

Flying Pinwheels



WALKING down a lonely Long Island beach, a fisherman was startled recently when he came across an odd-looking contraption. It was a fuselage on wheels with a big fan on top and a smaller fan at the rear end.

"How the devil did you get that thing in here?" he asked the young Navy lieutenant standing nearby. "Drive it in or pull it?"

He was even more astounded when, several hours later, the queer looking contraption rose straight up in the air, hung stationary while the pilot saluted and then nonchalantly flew away like a huge flying spider.

However, he was not nearly so impressed as the young pilot who ditched a *Helldiver* during recent Atlantic Fleet maneuvers. Only seconds after his plane had sunk and he was resigning himself to the same fate, a Sikorsky helicopter pilot dropped a line into his hands and hoisted him aboard. And thereby a helicopter saved a life that otherwise surely would have been lost.



CAPTAIN C. C. MARCY USN

In little over a year since the Navy's first helicopter squadron was formed, this new type aircraft has gained an important and respected position in the Fleet. And the helicopter's versatility is only now becoming apparent to Naval Aviation.

Fleet Commanders, during recent maneuvers and varied expeditions to all parts of the world have been both pleased and surprised to find that a helicopter can land on the gun turret of a rolling and pitching ship or hover above a submarine; and even without instruments they fly in weather that grounds combat planes.

Their utilization with all types of fleet organizations is limited today only by the time needed for developing helicopters suited to naval operations and the development of a program for training personnel. And that development is going ahead full steam at NAS LAKEHURST under the direction of Helicopter Development Squadron THREE (vx-3), Navy's only all-helicopter squadron.



HELICOPTER LINE AT NAS WAKEHURST PRESENTS STRANGE APPEARANCE TO NAVAL AVIATORS UNUSED TO WINGLESS LARGE-PROPELLERED CRAFT

VX-3 WORKING HARD TO FIND BEST USES FOR HELICOPTERS

DAILY operations around the squadron's big hangar are a constant reminder of the helicopter's main stocks in trade—vertical ascent and descent and stationary or hovering flight plus three-dimensional maneuverability. VX-3's operations exploit these characteristics for the Navy.

Under the command of Captain C. C. Marcy, USN, a pioneer in the Navy's rotary wing program, VX-3 bridges the gap between BUAEF experimental programs and the successful service operation of helicopters.

This squadron provides the necessary operational background to BUAEF for determining the desirable characteristics and configurations of the machines to be developed from experimental types now under construction.

VX-3 is under the operational control of Commander Operational Development Force, U.S. Fleet (See NANews August, 1947.) and Commander Air Force, Atlantic Fleet for administrative purposes.

The mission of this new experimental helicopter squadron covers a wide field. The squadron is developing and evaluating, operationally, the use of helicopters for search and rescue, as replacements for VO seaplanes, for ship-to-ship and ship-to-shore liaison, harbor traffic control, utility duties, amphibious warfare and many other useful missions which become apparent during daily test flying.

Perhaps the most publicized of the Navy helicopter's missions has been search and rescue work during carrier operations with the S-51 designated HO3S by the Navy.

MECHS FIND PRECISION IS REQUIRED IN MAINTENANCE OF HELICOPTERS



A recent design competition has indicated that helicopters comparing favorably in performance and capable of carrying out all the functions of present VO aircraft are now feasible. However, helicopters fall somewhat short of the endurance performance of present day VO seaplanes.

Helicopters on fleet duty have already proved themselves in liaison work. There is no longer a need for the destroyers which have had to maneuver alongside ships of a task force at sea in order to deliver mail, photographs or personnel.

USE of a helicopter in this operation cancels the danger to ships and personnel. A single rotary-winged aircraft equipped with a hoist can carry out the same mission in a fraction of the time, landing only on the parent ship.

Another field for the Navy's new helicopters is ship-to-ship and ship-to-shore transportation of equipment, mail and personnel at fleet anchorages and at beachheads in amphibious warfare where boating is difficult and slow.

The helicopter's utility duties are increased because of its ability to hover or fly at speeds below that of conventional aircraft. It has already been used for observing torpedo runs, special tests and for radar calibration.

Numerous requests from activities requiring specialized utility services are already on file awaiting the availability of suitable helicopters and trained personnel.

Prior to the commissioning of VX-3, the development, evaluation and application of rotary wing aircraft was, so far as the Navy was concerned, practically non-existent. During the war, BUAEF could not afford to divert engineering effort and manpower for the development of helicopters.

The only efforts along this line were two experimental projects undertaken by the Coast Guard, then a part of the Navy. In 1943, through the enthusiastic efforts of Comdr. Frank Erickson, USCG, a helicopter program was established at CGAS FLOYD BENNETT. This unit trained pilots and carried out search and rescue, mercy and transportation missions.

Upon the return of the Coast Guard to the jurisdiction of the Treasury Department, the Navy decided to set up its own program.

