH-60F. Though the official DoD name for the HH-60H is the Seahawk, it is invariably called the Rescue Hawk by crews and ground and shipboard personnel. Its primary mission is CSAR (Combat Search And Rescue) of Marines and Naval Special Warfare teams, but it can also conduct antishipping warfare. It is equipped with ECM, IRCM, and radar, as well as night vision, and has a NOD-friendly cockpit. It uses a variant of the T700-GE-401C engines with 1940 shaft horsepower each. It can guide its weapons by laser and can carry such missiles in addition to standard naval weapons, and on the extended side of the ESSS, the HH-60H often carries a quartet of Hellfire missiles, and sometimes on other hardpoints (though those hardpoints more often carry fuel tanks). It is also capable of using 19-round rocket launchers, Stinger missiles, Mavericks, or virtually the entire complement of US Navy torpedoes and missiles. It carries the Aircraft Survival Equipment (ASE) package, including ECM, ECCM, IRCM, Laser Warning and radar warning receivers, and flare and chaff dispensers. It also carries door guns of various types. In addition to the ESSS, it has one hardpoint on both sides for ordnance or fuel tanks. It has a rescue hoist on the left side with a capacity 270 kilograms and 60 meters of cable, and room for two stretcher cases and four seated medical patients, plus a doctor and nurse and ample medical supplies, on a Medevac mission. On a standard team or Marine recovery mission, the Rescue Hawk may carry its crew and eight troops, though *in extremis* 10 troops may be squeezed in. Troops may also be delivered or recovered using fast rope, rappelling, STABO, SPIE and McGuire rigs, CRRC, parachute drops, and boat deployment using a sling-loaded boat. In "Angel" flights, at least one combat rescue swimmer (CRS) is almost always carried. The HH-60H has a refueling probe and can be refueled in air. Note that the HH-60H is not equipped for ASW; that is the job of the SH-60F, and squadrons aboard most ships have three HH-60Hs and three SH-60Fs, and in maritime warfare, they operate in concert. Some 45 were built. The HH-60H was replaced by the MH-60S, starting in 2002; however, some HH-60Hs still remain in service with the US Navy.

The HH-60J Jayhawk (though its official name is still Seahawk) is also based on the SH-60F and is optimized for use as a SARbird. It replaced the HH-3 Pelican, as with a full load of extra fuel tanks, it can continue to search and remain on station for up to seven hours. (The Jayhawk cannot, as the Pelican could, land on water.) It has a state-of-the art electronics suite, to aid in finding victims as well as smuggling boats and aircraft. It can also mount a compartment similar to a firefighting water bin that carries oil-dispersal agents in the case of oil spills. It carries a crew of four (two pilots, one rescue swimmer, and one rescue swimmer/medic). It has a rescue winch with a 270-kilogram capacity and 60 meters of cable, and has room to rescue up to six people. The Jayhawk carries two stretchers and room for four sitting patients. It carries IV solutions of several types, a complement of medication, and a warmer for the IV saline solution for hypothermia cases. It has a blanket warmer for three blankets, and compartments for MREs and special survival rations, as well as a 100-liter drinking water tank. It has a defibrillator and plenty of bandages and materials for burn treatment, as well as Dawn dishwashing soap for oil removal. The cabin also has a large fuel tank in it at the rear, with lockers all around it; the Jayhawk also has an in-flight refueling probe. For antismuggling duties, the Jayhawk has an M-240D on one side and a Barrett M-107 antimateriel rifle mounted on the other for general warning shots and to shoot out engines and hostiles. The mounted M-107A1 is essentially on a tripod, and has one-half the recoil of an M-107A1 on a bipod. The first Jayhawk entered USCG service in 1990, and by 1996, production was complete; 42 were built. The HH-60J began to be modified into the MH-60T configuration in 2009, and upgrades to all 42 are expected were finished in 2015.

The MH-60R (officially called the Seahawk, but more often referred to as the Romeo Hawk or simply Romeo), has an "M"

designation to reflect its multimission role. It carries out jobs including Angel Flights, SARbird and CSAR, antishipping and antisubmarine warfare, cargo and vertical replenishment, transporting sling loads, and medivac, as well as general Naval fire support, equipped with cannons and Hellfire missiles on its ESSS winglets and machineguns on its sponsons. It can also be used to destroy mines; the gunner has an M-107A1 for this purpose. And organic guns may also be used. The Romeo Hawk is equipped with multimode radar, including ISAR (Inverse Synthetic Aperture Radar), a dipping sonar which can operate at low, medium, and high frequency, an electronic defensive suite, a comprehensive night vision/thermal detection suite, sponsons which can carry fuel tanks or a variety of weapons, including torpedoes, antishipping missiles, Hellfire or Maverick missiles, or M-3M machineguns, Miniguns or GAU-19A pods. The Romeo Hawk has a long-range laser rangefinder and designator for this purpose; the Hellfires and Mavericks, as well as some of the naval weapons, can also be guided by the MH-60R's radar. The MH-60R carries SH-60B Block I-type ESSS winglets, which can carry fuel tanks or the same sorts of weapons. It carries sonobuoys and one AIRBAC chaff dispenser. The MH-60R has an all-glass cockpit (except for certain secondary instruments), and they are NOD-compatible. Its radio set is comprehensive and all radios are data-capable, with one able to transmit pictures generated by its ISAR. It uses AFCS and HIFS to reduce workload on the pilots, and aircraft weapons gunner, through automation and computer assistance of many functions, including piloting the helicopter. It has RAST gear. It does not normally carry door guns or door gunners. The Romeo Hawk also has an ESM (Electronic Surveillance Measures) package which can jam radar, radio, and IR weapons and radios communications. The MH-60R will eventually replace the SH-60B and SH-60F in the US Navy, and it is also used by the Australian Navy. Currently, it works in conjunction with SH-60Bs and SH-60Fs until more MH-60Rs are available. First flight took place in 2001, with full-rate production approved in 2006, and first deployment, aboard the *John C Stennis*, in 2009. It can operate from frigates, destroyers, cruisers, amphibious ships and aircraft carriers as well as land bases. The nose of the MH-60R has a distinctive appearance, with a dish on the bottom and an extended FLIR/Image Intensification/Laser Module extending beyond the nose on a gimbal.

The MH-60S is officially still the Seahawk, but is more commonly known as the Knighthawk, as it replaces the H-46D Sea Knight helicopter formerly used the ASW and antisubmarine and antimine warfare. Other roles for the MH-60S include CSAR, humanitarian relief, vertical cargo carrying and replenishment, aeromedical evac, and special warfare missions. In fact, in Iraq and Afghanistan, it has spent much more time ferrying SEAL and MARSOC and their wounded than any other mission. The Knighthawk was originally going to be designated the CH-60S, but this was changed to MH-60S to reflect its multimission role. The Knighthawk began full-rate production in August 2002, and by January 2011 some 154 Knighthawks were deployed on the amphibious assault ships USS *Essex*, USS *Wasp*, and USS *San Antonio*, as well as some carriers and occasionally lighter vessels with flight decks. Deployment of the MH-60S began in 2003, and by September 2004, all of its predecessors, the H-46D Sea Knights, had been replaced. The MH-60S also replaced the HH-60H. Though the primary mission is regarded to be a naval warfare helicopter on the books, it is kitted out more for special missions than Naval operations, and it is equipped less than the MH-60R for Naval warfare operations. The UH-60M is its ancestor as well as the SH-60B Block 1 and SH-60F, and the Knighthawk sports a glass cockpit (in fact, the same as on the MH-60R), advanced flight controls, RAST gear, and generally carries fuel tanks on its ESSS winglets and its sponsons. (However, the right extended winglet usually carries a quartet of Hellfire missiles, and the sponsons often carry rocket pods.) The Knighthawk carries an Improved Multispectral Targeting System (MTS-A). The targeting system includes an electronic zoom, a laser rangefinder/designator/illuminator, as well as an autotracker. It has a GPS system which takes shots off of 12 GPS satellites for extreme precision. The Knighthawk is equipped with swing-down NODs and stabilized binoculars, but these are often ignored, with the crews using helmet mounted NODs instead. For a troop transport situation, the MH-60S can carry up to 12 troops in its cabin, as well as two door gunners; alternatively, up to six stretchers and four seated patients, along with a doctor, nurse or PA, and medic and a plethora of medical gear. (The MH-60S is, essentially, modular in its loadout.) For antimine warfare, the Knighthawk carries a BRU-14 rack that carries 14 113-kilogram bombs on one of the hardpoints of the winglets. Detection is by an ALMDS detector, which gets a general identification and shoots a pulsed laser to get a general outline to be sure. Finally, the Knighthawk is capable of Paving. The nose of the MH-60S has a distinctive appearance, with a dish on the bottom and an extended FLIR/Image Intensification/Laser Module extending beyond the nose on a gimbal.

Foreign users of the MH-60S include Australia and Thailand.

