KAMAN Rotor Tips

JULY-AUGUST, 1975

I pledge allegiance to the Flag of the United States of America and to the Republic for which it stands, one Nation under God, indivisible, with liberty and justice for all.

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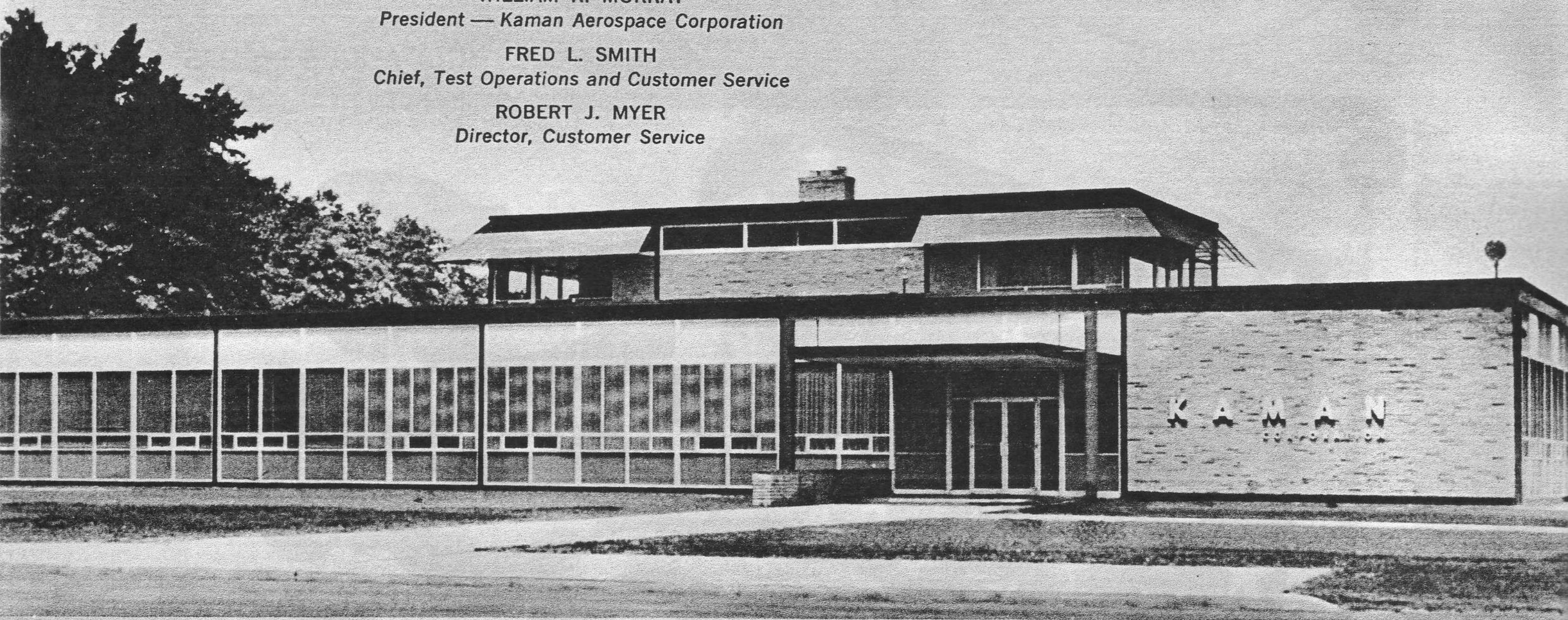

Rotor Tips

John P. Serignese, *Editor*

Volume VIII No. 11

On The Cover

Our great Nation begins its 200th year . . . a time for reflection and re-dedication to our principles.

Photo of HSL-34's five aircraft formation by Squadron PAO, Lt A. C. Robertson.

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Features

Space Shuttle Orbiter 3
SH-2 LAMPS Safety Record 3
Circulation Control Rotor 4
HSL-32 Wins Isbell Trophy 15
Frederick L. Feinberg Award 15
12th ILSMT Conference 16
HSL-37 Established 17
Army Rotor Blades 18
Solar Heating 18
Prestressed Spar Concept 18
Charles H. Kaman Honored 19
Sailor of the Year Award 20

Departments

Technical Section 7

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Capabilities

Space Shuttle Orbiter

by R. P. Carroll, KAC
Marketing Representative

Components designed to function in both earth and space environments must necessarily be fabricated to the highest quality and reliability standards. Kaman, which has this capability, recently contracted with one of its Connecticut-based neighbors to produce components for the space shuttle orbiter. Hamilton Standard Corporation, a division of United Technologies Corporation, has been selected to develop the space orbiter's water boiler hydraulic thermal control unit. The control units will be installed aboard the orbiter to cool the spaceplane's hydraulic system fluids during the heat of space flight. The hydraulic system provides power to operate the orbiter's elevons, rudder, speed brakes, steering controls, main engine controls, and gimbal actuators.

