



KAMAN

Rotor Tips



KAMAN AIRCRAFT CORPORATION
PIONEERS IN TURBINE POWERED HELICOPTERS

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KAMAN

Rotor Tips

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THE COVER

Downed fighter pilot surrounded by searching Viet Cong is shown just before rescue by ARS HUSKIE. Cover by Donald Tisdale, Service Publications.

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Southeast Asia



Disregarding ground fire, an HH-43F hovers over the tangled jungle and plucks a fighter pilot from the midst of the encircling Viet Cong... A HUSKIE crew flies at night over mountainous and unfamiliar territory to evacuate a seriously ill soldier... ARS volunteers make long helicopter trips to remote villages to bring medical assistance to the inhabitants — In this part of the world the Air Rescue Service is not only rescuing military personnel under combat conditions, but it is also carrying on its tradition for rendering humanitarian service whenever the need arises.

The number of U. S. and South Vietnamese pilots rescued from Red-infested jungles in Vietnam and Laos or from off-shore waters is classified but it is estimated that as many as 15 have been picked up. The rescuers have an enviable batting average — out of 10 pilots shot down during a recent series of raids against North Vietnam, seven were saved. The rescue operations often involve Air Force helicopters from Thailand, as well as South Vietnam, Army helicopters and ARS HU-16 Albatrosses.

During one such mission, while flying over the Gulf of Tonkin in search of a USAF fighter pilot who had bailed out, a HUSKIE crew spotted the smoke signal fired by a Vietnamese officer who had ditched his flaming Skyraider. The HH-43F, flying out of Danang, dropped to within three feet of the pitching wave crests, plucked the wounded pilot from the water, and started homeward. On the way it joined another HH-43F and an escort of

American fighters that had picked up yet another urgent distress call from a U. S. captain whose Thunderchief jet was shot down over the tangled jungle near Quangkhe. Sighting a signal fire, one HUSKIE descended to 100 feet and hoisted the downed pilot to safety. Soon afterward, in a night operation, another HH-43F crew located and rescued a U. S. pilot from jungle territory inside North Vietnam.

Recently, several groups of ARS personnel who served in Southeast Asia and shared in missions similar to these, returned home and began picking up the threads of their "Stateside" lives. Those attached to Det Provisional First, PARC, commanded by Capt Robert D. McDougal, were drawn principally from Det 4, WARC(MATS), Paine Field, Wash. They were on duty at Bien Hoa, Vietnam, and Takhli, Thailand.

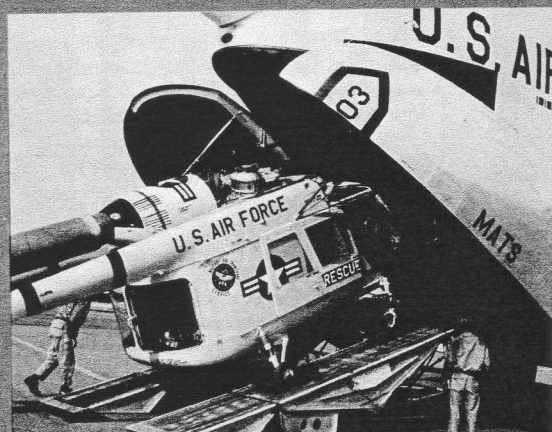
While in Vietnam, the First flew 142 combat support missions during approximately 75 days. Personnel received six Purple Hearts and 63 Air Medals with Clusters. They were also recommended for six Airmen's Medals and 25 Commendation Medals. Those receiving Purple Hearts were: Capt Robert T. Rosvold, Det 8, Selfridge AFB, Mich.; SSgt Franklin D. Cooper, Det 4; A1c Kenneth Scheer, Det 9, Portland IAP, Ore.; A1c Ronald Snook and A2c James Walsh, Det 1, Glasgow AFB, Mont.; A1c Franklin Riggins, Det 12, George AFB, Calif. Airman Riggins is also slated to receive the Distinguished Flying Cross for action while serving in an

armed Army helicopter which engaged a company of Viet Cong and aided in the rescue of a captured American adviser. The airman received a painful shrapnel wound in the knee but relentlessly kept firing his M-60 at the Viet Cong position, forcing the enemy to withdraw.

Most of the personnel from Det Provisional Second, commanded by Capt Alva G. Graham, came from Det 2, CARC, Minot AFB, N. D. They were on duty in northern Vietnam and Thailand and flew approximately 232 combat sorties in support of USAF operations. Captain Graham is scheduled to receive the Bronze Star and Capt Joseph V. Leech, a Purple Heart. Approximately 12 men are to be recommended for the Air Medal and three for the Commendation Medal.

Det Provisional Four, commanded by Capt Philip S. Prince and comprised primarily of personnel from Det 10, EARC (MATS), Maxwell AFB, Ala., was stationed at Korat RSI, Thailand. Their primary responsibility was support of USAF tactical fighter bombers assigned to the base.

ON THE WAY — HUSKIE from Paine Field is loaded for shipment to Vietnam.





THAILAND OPERATION—HUSKIE is guided in to release FSK after practice pickup. Ground crew, an important part of any rescue team, checks HH-43B blades. MSgt Henry L. Williams, line chief with Rescue 4, Det 3, PARC, poses atop helicopter after reenlisting. He has completed 23 years service. (USAF photos)



DET SECOND MISSION REPORT

Here is one rescue reported by Det Provisional Second: "After the HH-43B had completed an orbit mission, the RCC was advised an HU-1B was down just south of Da-nang. Speed was of the essence as the last radio call reported the Viet Cong were very close and the crew had only a few rounds of ammo left. A search was begun but made easy as the VC made their position known by firing at, and hitting, the HUSKIE. Suppressive small arms fire was returned by the HH-43B crew while assistance was called for. Ground fire was too heavy to effect a rescue at that time but the enemy was held away because of the fire from the helicopter which, in all probability, saved the downed crew. While the H-43 continued to suppress the ground fire, an unarmed Army helicopter went in and picked up the crew. Upon landing,

Due to space limitations and other factors, only the activities of a few Southeast Asia units are reported on in this issue of Rotor Tips. The names of those who served in Provisional Detachments First, Second and Fourth are carried at the end of this article. KRT will be pleased to hear from other units wishing to have the names of Southeast Asia veterans listed in subsequent issues.

it was discovered the HUSKIE had been hit nine times, including a complete hole in a rotor blade. In spite of this, the aircraft flew well, returning its crew to base."

Later, in sharp contrast to their combat duty, detachment crews flew an HH-43B mercy mission each week to remote villages in Thailand. They carried an Air Force flight surgeon, a paramedic and an interpreter to furnish sorely needed medical treatment for the villagers. An average of 100 people were treated on each trip and the flight surgeon estimated that 70 percent of the treatments resulted in immediate and lasting improvement. The men of this Pacific Air Rescue Center detachment performed these missions of mercy on their off-duty days—a logical extension of their traditional humanitarian role.

DET 5 RESCUES 8

In a Vietnam mission flown by two HH-43F's from Det 5, PARC (MATS), commanded by Maj Ronald L. Ingraham, eight crew members of an Army CV2-B were rescued after their aircraft was disabled by power failure some 56 miles west of Danang.

The crash-landed Caribou had been resupplying a Special Forces camp in the I Corps area. Rescue operations were further complicated by a solid overcast over the crash area and the Danang airfield.

The two USAF helicopters were guided into the area by short radio counts from the pilot of the light plane. There were no other navigational aids. When the two rescue helicopters arrived at the crash area, there was a hole in the thick overcast which allowed the aircraft to drop straight down and pick up the stranded Caribou crew.

Returning to Da Nang over the 6,000-foot cloud layer, the two

HUSKIES and their passengers came down again through a single break in the clouds south of the base and landed safely.

The primary rescue helicopter was piloted by Capt Bruce M. Purvine and Floyd R. Lockhart with SSgt Dewey A. Kilpatrick, crew chief and A2c Randolph Smith, para-rescue. In the second chopper were Capts James V. Berryhill and Jim F. Hartley, MSgt Lenote M. Vigare, paramedic and A1c Richard H. Syverson, crew chief.

Ironically, a report received at the rescue operation center two hours after the Caribou crew was rescued told about the scene of the Caribou crash receiving heavy insurgent mortar fire.

Along with missions such as this, the men of the Air Rescue Service continue their mercy flights for "people in trouble"—whether military or civilian. In one mission, an HH-43B piloted by Capt Clyde W. Lemke flew through rain showers to evacuate one of the personnel working on a radar site in a mountainous area. He had received serious head injuries in a fall and was suffering from shock and loss of blood. The helicopter crew administered first aid on the way back to Da Nang Hospital. With Captain Lemke were 1stLt Joseph P. Phelan, copilot; TSgt John G. Regan, Jr., and A1c Jon H. Young, crewmen.

DET 10 RESCUES

While on their tour of duty in Thailand, members of Det 10, EARC, Maxwell AFB, (Det Provisional Fourth) engaged in several missions of mercy including the hazardous evacuation of a critically injured U. S. soldier from a remote country village 90 miles east of Bangkok. The attending Army physician had requested helicopter evacuation because, he said, the patient would die unless an emergency operation was performed and once operated on, he would not be able to withstand the shock of extended ground transportation. The roads are, in many cases, cow

paths at best and, at worst, virtually impassable save by tracked, not wheeled, vehicles.

Manning the HUSKIE were 1stLt Theron J. May, RCC; 1stLt Zigmund W. Zalewski, copilot; and A2c Bill W. Sanders, crewman. Taking off despite extremely high winds and turbulence, they made their way over high peaks and jungle. Possible landing sites along the route were often impossible to find because of the extensive rice paddies punctuated by tall trees where the villages are sited. One of the biggest concerns of the crew was that they might not be able to pinpoint the location of the injured soldier because of the tremendous number of "look-alike" villages in the area. However, in spite of the fact that the last part of the flight was made at night and over unfamiliar territory, the right village was located. Selecting a landing spot was difficult and several approaches were made before the ultimate landing spot was chosen and a landing accomplished.

The patient had been operated on and now needed large quantities of AB negative blood, a commodity not available. Airman Sanders quickly prepared the helicopter to on-load the patient. The patient was now in desperate need of blood and no time could be wasted. Patient secure, the doctor briefed and in place and crew ready, Lieutenant May took off on the last leg of the hazardous journey.

