

## What Makes the Marines' King Stallion Helo Such a Monster

Get a closer look at the heavy-duty helicopter that will carry Marines and their gear.

By Eric Tegler

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Sikorsky

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As Sikorsky Aircraft rolled out its new CH-53K heavy-lift helicopter, the Commandant of the Marine Corps, Gen. James F. Amos, introduced the name: King Stallion.

Slated to be operational in 2019, the King Stallion is among the first digitally designed helicopters, presaging a new generation of rotorcraft that will emerge in the next decade and a half. They'll be faster, more efficient, more lethal, and more capable.

While wags immediately observed that King Stallion sounds vaguely pornographic, it's actually a play on the CH-53K's predecessors. Twin-engine CH-53A/D Sea Stallions first began providing heavy-lift utility transport for the Marines in 1968. In the 1980s, an updated version of the helicopter, the CH-53E Super Stallion, added another engine and more lift capability. Now comes the King Stallion, whose two most vital traits—lift capacity and survivability—are much improved over the earlier helos.

"The CH-53K aircraft will effectively triple the external load-carrying capacity of the CH-53E aircraft, to more than 27,000 pounds over a mission radius of 110 nautical miles," says Sikorsky president Mick Maurer.

Thanks to powerful new GE T408 engines and a lightweight composite structure, the King can move more troops and equipment from ship to shore, and to higher-altitude terrain. The helo shed that weight by using titanium frames under the gearbox, and carbon-fiber skins and beams elsewhere. And though it can do so much more than its predecessors, the CH-53E hasn't gotten any bigger, which means the same ships and cargo aircraft can transport it.

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Maurer points to three key technologies—a new rotor system, split-torque transmission, and fly-by-wire controls—that make the King Stallion so rugged.

**Rotors:** The helo's 79-foot-diameter main rotor has a new elastomeric hub developed from one used on Sikorsky's S-92. The rotor blades from the earlier CH-53E are replaced by fourth-generation composite blades with new, wider-chord airfoils. The King Stallion's 20-foot tail rotor generates the same thrust as the *main* rotor on an S-76.

**Transmission:** A split-torque gearbox divides the power from each one of the aircraft's three engines among four shafts that drive a gear, which turns the main rotor. Although the gearbox is lighter than those that came before, it can handle the combined 22,500 hp of the GE engines.

**Fly-by-wire:** The system builds on those designed for Sikorsky's CH-148 Cyclone maritime helicopter and upgraded UH-60MU Black Hawk. Unlike its predecessor, the CH-53K is flown with side-stick cyclic controllers with tactile cueing. The controls improve on the CH-53E's handling qualities, Sikorsky says, and provide better stability/control in degraded visual environments. The controls are complimented by a new glass cockpit with five liquid-crystal flight displays derived from Rockwell Collins's Common Avionics Architecture System, used in the special-operations MH-60M.



The result of all this engineering is a draft horse of a helicopter that can meet U.S. Marine Corps requirements while using 20 percent less fuel and offering greater interior cargo flexibility.

The first CH-53K ground-test vehicle (GTV) is currently undergoing tests at Sikorsky's West Palm Beach, Florida, facility. The GTV is nearly identical to the four flight-test aircraft (YCH-53K) that will begin flying later this year. The Marines plan to buy 200 King Stallions.

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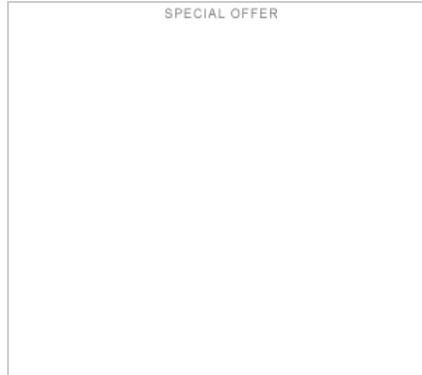
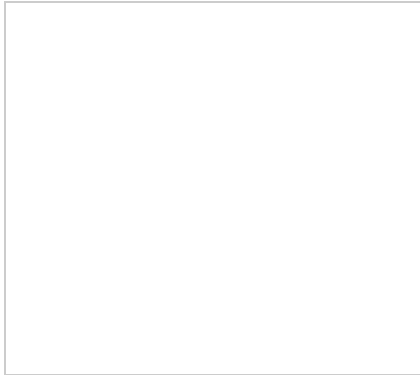
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