Planned as the nation's space workhorse of the future, the shuttle is the first reusable space transportation system. It will be able to carry as much as 65,000 pounds of varied cargo to orbit, ranging from satellites, to passengers, scientific laboratories and sections of other spacecraft that can be assembled in space. After delivering its payload, the orbiter will return to earth and land much like a jetliner.

One of the waterholding tanks undergoing inspection in Photo 1. Photo 2 shows the exterior of a special area which was constructed to minimize the presence of possible pollutants that could have an adverse effect on weld quality. Photo 3 provides the interior view of the clean weld room.

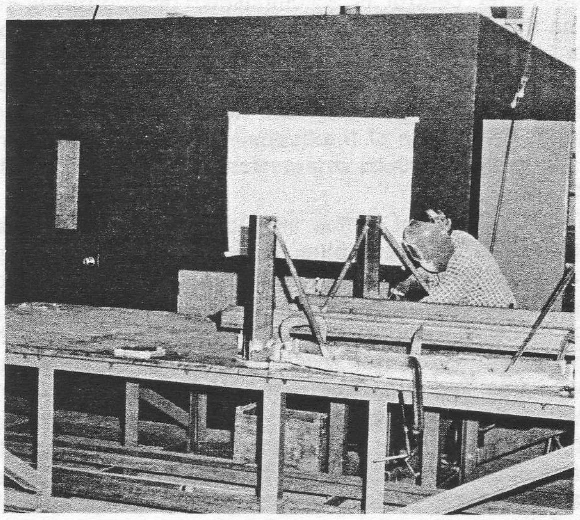


PHOTO 2

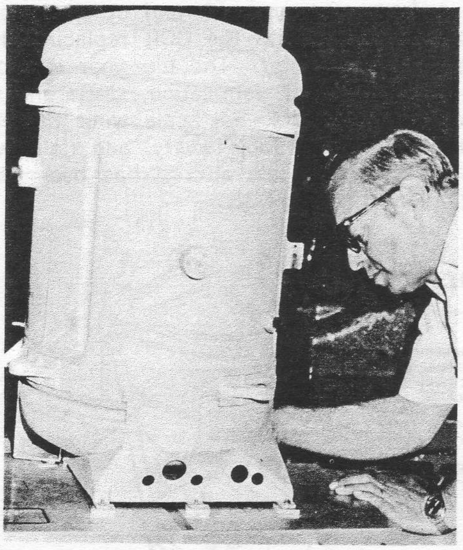


PHOTO 1

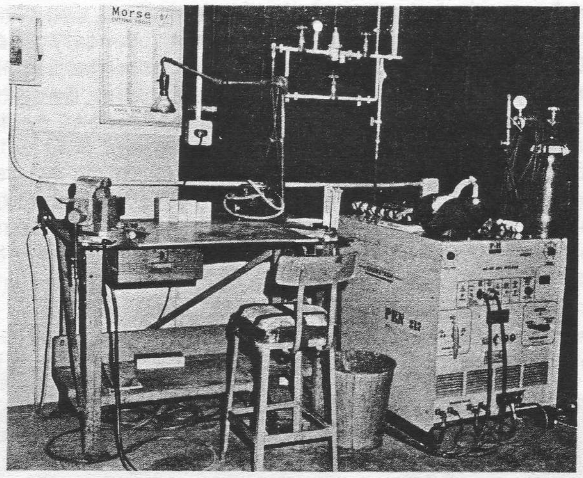


PHOTO 3

SH-2 LAMPS Safety Record

by Robert J. Myer, Director
Customer Service

"The Flight of the Phoenix," appearing in the May 1975 issue of Approach magazine, discusses the development of the LAMPS program. The well-written article refers, in particular, to the question: "Why is LAMPS unique in aviation safety?"

Having labored with the Navy during these past several years as the LAMPS program was developed, we read the referenced article with much interest. However, we were disappointed that, after mentioning the predicted accident rate of 2.86, the results of the indicated effort to improve program safety were not included. We believe that the old adage "The proof of the pudding is in the eating" applies here. The H-2 major accident rate for FY '74 was 0.40 and FY '75 is estimated as 0.81. We salute the H-2/LAMPS communities for this significant achievement.

The Circulation Control Rotor

by D. R. Barnes
CCR Program Manager

Helicopter Control

Helicopter control is accomplished by controlling the lift on the individual main rotor blades. In a conventional rotor system, blade lift control is achieved by changing the blade's angle of attack, with respect to the free-stream airflow. Changing the blade angle of attack changes the pattern of the "circulation" of airflow around the blade which results in a corresponding change in the blade lift.