When Bangkok International Airport became visible, fuel was well below minimums and when the HH-43B was later refueled, 184 gallons of JP-4 were required. The patient was evacuated the rest of the distance in an Army fixed-wing aircraft where 40 minutes later he was being given the blood he so urgently needed. He is alive today and on his way to recovery.

In another Thailand mission, an HH-43B crew from Det 10 evacuated two U.S. State Department officials critically injured in an automobile crash. They were taken from Sara Buri to Muang Air Base at Bangkok for medical treatment. The fast

HH-43B Does It Again!

Back in the June-July, 1963, issue of Kaman Rotor Tips it was reported that calendar year 1962 figures showed the HH-43B to be the safest aircraft in the military inventory for that period. The 1962 accident rate for the HUSKIE (per 100,000 flight hours) was 4.7 as compared with the Air Force all-helicopter rate of 12.6 and an all-aircraft rate of 5.7.

It is our pleasure to report an even better performance for calendar year 1964 which recorded an HH-43B accident rate of 4.3, as compared with the Air Force all-helicopter rate of 6.6, and an all-aircraft rate of 4.4.

We fully realize that these safety records are not only the product of inherent reliability characteristics built into the HH-43B, but are also a great tribute to the professional performance of the maintenance and operational personnel who live with the machines from day-to-day and the amount of Command emphasis given to performance standards, the development of safer techniques, and recognition of safety accomplishments.

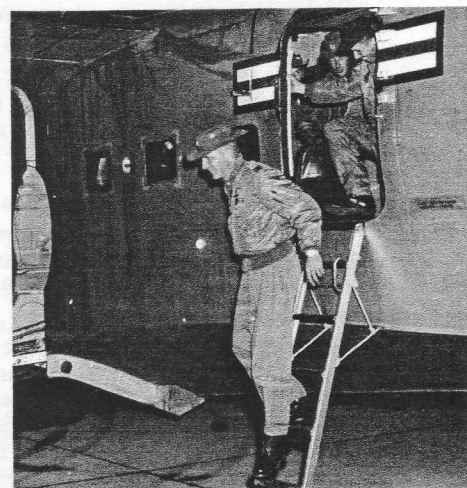
Our sincerest congratulations are hereby conveyed to the Air Force at large, and the Military Air Transport/Air Rescue Services in particular, for this superb performance.

WILLIAM E. ZINS *Director of Customer Service*

action by the ARS detachment was credited with saving the lives of the officials. Crew of the HUSKIE consisted of Capt Philip S. Prince, pilot; Lieutenant May, copilot; Capt Gerald J. Broock, U. S. Army flight surgeon; and SSgt William H. Sands, crew chief.

An HH-43B from the detachment was also deployed to Nakhon Nayok, the scene of a drowning accident. The victim, a U.S. Army soldier, was missing at the base of a waterfall deep in the mountains of Southern Thailand. The HUSKIE, piloted by Lieutenant May, located the site and two pararescuemen, SSgt James W. Watson and A2c Leroy W. Kelsay (48th Air Rescue Squadron), were dispatched. They recovered the body within fifteen minutes. The fast recovery was due to the fact that Sergeant Watson relaxed in the water and let the currents take him away and under the surface. This resulted in his ending up right beside the deceased soldier. The remainder of the crew consisted of Capt Robert J. Suhrheinrich, copilot, and A1c Frank M. Chesonis, crew chief.

The crew of a Det 10 HUSKIE scrambled after a "Mayday" call was received from a Royal Thai Air Force T-6 trainer near Korat, Thailand. Moments later the aircraft crashed. Within eight minutes the crash scene was located and as the HH-43B hovered with one gear touching a small dry mound of earth, the crewmen exited and aided the downed pilots in returning to the helicopter. Neither was injured. Captain Suhrheinrich was HH-43B pilot; Airman Chesonis, crew chief;



HOME COMING—Capt Ronald L. Bachman, HUSKIE pilot from Det 4, arrives at Paine Field after Southeast Asia duty. In right photo, TSgt James E. Johnson, HH-43B crew chief from Det 4 shows delight at being reunited with his family. SSgt Howard M. Lord of Det 5, McChord AFB, Wash., is greeted by his wife and children. (USAF photos)

Sergeant Sands, hookup man; SSgt Allan N. Bantle and SSgt Erving W. Cox, rescuemen.

36TH ARSQ RESCUES 5

Five tanker crewmen who bailed out of their crippled aircraft 12 miles from Takhli Airfield, Thailand, during an early morning flight were hoisted to safety soon afterward by two HH-43B crews from Det 4, 36th ARSq (MATS). Manning one helicopter were 1stLt Larry N. Young, pilot; 1stLt John M. Parks, copilot; A1c Joseph E. Ivansco, crew chief; A2c Lonnie W. Bunting and A1c Leroy Bruner, firefighters. In the other HUSKIE were 1stLt Kenneth C. Franzel, pilot; Capt Kenneth W. Dotson, copilot; Capt Karl J. Stumpf, flight surgeon; SSgt Bobby G. Cail and A1c Donald E. Farris, firefighters.

The pickups were made despite the semi-darkness and a heavy ground fog which obscured the bailout area. Lieutenant Young landed the HUSKIE to pick up one survivor and the second was hoisted from the thick jungle. Meanwhile the standby helicopter arrived and the crew spotted a penguin type flare in the ground fog. The survivor was almost directly below so Lieutenant Franzel made a near vertical let-down to keep him in sight. A vertical takeoff was made to avoid trees hidden in the fog. Another flare was seen soon afterward and a similar pickup was made. Mean-

while, the first HH-43B, which had delivered the first survivors to the airfield, returned and hoisted the fifth survivor to safety.

PAINE FIELD ARRIVAL

Typical of the returning suntanned Southeast Asia veterans were the six arriving at Paine Field, Ore. The group, along with two HH-43B's formerly attached to Det 4 at Paine, departed from the Pacific Northwest base last August for temporary duty in Vietnam as members of Det Provisional First. They are: Capt Ronald L. Bachman, 29 and TSgt James E. Johnson, 34 of Det 4, WARC, Paine Field, Wash., TSgt John F. Glenn, 33, and SSgt Howard M. Lord, 29, of Det 5, WARC, McChord AFB, Wash., TSgt Roger C. Reardon, 28, and A1c Kenneth R. Scheer, 21, of Det 9, WARC, Portland International Airport, Ore. Airman Scheer, the only single man in the group, was awarded the Purple Heart for wounds suffered while in Vietnam. All were awarded at least one Air Medal and others received as many as three, according to the number of missions flown. All received the Campaign Medal and other awards are also pending for some of the men.

When asked about the Viet Cong mortar attack that devastated Bien Hoa air base, destroyed several B-57 bombers and temporarily rendered the Air Rescue detachment non-operational, Captain Bachman

said, "The attack occurred shortly after midnight and covered the whole area we were in. The B-57 targets of the Viet Cong were just 200 yards away from our housing area and the mortars went right through our alert facilities, wounding five of six men on duty." Airman Scheer was wounded during this attack.

The crewmen said that they were not hit by ground fire but often observed it from the air. Most of it, they said, was small arms fire, but often as large as 50-caliber machine guns were used. "We never asked for trouble," Glenn said, "we went up to a 4,500-foot altitude when flying over known hostile areas. This was one of the reasons for not getting hit by ground fire."

Sergeant Johnson said that the rescue men had good equipment with which to work and praised the HH-43 HUSKIE as one of the most modern rescue craft. "I believe we did a lot of good over there," Johnson said. "The 'F' model of the H-43 we used is beefed up with a larger engine and a longer hoist cable so the crews can get down among the trees, and they also have armor-plating which at least gives you confidence when you are up there."

The group's impressions of the five-month tour were summed up by Sergeant Lord when he said, "Vietnam gives a man a true sense of values."

Southeast Asia Veterans

Det Provisional First

Capt Robert D. McDougal, Capt Ronald L. Bachman, Capt Robert T. Rosvold, Capt Billy J. Johnson, 1stLt William F. Austin, 1stLt Kenneth T. Fujishige, SMSgt Ernest E. Creach, TSgt James E. Johnson, TSgt John Glenn, TSgt Roger Reardon, SSgt Howard M. Lord, SSgt James Hines, SSgt O'Neil Vinson, SSgt Benjamin J. Hyder, SSgt Franklin D. Cooper, SSgt Grady L. Jordan, A1c Franklin Riggins, A1c Kenneth Scheer, A1c James Brennan, A1c Dale P. Jensen, A1c Ronald Snook, A1c Loney A. Martin, A2c James Walsh, and A2c Robert Donlevy.

Det Provisional Second

Capt Alva G. Graham, Capt Thomas R. Kelley, Capt Joseph V. Leech, 1stLt John W. Christianson, 1stLt James E. Sovell, 1stLt Robert J. Osik, MSgt Robert W. Bradfield, MSgt Eldrid Lusk, SSgt Charles L. Husby, SSgt Robert L. Julian, SSgt James R. Tabor, A1c Roman H. Jennissen, A2c Larry W. Smith, A2c John Zielinsky, SSgt Robert J. Bennett, A2c Andre Raymond, A2c Albert C. Dobson, A2c Richard L. Graham, A1c George K. Fink, SSgt Arthur R. Saintheart, A1c Jerry W. Wolford, A1c Edward S. Bevans, and SSgt William P. Dickerson.

Det Provisional Four

Capt Philip S. Prince, Capt Gayle D. Bernhardt, Capt Robert J. Suhrheinrich, 1stLt Theron J. May, 1stLt Zigmund W. Zalewski, MSgt Henry L. Williams, TSgt James R. Wilson, SSgt William H. Sands, SSgt Allan N. Bantle, SSgt Clyde R. Patterson, SSgt Erving W. Cox, SSgt Bobby G. Williams, SSgt Joseph D. Grubbs, A1c Frank M. Chesonis, A2c Billy W. Sanders, A2c Don M. Havens, A3c Wallace B. McCombs, A3c Daniel E. Albright, 1stLt Ronald G. Fitch, SSgt William O. Corn, A1c Gerald R. Dunham, and A3c Arthur A. Ros.

Timely Tips

Visual Blade Tracking (UH-2, HH-43B, HH-43F, OH-43D)

A 1/4-inch-wide stripe of phosphorescent paint on the chord of each blade tip, from leading edge to trailing edge, will help visually track blades. For a temporary setup, paint any fabric-backed adhesive tape with phosphorescent paint and place a 1/4-inch strip from well forward on the steel leading edge to within 1/2-inch of the trailing edge. Scotchlite tape works fine for this type of tracking at night.