The MH-60T Jayhawk is the US Coast Guard's multirole helicopter and is essentially a heavily modified and upgraded HH-60J. Three retired SH-60Fs were also remanufactured into MH-60Ts. At first, the MH-60T was designated the HH-60T, but this was changed to reflect the multimission role. A total of 42 are in service with the US Coast Guard currently. The first MH-60Ts entered service in 2007, with modifications ending in 2014, and deployment in 2015. At this point, the HH-60J and SH-60F were retired from active duty, though some were retained for training duties. The MH-60T normally operates from land bases, but is also capable of operating from the deck of 82-meter Medium Endurance Cutters or 115-meter High Endurance Cutters. It can also interoperate with US Navy ships with appropriate facilities, and has RAST gear. The Jayhawk was rebuilt into a helicopter which could perform the SARbird role, cargo role, training role, anti-smuggling tasks, and some ASW functions. One of the first modifications was to give it the glass cockpit of the MH-60R and MH-60S, and it is identical to the cockpits of those helicopters except for some specialized functions.

The electro-optical/night vision suite was updated, and the formerly absent armored seats were refitted into the MH-60T. Like the HH-60J, the MH-60T has a precision antimateriel rifle on a mount for shots through the engines of boats or to put holes in hulls of a boat; this is normally mounted on the right side, and a machinegun on the left. The nose of the MH-60T has a distinctive appearance, with a dish on the bottom and an extended FLIR/Image Intensification/Laser Module extending beyond the nose on a gimbal. The MH-60T has flare and chaff dispensers as well as an IRCM emitter. It is capable of using any torpedo in the US Navy inventory as well as Hellfire missiles and 19-round 2.75-inch rocket pods, or extra fuel tanks, or cannon or machineguns, on its ESSS winglets. These can also be mounted on the side sponsons; if carrying fuel tanks, the left sponson may carry two 454-liter tanks and the right sponson

one. On the right side is also mounted the rescue winch, with a basket on the end and capable of lifting 270 kilograms with 61 meters of cable. The MH-60T has the equivalent of a BMS, but oriented most of the time towards its SARbird or anti-smuggling roles. It can, however, interoperate with US Navy ships and aircraft when required.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
SH-60B Seahawk (Early)	\$15,752,405	JP8	2.99 tons	13.25 tons	5	32	Radar (240 km), Look-Down Radar	Enclosed
SH-60B Seahawk (MEF-MOD)	\$11,671,219	JP8	2.93 tons	13.48 tons	5	33	FLIR, Radar (240km), Look-Down Radar, Image Intensifier	Enclosed
SH-60B Seahawk (Block I)	\$12,049,725	JP8	2.74 tons	14.24 tons	5	34	2 <sup>nd</sup> Gen FLIR, Radar (240km), Look-Down Radar, 2 <sup>nd</sup> Gen Image Intensifier	Enclosed
SH-60F Ocean Hawk	\$7,806,579	JP8	3.27 tons	12.1 tons	6	30	Weather Radar (150km)	Enclosed
SH-60I Seahawk	\$9,663,446	JP8	3 tons	13.19 tons	3+6	40	FLIR, Weather Radar (150km), Radar (40km)	Shielded
HH-60H Rescue Hawk	\$12,195,678	JP8	2.72 tons	15.95 tons	3+ 2 Stretchers and 4 sitting patients, or 8 troops	34	2 <sup>nd</sup> Gen FLIR, 2 <sup>nd</sup> Gen Image Intensification, Weather Radar (50km)	Enclosed
HH-60J Jayhawk	\$11,519,053	JP8	2.58 tons	15.45 tons	4+2 Stretchers and 4 sitting patients, or 6 sitting patients	32	2 <sup>nd</sup> Gen FLIR, 2 <sup>nd</sup> Gen Image Intensification, Weather Radar (150km), Radar (50km), Look-Down Radar	Enclosed
MH-60R Romeo Hawk	\$25,240,072	JP8	2.71 tons	15.27 tons	4	30	2 <sup>nd</sup> Gen FLIR, 2 <sup>nd</sup> Gen Image Intensification, Weather Radar (150km), Radar (300km), ISAR Radar (300km), Look-Down Radar	Enclosed
M-60S Knighthawk	\$14,719,433	JP8	4.22 tons	14.37 tons	6+ 2 Stretchers and 4 sitting patients, or 12 troops	30	2 <sup>nd</sup> Gen FLIR, 2 <sup>nd</sup> Gen Image Intensification, Weather Radar (150km), Radar (100km), Look-Down Radar	Enclosed
MH-60T Jayhawk	\$10,151,044	JP8	2.23 tons	16.84 tons	4+6	33	2 <sup>nd</sup> Gen FLIR, 2 <sup>nd</sup> Gen Image Intensification, Weather Radar (150km), Radar (150km), Look-Down Radar, ISAR Radar (150 km)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
SH-60B Seahawk (Early)	389	183	38/45	3800	1649	5790
SH-60B Seahawk (MEF-MOD)	437	206	43/40	3800	1853	5790
SH-60B Seahawk (Block I)	422	199	42/40	3800	1918	5790

SH-60F Ocean Hawk	464	219	46/40	3150	1968	5790
SH-60I Seahawk	442	209	44/40	2756	2066	5790
HH-60H Rescue Hawk	399	188	40/40	3150	2295	5790
HH-60J Jayhawk	403	190	40/40	3674	1838	5790
MH-60R Romeo Hawk	394	186	39/40	3800	1789	5790
M-60S Knighthawk	419	198	42/40	3800	1901	5790
MH-60T Jayhawk	370	175	37/40	3674	1761	5790

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
SH-60B Seahawk (Early)	IR Suppression, MAD Sensor, Sonobuoys (125), INS, Secure Radios	40m	+2	6 Hardpoints	None
SH-60B Seahawk (MEF-MOD)	IR Suppression, MAD Sensor, Sonobuoys (125), INS, Secure Radios, Laser Jammer, Flare/Chaff Dispensers (40/40), RWR	40m	+2	6 Hardpoints, 2xM-60D Doorguns	3000x7.62mm
SH-60B Seahawk (Block I)	IR Suppression, MAD Sensor, Sonobuoys (100), Secure Radios, Laser Jammer, Flare/Chaff Dispensers (40/40), AIRBAC Dispenser (1), RWR, GPS	40m	+3	7 Hardpoints, 2xGAU-19/A Doorguns	1500x.50
SH-60F Ocean Hawk	IFF, IR Suppression, Dipping Sonar, Sonobuoys (8), Flare/Chaff Dispensers (30/30), AIRBAC Dispenser (1), GPS, Secure Radios, RWR	40m	+1	5 Hardpoints, 2xM-60D or M-240D or M-2HB Doorguns	3000x7.62mm or 1500x.50
SH-60I Seahawk	IFF, IR Suppression, Flare/Chaff Dispensers (40/40/10), RWR, GPS, ECM, ECCM, IRCM, Secure Radios, Satcom Radio, Radio Jammer (15 km), NBC Overpressure	40m	None	5 Hardpoints (w/ESSS)	None
HH-60H Rescue Hawk	IFF, IR Suppression, Flare/Chaff Dispensers (60/60/10), RWR, LWR, INS/GPS, ECM, ECCM, IRCM, Secure Radios, Satcom Radio, Radio Jammer (15 km), Laser Designator, Laser Rangefinder	40m	+2	7 Hardpoints, 2xM-60D or M-240D or M-134 or M-2HB or GAU-19/A Doorguns	4000x7.62mm or 2500x.50
HH-60J Jayhawk	IFF, GPS, IR Suppression, RWR, GPS, Secure Radios	40m	None	5 Hardpoints (ESSS), M-240D, M-107A1 Sniper Rifle Doorguns	3000x7.62mm, 30 10-Round Magazines .50
MH-60R Romeo Hawk	IFF, BMS, IR Suppression, Dipping Sonar, Sonobuoys (80), Secure Radios, Laser Jammer, Laser Designator, Flare/Chaff Dispensers (40/40), AIRBAC Dispenser (1), RWR, GPS, Radio Jammer (30km), ECM, ECCM, IRCM (30km each)	40m	+3	7 Hardpoints, 2xM-240D or M-134 or M-2HB or GAU-19A Doorguns	4000x7.62mm or 2500x.50
M-60S Knighthawk	IFF, BMS, IR Suppression, Secure Radios, Satcom Radio, Laser Designator, Laser Rangefinder, Flare/Chaff Dispensers (60/60/20), RWR, GPS, Radio Jammer (30km), ECM, ECCM, IRCM (30km each)	40m	+3	7 Hardpoints, 2xM-240D or M-134 or M-2HB or GAU-19A Doorguns	4000x7.62mm or 2500x.50
MH-60T Jayhawk	IFF, GPS, IR Suppression, RWR, GPS, Secure Radios, Satcom Radio, Look-Down Radar, Laser Designator, Laser Rangefinder, Flare/Chaff Dispensers (30/30), Radio Jammer (30km), IRCM (30 km)	40m	+2	7 hardpoints, M-240H and M-107A1 Sniper Rifle Doorguns	3000x7.62mm, 30 10-Round Magazines .50

