

(U) Between October and December 1965, test plans were prepared and equipment modifications were completed. Arrangements for use of the KC-130F were completed and the modified refueling system underwent ground tests. Flight tests were scheduled for 14-16 December.

(U) Drogue Stability Flight Checks. On 14 December 1965, preliminary flights were made to check the stability of two redesigned, 44-inch drogues, one attached to the standard 3.25-inch hose and the other connected to the lighter two-inch hose. Although the lighter hose was held in a higher, more desirable position, it seemed to be slightly unstable. It was therefore not selected for use in the hookups which followed on the next day.

(U) Successful Tests at Kitty Hawk. The dummy probe was attached to a CH-3C helicopter and tests were made at 4,000 feet on 15 December 1965, over water and in sight of historic Kitty Hawk, where 62 years earlier the Wright brothers had made their first successful flight. The test plan called for the helicopter not to attempt an actual hook-up, but to restrict itself to checking the drogues' stability and establishing that it could maintain a safe speed overlap and good control while placed in a close-in position. Test personnel were somewhat apprehensive because the drogues still appeared to be in too low a position to permit the helicopter to achieve stabilized flight and a successful hook-up.

(U) The first flight began in a general atmosphere of skeptical incredulity. The low drogue positions, the unspoken reservations concerning the safety of the operation, the doubts that the technique would be either possible or practical, the realization that higher-performance

jets often had to make as many as 20 to 30 tries before their probes successfully engaged the drogue--all these contributed to the presentiment of failure which pervaded the group. Optimism was hardly heightened by the realization that neither of the two CH-3C pilots had ever participated in a refueling operation.

(U) Despite this skepticism, the test took place with results far better than expected. The helicopter flew for a few minutes just aft of the refueling position, while the pilots observed that the drogue mounted on the standard hose remained completely stable and the helicopter's probe showed no discernible vibration. With these facts established, they decided that the risks were minor in going ahead with a dry-run engagement. The probe was eased up to the drogue, inserted--and engaged on the first attempt.

(U) Four more engagements were made on the first series of flights, with varying hose lengths, flap settings, and refueling positions. On the second series, five additional hook-ups were made, including one for approximately five minutes, the length of time required for a complete fuel transfer. This "dry run" was not so dry; it had to be broken off because fuel somehow leaked down the hose, onto the dummy probe, and over the helicopter windshield, obscuring the pilot's vision.

(U) In spite of this inconsequential incident, the test program was an overwhelming success which took only two days instead of the five-to-six days originally planned. At its end, ASD sent a ringing message to all major USAF, Army, Navy and Marine Corps headquarters:

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SUBJECT: HELICOPTER AERIAL REFUELING

ON 15 DEC 65 AT MCAS CHERRY POINT, N.C., AN AIR FORCE CH-3C HELICOPTER SUCCESSFULLY COMPLETED A SERIES OF AERIAL REFUELING TESTS WHICH INCLUDED A FIVE-MINUTE

HOOKUP WITH A MARINE CORPS KC-130F HERCULES AIRCRAFT OF MARINE AERIAL REFUELER TRANSPORT SQUADRON 252. THIS DEMONSTRATED FOR THE FIRST TIME IN AVIATION HISTORY THE FEASIBILITY AND PRACTICABILITY OF REFUELING A HELICOPTER IN FLIGHT USING CONVENTIONAL PROBE AND DROGUE SYSTEM. ASD JOINT TEST TEAM SENDS.

(U) Accomplishments. The flight-test demonstrations exploded many misconceptions about mid-air refueling for helicopters. In the first place, they proved decisively that in-flight refueling was operationally practical with a conventional probe-and-drogue system. Second, they demonstrated that the helicopter was maneuverable and controllable enough to complete a hookup without the thrusting technique used by high-performance aircraft, and was proportionately safer. Third, they showed by completing a sustained five-minute hookup that the technique was operationally suitable for a complete fuel transfer that could fill the helicopter's internal tanks. Fourth, they illustrated that an existing refueling system could be adapted to the function, with a consequent saving of R&D effort. Fifth, they showed that refueling hookups were relatively easy to make; in turn, this indicated that helicopter pilots could be easily trained in the technique. Finally, the operation was proved to be both safe and flexible; on one occasion, the engaged drogue was lifted by the helicopter about 20 feet above its normal trail station--a position where the helicopter could employ the "aerial surfing" technique--and released. The drogue then simply returned, without lashing or oscillation, to its previous position.