N. E. Warner, Service Engineer

Transmission Shipping Spacers (HH-43B, HH-43F)

When preparing a transmission for shipment, it is necessary to secure the top covers to the end cases with the same bolts normally used to attach the rotor shaft housings to the transmission covers. Naturally, since the rotor shaft housing flange is no longer included in the bolt stack-up, an equivalent amount of thickness must be substituted if the six bolts threaded into the end cases are not to bottom. NAS-43-5-16 shipping spacers are provided for this purpose. Use them and eliminate costly replacement of end cases because of cracks in the area of the threaded holes.

F. E. Storses, Service Engineer

Blade Replacement (UH-2)

During blade replacement, make certain the folding pin cone loading bushing has been reinstalled. This bushing is a prime structural element in the blade and folding pin area. Omission of the bushing drastically alters the load distribution in the folding pin area for all blade loads must then be carried through the upper arm of the blade clevis. As a result of this overload, the main rotor blades and folding pins involved must be scrapped and the re-tensions subjected to premature overhaul. Instances have occurred recently where the folding pin cone loading bushings were omitted.

N. E. Warner, Service Engineer

Static Leak Check (UH-2, HH-43B, HH-43F, OH-43D)

Storage of the helicopter for any length of time can be used by maintenance personnel to detect and identify the location of static leaks if, prior to storing, all components are wiped clean and various fluid tanks are checked for proper fluid level.

W. J. Wagemaker, Service Engineer

Battery Care (UH-2)

During maintenance, when the battery, P/N 6490, P/N 8073 or K683213 is being discharged, be sure to reduce the total battery voltage to zero volts in order to equalize the battery cells. Failure to do this may reduce the service life of the battery or cause other problems. The correct procedure is given in the NW01-260HCA-2-1, General Information Manual.

J. J. McMahon, Service Engineer

Collective Limiter Test (HH-43B, HH-43F)

Whenever possible, MIL-L-7808 transmission fluid should be used when testing the collective limiter. If, however, a standard flow bench utilizing MIL-H-5606 hydraulic fluid is used to test the limiter (because the proper MIL-L-7808 fluid was not available) the limiter must be thoroughly flushed with transmission fluid before installation on the helicopter. This precaution is necessary because the two fluids are not compatible and if mixed together will form sludge which will plug the transmission oil filter. MIL-H-5606 is a vegetable base fluid and MIL-L-7808 is a synthetic base fluid.

W. J. Wagemaker, Service Engineer

FUEL

Contamination

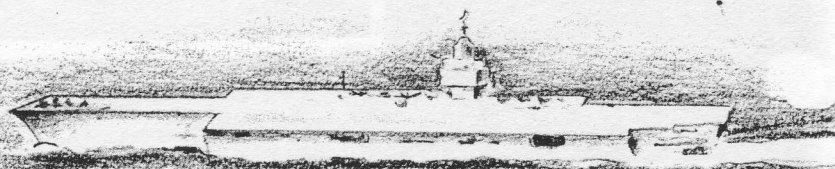
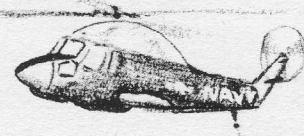
FUNDAMENTALS

DO YOU KNOW THAT — A gas turbine engine can consume as much as five times more fuel per hour than a comparable reciprocating engine? Assuming an equal contamination level, this means that a gas turbine engine and fuel control will be exposed to five times more contamination than a reciprocating engine.

H. Zubkoff, Service Engineer

SEASPRITE

ACTIVITIES



...SEASPRITE crewman, Robert Q. Aliff, AE3, of HU-2's Det 59, USS Forrester, lowered to water to aid pilot tangled in chute. Although buffeted by heavy seas, Aliff manages to cut one riser then finds he is entangled in shroud lines. Crewman signals for sling and then cuts himself free as pilot is hoisted to UH-2, chute and all, by Robert L. Mullinnix, AN, crewman. Lt(jg) Louis R. Grant II, SEASPRITE pilot, goes to crewman's aid and administers mouth-to-mouth resuscitation after copilot, Ens Michael E. Howe, takes over controls and heads for ship. Aliff inflates raft and waits to be picked up.... Night rescue of two pilots who ejected from disabled aircraft carried out by UH-2 crew from HU-1's Det Foxtrot aboard USS Constellation. Lt Kenneth G. O'Gorman, pilot of rescue helicopter; Lt(jg) Joseph G. Oyler, copilot; Burt D. Milan, PR2 and Richard L. Olsen, ADR3, crewmen.

...UH-2 crewman, R. A. Kedzierski, ADJ3, lowered into water to aid pilot tangled in shroud lines and keeps him afloat. Pilot had ejected from crippled aircraft. Other crewman, F. J. Ortner, AN, aided in bringing survivor and chute aboard helicopter by J. M. McClure, PHCA. SEASPRITE pilot is Lt(jg) Richard D. Lehman and copilot is Lt(jg) Craig B. Kaul. Helicopter personnel are attached to HU-1's Det Lima aboard USS Hancock.

...UH-2 crew from SAR, NS Adak, Alaska, makes two night searches in extreme turbulence and freezing rain for four enlisted men lost while on walk (Tundra stomping). Hunt centers around 3200-foot mountain close to shoreline. Because of zero-degree temperatures, necessary to cycle landing gear intermittently so it won't freeze in retracted position. Men sighted on third flight, made at daybreak, and they are hoisted aboard. All are suffering from exposure and taken to hospital. Lt William H. Sumrall, UH-2 pilot on night search, LCdr Deloy Meyer, pilot at time of rescue. Ens Robert H. Hamel, copilot; Billie B. Stevenson, ADR3; and Charles H. Blanchard, ADJAN, crewmen.

...UH-2 crew from HU-1's Det Mike aboard USS Ranger evacuates injured seaman from destroyer. Dawn litter pickup made despite high winds and seas and immediately after another mission involving a tiring four hour, low-level night search for two men who had fallen overboard. Lt(jg) R. L. Felton, pilot; Lt(jg) R. W. Campbell, copilot; R. E. Brim, ATR3 and P. J. Morgan, ADJ2, crewmen.

...Pilot who ejected from aircraft after flameout rescued by SEASPRITE from Det Bravo, HU-1, USS Ticonderoga. Because of high surface winds, helo makes two passes to collapse chute in water. Lt(jg) Herbert W. Gregory, UH-2 pilot; Lt(jg) Frederic G. Riehl, copilot; John E. Geier, ADR3 and John C. Smith, ADJAN, crewmen....SEASPRITE crew from SAR, NAS Cecil Field, Fla., rescues three fishermen from small boat 30 miles off Florida coast and under tow by Coast Guard. Hoist pickups made from disabled craft which is threatened by 12 to 15-foot waves. Lt Frederick J. Lakeway, UH-2 pilot; LCdr Paul H. Kirchner, copilot; James R. Williams, ADJ2, crewman.

...SEASPRITE from Det Golf, HU-1, USS Oriskany, makes midnight pickup of appendicitis-stricken sailor from pitching 50 by 50-foot helo deck aboard USS Comstock. Landing difficult due to gusting, 40-knot winds and proximity of ship's antennas and structure. Rotor blade clearance only three-feet on both sides. Lt(jg) W.W. Beck, UH-2 pilot; Lt R. L. Norris, copilot; J. G. Barrett, ADR3 and F. J. Compagno, AA, crewmen.



NORTH AND SOUTH—In Far North, Lt David Smith of Station Operations, NAS Argentia, Newfoundland, welcomes LCdr Ernest Hebert, ferry pilot from VR31, NAS Norfolk, Va. Commander Hebert just delivered the station's first UH-2. Two SEASPRITES will be used at the station for SAR and utility purposes. (USN photo) In sunnier climes, three aircraft attached to the SAR unit at MCAS Beaufort, S. C., are shown in formation flight. The helicopter flying between the two UH-2 SEASPRITES is scheduled to be retired from service. (USMC photo)

HU-2 SEASPRITES IN SAR EFFORT

Five UH-2 crews from Helicopter Utility Squadron Two, NAS Lakehurst, N.J., aided in the search for survivors after an Eastern Airlines plane crashed into the icy waters of the Atlantic off Jones Beach, L. I. Eighty-four persons were aboard when the DC-7 made its fatal plunge the night of Feb. 8.

The flight of SEASPRITES, led by the squadron's commanding officer, Cdr M.M. Gunter, Jr., was immediately launched and headed for the area to join in the SAR effort. The site of the crash was located by the Commander's UH-2 which also picked up some of the debris later and flew it to Floyd Bennett Field for identification by airline officials. Considerable haze was encountered over the crash area during the search although it was clear above 100 feet. A problem was also created unintentionally by the many surface craft circling the area — they continually played spot lights on the helo cockpits. Flying approximately 40 feet above the water, part of the time on in-

struments, the helicopters logged over 50 doppler approaches as they sought the wreckage of the downed airliner. All aboard perished in the crash. Cdr G.E. Skinner, Jr., was copilot in Commander Gunter's SEASPRITE during the search while D.H. Smith, AE3, and R.G. Hanna, AMS1 were crewmen. Manning the other UH-2's were: LCdr J. T. Denny, Jr., pilot; Lt(jg) R. K. Melcher, copilot; J. V. Tomlin, Jr., ADJ3, and J.F. Winter, ADJ3, crewmen. LCdr C. S. Sapp, pilot; Lt J. F. Martin, copilot; R. D. Pickens, AMS1, and F. F. Errico, AMS3, crewmen. Lt H. E. Williams, pilot; LCdr R. N. Wright, copilot; C.R. Beasley, AMH1, and R.G. Segal, PR2, crewmen. Lt(jg) P. M. Hoffman, pilot; Lt(jg) P. J. Foster, copilot; R. A. Demaio, PR3, and W.V. Larmie, Jr., ADJ2, crewmen.

HU-2's helicopters remained on the scene until forced to return for refueling. At 0330 on Feb. 9 the Coast Guard halted the air operations, allowing all of the squadron's

helicopters on station to return to Lakehurst. A total of 16.7 hours were flown during the search.

ARS DET 5 HH-43B'S ALSO IN SEARCH

Two HH-43B crews from ARS Det 5, EARC(MATS), also participated in the search for survivors of the airline crash. The HUSKIES, from Suffolk Co., AFB, L. I., 58 miles away, flew search patterns over the dark waters for two hours but their searchlights failed to reveal any signs of survivors. The two helicopters refueled at NAS, N. Y., and were then released by the Coast Guard, in charge of the SAR effort, since all hope was gone that anyone had survived the crash.

