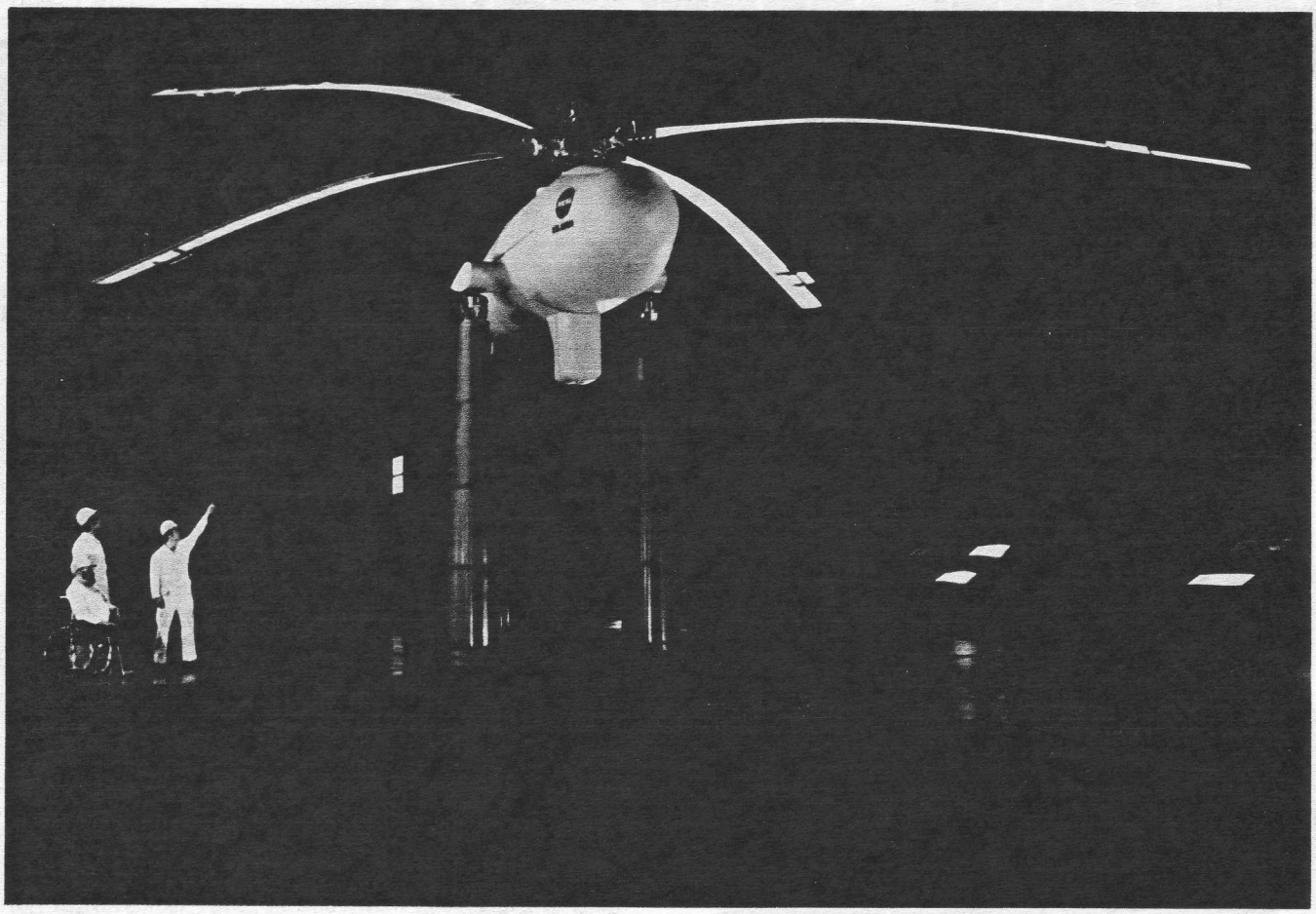
KAMAN Rotor Tips

SEPTEMBER-OCTOBER, 1975



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Rotor Tips

John P. Serignese, *Editor*

Volume VIII No. 12

On The Cover

A full-scale model of KAC's Controllable Twist Rotor is tested at the NASA Ames, Moffet Field, CA wind tunnel. Further information about this test can be found on page 18.

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Departments

Rotor Tips is published by the Customer Service Department, Kaman Aerospace Corporation, Bloomfield, Conn. 06002.

Cdr D. Huff

Cdr C. D. Curtis

LAMPS Arrives In Hawaii

On Thursday, 3 July 1975, Cdr. Douglas Huff, USN, assumed command of the Navy's newest squadron, Helicopter Anti-Submarine Squadron Light Thirty-Seven (HSL-37), thus bringing the Light Airborne MultiPurpose System to Hawaii permanently. HSL-37 is the first squadron to be established outside the limits of the continental United States, a fact which made excellent coordination and logistic support by all concerned an absolute necessity.

VAdm Robert Baldwin, Commander, Naval Air Forces, United States Pacific Fleet, was the guest speaker at the ceremony. He stressed the ever-increasing and important role the helicopter is playing in Anti-Submarine Warfare specifically, and in the entire aviation community in general. Capt Charles Smiley, Chief of Staff, Anti-Submarine Warfare Wing, United States Pacific Fleet, read the Establishment Directive; COMASWWINGPAC is HSL-37's Operational Commander. Also attending the ceremony were VAdm Emmett Tidd, Commander, Naval Surface Force, Pacific Fleet and VAdm James Doyle, Commander, Third Fleet.

During his remarks, Cdr Huff reiterated his guiding thought for the new squadron, that the individual, and therefore the squadron, is limited only by the constraints of imagination. This has been demonstrated many times already in meeting all assigned milestones, deadlines, and commitments while maintaining morale at an extremely high level.

We all join together in wishing a happy "Welcome Aboard" to HSL-37 . . . newest **LAMPS** squadron in the fleet.

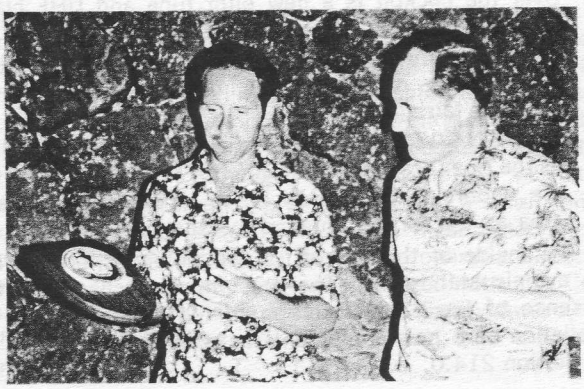
HSL-37's new Commanding Officer, Cdr Douglas Huff, is a native of Kentucky and a graduate of Indiana University, class of 1958. He entered the Aviation Officer Candidate program in September 1958 and was commissioned on 1 February 1959. Cdr Huff was designated a Naval Aviator in June 1960.

His initial assignment was with VW-11, Argentia, Newfoundland, Canada where he served as an Early Warning Carrier Pilot, Air Intelligence Officer, and Check Navigator. In November 1962, he underwent helicopter transition training and from May 1963 to August 1965, served with HS-3 homeported at Norfolk, Va. Cdr Huff was then selected to attend the Defense Intelligence School in Washington, D.C. and upon completion was assigned as an Intelligence Analyst at the Naval Field Operational Intelligence Office, Ft. Meade, MD. In September 1968, Cdr Huff came to the west coast to serve as Administrative Officer, Safety Officer, and Maintenance Officer with HS-6, NAS Imperial Beach, CA. While attached, he participated in the recovery operation of Apollo 14. In April 1971, he was assigned as Chief of Staff and Operations Officer on the staff of CVSGR-80, NAS North Island. Upon completing H-2 transition training, Cdr Huff served as Executive Officer of HSL-33, NALF Imperial Beach, CA.