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
UH-60A	\$463,832	JP8	3.63 tons	9.19 tons	4+11		None	Enclosed
UH-60L	\$604,339	AvG	4.39 tons	11.11 tons	3+14	14	None	Enclosed
HH-60J	\$992,516	AvG	3.92 tons	9.93 tons	3+14	18	FLIR, Image Intensification	Enclosed
VH-60N	\$1,282,030	AvG	3 tons	10 tons	3+6	24	FLIR, Radar (Weather)	Shielded
SH-60B (Early)	\$1,424,720	AvG	3.74 kg	9.93 kg	3+6	24	Radar	Enclosed
SH-60B (Late)	\$1,854,730	AvG	3.74 kg	10.51 tons	3+6	24	FLIR, Radar, Image Intensifier	Enclosed
SH-60B (Block I)	\$1,904,730	AvG	3.74 kg	10.57 tons	3+6	24	FLIR, Radar, Image Intensifier	Enclosed
SH-60F	\$1,538,888	AvG	3.74 tons	9.42 tons	3+9	20	Radar	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
UH-60A	592	148	40/37	2756		4000
UH-60L	589	147	40/37	3500	1435	4000
HH-60J	604	151	40/38	3500	1350	4000
VH-60N	586	147	40/38	3500	1350	4000
SH-60B (Early)	518	130	40/37	3800	1217	4000
SH-60B (Late/Block I)	525	132	40/37	3800	1350	4000
SH-60F	604	151	40/37	2233	1350	4000

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
UH-60A	IFF, Flare/Chaff Dispensers, RWR, GPS	40m	None	2xMAG, M-60, GAU-19/A, or M-134 Doorguns	2000x7.62mm
UH-60L	IFF, IR Suppression, Flare/Chaff Dispensers, RWR, GPS, IRCM	40m	None	2xMAG Doorguns	2000x7.62mm
HH-60J	Secure Radios, IR Suppression, Flare/Chaff Dispensers, RWR, GPS, IRCM	40m	None	2xMAG Doorguns	2000x7.62mm
VH-60N	IR Suppression, Flare/Chaff Dispensers, RWR, GPS, ECM, IRCM, Secure Radios, Satcom Radio, Short-Range Radio Jammer	40m	None	None	None
SH-60B (Early)	IR Suppression, MAD Sensor, Look-Down Radar, Sonobuoys (125), Inertial Navigation, Secure Radios	40m	+2	4 Hardpoints	None
SH-60B (Late)	IR Suppression, MAD Sensor, Look-Down Radar, Sonobuoys (125), Inertial Navigation, Secure Radios, Laser Jammer, Flare/Chaff Dispensers, RWR	40m	+2	4 Hardpoints, 2xM-60D Doorguns	2000x7.62mm
SH-60B (Block I)	IR Suppression, MAD Sensor, Look-Down Radar, Sonobuoys (125), Inertial Navigation, Secure Radios, Laser Jammer, Flare/Chaff Dispensers, RWR, GPS	40m	+3	5 Hardpoints, 2xM-60D Doorguns, GAU-19/A	1000x7.62mm, 500x.50
SH-60F	IR Suppression, Dipping Sonar, Sonobuoys (8), Inertial Navigation, Secure Radios, RWR	40m	+1	5 Hardpoints, 2xM-60D Doorguns	2000x7.62mm

### Special Operations Black Hawks

#### **Early Special Operations Black Hawks**

The first special operations Black Hawks were the M-60A Black Hawks. (Well, this is not *entirely* true; the HH-60D Night Hawk was the *first* first attempt, but it proved unsuitable, and did not pass beyond the prototype stage.) Some 30 UH-60As were modified for the special operations role, with additional avionics, a NOD-compatible cockpit, a FLIR camera, doorguns, extra internal fuel, and the ESSS winglets which were almost always carried, often with a weapon load and extra fuel tanks. The winglet weapons were assisted by a laser rangefinder, laser designator, and a ballistic computer. They were used by the US Army special operations forces (including Rangers on some missions) in the 1980s, before being replaced by the MH-60L in the early 1990s. The MH-60As were then passed to the Air National Guard and Reserves, to operate with National Guard Special Forces units and Reserve Ranger units. The MH-60A

can drop up to three fast-ropes on each side, or four rappelling ropes. The MH-60A was operated by the 160<sup>th</sup> SOAR Night Stalkers, a special operations aviation unit. The MH-60A, like most special operations aircraft, is capable of Paving, or flying just a few meters above terrain, like a miles-long roller-coaster ride; this is as much due to the skill of the pilots as due to the TFR radar. Most of the Black Hawks used during Operation Gothic Serpent were MH-60As, though some were heavily-modified UH-60As and a few were MH-60L Pave Hawks. (S-70As were used in the movie.) The additional avionics meant that the MH-60A's crew could leave most of the flying on automatic and allow them to concentrate more outside the cockpit, especially crucial in night flying.

The HH-60G Pave Hawk was the next step in the development of special operations helicopters. It is most notable for the introduction of a helmet/sight interface for the aiming and firing of its winglet- and sponson-mounted weapons. (It cannot control the doorguns.) This sight interface can also slave the weapons to a laser designator and laser rangefinder, or an MMW radar guidance system for certain weapons. All 98 UH-60A Credible Hawks, plus some new UH-60As, were upgraded to the HH-60G Pave Hawk configuration and designation; these are orientated towards the CSAR mission and in the case of the former Credible Hawk, retain their medical suite plus some added equipment (mainly room for six stretchers and four sitting patients, and more IV, bandages, splints, and drugs), a blanket warmer for hypothermic patients, and special "chill blankets" for hyperthermic patients. The new UH-60As were modified to the same specification, but designated HH-60G. They had HIRSS exhaust shields (a better version of the standard IR Suppression), and room for door gunner positions on either side (something not found on most dustoffs as a standard fit), though the door gunners and doorguns are not normally carried on the HH-60G and MH-60G. They have small freezers to cool the chill blankets, as well as a small refrigerator for temperature-sensitive medicines. If the doors are shut and locked, the Pave Hawks have the benefits of NBC Overpressure (something which cannot be done with door guns mounted). It is staffed with a Doctor, PA, or Nurse Practitioner, and two medical techs (and sometimes door gunners; the stats below reflect this). If simply deploying or recovering healthy or lightly wounded troops, the stretchers are folded and the Pave Hawks can lift up to 11 troops. The aircraft has a small EW suite, as well as the same electro-optical setup of the MH-60A, except that the MH-60Gs have color weather radar. The MH-60Gs also have a BMS installed, with over-horizon capability; it is normally used to receive real-time information on their missions and surveillance information from drones and satellites. Both have the capability to detect the personal locator beacons that many special ops personnel carry. Normally, the ESSS Winglets carry a pair of large fuel tanks, as do the sponsons; however, the outer winglets often carry weapons, from machineguns and cannons to rocket launchers and Hellfire missiles. The sponsons sometimes carry Stinger or Sidewinder missiles if air opposition is expected, or Sidewarm missiles in a heavy radar environment. Though designated differently, the HH-60G and MH-60G are essentially configured almost identically; the MH-60G, however, has a more comprehensive EW suite and has slightly more powerful engines of 1630 shaft horsepower each, and the tail of the UH-60L for greater maneuverability. Both are capable of Paving, as their name indicates, and can recover troops via STABO, SPIE and McGuire rigs, and CRRC. Both have anti-icing systems for the windshields and rotor blades, and a retractable in-flight refueling probe. They have a rescue hoist capable of lifting 300 kilograms with 100 meters of cable. The HH-60G is primarily used by the National Guard, Reserves, and Combat Commands in Europe, the Pacific, AETC, and Air Combat Command. A small number are used by USAF Materiel Command for testing new equipment, weapons, and flight regime testing. The MH-60Gs are mostly assigned to SOCOM and flown by the Army's 160<sup>th</sup> SOAR (Nighthawks).

### **The "Transition" Special Ops Black Hawks**

The HH-60L Pave Hawk is, as the designation suggests, based on the UH-60L airframe and engines. However, the HH-60L has more powerful T-700-GE-401D engines, developing 1940 shaft horsepower each. It has the increase of maneuverability of the UH-60L. It is outfitted similarly to the HH-60G, but also has a litter lift system what allows the crew to take in a patient by sliding the patient table out, then pulling it back in and if necessary, raising it to about middle of the height of the cabin. The HH-60L has a full surgical care kit and suite, if the ride is smooth enough to allow surgery (usually, only life-saving surgery is conducted aboard the aircraft). Full patient monitoring can be placed on the patient, whether on litters or sitting. In addition to normal vessels, the HH-60L can land aboard hospital ships. The HH-60L can also take 4 sitting patients, or the litter tables can be swung up against the front and back of the cabin and the HH-60L can take up to 11 troops, plus the crew, or bulk cargo. It should be noted that no equipment is removed from the HH-60L despite its changing internal configuration. The cabin light may generate high-intensity lighting for surgical or treatment use or lower lighting which is also NOD-compatible. HH-60Ls are normally marked as medical aircraft to (hopefully) avoid taking ground fire (fat chance), and almost never mount door guns, though they often mount ESSS or sponson-mounted weapons, and can fire a variety of weapons, from machineguns and cannons to Sidewinder missiles. (They are primarily CSAR and aeromedical aircraft.) ESSS and sponson hardpoints almost always carry fuel tanks, and the HH-60L is also capable of in-flight refueling. The HH-60L has a BMS system and is fully integrated with Link 16 and BFT. Its gunner uses the helmet/sight interface of the MH-60G and also has the TopOwl helmet sensor system and the Pathfinder electro-optical suite. The TopOwl system also shows on the helmet visor the location of friendly assets, combat information, and overlays of information from the Pathfinder suite.