Capt J. T. Herr was pilot of the first HH-43B dispatched to the scene; Capt C.A. Morrill, copilot; and SSgt D. A. Bidwell and Alc L. W. Forehand, crewmen. Manning the backup HUSKIE were Capt A. D. Kwiatkowski, pilot; Capt F. L. Chase, copilot; MSgt D. R. Pavel and SSgt H. L. Mott, crewmen.

Good Neighbor Policy

The SAR unit at MCAS Cherry Pt, N. C., recently embarked on a plan which will undoubtedly save lives and also further good relations between the air station and civilian communities. The unit contacted hospitals within a 150-mile radius of the station and offered helicopter service, when deemed necessary, for emergency evacuations. Led by Capt John L. Pipa, the SEASPRITE crews are also demonstrating the rescue capabilities of the UH-2 and plotting landing sites in the area. In addition, the marines arranged for use of the recompression/decompression chamber at Duke University, Durham, N. C., since ex-

tensive diving is carried on in the Cherry Point area. Response to the suggestions was very enthusiastic.

Recently a UH-2 from the unit flew almost 200 nautical miles to take sailor, seriously injured in an automobile accident, to the Naval hospital at Portsmouth, Va. Capt Gerald E. Harbison was pilot; Col Jay E. McDonald, copilot; and GySgt Roy D. Logan, crewman. In a night rescue, Captain Pipa piloted a SEASPRITE 55 miles to make a hoist pickup of two fliers who bailed out of their F4B. Lt Stanley B. Sprague was copilot; Cpl Edward R. O'Connor, crewman; and Lt Robert Holmstrom, USN(MC), doctor.

HU-4 Aids in Test

Forty pilots and crewmen of the 539th Fighter-Interceptor Sqdn, McGuire AFB, N. J., were "rescued" from the icy waters of the Toms River recently during a joint Navy-Air Force survival training exercise. The "rescuers" were SEASPRITE crews from Helicopter Utility Squadron Four, NAS Lakehurst, N.J.

The operation provided cold weather survival experience for the Air Force personnel and is part of HU-4's flight-training syllabus. The squadron, which provides all types of helicopter support for the Atlantic Fleet, is commanded by Cdr Andrew A. Tonkovic.



MOUNTAINSIDE RESCUE—Capt L.R. Jenson, commanding officer of NAS Whidbey Island, Wash., presents Kaman Scrolls of Honor to SEASPRITE crew which rescued a seriously injured woman from a ledge at the 8,300-foot level on Mount Eldorado, Wash. Left to right are Captain Jenson, Homer Helm, KAC service representative; Lt J.R. Greenway, UH-2 pilot; G.L. Weiser, AD3, crewman; LCdr A.O. Hanson, copilot. (Official USN photo)



If you have a question regarding Kaman Aircraft maintenance, send it along to Rotor Tips. The Service Department's engineers will be glad to answer it.

Q. (Applies HH-43B/F, UH-2, OH-43D, UH-43C) SHOULD MAINTENANCE PERSONNEL ASSUME THAT, BECAUSE "TORQUE STRIPES" REMAIN INTACT, THE PROPER TORQUE IS PRESENT ON BOLT/NUT ASSEMBLIES?

A. Such an assumption should not be made by maintenance personnel. A torque wrench should be used as a positive means of determining if the proper torque is present. Several field reports indicate that, although the painted "torque stripes" have remained intact, torque has dropped off the bolt/nut assembly. A "torque stripe" is primarily a method utilized by Quality Control to indicate that the bolt had the proper torque at installation. Bolt/nut assemblies can, and do, experience a substantial drop in torque without rotation of the bolt and nut.

G. M. Legault, Service Engineer

Q. (Applies HH-43B) HOW IS THE AZIMUTH BAR BUSHING, P/N K350013-1, OBTAINED FROM THE SUPPLY SYSTEM? THIS BUSHING FITS BOLT, P/N K750635-1, WHICH SECURES THE AZIMUTH HUB CONTROL ROD TO THE AZIMUTH BAR.

A. This bushing is not ordered as a separate item. Both the bolt and bushing should be ordered as an assembly under FSN 1560-794-8334JC, "Bolt Assy."

W. J. Rudershausen, Service Engineer

Q. (Applies UH-2) DURING ENGINE INSTALLATION, WHAT PRECAUTION SHOULD BE OBSERVED REGARDING BUSHING P/N NAS-75-6-009?

A. When installing an engine, be sure that the bushing P/N NAS-75-6-009 is installed in the outboard ear of the forward mount outboard fitting, P/N K631154-1 (see NAVWEPS 01-260HCA-4-2). Since this is a slip-fit bushing, it is usually removed together with the engine mount bolt, P/N K672063-11, and can possibly be overlooked during reinstallation of the engine. The bushing has two functions. It reduces the hole in the outboard ear of the fitting from 1/2-inch dia. to 3/8-inch dia. to fit the engine mount bolt. It also serves as a spacer to properly position and retain the engine mount support rod end bearing in the fitting. Failure to install the bushing can result in a broken fitting due to force exerted against the ears of the fitting when torquing the engine mount bolt. A precautionary note to this effect has been submitted as a revision to NAVWEPS 01-260HCA-2-3.

H. Zubkoff, Service Engineer

Q. (Applies UH-2, HH-43B, HH-43F, OH-43D) WHY SHOULDN'T SOLVENT BE USED WHEN CLEANING CONTROL ASSEMBLIES?

A. The use of solvent should be avoided because some assemblies (azimuth for example) contain cavities that are not easily inspected and which can trap the solvent, rendering the lubricant in the cavity ineffective. Unless a grease fitting for relubrication is provided, it is possible that the solvent will flush out all the grease in a bearing and leave it unprotected. Use a lint-free cloth to wipe such assemblies clean.

W. J. Wagemaker, Service Engineer

Q. (Applies UH-2) WHAT IS THE MAXIMUM ALLOWABLE CLEARANCE BETWEEN THE FACE OF THE BRAKE DISC AND THE FLAT SURFACE OF THE ADJACENT HOUSING ON BRAKE ASSEMBLIES, P/N 9532963 and K641050-9?

A. The maximum clearance should be 0.250 of an inch. NAVWEPS 01-260HCA-2-2 is being revised to include this information.

H. Zubkoff, Service Engineer

Q. (Applies UH-2, HH-43B, HH-43F, OH-43D) WHY IS IT BEST TO INSPECT THE WHEEL AND ROTOR BRAKE SYSTEMS WITH PRESSURE IN THE SYSTEM?

A. In addition to leaks, any deformation of the lines caused by the pressure is more readily apparent.

W. J. Wagemaker, Service Engineer

Q. (Applies UH-2) IS THERE A CONVENIENT SOURCE OF 115VAC AND 28VDC POWER LOCATED IN THE HELICOPTER FOR UTILITY PURPOSES?

A. The cabin overhead test receptacle will provide 115VAC and 28VDC. A simple, all-purpose harness can be made by using a PT06SE14-5P connector and #20 gage wire. If an AC current greater than 1 ampere is anticipated, TEMPORARILY replace the existing 1 ampere fuses with up to 5 ampere fuses during use. Fuses with ratings greater than 5 amperes should not be used. Make certain that the 1 ampere fuses are returned to their places after the test is completed. The DC circuit has a 5 ampere capability.

J. J. McMahon, Service Engineer

Q. (Applies UH-2, HH-43B, HH-43F, OH-43D) WHAT IS INDICATED WHEN UNDUE FORCE IS NECESSARY TO REMOVE A RIGGING PIN.

A. This indicates the system may be preloaded. Check the trim actuators first to insure that they are not inducing the preload. If they are not, continue efforts to find the reason why the rigging pin was so difficult to remove.

W. J. Wagemaker, Service Engineer

Q. (Applies UH-2) WHAT MAY BE ONE CAUSE FOR A HIGH CONTAMINATION COUNT IN SAMPLES OF HYDRAULIC FLUID TAKEN FROM THE HELICOPTER?

A. Unless the sample bottle is prepared correctly and the proper material and procedure used, a high contamination count may result even though the actual contamination in the hydraulic system is much lower and within limits. The materials needed for sampling are: One teflon seat needle valve, two 12 to 15-inch lengths of teflon-lined flexhose (use only this type hose to prevent the possibility of contamination from within the hose itself) a one-quart container and a 100 milliliter sample bottle. To correctly prepare the sample bottle: (1) Rinse in two successive rinses of petroleum ether. (2) Wash thoroughly in a solution of detergent and hot water. (3) Rinse twice in soft, hot tap water. (4) Rinse with filtered distilled water twice. (5) Rinse with filtered isopropyl alcohol to remove the water. (6) Rinse with filtered petroleum ether and allow a very small quantity of the petroleum ether to remain in the bottle. (7) Rinse a previously cleaned 2 by 2-inch strip of plastic film with petroleum ether and place it over the mouth of the bottle. (8) Install the cap over the plastic film. For convenience, as many bottles as possible should be prepared at one time. To collect the sample: (a) Use one length of hose to connect the needle valve to the sampling port located on the pressure line of the ASE control actuator. (A special tool, P/N K604842-1, will be provided in the future to take the place of the needle valve and hose.) Connect one end of the second hose to the other side of the valve. (b) After ensuring that the valve is closed, apply 1500 psi hydraulic pressure either by ground turn-up or by connecting an auxiliary jenny to the helicopter (ground turn-up is preferable). (c) Direct the hose from the sampling valve into the empty one-quart container, and slowly open the valve. (d) Allow approximately one-half pint of fluid to flow into the container. (e) Open the sample bottle and direct the stream of fluid into the bottle. (f) Remove filled bottle from stream of fluid and reseal, using the plastic film and cap. (g) Close the needle valve, remove hydraulic pressure from system and disconnect the sampling valve. (h) During storage the two hoses should be connected together, using an AN815-4 union, to prevent dirt and dust from entering the hoses and valve. For further information refer to the article on "Hydraulic Fluid Contamination" in the April-May, 1964, issue of Kaman Rotor Tips.

P. M. Cummings, Service Engineer

Q. (Applies UH-2, HH-43B, HH-43F, OH-43D) WHAT SHOULD BE DONE BEFORE ADJUSTMENTS ARE MADE TO ANY PART OF A CONTROL SYSTEM?