HSL-37's First Executive Officer, Cdr Charles D. Curtis, graduated from Hofstra University, L.I., New York in May 1958. He entered the Navy in December, 1958 and was commissioned an Ensign, United States Naval Reserve, upon graduation from the Naval Officer Candidate School, Newport, R.I. in May 1959. His first assignment was aboard USS Capricornus (AKA-57) which was followed by another "Gator Navy" tour with Assault Craft Unit TWO where he received a Regular Navy appointment.

After designation as a naval aviator in August 1963, he completed Carrier Replacement Air Group training in Key West, FL, and reported to Helicopter Anti-Submarine Squadron Seven (HS-7) serving as Avonics Weapons Officer and Aircraft Division Officer. During this period, the squadron made numerous deployments aboard USS Randolph (CVS-15) and USS Intrepid (CVS-11) in the Atlantic and Mediterranean. In May 1966, he returned to Key West and served as a flight and ground instructor at HS-1 and subsequently as helicopter training officer on the Carrier Anti-Submarine Air Group Fifty (DVSG-50) staff. His next assignment was to HS-5 at NAS Quonset Point, RI, as Anti-Submarine Warfare Officer. During this tour, the squadron was awarded the Navy Unit Commendation for ASW Operations aboard USS Wasp (CVS-18) in the Eastern Atlantic. Since July 1971, Commander Curtis has been stationed at the Naval Air Development Center, Warminister, PA., where he was Project Director for the LAMPS MK-III development effort. LAMPS MK-III is expected to enter the fleet in 1981 as the replacement for the MK-I SH-2F helicopters presently in service.

Cdr Huff, left, presents Squadron Plaque to Capt C. B. Smiley, Chief of Staff, Anti-Submarine Warfare Wing Pacific. The new insignia, shown above, features King Kamehameha, the individual responsible for unifying the Hawaiian Islands.



The YSH-2E Helicopter — A Brief Description

by David G. Uitti
H-2 Project Engineer

The H-2 is currently being used by the Naval Air Development Center (NADC; Warminster, PA), as a test bed to develop improved subsystems for the LAMPS Mark III Program under the overall cognizance of Cdr Allan Kruger with LCdr Tom Berger as Test Director. There are presently two Kaman helicopters in the program undergoing tests by NADC with Kaman personnel furnishing aircraft maintenance support. The purpose of this article is to provide a brief description of the configuration of these aircraft and make some comparisons to the standard SH-2F.

The YSH-2E aircraft shown in the photo appears very similar to the SH-2F, with exception of a different radome for the radar. Closer observation, however, shows several new or relocated antennas from the nose doors to the trailing edge of the tail pylon.

The primary external changes are as follows:

a. The large radome installed under the nose houses the APS-124 (XJ-5) antenna.
b. The square boxes on the nose doors (4 units) are the radomes for the ALR-47 Mod ESM system. The aft-facing ESM antennas are housed in a structure mounted on the trailing edge of the tail pylon.
c. The radomes on top of the nose doors and on the underside of the tail boom house the data link antennas.
d. Over the cockpit is a new pitot tube and UHF blade antenna.
e. An 8-unit smoke/sus dispenser is presently installed on each side of this aircraft in the area of the ditching gear fairing.
f. The APN-205 doppler utilizes a single antenna in lieu of the dual antenna in the SH-2D/F. It is mounted on the underside of the tail boom in the same general area as the former antenna installation.

The inside of the aircraft is completely different from an avionic standpoint. The most marked change is the absence of the SENSO station in the aft cabin and installation of 5 new equipment racks in the cabin and aft of Station 214.0.

The aft cabin includes 3 equipment racks and the standard SH-2F sonobuoy launcher. The arrangement still leaves the cabin doorway clear for rescue hoist operation. Two additional racks are located aft of Station 214.0, one on either side of the aircraft with a center aisle to provide access to the tail boom. The accompanying Table outlines the basic avionic differences between the SH-2F and the YSH-2E.

Installed in the cockpit is a completely new instrument panel with a CRT-type multipurpose display which can be used for TAC-NAV or radar functions. (NADC has an extensive program to evaluate the 2-man crew concept.) The lower console houses the keyset which controls the inputs to the display. The lower console also includes a Data Information Transfer Set (DITS) which handles control of the UHF communications, OTPI, IFF, Data Link, TACAN, and DF. Other control panels have been installed on the canted frame and over the windshields.

The two aircraft have been updated with all of the major SH-2F airframe improvements including the "101" rotor system and landing gear strengthening. Prototype installations of bleed-air pressurization of the auxiliary fuel tanks and ripple-fire of the sonobuoys have also been incorporated. The aircraft have been certified for take off gross weight of 13,500 pounds on the basis of a structural demonstrations program conducted by Kaman Aerospace.

NADC is currently flying both aircraft in a comprehensive system development and evaluation program. The program also includes extensive bench and ground tests to optimize the computer programming for the TAC-NAV system, integration of the new subsystems, and general functional tests. Flight tests are now in progress to thoroughly establish the performance of these subsystems as well as evaluate initial tactical procedures for use of these new systems. The test schedule also includes ship interface tests which will be held off Cape May, NAS Norfolk; the Autec Range in the Bahamas; and, at sea. The tests are scheduled for completion late this fall.

Avionics — SH-2F/YSH-2E

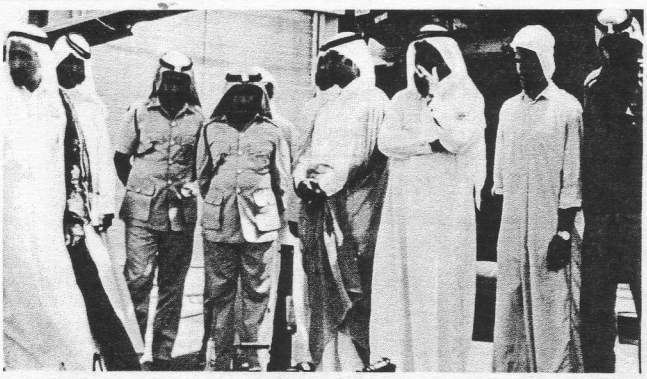
	SH-2F	YSH-2E
UHF Transceivers	(2) ARC-159	(2) ARC-159
Secure Speech	KY-28	KY-28
IFF/SIF	APX-72	APX-100
Intercom	(4) AIC-14	DITS
Radar Altimeter	APN-171	APN-194
Radar Altitude Warning	APQ-107	Incl in APN-194
Attitude Head Ref Sys	ASN-50	A/A 24G-39A
UHF Direction Finder	ARA-25	OA-8876/ARD
Interrogator Set	—	APX-76A
Doppler Navigation	APN-182	APN-205
Navigation Computer	AYK-2	CP-985/ASQ-133
Tactical Nav. Display	PT-429A	MPD/Ord Control Set
TACAN	ARN-52	ARN-84
Surface Search Radar	LN-66HP	APS-124 (XJ-5)
ESM	ALR-54	APR-47(Mod)
Data Link	AKT-22	ARC-172
MAD System	ASQ-81	ASQ-81
MAD Recorder	RO-32	Multipurpose Display
MAD Signal Processor	None	ASA Signal Processor Set, MAD
On Top Position Indicator	R-1047A/A or R-1651A	R-1651A
Sonobuoy Receiver	ARR-52	ARR-75
Acoustic Processor	ASA-26	AQA
Sonobuoys (15)	SSQ-41/47	SSQ-41A/53/47B/50/36
Smoke Launcher	(8) Mark 25	(16) Mark 25/SUS
Torpedo Presetter	None	C-7821/A
Digital Magnetic Tape Unit	None	For Test Purposes Only

HSL-33 Awarded Isbell Trophy

In photo, Cdr LaRon "L" Stoker, center, holds trophy as he receives congratulations from VAdm James H. Doyle, Commander Third Fleet. HSL-33's first Commanding Officer, Cdr Meryl A. Belto, left foreground, also witnessed the presentation.