The MH-60L Direct Action Penetrator, also known as the AH-60L DAP, is a very different animal from the HH-60L. It too is based on the UH-60L, and has the same T-700-GE-401D engines, as well as the same maneuverability. That's where the similarity ends. The DAP is an attack helicopter, first and foremost; it's designed to provide immediate fire support to special operations teams, whether in action, during deployment, or extraction. It also escorts other helicopters in those roles. It suppresses enemy fire in hot LZs. The DAP can take a small team of four troops, but its primary role is to carry weapons, and the cabin is most often filled with reloads for its weapons and a pair of door gunners; troops are not often carried due to high gross aircraft weights. The DAP carries the ESSS, and on it, generally a pair of 30mm M-230 Chainguns on the outer hard point, or Mk 19 AGMs instead of the 30mm autocannons. These two hardpoints also often carry four Hellfires on the inner hardpoints and rocket launchers on the outer

hardpoints. A third hardpoint is attached to the end of each ESSS, where a pair of 10-round Hydra-70 launchers, four Hellfire missiles, two Maverick missiles, or four Stinger missiles or two Sidewinder missiles. Sometimes, a pair of M-3M or M-2HB machineguns are carried. The main landing gear are extended in length; this prevents the Hellfire missiles or rocket launchers on the wingtip hardpoints, when mounted, from bumping the ground. The door gunner's M-134s are able to be locked just slightly less than forward to contribute to strafing and benefit from the sights of the DAP. The DAP's sponsons normally carry external fuel tanks, but often carry weapons as well, and in fact are capable of carrying bombs; one of the most common weapons carried on the sponsons are a pair of M-134 Miniguns. The DAP has a BMS system and is fully integrated with Link 16 and BFT. Its gunner uses the helmet/sight interface of the MH-60G and also has the TopOwl helmet sensor system and the Pathfinder electro-optical suite. The TopOwl system also shows on the helmet visor the location of friendly assets, combat information, and overlays of information from the Pathfinder suite. The DAP has a comprehensive EW suite as well as missile launch warning, radar illumination, and laser illumination warning gear. Modifications to the glass cockpit include an Armament System Processor Panel, telling the gunner what weapons he has onboard, which ones to fire, and how much ammunition he has; a digital video recorder (like a gun camera), a dual helmet/sight interface (either crewmember may fire the weapons), and a HUD visor in each helmet. The DAP has an upgraded, robust electrical system upgrade to handle the sheer amount of weapons. The DAP has existed since at least Desert Storm; a few early examples were engaged in Scud-Hunting at the time, though few were in service then. The DAPs are exclusively flown by the 160<sup>th</sup> SOAR. Weapons may be aimed by optical gunsights (computer-assisted), laser guidance, or radio or radar-guidance. The DAP has slightly thicker armor than the standard Black Hawk series. The MH-60L DAP was replaced by the MH-60K DAP, which was in turn replaced by the MH-60M DAP.

Despite the designation, the MH-60K DAP is an upgraded version of the MH-60L DAP, differing primarily in the advanced integrated cockpit (a modified form of that of the UH-60M), the EW suite, the electro-optical suite, and the door guns able to be mounted. It is also a little more maneuverable than the MH-60L DAP, has upgraded navigation and communication systems including color weather radar, integrated Aviation Support Equipment, modular replacement packages and circuit boards, interactive MFDs, and has a digital map generator, feeding from the GPS/INS system, the BMS, and the weather radar. Some of the components are more miniaturized and the MH-60K DAP is a little lighter than the MH-60L DAP, with a slight increase in cargo capacity. It is capable of taking, deploying, or recovering up to four troops by various means; however, this is not often done due to the aircraft's already high weight. The MH-60K has an extendible in-flight refueling probe, but these were not added until 2003. It otherwise has all the systems of the MH-60L DAP. Deployment to the 160<sup>th</sup> SOAR began in 1994, but it started to be replaced by the further-upgraded MH-60M in 2010.

The MH-60L Pave Hawk (also known, less commonly, as the Black Hawk and the Velcro Hawk, for the way things were just added in and "stuck on" the aircraft) uses the same base as the MH-60L DAP, but is a special ops utility helicopter. It is essentially a UH-60L with extra features added in to make it more suited for its special operations missions. These include a substantial electro-optical and EW suite. The MH-60L Pave Hawk has a BMS system and is fully integrated with Link 16 and BFT. Its gunner uses the helmet/sight interface of the MH-60G and also has the TopOwl helmet sensor system and the Pathfinder electro-optical suite. The TopOwl system also shows on the helmet visor the location of friendly assets, combat information, and overlays of information from the Pathfinder suite. It is equipped with an extensive communications suite, including data capable modules that connect to the helicopter's instruments and electro-optical suite and can transmit video, pictures, and data through its standard radios or its Satcom radio. It can recover troops via STABO, SPIE and McGuire rigs, and CRRC; it can deploy troops through rappelling or fast ropes, or by parachuting or helocasting. The MH-60L also has a 300-kilogram-capacity hoist with 300 meters of cable. It often sling-loads assault boats or light vehicles for use by the deployed team. Interior rearrangement allows the carriage of one more trooper over the UH-60L. The MH-60L has the more powerful T-700-GE-401D engines. It can also be kitted out as a Medivac chopper, in which case it has the setup and internal capabilities and crew of the HH-60G/L. Medical birds normally do not carry door guns or door gunners, and carry external fuel tanks on their sponsons and ESSS winglets. For game purposes, the medical version is identical to the HH-60L. The MH-60L often mounts ESSS or sponson-mounted weapons, and can fire a variety of weapons, from machineguns and cannons to Sidewinder missiles. The sponsons are enlarged and carry 700 liters of fuel each. The MH-60L is also capable of in-flight refueling. It is rumored that the MH-60L served as the base helicopter in the construction of the Stealth Black Hawk (see below), but it is more likely that the modified Pave Hawk was built on the MH-60K platform.

### **Late and Current Special Ops Black Hawks**

Despite the designation, the MH-60K DAP is an upgraded version of the MH-60L DAP, differing primarily in the advanced integrated cockpit (a modified form of that of the UH-60M), the EW suite, the electro-optical suite, and the door guns able to be mounted. It is also a little more maneuverable than the MH-60L DAP, has upgraded navigation and communication systems including color weather radar, integrated Aviation Support Equipment, modular replacement packages and circuit boards, interactive MFDs, and has a digital map generator, feeding from the GPS/INS system, the BMS, and the weather radar. Some of the components are more miniaturized and the MH-60K DAP is a little lighter than the MH-60L DAP, with a slight increase in cargo capacity. It is capable of taking, deploying, or recovering up to four troops by various means; however, this is not often done due to the aircraft's already high weight. The MH-60K has an extendible in-flight refueling probe, but these were not added until 2003. It otherwise has all the systems of the MH-60L DAP. Deployment to the 160<sup>th</sup> SOAR began in 1994, but it started to be replaced by the further-upgraded MH-60M in 2010.

Again, the MH-60K is more advanced than the MH-60L Pave Hawk; the MH-60L and MH-60L DAP were essentially interim models until the MH-60Ks were ready, but development of the MH-60Ks started before the MH-60Ls in 1988. The MH-60K is officially

referred to as a Black Hawk, but is more commonly referred to by SOCOM operators and crews as a Pave Hawk. They began replacing the MH-60L Pave Hawks in 1994, and full squadron service began three years later after field and combat testing; more changes were made to the electronics and interior arrangements, and things like the sling hook and the landing gear were made more robust. The aircraft was made more resistant to fire with stronger rotor blades and a full armor cockpit with the cabin having a titanium plate underneath it, and the cockpit and cabin are lined with extra Kevlar. The MH-60L Pave Hawk was almost completely replaced by the MH-60K by the start of the Iraq War. The rotor and tail rotor blades are “cutter blades” – they slice through power lines and cables that would bring down an earlier MH-60. The MH-60K is a more advanced version of the MH-60L, primarily in the area of more advanced versions of the avionics and instruments of the MH-60L, and for game purposes it primarily manifests itself in a lighter, faster, and more responsive aircraft. The MH-60K Pave Hawk has basically the same electro-optical suites, EW suites, and fuel and weapons-carrying ability of the MH-60L, but they are more advanced. Other improvements include sponsons with 700 liters of fuel each, a pair of M-2HB machineguns at the windows, and M-134 Minigun doorguns. They have the electronic suites of the MH-60G and MH-60L, but in a more miniaturized and advanced form, with the communications suite, for example, being able to transmit video, pictures, information from the weather radar, maps from the BMS and personal locator beacons. The MH-60K is able to deploy and recover troops and their vehicles in the same manner as the MH-60L and G. The interior is rearranged, and has room for even heavily-encumbered troops, and also carries a large amount of medical instruments and supplies, including two elevated stretcher positions which fold up when not needed. For game purposes, other capabilities mimic the MH-60G and L.