A. The maintenance history of the helicopter should be checked to see if any previous adjustments were made in the same area. Trends indicating possible failure of a particular component may be discovered and corrective action can be taken.

W. J. Wagemaker, Service Engineer

Q. (Applies UH-2, HH-43B, HH-43F, OH-43D) BEFORE MAKING RIGGING CHECKS, WHAT FUNDAMENTAL STEP SHOULD ALWAYS BE TAKEN?

A. Prime control locks should ALWAYS be installed on the three basic controls to prevent movement while rigging adjustments are being made.

W. J. Wagemaker, Service Engineer

Q. (Applies UH-2) HOW CAN THE PROPER LIGHT INTENSITY BE ESTABLISHED FOR THE COLLECTIVE STICK SWITCH PANELS?

A. By adjusting resistor RX33V500 and monitoring the voltage for 3VDC between the following location and aircraft ground. (a) Aircraft effectivity 147973 through 147983, 149014 through 149028: terminal block 14, terminal 1. (b) Aircraft effectivity 149013, 149029 and subsequent: terminal block 84, terminal 1. Do not use battery power as a source and do not allow more than 5 volts to be impressed between the terminals and ground.

J. J. McMahon, Service Engineer

Q. (Applies UH-2, HH-43B, HH-43F, OH-43D) WHEN INSPECTING A BOLTED CONNECTION FOR PROPER TORQUE, WHAT ACTION SHOULD ALWAYS BE TAKEN?

A. Check the washers under the bolthead and nut. If they turn, chances are good that the threads have bottomed out and the connection is loose even though the nut and bolt appeared to be properly torqued when inspected. On the gang cranks and similar areas, proper torquing can be critical because the bolt heads and tails are in close proximity.

W. J. Wagemaker, Service Engineer

Q. (Applies UH-2) WHICH IS THE PROPER TORQUE VALUE FOR THE NUTS SECURING THE OIL PUMP TO THE SPEED DECREASER GEAR BOX? TWO DIFFERENT VALUES HAVE BEEN CALLED OUT IN NAVWEPS DIRECTIVES.

A. The correct value is 50-70 inch pounds as specified in NAVWEPS 02B-105ANB-2. A higher torque will strip the heli-coil inserts. NAVWEPS 03-1-176, dated 15 May, 1964, carried an erroneous call-out of 160-190 inch pounds and was revised 15 October, 1964, to reflect the correct torque value of 50-70 inch pounds.

H. Zubkoff, Service Engineer

Q. (Applies UH-2) IS THERE A LIFE LIMIT ON THE LOWER (FR4, FR4R) RODEND BEARING OF THE K659027 AZIMUTH ROD?

A. Yes. The FR4, FR4R rodend bearings must be replaced each 240 hours. For convenience it is suggested that the rodend removal be timed to coincide with the 240-hour azimuth assembly time between overhaul (240 hours).

P. M. Cummings, Service Engineer

UH-2 FUEL SYSTEM

by Herman Zubkoff
Service Engineer
Field Service Department



PART III

This article, the third in a five-part series on the UH-2 SEASPRITE, deals with a description and operation of the pressure fueling, suction defueling, and fuel quantity systems. Subsequent articles will cover the power plant fuel system and the fuel control system. Part I dealt with the internal and auxiliary systems and Part II, the fuel transfer system.

Part III will be discussed in the following order (Reference Fig 1 in Part II): 1. Pressure Fueling (a) general (b) auxiliary tank units (c) internal tank units (d) pre-check panel. 2. Suction Defueling. 3. Fuel Quantity System.

Pressure Fueling

(a) General: The single point pressure fueling system employs the same internal plumbing that is used for the fuel transfer and suction defueling systems. Fuel, under a recommended external pressure of 45 to 55 psi, is serviced into the internal and auxiliary tanks through the single point pressure filler adapter to which the quick disconnect type fueling hose nozzle is attached. The internal fuel plumbing was designed to permit a fuel flow of 300 to 360 gals per minute at the above recommended servicing pressure. A reduction in servicing pressure may result in only a partial opening of the fuel-defuel valves through which fuel enters each separate tank. This, in effect, will create a restriction in the servicing lines and result in a decreased fuel flow rate. When each tank is full, the fuel-defuel shutoff valve in the respective tanks will automatically shut off the flow of fuel. As soon as servicing is started, proper operation of these valves is checked by means of switches located on a recessed "PRECHECK" panel directly above the pressure filler adapter. Other switches on this panel control the solenoid swing check valves on either side of the pressure fueling adapter to allow pressure fueling of the internal tanks only.

(b) Auxiliary Tanks: Both tanks are similar and contain a fuel shutoff valve, an upper fuel level sensing valve, a lower fuel level sensing valve, and a solenoid-operated vent/relief valve.

Fuel enters the auxiliary tanks through the pressure fueling adapter, through the solenoid operated swing check valve (which is explained in paragraph (d)) through the two-way check valves and into the auxiliary tanks through the shutoff valve. Venting, during pressure fueling, is provided by the solenoid-operated vent/relief valve (which is explained in paragraph (d)).

The two-way check valves open in the servicing direction at 17 psi and in the opposite direction (when fuel is being transferred from the tanks) at 0.25 psi. When the auxiliary tanks are pressurized the maximum pressure developed is only 16 psi, which is not enough to open the valves in the servicing direction. Recirculation from one auxiliary tank to the other during operation is thus prevented and the fuel is directed into the forward or sump tank.

When the auxiliary tanks are filled, the upper float-operated fuel level sensing valve closes, creating a pressure in the pilot line which is connected to the shutoff valve. Back pressure in the pilot line closes the fuel shutoff valve and shuts off the flow of fuel into the auxiliary tanks. When the tanks are pressurized for fuel transfer, the shutoff valve opens in the opposite direction. When the tanks are empty, the low level sensing valve closes the shutoff valve to exclude air from the fuel system.

(c) Internal Tanks: Fuel enters the two internal tanks simultaneously through the pressure fueling adapter, the main line swing check valve and through the forward and aft tank fuel-defuel shutoff valves. When the tanks are full, the dual pilot solenoid precheck valves in the respective tanks actuate the shutoff valves to the closed position, thus shutting off the fuel flow into the tanks.



1000-Hour
Pilot Awards



In left photo Capt Price S. Summerhill, commander of Det 8, CARC, Selfridge AFB, Mich., is greeted by Capt Anthony G. Volonis after logging 1000th hour in a Kaman helicopter. In right photo, Captain Summerhill congratulates Capt Ernest L. Neville, also of Det 8, upon reaching the same milestone. Both HH-43B pilots, who also flew in HH-43A's, will receive the award given by KAC in recognition of this achievement. Others who recently qualified for the award are: Capt Grant D. Kerber, EARC Hdqts, Robins AFB, Ga.; Capt Allen R. Martin, AARC Hdqts, Ramstein AB, Germany; Capt Joseph H. Pinaud, Det 8, EARC, Myrtle Beach AFB, S. C.; Capt Wayne J. Wolf, Det 9, AARC, Moron AB, Spain; Capt Richard A. Smith, Det 1, AARC, Spangdahlem, Germany; Capt Grant F. Mackie, Det 4, AARC, Ramstein AB, Germany; and Capt David J. Wege, 31st ARSg, PARC, Clark AB, Philippines. (USAF photos)

(d) Precheck Panel: Proper operation of the internal tank fuel-defuel shutoff valves is checked by means of switches installed on this panel. This check must be accomplished just as soon as pressure fueling is started to assure the operator that the valves will close and shut off further fuel flow when the tanks are full. Selective pressure fueling or suction defueling of the internal tanks, auxiliary tanks, or both, is also accomplished by switches on this panel. The panel is located on the right side of the fuselage, above the pressure fueling adapter. A door, hinged at the bottom, protects the switches and serves as a fairing for the recessed panel. When this door is opened, a micro-switch is actuated which opens the solenoid vent/relief air valve in the auxiliary tank air pressure lines. This vents the tanks to permit servicing.

The PRECHECK panel contains 4 toggle switches (Reference Fig 1 in Part II). The two switches on the right, marked "MAIN LINE" and "AUX CHECK," are two-position "OPEN" and "CLOSED." They control the two solenoid operated swing check valves on either side of the pressure fueling adapter. They are normally in the closed position as illustrated. In this position the swing check valves permit fuel flow in the transfer direction and prevent recirculation of aft tank fuel to the auxiliary tanks. During servicing, if both internal and auxiliary fuel is required, both switches are placed in the OPEN position. This opens the swing check valves allowing fuel flow into all tanks. If auxiliary tanks are not installed, or if internal fuel only is desired, the "AUX CHECK" switch will remain closed and the "MAIN LINE" switch will be placed in the OPEN position.

The two switches on the left side of the precheck panel are used to check the operation of the fuel-defuel shutoff valves in the forward and aft internal tanks, prior to complete servicing. Proper operation of the shutoff valves is important to prevent rupture of the internal tanks during servicing. These two switches, marked "PRIMARY & SECONDARY - AFT & FWD MAIN TANKS," are spring loaded to the center or off position. The FWD switch is for the forward tank, the AFT switch is for the aft tank. Operation and function of the switches, in relation to their respective tanks, is identical. Each switch has two positions, other than the center or off position, marked PRIMARY and SECONDARY. These correspond to the primary and secondary float valves in the dual pilot solenoid precheck valve. When the switches are placed to the PRIMARY position, the lower float valve is electrically closed, simulating a full tank. This blocks the pilot line to the fuel-defuel shutoff valve and creates a back pressure; the fuel-defuel shutoff valve closes, stopping fuel flow into the tanks. When the switches are placed in the SECONDARY position, the same sequence of events occur with the upper float valve. Only one float valve in the dual precheck valve is required

to close the fuel-defuel shutoff valve. The second float valve has been added as a safety feature. This check is accomplished as soon as pressure fueling begins and ensures that the fuel-defuel shutoff valves will close when the tanks are full.