At ceremonies held at Naval Auxiliary Landing Field Imperial Beach, the Commander Third Fleet, VAdm J. H. Doyle, presented the Isbell Trophy to Cdr LaRon "L" Stoker, Commanding Officer of Helicopter Anti-Submarine Squadron Light Thirty-Three (HSL-33) for the squadron's overall excellence and superior performance in airborne anti-submarine warfare. The trophy is presented annually to eight squadrons, four on each coast, on the basis of operational readiness inspections and tactical performance. The trophy is sponsored by the Lockheed-California Company in honor of Captain Arnold Jay Isbell, a distinguished anti-submarine commander killed in action while serving aboard the USS Franklin during World War II. A permanent Isbell Trophy is on display in the Navy Department in Washington, D.C.; replicas of the trophy are awarded to the individual squadrons.

Helicopter Anti-Submarine Squadron Light Thirty-Three was established on July 31, 1973, thus becoming the first fully operational Light Airborne Multi-Purpose Systems (LAMPS) Squadron. Since that time, sixteen HSL-33 detachments have deployed to the Western Pacific aboard destroyer escort type ships. The mission of these LAMPS detachments, flying the SH-2F Seasprite Helicopter, is to provide destroyers with all-weather, day and night, airborne ASW protection by utilizing radar, sonobuoys, and magnetic anomaly detection gear to localize and classify submarines, and homing torpedoes if attack is appropriate. LAMPS also has the capability to give early warning of an anti-ship guided missile attack. Additionally, LAMPS has the inherent helicopter capabilities to conduct search and rescue (SAR), naval gunfire spotting (NGFS), logistics support, medical evacuations, and other utility missions. Although operating in the extremely hazardous and demanding environment of a small, pitching flight deck of a destroyer at sea, these detachments accumulated an impressive safety and operational record resulting in the squadron being honored with the Commander Naval Air Force Pacific Fleet Safety Award, the Chief of Naval Operations Safety Award, and the Isbell Trophy.



Representatives of the Sheikdom, Ras Al Lhaimah, along the Persian Gulf coast, learn about the small arms carried aboard the ship. The Sheikdom was once headquarters for pirates who roamed the Gulf. After touring the LAMPS helo, the Sheikdom's ruler, far left, indicated his pleasure and stated that the USS Hewes was the first American warship ever to visit his country.

HSL-32 Det
Among First Through Reopened Suez

by Lt(jg) R. Michalske
HSL-32 PAO

The USS Joseph Hewes (DE-1078) was the first US Navy Warship to routinely transit the Suez Canal since it was re-opened, on 5 June, 1975, by President Sadat of Egypt. (The canal was closed due to damage and sunken ships as a result of the 1967 Arab-Israeli War.)

HSL-32, Det 3, has recently been globe trotting in the Indian Ocean, aboard the USS Hewes (DE-1078) which is home-ported in Charleston, SC. Lately these "gypsies" of the US Navy have taken part in many exercises with foreign ships deployed in the Indian Ocean and Persian Gulf as well as making numerous goodwill stopovers in ports not often seen by American sailors.

While in Karachi, Pakistan, the USS Hewes with LAMPS Det 3 aboard, participated in a two-day joint exercise with several Pakistani Navy destroyers.

From Pakistan, the ship transited the Indian Ocean to Colombo, Ceylon, in the far southwest corner of the Indian Ocean. The Ceylonese local officials in Colombo held formal receptions for these far-off visitors to cap off their highly successful portcall. For this the crew received a congratulatory telegram from the American Ambassador praising the USS Hewes and HSL-32, Det 3 for a job "well done." Similar messages were received from the Commander, Middle East Forces, and Admiral Schear, Commander-in-Chief, U.S. Naval Forces, Europe.

With Colombo behind them, the ship set out across the Indian Ocean headed for Djibouti, capital of the French territory of Afars and Issas, which is located near the Straits of Bab-El-Mandeb. These straits command the entrance to the Red Sea, which is the passageway to the southern end of the Suez Canal. This French colony is therefore strategically important to the Western allies. The Hewes received a warm and very friendly welcome from our French comrades-in-arms. After an all-too-brief two and one half days in port, the Hewes sortied for a highly successful day of exercises with the French Destroyer Kersaint.

With the exercise completed, the USS Hewes passed through the Bab-El-Mandeb Strait and entered the Red Sea, enroute for a short two-day diplomatic call to Jidda, Saudi Arabia. As it entered Jidda Harbor, the USS Hewes fired a 21-gun salute to the new king of that country, and received the same salute in return from the Saudi's. The American community in Jidda welcomed the Navy crew. After departure from Jidda, they unexpectedly encountered some old friends — the French Frigate, Suffren, with RAdm Schweitzer, Commander, French Naval Forces, Indian Ocean, embarked. The Admiral accepted an invitation to come aboard the Hewes via the LAMPS helo, have lunch, and to observe a first-class American warship operating at sea. In all, he spent a very enjoyable 3 hours before returning to his flagship.

We can all look with pride and envy at these globe trotting diplomats of goodwill. Even in the midst of such uncertain times in this hotspot of the world, and with our NATO allies, it is reassuring to know American sailors are still more than welcome to visit such ports.

3-Month-Old Child Rescued

Recently, Richard Bettis, the 3-month-old son of U.S. Army Sgt Bettis, was brought to the 11th USAF hospital in U-Tapao, Thailand, suffering from pneumonia. The clinical diagnosis at the hospital was congestive heart failure due to decompensated cardiovascular status (stress of pneumonia and anemia). The medicine needed to treat this condition was not available at the hospital so a call went out to the 40th ARRS for an emergency medevac.

Det 12 responded with a helo and "Pedro" waited for the sick child. As soon as the boy was onboard the aircraft, Capt Russell J. Spahr, pilot, lifted the aircraft off toward Bangkok. Assisting Capt Spahr was 2nd Lt Kenneth H. Charfauros, copilot; TSgt Ronald K. Allen, first crewman; and Sgt John M. Coiro, second crewman. The doctor, Capt Louis Royal, also accompanied the child. When the helo landed at Don Muang, the tiny patient was transferred to a waiting ambulance. Dr. Royal and TSgt Allen accompanied the sick boy to Commit Hospital in Bangkok. After the mission had terminated, Dr. Royal notified the helo crew that they had saved the child's life.

Recruiting For LAMPS—HSL-30

by ENS D. K. Wright
HSL-30 PAO

Representatives from HSL-30 recently visited the Naval Air Technical Training Center, Memphis, TN. Possible future LAMPS personnel attending the Aviation Anti-Submarine Warfare Technician "A" School were briefed on the LAMPS program and the SH-2F aircraft. A two hour slide/movie and oral presentation was conducted, followed by a walk-around inspection of the aircraft. The following day, indoctrination flights were given to 48 students.

The HSL-30 crew, composed of Lt Greg Mitchel, Lt Jack Smith, AW2 Tom Mixon, and AWAN Todd Mack generated a great deal of interest and enthusiasm for the LAMPS program. If the amount of interest shown by the students is any indication, the LAMPS community will be receiving many qualified personnel in the near future.

