



By Hal Andrews

## HO4S/HRS/H-19

In early 1949, Sikorsky Aircraft was at a crossroad with its single main rotor helicopters. The company's current four-place S-51 (naval HO3S-1) was the most widely used, but competitions for larger helicopters were being won by tandem-rotor designs that didn't require balancing fore and aft loading under a single rotor. Along with general improvements, such as all-metal, untapered rotor blades, Sikorsky engineers explored rotor hub design and other improvements, such as hydraulically powered flight controls. They also investigated other rotor configurations.

The benefit of direct military and commercial use of its two- and four-place helos led Sikorsky to initiate a larger follow-on design, carrying 10 passengers or equivalent cargo and a crew of two. With the payload cabin directly under the rotor and transmission, fuel tanks under the cabin, the hub and flight control improvements and the engine moved to the fuselage nose, the new design attracted a great deal of operator interest since the principal drawbacks of the single-rotor design were largely overcome.

Compactness of the new design was aided by tilting the rearward-mounted engine, with an upward-slanted extension shaft running between the raised pilot's cabin and the payload cabin to the transmission directly above. Two clamshell doors, opening to provide engine access, formed a bulbous nose with



air intakes to the engine-driven cooling fan extending around the upper fuselage ahead of the windshield, and an exit opening under the nose. The result looked something like a box with four wheels underneath and a tail boom extending aft from the top.

The Air Force ordered the first five S-55s to be built as YH-19s for evaluation. Rolled out and first flown in November 1949 when jet fighters, bombers and high-speed research aircraft were getting all the aviation interest, the clamshell nose doors did

attract some attention. Flight test changes provided a faired-in triangular section aft of the cabin and a small inverted V tail below the tail rotor, smoothing out the boxy appearance.

Beginning in early 1950, S-55 events moved rapidly with expanded antisubmarine warfare (ASW) and Marine combat troop transport applications. Requiring enough aircraft for a high-priority operational investigation of helicopter ASW using dipping sonar, 10 were ordered in April as HO4S-1s.

Before any were delivered, North Korea invaded South Korea in June, initiating the Korean War and a big buildup for our military assistance. In August transports were ordered as HRS-1s. HO4S-1 deliveries were completed in early 1951, as HRS-1s began to reach the



Left, an Air Force YH-19 prepares for its initial flight. Above, a Coast Guard HO4S. Top, HRS-1 delivers a sling load to Marines in Korea.

Marines—first with Marine Helicopter Squadron 1 and then the first squadron to deploy to Korea, Marine Helicopter Transport Squadron (HMR) 161. Seven HO4S-1s for the Coast Guard were completed in late 1951, along with 59 Marine



HRS-1s. All versions could have a hoist installed above the single sliding cabin door on the starboard side for rescue and other lift.

When HMR-161 entered the Korean conflict in August 1951, the Marines demonstrated the HRS's effectiveness in combat operations. The use of sling loads for cargo and oversized combat equipment proved to be a particular asset.

Sixty-eight upgraded Marine HRS-2s were delivered through 1952, and Coast Guard HO4S-1s were modified as -2Gs. Power limitations of the 600 hp Pratt & Whitney R-1340 Wasp engine were evident in all uses. Engine replacement by a new Wright 800 hp R-1300 Cyclone 7 resulted in the -3s, and 144 were built for the Navy, Coast Guard and Marine Corps in 1953 and 1954. Some -2s were similarly converted to -3s. The HO4S-3s that could carry and drop one torpedo were assigned to early Navy ASW helicopter antisubmarine and helicopter utility squadrons. While the HRS-3s were late for Korean combat, they served many roles in post-armistice Korean operations.

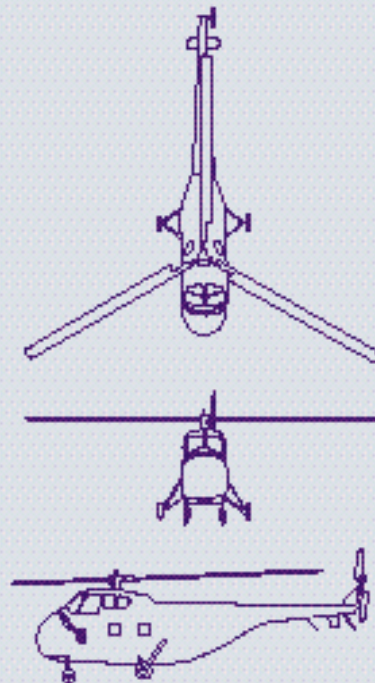
Subsequent Marine peacetime operations included staging helicopter assault exercises from carriers, leading to dedicated helicopter assault carriers. The HRS-3s played a major role in these operations, and when the redesignated escort carrier *Thetis Bay* (CVE 90) was recommissioned as

CVHA (assault helicopter aircraft carrier) 1 in 1956, the HRSs fulfilled their last major role as the ship's first helicopter complement. Difficulties in helicopter carrier operations, such as manual blade folding, led to phasing out the HRSs starting in 1957. By the time the various converted and newly built assault helicopter carriers went to sea with LPH (amphibious assault ship) designations, the complement was mostly later HUSs. HSS-1s replaced HO4S-3s on CVSs (ASW support aircraft carriers), and HUS-1Gs replaced the Coast Guard's HO4S-3Gs. Three HO4S-3s were among Air Development Squadron 6's aircraft in Antarctica for Operation Deep Freeze, 1955–1956.

Both HRS-3s and HO4S-3s continued in utility and air station rescue roles into the 1960s; HO4S-3s were also Naval Air Training Command helicopter pilot trainers. To comply with common military designations in 1962, HRSs still in service became CH-19Es; HO4S-3s UH-19Fs; and Coast Guard HO3S-3Gs HH-19Gs—joining their Air Force and Army counterparts under the original Air Force H-19 designation series.



**HRS-3 with the rocket on rotor (ROR) system. The pilot controlled the flow of mono-propellant fuel from the tank over the hub to the small rocket motors at each tip for increased lift.**



### HRS-3 (CH-19E)

Rotor diameter	53'
Length: Rotors turning	62.5'
Rotors stowed	42.1'
Height (over tail rotor)	15.3'
Engine: Wright R-1300-3	800 hp
Max speed	108 kts
Max range (rescue)	280 nm
Service ceiling (rescue)	14,700'
Weight: Empty	5,193 lbs
Maximum takeoff	7,761 lbs
Crew	2
Passengers	10

UH-19Fs were phased out of training in 1963, HH-19Gs left Coast Guard rescue in 1966, and CH-19Es completed rescue and utility duties in 1969. The "Horses" (the unofficial Navy nickname) became memories in Naval Aviation, but other military and civilian versions, some converted with turbine engines, would continue lifting for many years.