Suction Defueling

Suction defueling is accomplished through the pressure fueling adapter and through the same internal plumbing employed in the pressure fueling system. Suction developed in the lines will open the fuel-defuel shutoff valves and fuel will be drawn out. When a tank is empty a float valve (which is an integral sub-unit of the fuel-defuel shutoff valve) drops and closes the respective valve. This prevents breaking the suction and permits the drawing out of fuel which may still remain in the other tanks. During defueling, suction is also applied to the suction check valve to keep it closed. This prevents fuel from bypassing internally. To permit defueling, the two toggle switches on the right side of the precheck panel, marked "MAIN LINE" and "AUX CHECK," must be opened. If only defueling of the auxiliary tank is desired, the MAIN LINE toggle remains closed and the AUX CHECK toggle alone is placed in the OPEN position. This closes the swing check valve to the internal tanks and opens the swing check valve from the auxiliary tanks, allowing auxiliary tank fuel only to be drawn out.

Fuel Quantity System

Fuel quantity is measured by means of six submerged probes called tank units, one in each of the four internal cells and one in each of the two auxiliary tanks. They are all interconnected by electrical wiring to the gage on the pilots instrument console which is calibrated in pounds. The gage indicates the continuous total quantity of fuel. A selector switch is provided to allow the same indicator to be used to check the fuel quantity of each individual tank. Each probe position is indexed to the cell in which it is installed. The cell covers and probe assemblies should not be interchanged. This system is a capacitance-type fuel quantity gage system. The probes sense the level and density of the fuel and deliver the signals to an electronic amplifier bridge which responds to these input signals by sending a proportional voltage to the indicator where fuel quantity is indicated in pounds. The two probes in the sump tank cells also include two additional compensating capacitors which sense and correct for fuel density variations due to temperature changes. When the auxiliary tanks are jettisoned, a capacitor, calibrated to read "0", is automatically introduced into the system. This provides for an accurate continuous total quantity reading.

A complete detailed description of the fuel quantity system components is included in the June-July 1963 issue of Kaman Rotor Tips. ✦

CURRENT CHANGES

		Issue Date
AFC	No. 49 - Removal of FUEL PRESSURE INDICATING SYSTEM	12/15/64
AFC	No. 58 - Oil Cooler Blower Installation; Replacement of FLEXIBLE BLOWER DRIVE SHAFT ASSEMBLY	2/28/65
AFC	No. 86 - Hydraulic System; Installation of an additional ASE SYSTEM HYDRAULIC FILTER	2/19/65

TCTO 1H-43(H)B-573	Installation of OIL COOLER BLOWER ALIGNMENT PIN and BLOWER DRIVE SHAFT SHEAR PIN, HH-43B HELICOPTERS	1/4/65
TCTO 1H-43(H)B-576	Installation of AN/ARC-44 RADIO, HH-43B HELICOPTERS (Map Only)	3/15/65

A. J. Leonaitis, Service Publications

DET 5 AND 9 HH-43B'S RESCUE 138

The evacuation of more than 175 persons in the flood-stricken Pacific Northwest was reported on in the last issue of Rotor Tips. Two HH-43B's from ARS Det 9, WARC(MATS), Portland International Airport, Ore., were aided in the rescue work by another HUSKIE from Det 5 at McChord AFB, Wash. A few weeks later a sudden warming trend and heavy rain again raised the flood danger but, this time, nature reversed the situation and most of the evacuation was called for in the Det 5 area. The McChord detachment rescued 126 persons, including two relatives of the Japanese Imperial Family. They were Mr. and Mrs. Kybei Ohki, she being related to Princess Hanako who recently married the Emperor's second son, Prince Hitachi.



EVACUATION — Civilians wait to board Det 5 HUSKIE during rescue operation. McChord's three HH-43B's flew 3,200 passenger miles over rugged mountain terrain during evacuation. (USAF photo)

Detachment 5 was called on after roads and bridges leading to Crystal Mountain were washed out, stranding over 300 skiers in the snow-covered area. Operating under the call-names of Pedro 1, 2 and 3, the crews were faced with turbulence so bad that the crew of Pedro 1 — Capt Thomas D. Precious, SSgt Enoch Benson, medic, and A3c George Lepsey, crewman — was temporarily delayed from takeoff.

Pedro 2 was manned by 1st Lt Jason Bridge, Capt Paul Schildgen and A2c Richard Landry. Pedro 3, was piloted by Capt Andy Solberg while SSgt Howard Lord and TSgt Eddie Hagerman were crewmen. Departing from McChord at eight o'clock on a Saturday morning, the choppers proceeded to Crystal Mountain and Crystal Village to aid in distributing supplies and in evacuating the trapped persons.

Excessive wind, rain and poor visibility plagued rescue operations at the two sites. By 11:30 several trips had been made in transferring the people from Crystal Village to Enumclaw, a distance of about 32 miles. These included children and one person who had suffered a broken leg. By 1 p.m., 49 persons had been evacuated by the Air Force helicopters, but bad weather forced a delay in further operations. A half-hour later, three helicopters dispatched from the Navy and Coast Guard arrived and joined in the rescue mission. At 3:30 p.m. all

six helicopters took off to continue the mission. Meanwhile Hagerman and Landry remained behind at Enumclaw to try and establish organization among the displaced skiers.

By darkness, Det 5 had evacuated 92 people in 31 trips over a period of 18 hours and 20 minutes. The Navy and Coast Guard units rescued 18 persons. The situation was fairly well in hand by late Saturday night and Pedro 1 and 3 returned to base. Pedro 2 stayed overnight in the immediate area and rescued an additional 34 people on Sunday, making 13 trips. Later, Captain Schildgen and his crew returned to McChord for rest.

The entire mission involving McChord's Det 5 took a total of 24 hours and 50 minutes. Flight over the treacherous mountain terrain consumed 1,341 gallons of fuel and amassed nearly 3,200 passenger miles.



DOGS TOO — G.M. Gosnell and his dog are assisted aboard Det 9 HH-43B by A1c Kenneth Scheer during flood evacuation. (USAF photo)

Meanwhile, an HH-43B crew from Det 9 rescued 12 civilians trapped by flood waters in the Albany, Ore., area. Manning the HUSKIE were Maj Howard J. Cochran, pilot; Capt Troy L. Allen, copilot; A1c Kenneth R. Scheer, crew chief, and A2c Carl F. Wilhelm, photographer. They were accompanied by Deputy Sheriff Daruynne C. Knofler of Linn County.

During the 150 miles flown to and from the rescue site, moderate rain was encountered along with mild turbulence and 15 to 20-knot winds. Due to the low ceiling, the trip was made at comparatively low altitude despite the tall pine trees topping the hills below.

Guided by the deputy sheriff, Major Cochran flew the HUSKIE to a spot where a man, his wife and two small children waited for help in their water-surrounded home. All were hoisted to safety by Airman Scheer. Later, with Captain Allen as pilot, three adults, five children and a dog were evacuated from a small knoll completely surrounded by water. Finally, their mission complete, the helicopter crew headed homeward and made the 75-mile night trip without incident.

HH-43B crews from Det 5 and Det 9 have rescued more than 300 flood victims, all civilians, during the last few months. ✦

Det 3's Proud Record

Flying a total of 1800 hours and recording 9780 takeoffs and landings, HH-43B's from Det 3, CARC (MATS), at Grand Forks AFB, N.D., recently completed three years of accident-free flight operations. The unit is commanded by Capt Richard C. Goven.

The commendable record was compiled despite the fact that during the past year Det 3 experienced a rapid changeover of personnel due to transfer and the temporary duty movement of 11 officers and enlisted men to Vietnam and Southeast Asia. Captain Goven said that even with the rapid rotation of personnel the detachment has maintained its alert capability and the morale of all its personnel is very high. Det 3 was rated as "outstanding" on the last command inspection.

48th in Hazardous Mission

When the HH-43B crew from the 48th ARSg, Eglin AFB, Fla., arrived at the scene of the bomber crash they found one of the survivors almost directly below in the heavily wooded area. Capt Joseph E. Gagnon, RCC, immediately flew to a small clearing a half-mile away, set down the FSK, and returned. Using extreme caution due to reported exploding ordnance in the crash, A1c James F. Hooks, firefighter, lowered A1c James H. Garrett, the medic, to the ground. He began administering first aid to the survivor whose leg had been severed in the crash.

Meanwhile, in between air searches by the helicopter for a possible landing spot, Airman Hooks made two hoist trips to report on the survivor's condition and to receive instructions. He and the medic then placed the injured man in a litter and headed through the woods toward a small clearing which had been located. Even here the helicopter could not make a complete touchdown until A1c Lefay Parker, the other fireman, leaped from the HUSKIE and bent a tree over—the blade clearance was still less than a foot. The survivor was placed aboard and Captain Gagnon learned that a doctor and ambulance from the base were in the area. A quick air search revealed the ambulance; Capt George M. Chastain, MC, was hoisted aboard, and the HH-43B headed for Eglin.

OH-43D Saves Troops

The effective use by Capt George G. Evans, USMC, of his OH-43D's rotor downwash in beating back a fire in a forest on Okinawa has been credited with saving troops and valuable radar equipment in the area.

Captain Evans, of VMO-2, MAG-16, MCAF Futema, was on the ground when a helicopter crashed into the side of a hill about two miles away. He sped to the OH-43D in a jeep, was airborne and over the crash scene in less than five minutes. A 20-knot wind was blowing flames in the direction of personnel and equipment so he hovered the helo over the edge of the fire and contained it for 25 minutes.

33rd ARSg Rescue

A SCUBA-diving airman who fell while trying to climb a cliff was rescued afterward by an HH-43B crew from the 33rd ARSg, PARC (MATS), Naha Air Base, Okinawa. A hoist pickup could not be made because of the cliff overhang and the possibility that the gusting winds might slam the injured airman against the steep face. Capt James M. Crabbe, RCC, and Capt Bruce B. Duffy, copilot, made a crosswind approach and landed the helicopter on a narrow shelf of coral, between the sea and the cliff. Waves were breaking over the precarious landing spot and there was only a six-foot clearance for the rotor blades. Descending by rope, SSgt Jerome C. Gorny and A1c Thomas F. Bradley, pararescuemen, made their way to the airman and administered first aid. With the help of SSgt Donald L. Watson, medic, he was then placed in the helicopter.

Det 14 Aids at Crash

Det 14, WARC (MATS) at Nellis AFB, Nev., received the call at 2100 hours — A civilian airliner with 29 persons aboard had disappeared from the radar scope nine miles from Las Vegas. Would the detachment help?