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Rotor Tips

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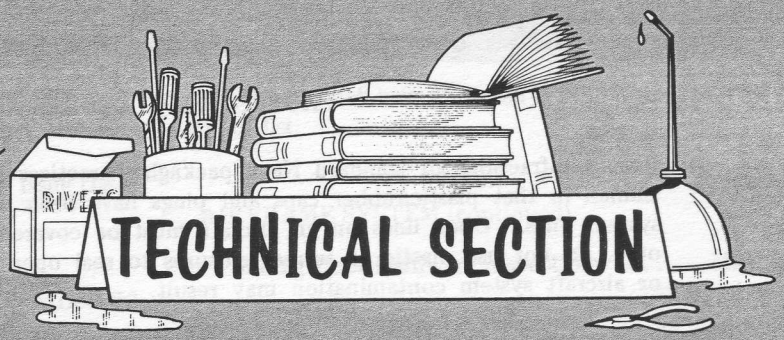

The information contained here has been reviewed by Customer Service Department Engineering Personnel. The data is either in existing Official Publications or will be contained in forthcoming issues of those publications. The information supplied does not in any way supersede operation/maintenance directives established by cognizant authorities.

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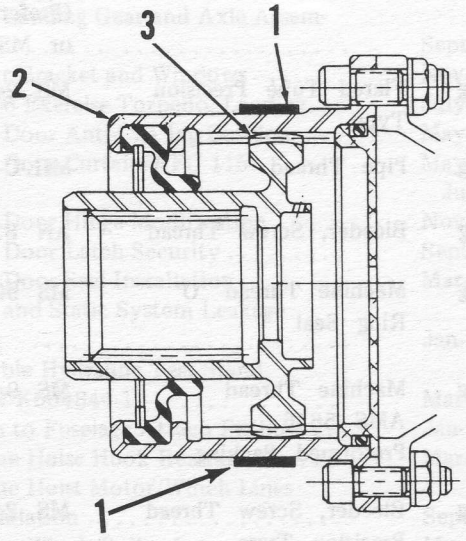
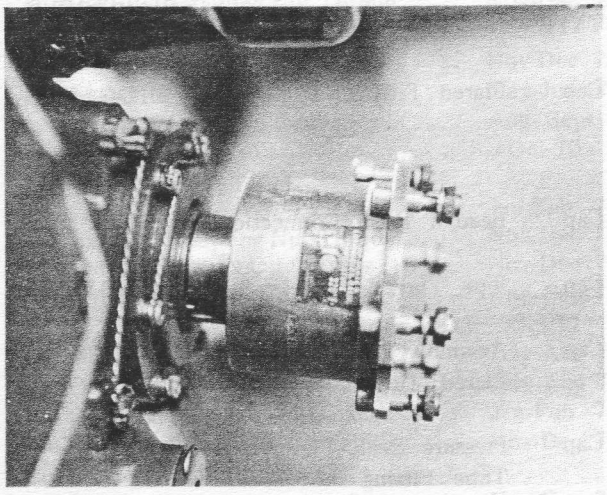
SERVICE ENGINEERS: Avionics, N. L. Hankins, J. M. Nenichka, Mechanical, E. F. Noe, R. J. Trella, W. J. Wagemaker, H. Zubkoff

Q. WHAT IS THE PROPER LOCATION FOR THE TAIL ROTOR DRIVESHAFT COUPLING TEMP PLATE?

A. The temp plate, P/N 224 (320°F; item 1 in the illustration), should be placed so its edge is adjacent to the radius of the coupling sleeve as shown in two places, 180° apart. When installed in this position, the indicator portion of the temp plate (white dot) is directly above the hub teeth working area.



1. Temp plate
2. Coupling sleeve
3. Hub gear teeth



PROTECTIVE CLOSURES

E.L. Parmelee, Spares Packaging Engr.

Recent infractions of standard Navy packaging practices have been reported to Kaman in that plastic/rubber caps and plugs have been installed on hydraulic system lines. Open lines on an aircraft must be covered with metal closures only...do not use plastic or rubber closures to seal open lines, hoses, or tubing or aircraft system contamination may result.

Kaman's contractural agreements with the Navy provide that all units which have been flushed or contain a filling fluid shall have a tag affixed to the unit indicating fluid type. All fuel, hydraulic, oil, oxygen, pneumatic, etc., system components, i.e. engines, pumps, regulators, reservoirs, hose/pipe assemblies, etc., shall have all threaded parts, orifices and fittings capped with metal fittings only, conforming to Military Specification MIL-C-5501. When installing aluminum caps or plugs, caution shall be exercised in the application/tensioning of same to preclude shearing particles off of the softer metal fittings.

NAVAIR 01-1A-17 provides the following guidelines:

It is essential that caps and plugs of the proper size and material be employed. Only closures of metal construction conforming to the specifications listed in Tables 13-1 and 13-2 are authorized for use in sealing hydraulic system equipments, lines, tubing, hoses, accessories and components. Plastic closures may be used to seal electrical fittings and receptacles or other non-fluid openings where contamination is not considered a problem.

CAUTION

In all cases, where there is a choice between an internal or external installation, use the external type of closure. Never blank off openings with wooden plugs, rags, tape or other unauthorized devices.

TABLE 13-1. CAP - PROTECTIVE DUST AND MOISTURE SEAL

TYPE	APPLICATION	APPLICABLE SPECIFICATION
Cap	Flared Fitting	MIL-C-5501* (Preferred) or NAS 817
Cap	Beaded Hose Connection	MIL-C-5501*
Cap	Pipe Thread	MIL-C-5501*
Cap	Assembly, Pressure Seal Flared Tube Fitting	AN 929
Cap	Pressure Seal, Flareless Tube Fitting	MS21914

Rubber, plastic, or unthreaded type closures designed to fit over open ends of bulk tubing and hoses shall be used in accordance with their design function. Such closures shall not be used as plugs and inserted into open lines, hoses, or ports of hydraulic equipments.

Ensure that all closures are removed before installation of equipments. If an opening which normally requires protection is found uncovered, the part or assembly shall be cleaned and inspected before installation or assembly.

TABLE 13-2. PLUG - PROTECTIVE DUST AND MOISTURE SEAL

TYPE	APPLICATION	APPLICABLE SPECIFICATION
Plug	Flared Tube End and Straight Threaded Boss	MIL-C-5501* (Preferred) or NAS-818 or AN 806
Plug	Flareless Tube End	MIL-C-5501* (Preferred) or MS 21913
Plug	Flared Tube Precision Type	MS 24404
Plug	Pipe Thread	MIL-C-5501*
Plug	Bleeder, Screw Thread	AN 814
Plug	Machine Thread 'O' Ring Seal	MS 9015
Plug	Machine Thread AMS 5646 Preformed Packing	MS 9404
Plug	Bleeder, Screw Thread Precision Type	MS 24391

TECHNICAL SECTION

The following alphabetical index is a compilation of technical items which have appeared in KRT from Jan/Feb 1970 to Jan/Feb,1975. For items after that date, refer to end of list.

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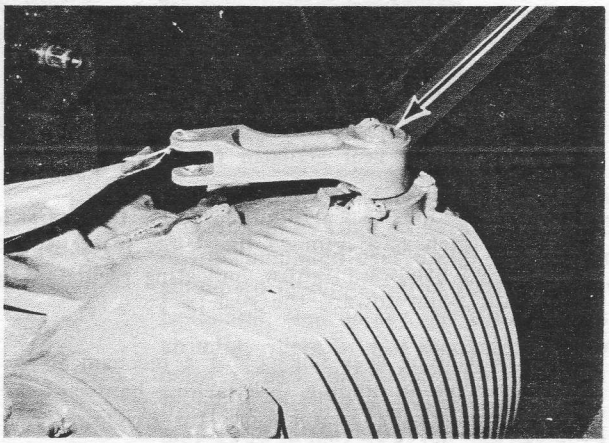
TO LATE TO CLASSIFY

The following lists those items which appeared in KRT from March 1975 to date.