The MH-60M, first reaching service with the 160<sup>th</sup> SOAR in 2011, is essentially a Pave Hawk based on the UH-60M aircraft. They are, of course, modified to special ops standards, from electro-optical and EW to the computers and avionics. It is partially an upgraded MH-60K, and part new aircraft. (They are built on new airframes.) The avionics have been miniaturized in some cases, and some new gadgets and avionics have been added in. The MH-60M has a laser designator and laser rangefinder, and the TopOwl helmet sensor system and the avionics computers have been upgraded to allow better use of Hellfire or Maverick missiles carried on the ESSS or sponsons. These lasers are on a turret in the nose of the aircraft, as are a near-infrared sensor, a color TV camera, and the ISAR radar aperture. The MH-60M can also take over the guidance for many types of ordnance dropped or fired by other aircraft and helicopters, or even ground-launched weapons. A large, bulbous fairing at the front of the nose of the MH-60M houses the rest of the electro-optical suite. Again, the sponsons are enlarged and each carries 700 liters of fuel, in addition to having a hardpoint. It also has a retractable refueling probe for aerial refueling. It is equipped with an extensive communications suite, including data capable modules that connect to the helicopter's instruments and electro-optical suite and can transmit video, pictures, and data through its standard radios or its Satcom radio. The MH-60M uses more powerful YT706-GE-700 engines with 2638 shaft horsepower each. Controls are by fly-by-wire systems, similar to most modern fighter and bomber aircraft. They have hingeless rotors and wide-chord rotor blades that can cut through most power lines and other cables without suffering major damage. The new tail, stabilizer, and parts of the fuselage are built of a carbon fiber/fiberglass honeycomb material, further decreasing weight. It can recover troops via STABO, SPIE and McGuire rigs, and CRRC; it can deploy troops through rappelling or fast ropes, or by parachuting or helocasting. The MH-60M also has a 300-kilogram-capacity hoist with 300 meters of cable. It often sling-loads assault boats or light vehicles for use by the deployed team. Interior rearrangement allows the carriage of one more troop over the UH-60L. It can also be kitted out as a Medivac chopper, in which case it has the setup and internal capabilities and crew of the HH-60G/L (and is known as an HH-60M).

The HH-60M is the medical version of the MH-60M Pave Hawk. It is often called the Dustoff Hawk. It is currently the primary special operations medevac helicopter, and it based on the MH-60M airframe, engines, and avionics. It is, however, optimized for medical missions, and is often accompanied in its mission by an Apache gunship or DAP helicopter to protect it. Though officially called the Black Hawk, it is more commonly known as the Medevac or Medevac Pave Hawk to its users and crews. It has the mechanical improvements and engines of the MH-60M, with a rearranged interior able to carry an amount of medical supplies that would make a hospital emergency room proud, and bubble side windows to fit the new supply lockers and their displacement of two of the stretchers. Though it does not normally carry weapons, and rarely carries door or window guns, it can carry them on its ESSS winglets, and has a laser rangefinder and designator for Hellfire missiles, or can carry machineguns on the winglets or sponsons for delivering suppressive fire. Medical gear carried is similar to that of the HH-60G and HH-60L, with the power slide out and lift stretcher tables of the HH-60L. The stretcher platforms can also be folded up against the sides of the aircraft, to allow for a large number of sitting casualties or simple extraction. The crew generally consists of its two pilots, a doctor or PA trained in emergency procedures, and a medic with similar training. Six stretcher and four sitting patients may be carried; for each stretcher pad folded, one more sitting patient may be accommodated. It can also extract up to nine regular troops and their gear, for a total of 11. The HH-60M has a full surgical care kit and suite, if the ride is smooth enough to allow surgery (usually, only life-saving surgery is conducted aboard the aircraft). Full patient monitoring can be placed on the patient, whether on litters or sitting. The HH-60M has medical suction devices with an internal tank for medical and hazardous waste, as well as bins for soiled bandages, gauze, sponges, bit of uniform cut away, etc. In addition to normal vessels, the HH-60M can land aboard hospital ships. The HH-60M can also take 4 sitting patients, or the litter tables can be swung up against the front and back of the cabin and the HH-60L can take up to 11 troops, plus the crew, or bulk cargo. It should be noted that no equipment is removed from the HH-60M despite its changing internal configuration. The cabin light may generate high-intensity lighting for surgical or treatment use or lower lighting which is also NOD-compatible. ESSS hardpoints almost always carry fuel tanks, and the HH-60M is also capable of in-flight refueling. The HH-60M has a BMS system and is fully integrated with Link 16 and BFT. Its gunner uses the helmet/sight interface of the MH-60G and also has the TopOwl helmet sensor system and the Pathfinder electro-optical suite. The TopOwl system also shows on the helmet visor the location of friendly assets, combat information, and overlays of information from the Pathfinder suite, the ISAR radar, and the video and photo links to headquarters. The avionics have been miniaturized in some cases, and some new gadgets and avionics have been added in. The

lasers are on a turret in the nose of the aircraft, as are a near-infrared sensor, a color TV camera, and the ISAR radar aperture. The sponsons are enlarged and each carries 700 liters of fuel, in addition to having a hardpoint. Other avionics not specifically addressed here or in the stats are mostly as on the MH-60M, while medical appointments are otherwise similar to the HH-60G and L for game purposes (the better of the two aircraft). With doors closed and sealed, the cabin retains a sterile environment and the benefits of NBC Overpressure, along with an internal air evacuator to rid the aircraft of contaminated air. There are also air filters and air exchangers. In addition to SOCOM, the HH-60M is used by the South Dakota National Guard, who operates six of them, the 82<sup>nd</sup> Airborne Division, and the 25<sup>th</sup> Infantry Division. Some 30 are operated by SOCOM. The HH-60M will eventually replace the HH-60G and HH-60L in all uses.

The MH-60M DAP (Defensive Armed Penetrator, in the case of the MH-60M DAP) is sometimes called the AH-60M, though this is not an official designation. It essentially an MH-60K DAP upgraded to the MH-60M configuration, and then more. First of all, they have more powerful engines -- YT706-GE-700As, which develop 2700 shaft horsepower each. These are somewhat more powerful than those of even the MH-60M Pave Hawk and go a long way towards mitigating the MH-60M DAP's greatly-increased weight over the MH-60 Pave Hawk. (The DAP also is not set up to carry troops, being filled with extra fuel and reloads for its weapons.) The MH-60M DAP has numerous modifications, ranging from electro-optical and EW to the computers and avionics. It is partially an upgraded MH-60K DAP, and part new aircraft. The avionics have been miniaturized in some cases, and some new gadgets and avionics have been added in. The MH-60M has a laser designator and laser rangefinder. The TopOwl helmet system has been replaced with an Apache-type helmet with a monocle for night vision, enhanced vision, and weapons use while retaining a view outside the cockpit and of the instruments. The MH-60M also has an enhanced HUD that allows the pilot and copilot/gunner to spot targets and keep track of aircraft functions, and also has a HUD interface. The avionics computers have been upgraded to allow better use of Hellfire or Maverick missiles carried on the ESSS or sponsons. These lasers are on a turret in the nose of the aircraft, as are a near-infrared sensor, a color TV camera, and the ISAR radar aperture. (It should be noted that the MH-60M DAP normally carries fixed forward-firing Miniguns on the sponsons, with ammunition drums behind them on the sponson; this is the normal loadout, though other weapons can be carried.) The radar is more of a fighter-type radar, with a true EW suite, and the ability to see in 270 degrees, including up and down (the crew can "look through the roof" and look through the floor" to see enemy targets and personal locator beacons. The MH-60M can also take over the guidance for many types of ordnance dropped or fired by other aircraft and helicopters, or even ground-launched weapons. A large, bulbous fairing at the front of the nose of the MH-60M houses the rest of the electro-optical suite. The MH-60M DAP is capable of carrying a variety of new weapons, such as small JDAMs, iron bombs and laser-guided bombs, subject to weight restrictions.

Again, the sponsons are enlarged and each carries 700 liters of fuel, in addition to having a hardpoint. It also has a retractable refueling probe for aerial refueling. It is equipped with an extensive communications suite, including data capable modules that connect to the helicopter's instruments and electro-optical suite and can transmit video, pictures, and data through its standard radios or its Satcom radio. Controls are by fly-by-wire systems, similar to most modern fighter and bomber aircraft. They have hingeless rotors and wide-chord rotor blades that can cut through most power lines and other cables without suffering major damage. The new tail, stabilizer, and parts of the fuselage are built of a carbon fiber/fiberglass honeycomb material, further decreasing weight.