An HH-43B crew made immediate preparations for takeoff but were forced to wait until shortly after midnight because of the wind-driven snow and poor visibility. When three miles south of Las Vegas, while under radar surveillance, Capt I. S. Momii, RCC, was forced to turn back because of the worsening weather. With him were 1st Lt R. C. Tubbs, copilot; A2c R. R. House, HM; TSgt A. R. McCall, MT; and Capt R. C. Hancy, doctor. At 0700 another crew launched for the suspected crash area and 25 minutes later sighted the wreckage at 3600-feet, eight miles from Las Vegas. All aboard the plane had perished. Manning this helicopter were Capt T. E. Fallows, pilot; Lieutenant Tubbs, copilot; Airman House, HM; Captain Hancy, MSgt J. T. Blew and Sergeant McCall, MT's.

For the next few days two helicopters from Det 14 and one from Indian Springs AFB transported approximately 40 civilian rescue personnel and 10 FAA/CAB investigation personnel to the almost inaccessible crash area. When the grim task of transporting the bodies had been accomplished, all personnel were airlifted to the base camp. Total flying time was 8.35 hours. The second Det 14 HH-43B crew consisted of Capt R. H. Busch, pilot; 1st Lt J. T. Riley, copilot; SSgt J. V. Sells, HM; and A1c G. T. Sotack, MT.



GRIM TASK—HH-43B crewmen from Det 14 make their way over snow-covered slope to recover bodies from crashed airliner. (USAF photo)



Support equipment and pilot-mechanic coordination is covered in this, the last part of Line Level Helicopter Maintenance. Both topics fall under the heading of General Maintenance also dealt with in the two preceding issues of Rotor Tips.

Support Equipment

Much discussion has been generated regarding the negative aspects of support equipment. The most frequently heard critical comments are: too many items of support equipment are required; support equipment isn't simple enough or designed with the mechanic in mind; it should be more rugged and reliable, etc. Most aircraft manufacturers are duly concerned about these points and give them much consideration during design and development of new models.

Now let us look at the support equipment picture from a positive operational viewpoint. Regardless of how bothersome, I am sure you all agree that support equipment is as essential to the operation of today's aircraft as fuel, spare parts, handbooks and technically skilled personnel. This is equally applicable from the simple jacks and work stands, that we take so much for granted, to the latest complex electronic test and checkout equipment. Helicopters, with their increased use of electronic equipment; involved control, rotor and drive systems; and special operational handling and mooring requirements are especially subject to dependence on support equipment.

It is not the intention here to dwell further on reasons for, or design considerations relative to, support equipment, but rather to re-establish their necessity and point out a few recommendations as to how they should be treated to insure availability when needed. Most of these suggestions are well known but not always practiced:

1. When a new aircraft operation is established, review the support equipment requirements and take appropriate action to insure their availability. This may seem too basic to mention, but reports have been received of an operating activity so frugal with provided support funds that they refused to order recommended rotor blade covers. Due to limited hangar facilities at that activity, outside mooring was the rule rather than the exception. As could be expected, weather damage took its toll on blade finish, hardware

LINE LEVEL HELICOPTER MAINTENANCE

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Part X

and structure, causing numerous premature replacements. No matter how costly a piece of support equipment seems, you can usually be certain that the component it is provided to protect, or service, is worth much more and can often have a direct bearing on mission availability.

2. Set up functioning inventory and storage control of provided support equipment. No aircraft gear seems to disappear any quicker than support equipment, especially when it is most needed! Shadow boards, cabinets and compartmentized shelves are all good, if properly monitored.

3. Give due consideration to correct handling required by various types of equipment. There are fairly rugged bulky items such as towbars, stands, dollies, etc. that can take a reasonable amount of abuse; mechanical devices such as protractors, rigging fixtures, locks or lifting devices with close-fitting pins that look fairly rugged but can cause misrigging or item damage if abused; and equipment containing gauges or other accurate measuring devices, as well as electronic test sets, that should be treated like the precision equipment they are. Provided boxes should always be utilized to give required protection and keep loose pieces together.

4. Establish a support equipment maintenance policy. Next to the average homeowner's maintenance equipment, there are very few categories of gear that get more wear and tear and less care than support equipment. How many times have you seen a mechanic struggle to turn a nut or bolt or insert a pin in a piece of support equipment that was either bone dry, covered with rust, or both? How many pieces of support equipment have you seen with parts missing, broken or with poorly improvised fixes?

Our top procurement planners have finally recognized the interrelationship and dependence of all aspects of a weapon system by stipulating simultaneous development and delivery of support requirements with the end item. Full benefits of such foresight will only be realized when operating activities recognize their related responsibility and take appropriate constructive action. Specific maintenance recommendations for support equipment are:

- a. Check periodically for condition and completeness.
- b. Check measuring devices periodically per applicable specifications.

- c. Lubricate working part, joints and unfinished surfaces regularly.
- d. Touch up exposed metal surfaces with appropriate finishes.

In summary, treat support equipment in a manner befitting its importance to the operation of the respective end item — always make certain it is available and in a state of good repair and readiness. Failure to do so can result in gross inconvenience, mission abort or contribution to a flight safety condition.

Pilot-Mechanic Coordination

Some lip service has been given to this subject, usually in connection with the broad military organization "team concept;" however, few texts deal with the manner or importance of bringing it about. Pilots have their specific areas of training and operational instructions as do maintenance personnel, but seldom, if ever, is any recognition given to the very important area of overlapping responsibilities. Although this concern is applicable to fixed-wing activities, its effect on helicopter operations is more serious due to the relationship of performance and safety with most routine adjustments and maintenance. With few exceptions, the desired level of pilot-mechanic relationship is seldom attained outside of the manufacturer's flight-test facility.

This may sound a bit philosophical, but the solution is obviously as simple as the problems, otherwise created, are frustrating:

- a. Appropriate coverage in both pilot and maintenance training courses;
- b. More emphasis at the operational level;
- c. Increased exchange and appreciation of each others concerns and responsibilities.

In the meantime, consideration of some of these related points may help improve your operation:

- 1. Strive for increased mutual confidence and respect.
 - (a) Pilots should crab bona fide problems, not invented ones, and provide sufficient detail to

insure that reported problems can be understood.

- (b) Mechanics should understand the flight safety considerations underlying pilots' requests and make every reasonable effort to satisfy them.
- (c) Both pilots and mechanics should perform respective functions in accordance with good practice and specified instructions. Don't guess or short-cut!

- 2. Establish a common basis of exchange. Know each others terms and prime responsibilities.
- 3. Fully explore and plan any joint operation to insure a complete understanding of mutual objectives.

In addition to routine operational maintenance requirements, the prime areas in helicopter operations that require the utmost in pilot-mechanic coordination are:

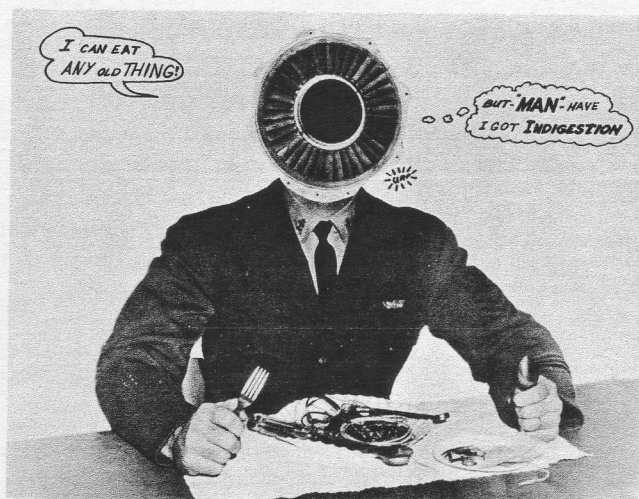
- 1. Basic rotor tracking;
- 2. Flight control and aerodynamic surface rigging as related to desired flight performance;
- 3. Power plant adjustment and control rigging to attain required performance. This area is especially significant with the increasing utilization of turbine engines in helicopters;
- 4. Any operation related to component performance analysis and/or trouble shooting.

Pilots and mechanics should make every effort to be objective, understanding and reasonable. It has been well established that they cannot function successfully without each other, so they must continue to strive to work together better.

As indicated in the first article, published in the Oct-Nov, 1963, issue of Rotor Tips, the main objective of this series was to acquaint newcomers to the field and refresh the old-timers with the highlights of helicopter maintenance concerns at the Organizational or Line Level. We hope the series has accomplished this and contributed in some small part to an improved appreciation of helicopter maintenance and the need for a "professional approach and attitude" in this field. Attainment of this "professional approach and attitude" by all responsible personnel is essential to insure the accomplishment of our mutual goals —

FLIGHT SAFETY, MISSION AVAILABILITY, REDUCED MAINTENANCE MAN-HOURS AND COST.

FOD FACTS



FOD CONTROL—Personnel attached to HU-2, NAS Lakehurst, N.J., are constantly reminded of the dangers of FOD by these two characters. C.A. Roberts, ADR2, conceived the eye-catching idea of combining man and a T-58 inlet guide vane to emphasize that the turbine engine will "eat" anything within reach and, when it does, expensive or even dangerous "indigestion" is bound to follow. (Official USN photos)

Huskie Happenings



...During hazardous low-level night search for two lightly-clad teenagers, HH-43B crew from ARS Det 8, EARC (MATS), Myrtle Beach AFB, S.C., flies two sorties over icy waters of Winyah Bay, numerous small islands and a marsh. Temperatures below freezing point. Due to poor visibility and in spite of winds gusting up to 45 knots, search made from 20 to 75-foot altitudes using helicopter lights and Aldis lamp. Capt Charles M. Roberts, RCC, and Capt Joseph H. Pinaud, copilot, take turns navigating HH-43B over large water areas. Others aboard helicopter concentrate on search. They are LtCol Louis B. Thompson, 354th Cmt Spt Gp (TAC); SSgt Dorland E. English, 354th TAC Hospital; and A3c Claude E. Anderson, Det 8. Boys' boat found tied to barge shortly before midnight and they are hoisted to safety. Operation hampered by winds, darkness, pitching of vessel, and failure of hoist operator's microphone during pickup.