TECHNICAL SECTION

TAIL ROTOR GEARBOX INPUT PITCH CONTROL SHAFT - ALLOWABLE AXIAL PLAY



R.J. Trella, Service Engineer

The design of the gearbox permits the input shaft to "float" axially to preclude binding pitch control inputs to the tail rotor blades. The nominal tolerance, during gearbox assembly, and allowable service wear limits, should be between 0.002 — 0.020-inch axial movement of the input shaft. Recorded axial movement greater than 0.020-inch, requires gearbox replacement. The input shaft and control crank is shown, with arrow, in accompanying photo.

MAIN LANDING GEAR FLOW REGULATOR VALVE

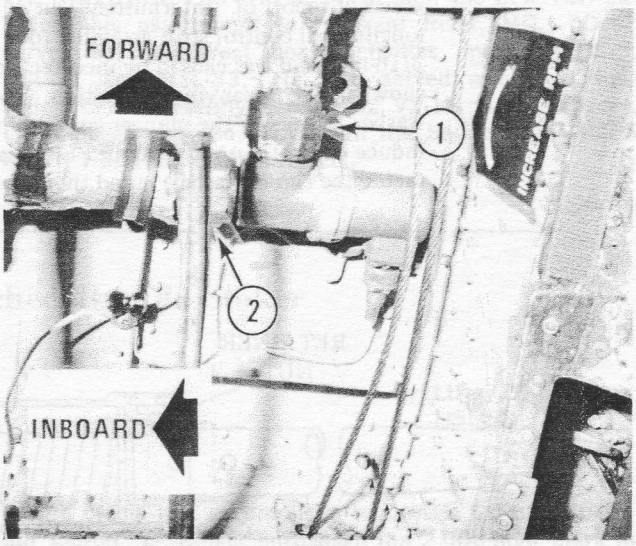
A flow regulator valve, P/N MS28886-4-1.0 (NSN, 9C4820-00-794-6283), is installed in the LH and RH main landing gear UP lines. The flow regulator valves should be installed with the arrow indicating "regulated flow" pointing toward the landing gear. If the valves are installed in reverse, with the arrow indicating "uncontrolled reverse flow" pointing toward the gear, the gear will come up too quickly. If repetitive, this fast retraction could cause structural damage.

W.J. Wagemaker, Service Engineer

CABIN HEAT SOLENOID VALVE

The cabin heat solenoid valve, Part Number, KW10412 (NSN 1RM-4810-00-072-1452BH), is mounted on the LH side of the aft cabin roof above the sonobuoy launcher box. The valve must be installed as shown in the accompanying photo, with the electrical connector pointing aft. The valve has two B-nut connectors: item 1, the engine bleed (HOT AIR) in-line, and item 2, the hot air line to the cabin diffusers and plenum chamber.

The tube connector pointing forward (item 1; at right angle to valve body), is connected to the tube routed through the cabin roof to the bleed ports on the engine combustor casing. The tube connector on the inboard side of the valve, (item 2; in-line with the valve body), is connected to the tube supplying hot air to the cabin diffusers and the heater plenum chamber. If the valve is rotated so that the line connections to the valve are reversed, engine bleed air pressure will force the solenoid poppet open, permitting a continuous flow of hot air into the heater system. Eventually, the continuous flow of hot air will burn the paint off the plenum, burn the hot air lines at the plenum and damage the thermostats.



1. Engine bleed line
2. Cabin--plenum chamber line

View looking up at LH side of cabin roof

H. Zubkoff, Service Engineer

MAIN LANDING GEAR FREE-FALL CHECK

W.J. Wagemaker, Service Engineer

The importance of checking the main landing gear for free-fall cannot be overemphasized. Satisfactory free-fall guarantees the gear will go down and lock in event of a failure in the hydraulic system.

If, when checking free-fall, the gear fails to fully extend to the down and locked position, check the following:

1. The landing gear actuator DOWN and LINKAGE FAILURE microswitches for proper adjustment. (The microswitch plunger spring force can prevent the folding stay from going over center.) Adjust the switches to indicate GEAR SAFE with the folding stay overcenter and gear locked down. Note: Assure that the gear is in fact locked down by attempting to push it in the up direction.

2. The spring box (bungee) on the gear for proper operation. The spring box must be removed from the gear and compressed to assure that the internal springs are operable. The unit is spring loaded (200 lbs); therefore, care must be taken when removing the installation hardware. (Several spring boxes have been discovered with severely rusted springs which restricted rather than assisted the gear down movement.)

3. The landing gear actuator for proper rig.

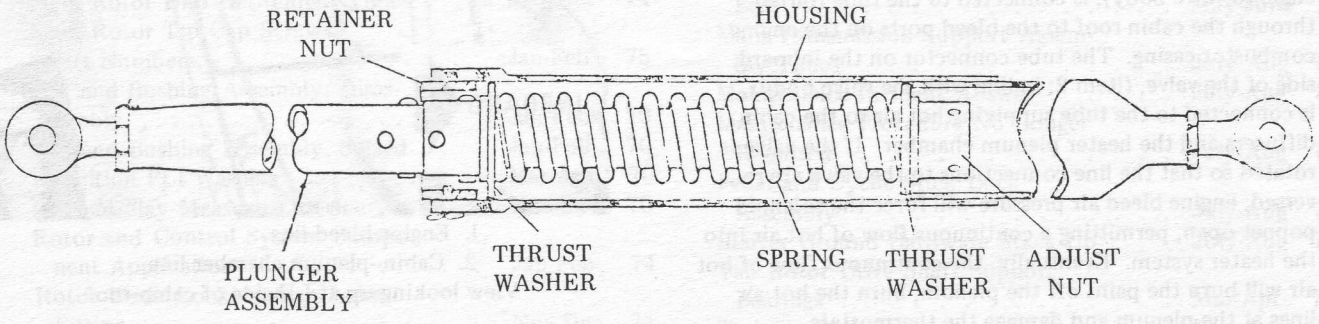
4. The landing gear hydraulic system for a restriction such as a crimped line, flow regulator installed backward (arrow indicating regulated flow must point toward the gear.)

5. The landing gear linkage for a mechanical restruction or binding. (Attaching hardware for proper torque, swivel joints for freedom and proper lubrication.)

PRELOADED FLIGHT CONTROL STRUT, K651051

A recent report of "Intermittent Out of Track" was traced to free-play or backlash in the longitudinal control strut assembly (one of the roof rods). The free-play measured about 3/16-inch and was caused by incorrect installation of the retainer nut, P/N K651053-11 shown in accompanying illustration. The nut must be installed snugly against the thrust washer, otherwise the plunger assembly will chuck back and forth within the housing and induce unwanted control input. Eliminating the free-play (turning the nut until it contacted the thrust washer) cured the reported intermittent track problem.