### **The Stealth Black Hawk**

There is still very much an air of mystery surrounding what has been called the Stealth Hawk (and reportedly referred to in the special ops community as the Ghost Hawk; another, little used sobriquet is the Silent Hawk). The Stealth Hawk is often given the designation MH-60X or MH-X or M-X, though no official designation has been released to the public. It was first revealed, in demolished form, during Operation Neptune Spear, the raid that killed Osama Bin Laden, and some details, estimates, and inferences have leaked out since then or been made by all from internet fans to aeronautics experts. Though the Stealth Hawks used in Neptune Spear appear to be the first two, it is rumored that since then at least six more Stealth Hawks have been built and used, along with a few stealth A/MH-6s and possibly one stealth CH-47.

Most information puts the Stealth Hawks as highly-modified MH-60Ls, though it is more logical that MH-60Ks were used, since they were the most advanced Pave Hawks available at the time of the raid. (The MH-60M was just coming into service during Neptune Spear, with perhaps less than ten available at the time). Therefore, I have used the MH-60K as a base for this treatment. The interior of the Stealth Blackhawk is largely unchanged from the interior of the MH-60K; most of the modifications are external and consist of an unspecified-composition add-on stealth-shaping panels and replacements for some other aircraft panels with RAM and carbon fiber. The windshields and windows are treated to that the troops and crew do not create a large radar signature and so radar does not penetrate the glass. The composition of the windshield and windows is not something I've been able to find out. The add-on stealth shaping is similar to the faceted construction of the F-117 Nighthawk, with design lessons taken from the RAH-66 Comanche, and the working roots of the rotors are capped with stealth shaping. The rotors are wide-chord and the main rotor is hingeless. The exhausts use an advanced form of the HIRSS IR Suppression. Rotor noise is somehow dampened, and much quieter than that of even the MH-60K, and this design lesson goes all the way back to a modified Hughes 500P used in Vietnam, called the "Quiet One," and which has such a reduced noise signature that it was able to deploy crews to plant a wiretap. The noise dampening gives the Stealth Hawks an advantage of 15-30 seconds over normal MH-60s before they are heard on the ground. The design was also influenced by the Indian HAL LCH and European Tiger attack helicopter, which employ some stealth features. The stabilators appear to be swept forward, while the tails appears to be swept back. The add-on shaping is said to add some 500 kilograms to the weight of the aircraft, with other stealth systems and coatings adding more weight. Several weeks of special training were done by the 160<sup>th</sup> SOAR pilots who flew them due to their unique flying characteristics. The Stealth Black Hawk has a retractable refueling probe, which retracts into

a RAM/stealth enclosure. The landing gear retracts partially, into enclosures. With all external modifications added, the aircraft actually more resembled an S-76 than an MH-60, though the appearance is superficial. The Stealth Hawk is reputedly slower than a standard MH-60K and less maneuverable. IR Searches and IR-homing missiles are two levels more difficult; radar searches and radar-homing missiles are also done at one level more difficult. Radar-directed guns fire as if they are not radar-directed. LADAR, LIDAR, and laser-guided searches and weapons suffer a -4 penalty. If the Stealth Hawk's doors are open, the radar stealth is negated. This is of course, in addition to the ECM and IRCM equipment carried.

The development and crew training were done at Area 51. It should be noted that the crews from 160<sup>th</sup> SOAR had every confidence in their ability to fly the exotic aircraft; however, the SEALs were less than thrilled about the flight characteristics of the Stealth Hawk and wanted to use the then-new MH-60Ms instead, or even MH-47s. This reticence was exacerbated for the SEALs by the fact that the Stealth Hawks were totally unproven in combat. (According to one source, the Stealth Hawks were sort of forced upon the SEALs.)

Some sources say that the Stealth Hawks were again employed in several raids by SEALs and Delta Force operatives, with perhaps the most well known being the 3 July 2014 deep penetration raid on an ISIS hideout in Syria. The Stealth Hawks were also believed to be used in the raid to kill ISIS leader Abu Sayyaf. They were possibly used in the raid to rescue relief workers Jessica Buchanan and Paul Tisted from Somali pirates. The Stealth Hawks are most likely kept at Tonapah Test Range in Nevada, where SOCOM has had a presence for years, and where they test new concepts, aircraft, and practice flying and raids. There is a less-than-reliable rumor that the Israelis have been using two Stealth Hawks, though this is doubtful. And of course, it is presumed that the Stealth Hawk wrecked in Pakistan has been picked over by the Chinese, Pakistanis, Russians, and Iranians.

For game purposes, the Stealth Hawks are essentially MH-60Ks with a stealth shape and treatment, such as RAM paint, on their fuselages and rotor blades and tails. They do not normally use window or door guns, so as not to spoil their stealth shape. They also rarely mount ESSSs, and if they do, the ESSSs have probably been given a treatment similar to the rest of the aircraft (including the fuel tanks), and used only to carry extra fuel. Note that the Stealth Hawk has no official designation, no official name, and does not officially exist. This text and the figures below are approximations and extrapolations.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
MH-60A Black Hawk	\$10,319,304	JP8	3.3 tons	13.25 tons	4+11	24	FLIR, Look-Down Radar (30km), TFR	Enclosed
HH-60G Pave Hawk	\$13,710,285	JP8	2.49 tons	14.79 tons	7+11 or 6 Stretcher Cases and 3 Sitting Patients	28	FLIR, MMW Radar (10km), Look-Down Radar (30km), TFR	Enclosed
MH-60G Pave Hawk	\$25,070,334	JP8	2.02 tons	16.67 tons	7+11 or 6 Stretcher Cases and 3 Sitting Patients	30	FLIR, MMW Radar (15km), Look-Down Radar (30km), Color Weather Radar (100km), TFR	Enclosed
HH-60L Dustoff Hawk	\$13,040,980	JP8	1.99 tons	14.9 tons	7+11 or 6 Stretcher Cases and 3 Sitting Patients	30	FLIR, Look-Down Radar (30km), Color Weather Radar (100km), TFR	Enclosed
MH-60L DAP	\$14,866,707	JP8	1.5 tons	17.9 tons	4	32	FLIR, MMW Radar (20km), Look-Down Radar (30km), Color Weather Radar (100km), TFR	Enclosed
MH-60K DAP	\$21,656,152	JP8	1.68 tons	16.75 tons	4+4	30	2 <sup>nd</sup> Gen FLIR, 2 <sup>nd</sup> Gen Image Intensification, MMW Radar (30km), Look-Down Radar (30km), Color Weather Radar (125km), TFR	Enclosed

MH-60L Velcro Hawk	\$12,760,178	JP8	4.13 tons	14.24 tons	4+12	24	2 <sup>nd</sup> Gen FLIR, MMW Radar (20km), ISAR Radar (20km), Color Weather Radar (100km), TFR	Enclosed
MH-60K Pave Hawk	\$21,050,032	JP8	4.49 tons	13.88 tons	6+10	25	2nd Gen FLIR, 2nd Gen Image Intensification, MMW Radar (25km), Color Weather Radar (125km), TFR	Enclosed
MH-60M Pave Hawk	\$22,227,383	JP8	4.84 tons	13.53 tons	6+10	26	3rd Gen FLIR, 3rd Gen Image Intensification, MMW Radar (30km), ISAR Radar (25km), Color Weather Radar (125km), TFR, Day/Night CCTV (500m)	Enclosed
HH-60M Dustoff Hawk	\$23,073,218	JP8	4.31 tons	15.66 tons	2+6 Stretcher Cases and 4 Sitting Patients or 5+11 troops	30	3rd Gen FLIR, 3rd Gen Image Intensification, ISAR Radar (25km), Color Weather Radar (125km), TFR, Day/Night CCTV (500m)	Enclosed
MH-60M DAP	\$25,248,749	JP8	2.63 tons	18.1 tons	4	32	3rd Gen FLIR, 3rd Gen Image Intensification, ISAR Radar (30km), AESA Radar (60km), Color Weather Radar (125km), TFR, Day/Night CCTV (500m)	Enclosed
MH-60X Stealth Hawk	\$29,293,221	JP8	4.08 tons	15.5 tons	2+12	34	3rd Gen FLIR, 3rd Gen Image Intensification, AESA Radar (60km), Color Weather Radar (125km), TFR, Day/Night CCTV (500m)	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
MH-60A Black Hawk	412	194	40/40	4570	1322	5790
HH-60G Pave Hawk	390	182	38/40	3197	1378	5790
MH-60G Pave Hawk	368	172	36/37	3197	1299	5790
HH-60L Dustoff Hawk	415	194	41/37	3197	1465	5790
MH-60L DAP	407	188	45/40	3300	1443	5790
MH-60K DAP	436	202	48/37	3300	1544	5790
MH-60L Velcro Hawk	453	209	44/37	4156	1711	5790
MH-60K Pave Hawk	465	215	45/35	4156	1755	5790
MH-60M Pave Hawk	536	247	52/35	4156	2024	5790
HH-60M Dustoff Hawk	523	242	51/35	4156	1985	5790
MH-60M DAP	480	223	48/35	4641	1699	5790
MH-60X Stealth Hawk	417	193	40/45	4156	1728	5790