Through the efforts of Captain Marcy, a task unit was hurriedly organized to accompany the naval unit in Operations *Crossroads*. This was the first organized all-Navy unit to attempt full-scale shipboard operations employing the helicopter. (NANews September, 1946.)

While the original unit was operating at sea, the first naval helicopter squadron, VX-3, was being formed at NAS FLOYD BENNETT under Comdr. C. E. Houston, USN, one of the first helicopter pilots. This was on 1 July, 1946.

A fleet of HNS-1's and seven HOS-1 Sikorsky helicopters were transferred from the Coast Guard which also helped train pilots and maintenance personnel at the beginning.

Experienced naval aviators are the only ones so far to undergo training in helicopters. Approximately five hours of instruction are needed before the average fixed-wing pilot can solo. The present syllabus is completed in 40 hours, but pilots are not considered qualified for operational duty unless they have a total of 100 hours with 30 hours in type.

Because of logistic and personnel problems VX-3 was moved to NAS LAKEHURST in September of 1946. Captain Marcy relieved Commander Houston soon after returning from the atomic bomb tests.

To date, VX-3 has trained 18 pilots. This is not an impressive number until the reader considers that the unit began operations with two qualified pilots. Numerous operations—Bikini, Operation *Highjump*, Arctic expeditions and fleet maneuvers have all taken experienced pilots to sea.

Radar calibration hops, for which the helicopter is ably suited because of its hovering abilities, sometimes boost a pilot's time to over seven hours in one day.

Observations of VX-3's daily operations leaves even an experienced Naval aviator gasping with surprise. A squadron test pilot can sometimes be seen conducting an hour-long test hop without ever leaving the parking area or getting more than a few feet off the ground.

No other aircraft is capable of hovering just above the ground after take-off so that the pilot can check his engine and controls before proceeding with the flight.

LANDINGS are no problem with or without power, as the aircraft's speed can be lowered to zero just before contact with the deck is made. Engine failure does not worry experienced pilots so long as they can find a spot some 50 feet in diameter in which to land.

When an engine fails, the pilot puts his rotors into autorotation, or free-wheeling, and glides down at 50 mph at slightly less vertical speed than is reached by a descending parachute. Just before contact with the deck, the pilot feathers out, increases the pitch of his main rotors and sets down in a normal landing at zero airspeed.

The cockpits of VX-3's helicopters look much the same as those of conventional fixed-wing planes. There are the usual stick, rudders and throttle. The only additional control is the pitch stick.

This lever controls pitch or angle of attack of the main rotor blades and is used for ascent, descent and hovering. The throttle is mounted on the pitch stick and the two are partially synchronized by a governor for constant rpm.

Turns are made in the conventional manner, or with stick and rudder. But this is where normal pilots get mixed up. The "stick," as they know it, is used not only for banking, but for directional control as well. In other words, if a pilot does not want to bank, he flies sideways.

If a pilot wants to go forward, backward or sideways, he pushes the stick in that direction and moves away. This can be used to advantage in forced landings. In case of engine failure after a pilot passes a suitable spot, he can pull back on his stick, establish a backward glide, feather out and land at zero airspeed.

Since the rotor which propels and supports the helicopter is an airfoil, these rotary-winged craft can perform many maneuvers used by fixed-wing aircraft such as running take-offs and landings and balanced turns. They use the same type of approaches as conventional planes as best



PRE-FLIGHT CHECK IS MUCH THE SAME AS ON CONVENTIONAL AIRCRAFT

results are normally obtained by making all landings and take-offs into the wind.

One of the impressive features of the helicopter is its ability to fly in any direction. When a pilot has to get out of a tight spot, he can get out sideways or straight up. And, something that can not be done with a conventional plane, a helicopter can make a backward take-off. These features make them ideally suited for shipboard operation.

USUAL NEEDLE-BALL AND ARTIFICIAL HORIZON IS MISSING FROM PANEL





PILOTS FIND THE HELICOPTER DIFFERENT BUT NOT TOO HARD

CONTRARY to rumor, helicopters now have less vibration than most operational fixed-wing aircraft. Speech between passengers is almost normal.

Instrument flight is limited as no instruments have yet been adapted which will indicate the new flight dimensions peculiar to a helicopter. Since the operator sits in the nose, there is little reference for horizontal flight and he must check his altimeter continually. A position indicator is now being developed to show up, down, fore and aft flight.

Taxiing is simple and there is no need for brakes. The main rotor is tilted forward by means of the stick between the pilot's legs and pulls the craft along the deck. Leaving the line takes a minimum of time as only about 10 feet clearance is needed for a safe take-off.

Rudders control the pitch of the anti-torque rotor blades. This rotor can turn the 'copter on a dime, whether on the ground or in the air. Contrary to popular conception, this rotor does not speed up and slow down, but changes pitch.

Loss of the anti-torque rotor is not considered too dangerous by VX-3's pilots. Lieut. Jim Lamm's HOS-1 recently lost a tail rotor at 100 feet altitude and spiraled down to a safe landing.