W. J. Wagemaker,Service Engineer

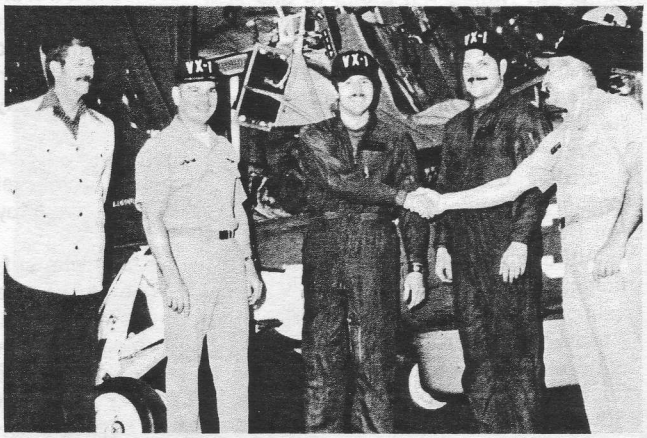


HSL-30 Officer Reaches 6,000-Hour Mark

by ENS David K. Wright
HSL-30 PAO

Kaman Tech Rep Jack L. King, left, congratulates the Executive Officer of HSL-30 Cdr William R. Lang on surpassing 6,000 accident-free flight hours recently. Cdr Lang has accumulated over 5,800 of these hours in helicopters and has made over 2,500 shipboard landings. After receiving his wings in 1957, Cdr Lang reported to HU-2 at Lakehurst, New Jersey. In 1962 he was assigned to HT-8 in Pensacola as a flight instructor, where he was recognized for flying over 2,500 accident-free hours along with being named Flight Instructor of Month three times. Following Pensacola, Cdr Lang trained with HS-1 and reported to HS-9, Quonset Point, Rhode Island, in 1966. From May 1968 to May 1969 he was assigned to HA(L)-3 in Vietnam. He was then assigned to the Boeing/Vertol Plant in Philadelphia, PA, as assistant Naval Plant Representative. Cdr Lang reported to HSL-30 in 1972 and became Executive Officer in the summer of 1973. Congratulations on this outstanding accomplishment.

VX-1 Pilot Logs 2,000 Flight-Hours



In photo on left, LCdr Donald L. Morgan receives congratulations from VX-1's Executive Officer, Cdr W. A. Dominque. The occasion was the completion of LCdr Morgan's 2,000th flight-hour in Kaman-built helicopters. Also in photo, witnessing the event, are, from left, Dave Rush, Kaman Field Rep; Capt R. L. Moffitt, VX-1 Commanding Officer; and Lt Steve Howdyshell. During the last seven years, LCdr Morgan has flown nearly every model of Kaman Seasprite helicopter, including the UH-2A, UH-2C, HH-2D, SH-2D, SH-2F and the new YSH-2E. Before his assignment to Patuxent River, MD., "Don" served with the West Coast activities, including HC-5, HSL-31 and HSL-33. He also served a combat tour with HC-1. Presently serving as VX-1's Safety Officer, LCdr Morgan is also active with the Squadron's LAMPS MARK I and MARK III projects.

2,000-Hour Mark Reached By Cdr Stoker

by Lt(jg) D. D. Hales
HSL-33 PAO

In one of his last accomplishments while CO of HSL-33, Cdr LaRon "L" Stoker surpassed the 2,000-hour mark in the H-2 Seasprite. Cdr Stoker, left, was congratulated by the HSL-33's new CO, Cdr J. R. O'Boyle upon completion of the milestone flight. Cdr Stoker began his helicopter career in 1957. During his first tour with the Seasprite, Stoker, who was OINC of Det 23 aboard the USS King (DLG-10) in the Gulf of Tonkin, rescued six downed combat aircrewmen.

A New Role . . .

Forest Fire Suppression

Using The HH-43 Huskie

By David M. Rush
Field Service Rep

Most of us are aware of the multiple role assigned to the Huskie helicopter as a Search and Rescue vehicle and utility machine while in service with the U.S. Air Force and foreign countries. A new role, one of forest fire suppression, has been assigned to the Huskie by the State of Washington's Department of Natural Resources.

Forestlands are one of our country's greatest natural resources and protecting this vital product from destruction by fire is a tremendous task. In the State of Washington, The Fire Control Division of The Department of Natural Resources has been tasked with the responsibility of providing protection for more than 1.2 million acres of forestland. Mr. Paul E. Krauss, Supervisor for the Division of Fire Control, has stated the average fire load is 1,248 fires which account for about 4,300 acres burned each year.

Recognizing the helicopter's ability to place firefighters, equipment, and water at the scene of a fire without the risk of parachuting to the ground, the Department of Resources has included four medium-size helicopters in their committment to firefighting. Each helo is used with a crew of men trained in the rigors of forest firefighting and assigned the action name of "Helitack Crews." During the fire season, these crews are stationed with choppers at strategic locations throughout the fire-danger area. The helos are capable of ferrying the Helitack crews to a fire, then returning with 450 gallon water buckets which are filled and dumped directly onto the fire. Ground crews and helo crews communicate with each other and Base Operations in order to coordinate their efforts.

The helicopter-carried water buckets are constructed from fiberglass for light weight and each contains a gate valve built into the bottom. Fortunately, the State of Washington has many beautiful lakes and rivers from which water may be obtained to fight fires. In use, the bucket, which is attached to the cargo hook, is lowered to the water and the gate valve opened. When full, or at a level which the pilot feels is sufficient, the gate valve is closed and the pilot brings the water to the fire, depositing it at the exact location which will do the most good. In the event of any problems while hauling the water bucket, the pilot may release the bucket from the cargo hook at any time.

Early in 1974, the Department of Natural Resources was faced with a serious situation when the company furnishing the medium size helos they were using, informed them that it was not going to remain in business. The Department launched an immediate search for replacement helicopters. They learned from the U.S. General Services Administration (GSA) that one type of helicopter was presently available and the Kaman HH-43 "Huskie" was soon to become available for purchase through the Surplus Equipment Program. According to a spokesman, the department found: "Interest in the Kaman Huskie developed quickly since it was determined to be a powerful machine and appeared to have a good military record insofar as efficiency and maintenance were concerned." Due to this impressive record, the Department decided to wait for the Kaman helicopter instead of accepting the helo available.

By mid May, it was becoming apparent that some fast work was necessary since the helos were not yet made available by the GSA and the fire season was approaching. The Department enlisted other government agencies and simultaneously set up contingency plans for purchasing services such as fuel trucks, pilots, mechanics, water buckets, radios, portable dip tanks and other equipment. Fortunately, the fire season was slow in starting and by the second week of July, seven HH-43's were ferried from Arizona to Olympia, Washington.

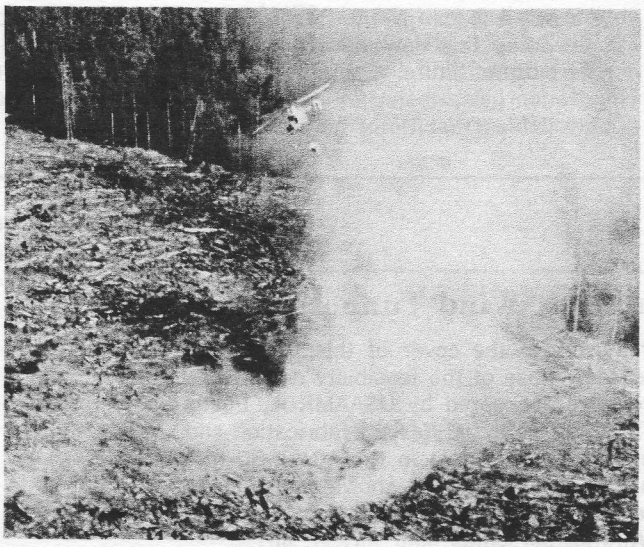
Department plans were to deploy four of the aircraft and Helitack crews to strategic locations, keep one at Olympia as a backup, and delay activating the other two aircraft. By July 1, the first Huskie and crew was "on station," and by July 10, all four were positioned, ready for the cry: "Fire!"