(U) Development of Operational Capability. The success of the demonstration at Cherry Point led the Air Staff to direct that in-flight

Air Refueling Conceptualized

While most of the action was happening in SEA, some rescue innovators were hard at work back in the United States. The idea of refueling a helicopter in flight was being conceptualized. Air refueling was urgently needed in SEA. Straight line distances from FOL's, to many of the target areas in NVN, were approximately 150–190 miles. Helicopters could not fly a straight line to downed airmen. Circuitous routes were flown to avoid enemy air defenses. The actual flight distance was as much as three times the straight line. Many missions exceeded the 350 mile radius of the HH-3. Major Harry P. Dunn had spent his entire Air Force career flying helicopters. He believed it might be possible to air refuel an H-3 from a C-130. Headquarters Air Rescue Service authorized him to test the concept. He jury-rigged a fuel probe, to the front of a CH-3.



AFHRA Photo

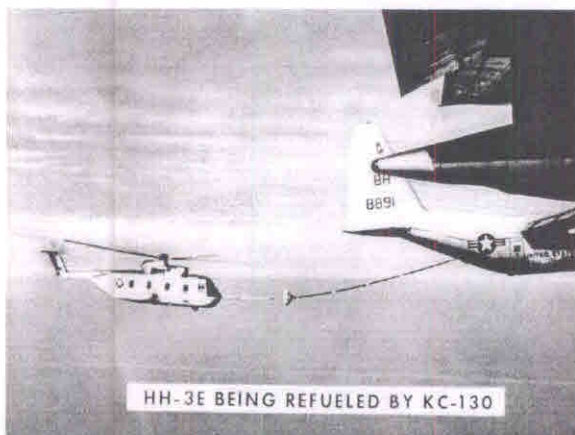
CH-3 with dummy probe installed for air refueling concept test

It was not plumbed to anything, but would serve the purpose of an attempted link up with an in-flight KC-130.

On 17 December 1965, Major Dunn took off to attempt an air-refueling linkup with a KC-130 owned by the U.S. Marine Corps.

Many engineers believed that the helicopter would be destroyed by the prop wash and wake turbulence, that occurred behind a KC-130. Optimism was heightened by the realization that Major Dunn had never

participated in an air refueling. Despite this skepticism, the test took place with results far better than expected. Major Dunn's theory proved to be correct when he flew up behind the KC-130, slipped into refueling position, and on his first attempt plugged the dummy probe into the refueling basket.



First HH-3 Aerial Refueling in Aviation History over Kitty Hawk, N.C.

At the completion of the air refueling, the following message was transmitted to HQ ARRS.

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ON 15 DEC 65, AT MCAS CHERRY POINT, N.C.,
AN AIR FORCE CH-3 HELICOPTER
SUCCESSFULLY COMPLETED A SERIES OF
AERIAL REFUELING TESTS WHICH INCLUDED A
FIVE-MINUTE HOOKUP WITH A MARINE CORPS
KC-130F HERCULES AIRCRAFT. THIS
DEMONSTRATED FOR THE FIRST TIME IN
AVIATION HISTORY THE FEASIBILITY OF
REFUELING A HELICOPTER IN FLIGHT USING
CONVENTIONAL PROBE AND DROGE SYSTEM.



AFHRA Photo⁷⁶

CONTACT! Major Dunn Engages the Basket on His First Try.