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF*	Armament	Ammo
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MH-60A Black Hawk	IFF, Flare/Chaff Dispensers (30/30), IR Suppression, Secure Radios, GPS/INS, AFCS, RWR, Laser Designator, Laser Rangefinder, Paving Flight	40m	+1	2xM-134 Doorguns, 4 Hardpoints (w/ESSS)	3000x7.62mm
HH-60G Pave Hawk	IFF, Flare/Chaff Dispensers (40/40/10), HIRSS IR Suppression, Secure Radios, GPS/INS, AFCS, RWR, Laser Designator, Laser Rangefinder, Paving Flight, Engine Noise Reduced by 15%, Helmet/Sight Interface, NBC Overpressure, ECM (10km), ECCM (10km), IRCM (10km)	40m	+2	M-240D and M-2HB Doorguns, 6 Hardpoints (w/ESSS; Otherwise 2)	3000x7.62mm, 1500x.50
MH-60G Pave Hawk	IFF, Flare/Chaff Dispensers (50/50/10), HIRSS IR Suppression, Secure Radios, Satcom Radio, GPS/INS, AFCS, RWR, Laser Designator, Laser Rangefinder, Paving Flight, Engine Noise Reduced by 15%, Helmet/Sight Interface, NBC Overpressure, ECM (20km), ECCM (20km), IRCM (20km)	40m	+2	2xM-134 or 2xGAU-19/A Doorguns, 6 Hardpoints (w/ESSS; Otherwise 2)	4000x7.62mm, or 2000x.50
HH-60L Dustoff Hawk	IFF, Flare/Chaff Dispensers (50/50/10), HIRSS IR Suppression, Secure Radios, BMS, Satcom Radio, GPS/INS, AFCS, RWR, Laser Designator, Laser Rangefinder, Paving Flight, Engine Noise Reduced by 15%, Helmet/Sight Interface, HUD Visor, NBC Overpressure, ECM (20km), ECCM (20km), IRCM (20km)	40m	+2	6 Hardpoints (w/ESSS; Otherwise 2)	None
MH-60L DAP	IFF, Flare/Chaff Dispensers (60/60/20), RWR, LWR, GPS/INS, ECM (30km), ECCM (30km), IRCM (30km), LWR, Secure Radios, Satcom Radio, BMS, 2 <sup>nd</sup> Gen Laser Designator, 2 <sup>nd</sup> Gen Laser Rangefinder, Paving Flight, HIRSS IR Suppression, Engine Noise Reduced by 15%, AFCS, Helmet-Sight Interface, HUD Visor	40m	+3 (Except Side Guns when Manned)	GAU-19/A or M-134 Doorguns; 8 Hardpoints (w/ESSS; Otherwise 2), 2xM-230 Autocannons (Optional), Mk 19 AGLs (Optional), 4-8 Hellfire or 2-4 Maverick or 1-2 Sidewinder or 2-4 Stinger or 1-2 Hydra-70 RL Pods (Optional)	7500x7.62mm or 4500x.50, 3200x30mm (Optional) or 4800x40mm Grenades (Optional)
MH-60K DAP	IFF, Flare/Chaff Dispensers (60/60/20), RWR, LWR, GPS/INS, ECM (40km), ECCM (40km), IRCM (40km), LWR, Secure Radios, Satcom Radio, BMS, 2 <sup>nd</sup> Gen Laser Designator, 2 <sup>nd</sup> Gen Laser Rangefinder, Paving Flight, HIRSS IR Suppression, Engine Noise Reduced by 15%, AFCS, Helmet-Sight Interface, HUD Visor, Interactive Glass Cockpit, Map Generation, In-Flight Refueling	40m	+3 (Except Side Guns when Manned; Then +1 for Doorguns)	GAU-19/A or M-134 or M-2HB or Mk 19 Doorguns; 8 Hardpoints (w/ESSS; Otherwise 2) 2xM-230 Autocannons (Optional), Mk 19 AGLs (Optional), M-3M (Optional), 4-8 Hellfire or 2-4 Maverick or 1-2 Sidewinder or 2-4 Stinger or 1-2 Hydra-70 RL Pods (Optional)	7500x7.62mm or 4500x.50 or 1450x40mm Grenades; 3200x30mm (Optional) or 4800x40mm Grenades (Optional) or 9600x.50 (Optional)
MH-60L Velcro Hawk	IFF, Flare/Chaff Dispensers (60/60/20), RWR, LWR, GPS/INS, ECM (30km), ECCM (30km), IRCM (30km), LWR, Secure Radios,	40m	+2	2xM-134 or 2xGAU-19/A Doorguns, 6 Hardpoints (w/ESSS; Otherwise 2)	5000x7.62mm or 2500x.50

	Satcom Radio, BMS, 2 <sup>nd</sup> Gen				
	Laser Designator, 2 <sup>nd</sup> Gen Laser				
	Rangefinder, Paving Flight, HIRSS				
	IR Suppression, Engine Noise				
	Reduced by 15%, AFCS, Helmet-Sight Interface, HUD Visor, 300kg				
	Rescue Hoist				
MH-60K	IFF, Flare/Chaff Dispensers (60/60/20), RWR, LWR, GPS/INS, ECM (30km), ECCM (30km), IRCM (30km), LWR, Secure Radios, Satcom Radio, BMS, 2 <sup>nd</sup> Gen	40m	+2	2xM-134 and 2xM-2HB Doorguns, 6 Hardpoints (w/ESSS; Otherwise 2)	5000x7.62mm and 2500x.50
Pave Hawk	Laser Designator, 2 <sup>nd</sup> Gen Laser				
	Rangefinder, Paving Flight, HIRSS				
	IR Suppression, Engine Noise				
	Reduced by 15%, AFCS, Helmet-Sight Interface, HUD Visor, 300kg				
	Rescue Hoist, Armored Cockpit				
MH-60M	IFF, Flare/Chaff Dispensers (60/60/20), RWR, LWR, GPS/INS, ECM (30km), ECCM (30km), IRCM (30km), LWR, Secure Radios, Satcom Radio, BMS, 2nd Gen	40m	+2	2xM-134 and 2xM-2HB Doorguns, 6 Hardpoints (w/ESSS; Otherwise 2)	5000x7.62mm and 2500x.50
Pave Hawk	Laser Designator, 2nd Gen Laser				
	Rangefinder, Paving Flight, HIRSS				
	IR Suppression, Engine Noise				
	Reduced by 15%, AFCS, Helmet-Sight Interface, HUD Visor, 300kg				
	Rescue Hoist				
HH-60M	IFF, Flare/Chaff Dispensers (60/60/20), RWR, LWR, GPS/INS, ECM (30km), ECCM (30km), IRCM (30km), LWR, Secure Radios, Satcom Radio, BMS, 2nd Gen	40m	+2	6 Hardpoints (w/ESSS; Otherwise 2)	None
Dustoff Hawk	Laser Designator, 2nd Gen Laser				
	Rangefinder, Paving Flight, HIRSS				
	IR Suppression, Engine Noise				
	Reduced by 15%, AFCS, Helmet-Sight Interface, HUD Visor, 300kg				
	Rescue Hoist				
MH-60M	IFF, Flare/Chaff Dispensers (80/80/40), RWR, LWR, GPS/INS, ECM (60km), ECCM (60km), IRCM (60km), LWR, Secure Radios, Satcom Radio, BMS, 3 <sup>rd</sup> Gen	40m	+3 (Except Side Guns when Manned; Then +1 for Doorguns)	GAU-19/A or M-134 or M-2HB or Mk 19 Doorguns; 8 Hardpoints (w/ESSS) 2xM-230 Autocannons (Optional), Mk 19 AGLs (Optional), M-3M (Optional), 4-8 Hellfire or 2-4 Maverick or 1-2 Sidewinder or 2-4 Stinger or 1-2 Hydra-70 RL Pods, or 2xBombs (Optional); 2xM-134 Fixed Forward	7500x7.62mm or 4500x.50 or 1450x40mm Grenades; 3200x30mm (Optional) or 4800x40mm Grenades (Optional) or 9600x.50 (Optional); 7500x7.62mm
DAP	Laser Designator, 3 <sup>rd</sup> Gen Laser				
	Rangefinder, Paving Flight, HIRSS				
	IR Suppression, Engine Noise				
	Reduced by 15%, AFCS, Helmet-Sight Interface, HUD, Armored Cockpit, Armored Fuselage				
MH-60X	IFF, Flare/Chaff Dispensers (60/60/20), RWR, LWR, GPS/INS, ECM (30km), ECCM (30km), IRCM (30km), LWR, Secure Radios, Satcom Radio, BMS, 2 <sup>nd</sup> Gen	45m	+2	6 hardpoints (w/ESSS, Otherwise 2)	None
Stealth Hawk	Laser Designator, 2 <sup>nd</sup> Gen Laser				
	Rangefinder, Paving Flight, Advanced HIRSS				
	IR Suppression, Engine Noise Reduced by 25%, AFCS, Helmet-Sight Interface, HUD Visor, Armored Cockpit				



## A/MH-6 Little Bird

Notes: This is a special operations variant of the OH-6. The AH-6 and MH-6 are probably the quietest helicopters in the world, used to insert small special operations teams into enemy territory and back up units like the US Army's Delta Force. The A/MH-6 is equipped with special, quiet engines, added electronics, and provisions for ATGMs. An optional 80-liter internal fuel tank can be fitted at the expense of cargo or passengers. No ejection seats are provided, and the helicopter is not capable of in-flight refueling.