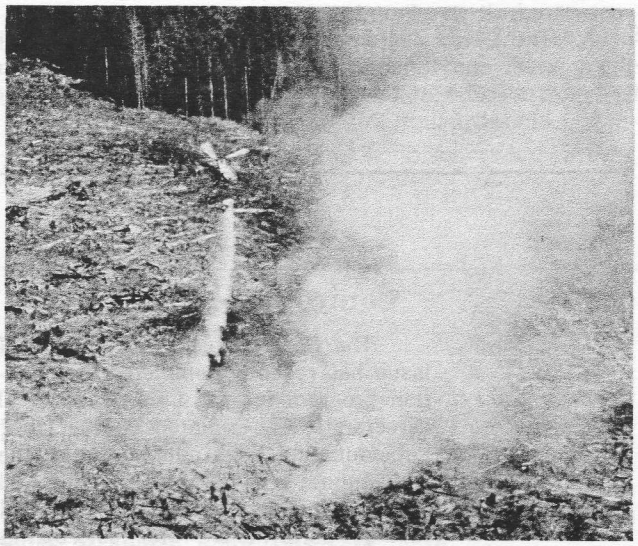
Those familiar with the effort necessary to ready these aircraft and get them deployed, cannot help but marvel at the tremendous effort and Esprit de Corps shown by the Department's personnel.

Although late in starting, the 1974 fire season was sufficiently difficult to thoroughly test the Kaman Huskie helicopter in its new role. The Department of Natural Resources reports that the Huskie performed its task admirably. As of October 1, the aircraft had flown 368 hours on fire suppression missions. Responding to over 50 wildfires, 1,851 water drops were made, each averaging 250 gallons, for a total of 462,750 gallons of water dropped. Put another way, if the Department were to haul water in the usual 500-gallon pump truck, it would have needed 925 truck loads and then had the problem of getting the water to the fire in areas where there were no existing roads. According to the Department, all reactions from the field were good. The Huskie proved to be a quiet, stable, willing worker, capable of completing water drops with little or no forward movement, thus assuring maximum use of the water-drop. The strength of the Huskie proven in the "On the job" situation were: "High dependability and low maintenance requirements."

Furthermore, while the costs are still being evaluated, it is clear they are favorable. The initial goal was to continue the same level of forest fire protection at no increase in cost to Washington's taxpayers. Early evaluation reports indicate costs will be less than the preceding year's costs, thus actually saving money! This year, the Department is ready and feels quite able to handle the fire season.

In photo on facing page, the HH-43 is shown parked next to a 450 gallon water-drop bucket. With the plugs removed as shown (note holes), the capacity is reduced to 250 gallons. This also provides for an increase in water payload as fuel is used. The bucket is equipped with electrically-operated "butterfly" doors and a wetting agent dispenser. The attaching harness is sufficiently long to enable the chopper to land alongside the bucket as shown. In photo above left, the pilot hovers the aircraft and carefully lowers the bucket into the water. This method is only used if an open water source is not available within close proximity. Usually, a stream or other source is close by and pumps can be used by ground crews. Photo above right, off to the fires with the water bucket full . . . in photo below right, water drops to the fire, and in photo left below, the subdued fire.





Editor's Note: As with any program dealing with machines, men are necessary. This program was no different. In addition to the valiant effort on the part of the Department of Natural Resources' employees, a Kaman Field Service Rep was sent to help start-up the program. The following excerpt from a Department's report concerns that Rep.

"The preparation of these machines for service required some expert advice. The Department was fortunate in acquiring the services of David Rush, a factory representative of Kaman Aerospace Corporation. Mr. Rush stayed in Olympia for several weeks and greatly facilitated what would have been a very difficult task of helicopter component checking for the Department. The planes were very-well preserved, showing good care and maintenance in the Military. Mr. Rush's aid at this point and his willingness to give our aircraft mechanics as much of his time as they requested, was extremely helpful."

Dynamic Antiresonant Vibration Isolator DAVI Does It . . .

by F. A. Foster
Chief Test Pilot

The Dynamic Antiresonant Vibration Isolator (DAVI) has been undergoing development here at Kaman and was recently installed into a UH-1H helicopter for flight testing. The results were quite impressive as indicated below.

The DAVI offers a degree of vibration reduction which cannot be achieved by conventional isolation and it is ideally suited for passive helicopter isolation. Significant features include:

A. Nearly 100% isolation at a tuned frequency of the DAVI. Tuning the DAVI to the predominant excitation frequency of the rotor practically eliminates the excessively high vibration level normally experienced throughout the fuselage at this frequency.
B. Isolation insensitive to gross weight or CG changes. Unlike conventional isolation, fuel usage and payload changes do not affect DAVI.
C. Low frequency isolation with low static deflection. Relative deflection between the rotor and fuselage can be small, minimizing the coupling, control, and landing qualities problems.

The flight test program recently conducted at Kaman consisted of obtaining base data for the standard UH-1H configuration through a modest flight envelope. This envelope consisted of hover turns, sideward flight, controllability, autorotation, 45° banked turns, RPM sweep, airspeed up to Vmax and out-of-track condition. This envelope was flown at two gross weights: 8250 and 9500 pounds, with a near neutral center of gravity.

Following DAVI installation, the identical envelope was flown and the flight characteristics and vibration levels compared. It was found that:

A. The 2/rev airframe vibration levels (the predominant and tuned DAVI frequency) were reduced to a fraction of the levels measured on the standard aircraft.
B. 4/rev and 6/rev frequencies were reduced slightly while 1/rev, 3/rev, and 5/rev frequencies were about the same.
C. Hover and autorotation, normally quite smooth in the standard aircraft could be described as "smooth as silk."
D. Translational lift vibratory characteristics were improved, with a substantial reduction throughout the whole translational flight regime.
E. Vibration levels were also substantially reduced in turns and roll reversals. In straight and level flight, 2/rev vibration levels increased at speeds above 100 knots, but remained less than half those of the standard aircraft.
F. Flying qualities remained comparable to the standard UH-1H helicopter.

The test program has now been completed with the DAVI concept satisfactorily demonstrated on a flight vehicle. Areas requiring additional testing have been identified and are being studied for follow-on programs. When considering the merits of such a device, it is not difficult to envision the potential to be realized from reduced vibration levels. Various studies of airframe vibration levels in certain aircraft have shown that maintenance manhours per-flight-hour for repairs associated with fatigue damage can be cut almost in half. Mission effectiveness will be enhanced by reduced crew fatigue and improved accuracy of fire control systems. Costs and weight of design features to mitigate vibration effects in prototype vehicles will also be minimized.

Already a leader in rotor technology, KAC looks forward to providing this new vibration control concept for helicopters of the future. For information about another rotor innovation being tested by Kaman engineers, refer to the Controllable Twist Rotor article immediately following.

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by H. E. Howes, CTR
Program Manager

Controllable Twist Rotor Completes Wind Tunnel Tests

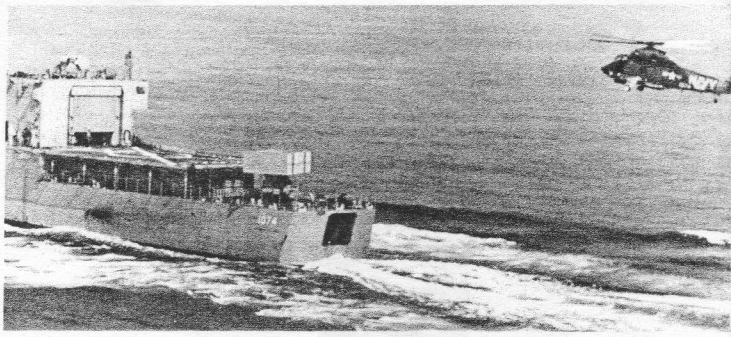
The Controllable Twist Rotor (CTR), featured on the cover of this Rotor Tips issue has recently completed the wind tunnel test phase of the feasibility demonstration program for the CTR concept. The program, sponsored by USAAMRDL, Eustis Directorate, was initiated in May 1972 and included analysis, design, fabrication and substantiating tests culminating in the recently completed test in the 40 by 80 foot wind tunnel at NASA Ames, Moffet Field, California. The CTR, as shown in this cover photo is installed for testing on a full scale rotor test module which was developed for high performance rotor tests by the NASA Ames personnel.