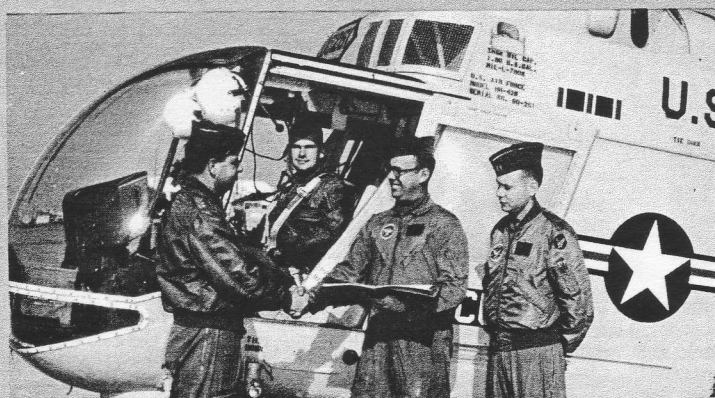
...HUSKIE crew from ARS Det 2, AARC(MATS), Laon AB, France, rescues French truck driver trapped on road by rising floodwaters. Driver spotted by helicopter crew on training mission and hoist pickup made due to proximity of trees and power lines. Capt Armand J. Fiola, HH-43B pilot; Capt Gerald A. Jones, copilot; SSgt Curtis V. Hickey, hoist operator. ... Civilian lost on island in Lake St. Clair rescued by ARS Det 8, CARC(MATS), Selfridge AFB, Mich., after hour-and-a-half search by HH-43B crew.

...HUSKIE from ARS Det 13, EARC (MATS), Brookley AFB, Ala., scrambles when Navy trainer flames out over Mobile Bay and both occupants eject. One picked up by Navy chopper, other hoisted to safety by Capt Herbert Gates, HH-43B pilot; TSgt C. R. Ross, rescue and survival technician; SSgt B. C. Kiser and A1c J. A. Hurst, firefighters. ... Responding to midnight call, HH-43B piloted by Capt Rockwell N. Greene and 1stLt Gerald B. Van Grunsven flies to mouth of Mobile Bay to aid stricken man aboard Army dredge. In hazardous night operation, Capt O.D. Stevenson, flight surgeon, and SSgt William Fulford, rescue and survival technician, lowered to vessel by hoist operated by SSgt Walter Johnson, crewman. Unfortunately, man already dead when they arrive. In another mission, Det 13 HH-43B hoists three-man crew of tugboat to safety after craft begins sinking in Mobile Bay. Rescue helicopter flown by 1stLt Harve R. Chappell. Sergeant Ross and SSgt Stanley Aubrey are crewmen.

...HH-43B crew from 33ARSq, Naha AB, Okinawa, makes 110-mile round trip at night over mountainous territory to evacuate seriously ill marine. Landing made on pad lighted by flares. HUSKIE pilot is Capt James L. Cantey; copilot, Capt Donald D. Metzinger; medical technician, SSgt Charles F. James.

...HH-43B crew from ARS Det 17, WARC(MATS), Davis-Monthan AFB, Ariz., airlifts injured 11-year-old boy from rugged Tucson Mountains to hospital. Capt Jerome R. Luttinger, RCC; Capt Peter J. Kerrigan, copilot; and MSgt Ambrose Morris, crewman. ...HH-43B from ARS Det 4, 36th ARSq(MATS), Osan AB, Korea, makes 60-mile night flight over mountainous terrain in order to deliver seriously ill Korean national to hospital. Capt Kenneth W. Dotson pilot of HUSKIE, 1stLt John H. Parks, copilot; SSgt Robert A. Pfender, crew chief; and A1c Lawrence Goclan, medical technician. In similar night flight, sergeant with perforated ulcer is rushed to hospital. Airman Goclan attends patient on way. Capt Kenneth C. Franzel is HH-43B pilot; Capt Charles N. McAllister, copilot; and A1c Joseph E. Ivansco, crew chief.

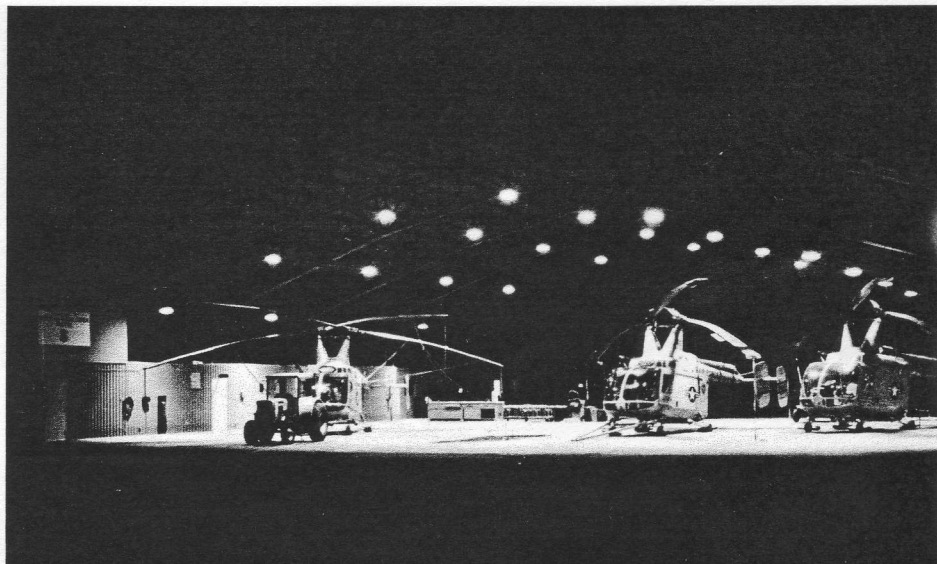
...Two pilots who ejected from crippled fighter picked up minutes later by HH-43B crew from 31st ARSq, Clark AB, P.I. Capt Marvin L. Palmer, RCC; Capt James L. Wissert, copilot; A1c Eugene E. Richards and A1c Charles A. Sullivan, crewmen.



1,000 HOURS-While flying with the FSK on an F-100 emergency, this HH-43B at ARS Det 15, Luke AFB, Ariz., logged its 1000th flight hour. Capt H. D. Salem, maintenance officer, is shown afterward congratulating SSgt T. J. Brown, crew chief. Capt A. J. M. Archer, RCC, is in the helo and Capt C. R. Kay, det commander, on the right. SSgt W. R. Basnight and A1c C. H. Williams, firefighters, were also aboard on the flight. (USAF photo)



PERUVIAN MISSION—Col G. J. Dunkleberg, EARC commander, presents a Kaman Scroll of Honor to Capt H. A. Lee, commander of Det 14, EARC (MATS), MacDill AFB, Fla. Also receiving Scrolls were Capt D. J. Frazier, Capt W. E. Arvo, Jr., and SSgt C. J. Montgomery. While utilizing HH-43B's, the Scroll recipients made several hazardous flights over the Andes at 17,000-foot altitudes to aid in the work of recovering crash victims from a civilian airliner. Presentation of the awards was one of Colonel Dunkleberg's last official acts before retiring. (USAF photo)



NIGHT VIGIL—Shown at rest, but ready for rescue, are the three HH-43B's attached to ARS Det 15, WARC (MATS), at Luke AFB, Ariz. The scene, with its appealing contrasts, was photographed by A1c Gerald M. Rouff. (USAF photo)



SCROLL OF HONOR—Two HH-43B pilots were recently awarded Scrolls of Honor for flying a hazardous mission over uncharted mountainous terrain in Ethiopia to evacuate an injured man. In photo on left, Capt Charles R. Dunn of Det 5, AARC (MATS), Hahn AB, Germany, is receiving Scroll from William E. Zins, director of customer service at Kaman. Captain Dunn recently completed 1,000 flight hours in the HUSKIE. In right photo, Mr. Zins presents the award to Capt Richard W. Shriber of Det 8, AARC, Bitburg AB, Germany. Watching are Richard A. Reynolds, Kaman technical representative, and Capt Frank W. Schnee, detachment commander. Both Scroll recipients were in Ethiopia supporting a joint photograph mapping mission sponsored by the United States and that country when the incident occurred. (USAF photos)



WELCOME HOME—Less than 40 minutes after ejecting from his F-102 and being rescued from the 43-degree waters of the North Pacific, Capt G. A. Heilala steps out of a Det 1, 36th ARS, HUSKIE to be greeted by Col R. C. Crawford, commander, 39th Air Division, and Capt J. Gilleran, MC, flight surgeon. Also shown are two members of the helicopter crew, TSgt C. Wilkins, medical technician, and Capt R. A. Clyde, RCC. Other members of the Misawa AB, Japan, crew were Capt D. M. Chase, copilot, and SSgt C. F. Lye. Manning the backup HH-43B were Capt D. E. Mullen, A1c H. R. Singleton and A1c N. L. Sonnenberg. (USAF photo)

MISSION AWARD—An HH-43B crew from Det 1, EARC (MATS), Loring AFB, Maine, recently received Kaman mission awards for the rescue of a woman lost overnight in the dense woods. The presentations were made by Capt Dale R. Tyree, detachment commander. Recipients are, left to right, Capt Larry A. Nitz, RCC; 1stLt Wilson T. Arnold, copilot; SSgt James G. Gonyea, medical technician; and A1c John F. Dorgan, crew chief. (USAF photo)



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MARTIN WHITMORE
WAYNE ZARLING
NAAS Ream Field, Calif.
NAS Miramar, Calif.
NAS Pt Mugu, Calif.

WILLIAM C. BARR
Morocco

JOHN D. ELLIOTT
Clark AB, P.I.
Misawa AB, Japan
Yokota AB, Japan
Naha AB, Okinawa
Osan AB, Korea

GORDON FICKES
MCAS Beaufort, S.C.
MCAS Cherry Pt., N.C.
NAS Cecil Field, Fla.
NAS Jacksonville, Fla.
NAS Sanford, Fla.
NAS Key West, Fla.
NAS Pensacola, Fla.

HORACE F. FIELD
Pakistan

CLINTON G. HARGROVE
Iran

FRANK HEFFERNAN
NS Adak, Alaska

HOMER HELM
NAS Alameda, Calif.
NAS Lemoore, Calif.
NAS Whidbey, Wash.

JACK L. KING
HENRY J. TANZER
NAS Atsugi, Japan
NAS Cubi Point, P.I.

THOMAS C. LEONARD
NAS Corpus Christi, Tex.
NAAS Kingsville, Tex.
NAAS Chase Field, Tex.

DONALD LOCKRIDGE
O&R NAS North Island, Calif.

BILL MAGNAN
NS Mayport, Fla.
O&R NAS Jacksonville, Fla.

WILLIAM MORRIS
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NAS Oceana, Va.
NAS Patuxent River, Md.
NAS Quonset Pt., R.I.
NAS Argentia, Newfoundland

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Ethiopia

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NAF Sigonella, Sicily

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