With the concept proven, Rescue Headquarters ordered an initial modification of a few HH-3C helicopters. The modified aircraft would become the HH-3E. Several HC-130H's were in the final stages of assembly. HQ ARS ordered eleven of them to be configured as tankers. The modified aircraft became the HC-130P. Air refueling would revolutionize helicopter SAR. It was to have a profound effect on successful SAR's in SEA.⁷⁷

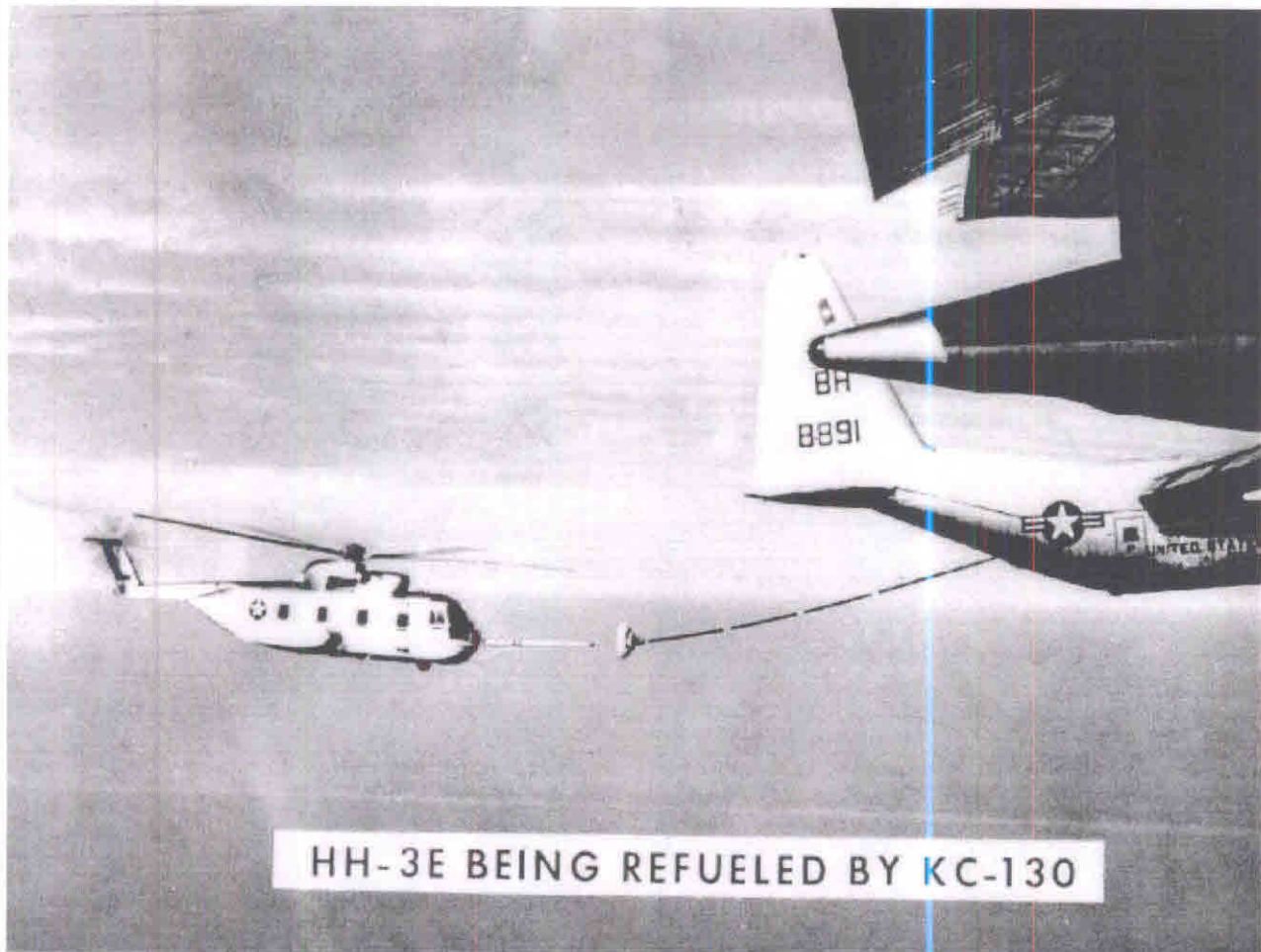
⁷⁵ CHECO Report USAF SAR in SEA 1961-66, 24 October 1966, p92. In USAF Collection, AFHRA

⁷⁶ Ibid. p93

⁷⁷ Earl H Tilford, Jr, Search and Rescue in Southeast Asia, (Washington: Center for Air Force History, 1991) 84.



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