The basic CTR concept evolved out of earlier study contracts, and is intended to optimize the blade twist distribution, both collectively and cyclicly, throughout the helicopter flight regime. This is achieved by employing a torsionally-elastic rotor blade utilizing both conventional root and pitch horn control and the Kaman servo flap. The test results show excellent correlation with the analytical predictions and that substantial improvements in performance with a significant reduction of blade and control vibration loads can be realized.

The wind tunnel test results are currently being evaluated and will be published by the Eustis Directorate when completed.

The full scale rotor recently tested at the Wind Tunnel is scheduled to undergo additional tests to expand the basic CTR concept to incorporate harmonic vibratory flap control inputs. This program, called the Multi Cyclic Flap concept, is just one of a number of new rotor technology concepts being developed at Kaman.

SH-2 LAMPS Activities . . . Update



by Bruce A. Goodale

The U.S. Navy has been deploying LAMPS detachments on destroyers and escort ships for nearly four years. The outstanding success is due mainly to the professionalism and enthusiasm demonstrated by the detachment and ship's personnel who have operated the system.

Through August 1974, 54 LAMPS detachments have deployed on long cruises, 24 of these from East Coast Squadrons and 30 from West Coast Squadrons. In addition, Navy personnel participated in many at-sea evaluation programs and short cruises for training and work-up. Several classes of ships have been used, including the CG26 (formerly DLG26), CGN 35 (DLGN35), FF1040 (DE1040), FF1052 (DE1052), and FFG1 (DEG1) classes. In the near future, DD963, CGN38 (DLGN38), and FFG7 (PF109) classes will enter the Fleet with LAMPS capabilities. Since September 1973, all LAMPS deployments have utilized the SH-2F model aircraft. At this writing, there are 10 detachments deployed on long cruises, with others doing their work-ups for deployment soon.

In March 1972, East Coast Squadron HC-4 and West Coast Squadron HC-5 were redesignated HSL-30 and HSL-31, respectively, to reflect the new roles of these squadrons. As more LAMPS aircraft were delivered, additional squadrons were established. HSL-32 and HSL-33 were formed in mid-1973 at Norfolk and Imperial Beach, HSL-35 in January 1974 at Imperial Beach, and HSL-34 in September 1974 at Norfolk. HSL-37 was formed in Hawaii in July 1975, and HSL-36 was recently commissioned in Mayport in September. Imperial Beach based squadrons moved to North Island in early September.

Through August 1975, the Navy had 93 SH-2F's and SH-2D's in service, modified by Kaman from HH-2D's into the LAMPS configuration. By December 1975, 8 more SH-2F's will be delivered, according to Owen Polleys, H-2/LAMPS Program Manager. All SH-2D's are programmed to be converted to SH-2F's. The Navy intends to continue using the SH-2F through 1985-1990 and, starting in late 1976, a program designed to extend the aircraft's service life is planned. Kaman is working with the Navy to effect several improvements, generated from Fleet experience, which will further enhance mission capability and reliability.

The success of the SH-2F LAMPS program with its MK-I sensors has led to a follow-on sensor development called MK-III. The Naval Air Development Center in Warminster, Pa., is using two Kaman YSH-2E helicopters as test beds for this program, reported on page 4 in this issue of Rotor Tips. These aircraft will also be converted to standard SH-2F's early in 1976, bringing the total of SH-2F's in service to 103.

Again in Fiscal Year 1975, as in FY1974, the SH-2 has enjoyed the best safety record of all Navy operational helicopters, while utilized in one of the toughest environments. Well done, LAMPS squadrons!!

KAMAN ROTOR TIPS — FINAL ISSUE

This is the final issue in the current series of Kaman Rotor Tips. For those occasions when it is necessary or desirable to provide information from the plant, this will be done using other techniques and formats. Interim technical information will be supplied by issuing Training Bulletins or other data from our Service Department.

Kaman's support of customer activities will continue as in the past, led by our on-site Field Service Reps and backed up by our Service Department here at the plant. Operators of our helicopters will continue to receive the same high quality product support they have come to expect from Kaman.

Cdr John R. O'Boyle, Jr.

HSL-33
Changes Commanding Officers

IMPERIAL BEACH, CA — In ceremonies held July 1 at the Naval Auxiliary Landing Field (NALF) here, command of Helicopter Anti-Submarine Squadron Light Thirty-Three (HSL-33), changed from the hands of Commander LaRon "L" Stoker to Cdr John R. O'Boyle. Guest speaker for the event was VAdm Emmett H. Tidd, officially appearing in his first change of command ceremony since recently taking the post of Commander, Naval Surface Force, U.S. Pacific Fleet.

HSL-33 was established during July, 1973, in a split from its sister squadron, HSL-31. The squadron mission is to provide LAMPS (Light Airborne Multi-Purpose System) helicopter detachments onboard LAMPS-configured ships of the Pacific Fleet, as well as maintaining a support detachment at the Naval Air Station, Cubi Point, Philippines.

Commanding Officer O'Boyle is a native of Atlanta, GA, who entered the Naval Service in 1958. He is a Naval Aviator who, in addition to Navy educational institutions, has attended San Jose State College and the Naval Post-graduate School, Monterey, CA. His tours of duty prior to HSL-33 include shipboard deployments in both the Mediterranean and Pacific arenas in addition to duty with Helicopter Anti-Submarine Squadrons 2, 8 and 10. He also served on the staff of Commander, Amphibious Squadron Three as the Air Tactical Officer.

Departing skipper, Cdr Stoker, attended Utah State Agricultural College in Logan, Utah, where he majored in Aeronautical Technology. He enlisted in the Naval Cadet Program in 1956, undergoing his initial flight training at Pensacola, FL. He was designated a Naval Aviator in September, 1957, and completed his basic helicopter training later that year. Cdr Stoker's initial aviation assignment was with Helicopter Anti-Submarine Squadron One, in Key West, FL. He then served with Air Development Squadron Six, where he wintered over as Assistant Officer in Charge of Det Alfa at McMurdo, Antarctica. Cdr Stoker was re-assigned to Helicopter Training Squadron Eight, to serve as a flight instructor and test pilot, Ground Support Officer, and Quality Assurance Officer. Following this, Cdr Stoker saw tours with Helicopter Combat Support Squadrons One and Five, Helicopter Anti-Submarine Squadron Light 31, and deployment aboard the USS King and the USS Ranger. Cdr Stoker was the first executive officer of HSL-33, following its establishment in 1973. In July, 1974 he assumed its command as Commanding Officer. From Imperial Beach, he will travel to attend the Air War College, Maxwell Air Force Base, AL.

HSL-33's new Executive officer LCdr John H. Mosser was formerly with HSL-35 as Operations Officer. LCdr Mosser has been involved with Navy helicopters since June 1963, having served with HS-8, HS-6, and the Naval Air Engineering Test Center where he served as an engineering test pilot for LAMPS.

Cdr LaRon "L" Stoker

LCdr John H. Mosser