Chief Aviation Pilot Kembro, the Navy's only enlisted helicopter pilot, recently lost a blade from the main rotor of his helicopter. This is the worst thing that can happen as the vibration makes a pilot helpless and unable to regain control. Fortunately, Kembro was only 10 feet off the deck. By hitting the stick and dumping the other two main rotor blades into the ground, he got down in one piece.

This same tactic is used for ditching a helicopter. The HOS-1 which went into Bikini lagoon lost an engine at 400 ft. The pilot auto-rotated down, slowed airspeed to zero while his passenger jumped into the water and then dumped the rotor into the drink on the pilot's side. This kept the rotor from whirling as the plane sank and trapping the pilot under water or conking him when he emerged.

BECAUSE of the helicopter's early stage of development, spare parts are not too plentiful, making maintenance difficult at times. Although VX-3 had to start from scratch, its maintenance personnel have become highly skilled and the squadron's availability is as good or better than in many conventional squadrons.

Chief Machinist Haight believes that helicopter personnel must be highly skilled. Besides the conventional aircraft parts, the helicopter has a transmission and a gear box for each of the rotors. The entire machine is put together with the precision of a well-made watch.



- 1** S-51 Sikorsky helicopter landing on No. 1 turret of the U.S.S. *Missouri* under way during recent fleet maneuvers.
- 2** **Hovering** helicopter here demonstrates the technique used to pick up a downed Airman in an air-sea rescue.
- 3** **Simulated** landings aboard are being practised on this unique rolling platform located at NAS Floyd Bennett.
- 4** **Helicopter** equipped with floats is truly amphibious aircraft and can land aboard or on water with equal ease.

On the other hand, there are no problems of damage to landing gear or structure. Even if a helicopter should lose its landing gear, it could probably set down undamaged.

Several types of helicopters are being used for training as VX-3 waits for more advanced models of helicopters. Primary trainer is the Bell HTL-1, a light helicopter with a two-bladed main rotor, and cruises at 90 mph.

So stable that it will fly hands off, this helicopter speeds training because of its dual control system. It is powered by a Franklin opposed six-cylinder, 178-hp. engine.

The Sikorsky HO3S-1 is much bigger, carrying four passengers, and is powered by a 450 hp. Pratt & Whitney engine. Its three-bladed, fabric-covered main rotor has a diameter of 48 feet. Electrically controlled fore and aft tabs make it easy to trim. Flying at 103 mph, this helicopter can get to the scene of a crash in a hurry. The Navy has ordered 20 more of this type.

Still operating are a few of the first helicopters acquired by the Navy, the HNS-1's. Cruising at 70 mph, this helicopter has a 190-hp. engine and hoisting gear.

THE HOS-1, used at Bikini, is also used by VX-3 for instruction. This Sikorsky helicopter will fly at 85 mph, and is powered by a 225-hp. opposed six-cylinder Franklin.

One HO3S-1 and one HTL are now on the *Randolph* for the midshipman cruise. HO3S's were also used for the Antarctic expedition carrying out photographic and ice-pack scouting missions.

Members of VX-3 are eagerly awaiting delivery of the new Piasecki XHRP-1. An all-Navy design, this helicopter will be specially adapted to shipboard work and will boast a hatch through which passengers, survivors or freight can be hauled directly into the cabin.

VX-3's small group includes, besides those mentioned previously, Comdr. M. Peters, executive officer, Major A. H. Delalio, USMC, and Lieut. C. J. Reeves, the latter two now being on the midshipman cruise aboard the *Randolph*, and Lt. Comdr. H. M. Kosciusko.

Lt. Comdrs. C. Fink, C. Tanner and Jungans flew helicopters in the Antarctic soon after qualifying at NAS LAKEHURST. Others include Lieuts. Jim Lamm, G. A. Rullo—who flew aboard the *Roosevelt* on her Caribbean cruise—E. Kubicki, Lt. (jg) W. Schaffer, Chief Machinist Haight and one student, Lt. (jg) Hamilton.

Within the next few years, every aircraft carrier may boast at least one helicopter for special missions. Operational development as now carried on by Helicopter Development Squadron Three will be expanded and accelerated as improved helicopters become available.

In the long range future, according to Captain Marcy, the naval helicopter will probably never become, primarily, a military or naval weapon. It will probably remain a vehicle of transportation and observation which will find many uses for the Navy, although the uses will be determined by this fundamental non-military characteristic.



- 5 Pilots** give their helicopter its pre-flight check off of the deck in the air but before leaving the flight parking area.
- 6 When** a pilot wants to make a landing with S-51 Sikorsky he just picks his spot and comes straight down into it.
- 7 Flight** attitudes are somewhat different in the 'copter—this HTL is getting up its forward speed for cruising.
- 8 This** HTL isn't about to stall in from fifty feet but is merely making a quick stop for a vertical no-roll landing.