The AH-6C is based on the OH-6A Cayuse, with extra avionics and equipment for its attack mission. The AH-6E is based on the OH-6D, while the AH-6J is based on the MD-530 Defender. The MH-6E is based on the AH-6E, but has additional avionics, as well as engine noise dampening and skin construction of RAM. (All radar-based attacks and detection vs. the MH-6E is at -4.) The MH-6J is based on the AH-6J, and has the same skin, as well as a mast-mounted sight for its sensors.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
AH-6C	\$1,278,720	AvG	455 kg	1.24 tons	2+2	14	Thermal Imaging, Image Intensification	Shielded
AH-6E	\$1,283,059	AvG	520 kg	1.71 tons	2+2	14	Thermal Imaging, Image Intensification	Shielded
AH-6J	\$1,301,309	AvG	672 kg	1.72 tons	2+2	14	FLIR, Image Intensification	Shielded
MH-6E	\$1,740,105	AvG	760 kg	1.47 tons	2+4	16	FLIR, Image Intensification	Shielded
MH-6J	\$1,940,310	AvG	912 kg	1.48 tons	2+4	16	FLIR, Image Intensification	Shielded

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
AH-6C	480	120	20/30	340	44	4380
AH-6E/MH-6E	553	138	20/35	340	116	4380
AH-6J/MH-6J	518	130	15/32	340	106	4300

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
AH-6C/E/J	Laser Designator, Secure Radios, Flare/Chaff Dispensers, INS, TFR	30m	+3	M-134 or Mk19, 2xHardpoints	1285x7.62mm or 250x40mm
MH-6E/J	Laser Designator, Secure Radios, Flare/Chaff Dispensers, GPS, TFR, IR Suppression, Engine Noise Reduced by 60%	30m	+3	M-134, M-2HB, or Mk19, 2xHardpoints	1285x7.62mm, 775x.50, or 250x40mm
MH-6J	Laser Designator, Secure Radios, Flare/Chaff Dispensers, INS, TFR, IR Suppression, Engine Noise Reduced by 60%	30m	+4	M-134, M-2HB, or Mk19, 2xHardpoints	1285x7.62mm, 775x.50, or 250x40mm

## EH-60A Quick Fix

Notes: This is a Blackhawk airframe decked out with advanced electronics (and the accompanying antennae). The EH-60A is intended for battlefield EW. It performs ECM, ESM, and ARDF missions, and can gather COMINT/ELINT. The primary EW systems on EH-60A are the AN/ALQ-151 (v)2 Quickfix and the AN/TLQ-17A Trafficjam. No ejection seats are provided, but the aircraft is capable of aerial refueling.

Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
\$1,615,534	AvG	3.6 tons	14.35 tons	4+2	18	FLIR	Enclosed

Tr Mov	Com Mov	Mnvr/Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
592	148	40/37	3500	1198	4000

Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
Secure Radios, Radio Jammers, Chaff/Flare Dispensers, ECM, Active Jamming, IRCM	48m	None	None	None

### MH-47 Pave Chinook

Notes: This is the special operations version of the CH-47 Chinook, with upgraded electronics, provision for air-to-air refueling and buddy refueling, and armament. It was used before the advent of MH-53H Pave Low, but is still used from time to time when heavy loads need to be moved or the Pave Chinook's sling load capabilities are needed.

The MH-47D is based on the CH-47D. It has a wide variety of added communications, electronics, and defensive gear. A probe for aerial refueling is added, as is a rescue hoist with a capacity of 272 kg. The MH-47E is similar, but has additional defensive measures added, more powerful engines, as well as a flight management computer. The MH-47G is the latest special ops variant of the Chinook, based on the CH-47F.

Twilight 2000 Notes: The MH-47G does not exist.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
MH-47D	\$2,147,109	AvG	13.92 tons (up to 7.85 tons internal)	25.24 tons	5+44 or 25 paratroops	40	FLIR, Weather Radar	Enclosed
MH-47E	\$2,564,514	AvG	13.92 tons (up to 7.85 tons internal)	28.59 tons	5+44 or 25 paratroops	42	FLIR, Weather Radar	Enclosed
MH-47G	\$2,654,514	AvG	13.92 tons (up to 7.85 tons internal)	23.38 tons	5+44 or 25 paratroops	44	FLIR, Weather Radar	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
MH-47D	538	135	60/34	4200	2219	2575
MH-47E/G	630	157	60/39	4200	3199	2575

Vehicle	Combat Equipment	Minimum	RF	Armament	Ammo

		Landing/Takeoff Zone			
MH-47D	Secure Radios, Doppler/Inertial Navigation, GPS, Flare/Chaff Dispensers, Radio Direction Finder	80m	None	2xM-2HB Doorguns, M-134 (Rear)	1100x.50, 2000x7.62mm
MH-47E	Secure Radios, Doppler/Inertial Navigation, GPS, Flare/Chaff Dispensers (32), Radio Direction Finder	80m	None	2xM-2HB Doorguns, M-134 (Rear)	1100x.50, 2000x7.62mm
MH-47G	Secure Radios, Doppler/Inertial Navigation, GPS, Flare/Chaff Dispensers (32), Radio Direction Finder, IR Suppression	80m	None	2xM-2HB Doorguns, M-134 (Rear)	1100x.50, 2000x7.62mm

### MH-53 Pave Low

Notes: The Pave Low is the special operations variant of the Super Stallion, used for deep insertion of Marine Recon and FAST teams, Special Forces, Delta Force, and Rangers, SEAL teams, and USAF ARRS teams, as well as pathfinding for helicopters on deep strike missions. The Pave Low has a variety of radios and radars, a complete EW suite, all weather flight capability, a 300 kg rescue hoist, and thermal vision for the pilot, copilot, and gunner, and the ability to carry air-to-surface and air-to-air weapons. Its terrain-following capability is legendary, and it is well capable of flying less than 50 feet off the ground for hundreds of kilometers (in the hands of a skilled pilot and copilot; this type of flying, known as "Paving", is a Formidable: Pilot task). The Pave Low can carry external drop tanks (two 2145-liter tanks), and an internal extra fuel tank (8265 liters), all at the expense of cargo. The Pave Low is capable of in-flight refueling, buddy refueling, and amphibious landings, but has no ejection seats.

The MH-53J Pave Low III is an improved version of the MH-53H. Most of the upgrades are to the electronics systems. Cargo carrying capacity is increased, and the armor is made of titanium. Paving in an MH-53J is only a Difficult task, instead of the Formidable task of earlier versions.

Twilight 2000 Notes: Only about half the Pave Lows in the US inventory were upgraded to this standard before the Twilight War.

Vehicle	Price	Fuel Type	Load	Veh Wt	Crew	Mnt	Night Vision	Radiological
MH-53H	\$5,464,553	AvG	14.25 tons (up to 11.57 tons internal)	19.05 tons	6+38 or 22 paratroops	50	FLIR, Weather Radar	Enclosed
MH-53J	\$6,773,863	AvG	16.33 tons (up to 13.26 tons internal)	19.05 tons	6+38 or 22 paratroops	52	FLIR, Weather Radar	Enclosed

Vehicle	Tr Mov	Com Mov	Mnvr/Acc Agl/Turn	Fuel Cap	Fuel Cons	Ceiling
MH-53H/J	630	157	55/39	8619	5865	4000

Vehicle	Combat Equipment	Minimum Landing/Takeoff Zone	RF	Armament	Ammo
MH-53H	Flare/Chaff Dispensers, ECM, IRCM, Secure Radios, Doppler/Inertial Navigation, GPS, RWR, Engine Noise Reduced by 50%, Armored Fuselage	40m	+1	2xM-2HB Doorguns, M-134 (Rear), 4 Hardpoints	1100x.50, 2000x7.62mm

MH-53J	Flare/Chaff Dispensers, ECM, IRCM, Deception Jamming, Doppler/Inertial Navigation, GPS, TFR, RWR, LWR, Engine Noise Reduced by 50%, Armored Fuselage	40m	+2	2xM-2HB Doorguns, M-134 (Rear), 4 Hardpoints	1100x.50, 2000x7.62mm
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