The circulation of airflow around an airfoil section can be controlled by means other than by changing the angle of attack. One of these methods is the "Circulation Control" concept illustrated in Figure 1 as applied to a rotor blade . . . a Circulation Control Rotor (CCR). The CCR system eliminates cyclic pitch, thus requiring no swash plate and promises reduced vibration levels, and improved performance.

Conventional cyclic pitch is replaced by direct cyclic control of blade lift by circulation control. Air supplied by a compressor system is ejected tangentially, out of a thin, full span slot near the trailing edge of the individual rotor blades. The ejected airflow induces a circulation of free-stream air around the rotor blade creating lift. The ejected airflow also provides a degree of boundary layer control which delays airflow separation from the airfoil, substantially reducing blade section profile drag. By cyclically modulating the amount of ejected airflow, cyclic lift control is obtained. Likewise, by collectively controlling the ejected airflow, collective lift control is obtained. The rotor blades operate in fixed pitch and are shaft driven in a conventional manner.

The concept of a circulation controlled rotor has been around for many years. Efficient application of circulation control began in the mid sixties at the Naval Ship Research and Development Center (NSRDC). NSRDC developed two-dimensional circulation control airfoil data to form a data and technology base for circulation control applications. In the early seventies, model rotor tests were conducted in NSRDC wind tunnels. The success of these tests prompted the Navy to invite industry to explore the feasibility of constructing full scale CCR helicopters. A competitive procurement cycle ultimately resulted in the selection of Kaman to design, develop, and flight test a CCR system.

Kaman will develop and flight test the CCR system using an H-2 aircraft as a "test bed." The basic H-2, including airframe, power train, and other components will be used "as is" with the CCR replacing the H-2 servo flap controlled rotor. The four-year development program includes design, fabrication, static and fatigue testing, whirl tower tests, full scale wind tunnel tests in the Ames 40 by 80 foot facility, and tie down and flight tests. The flight test aircraft has been assigned the designation of: XH-2/CCR.

Circulation Control Rotor Concept

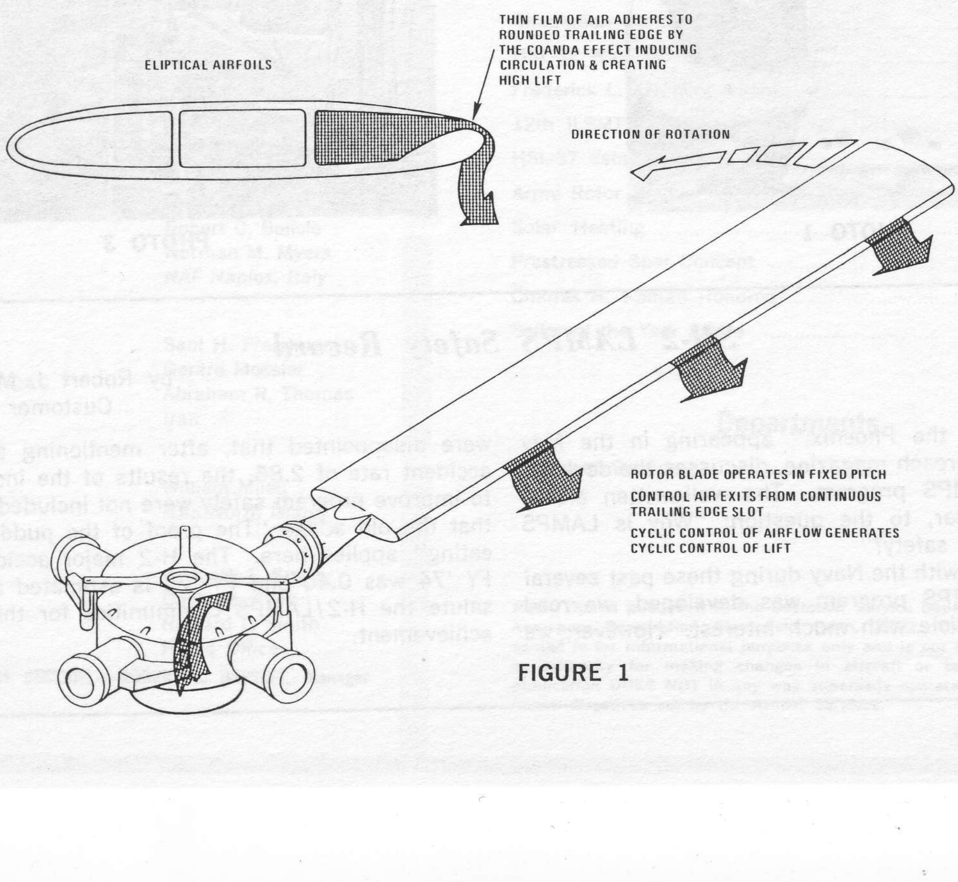
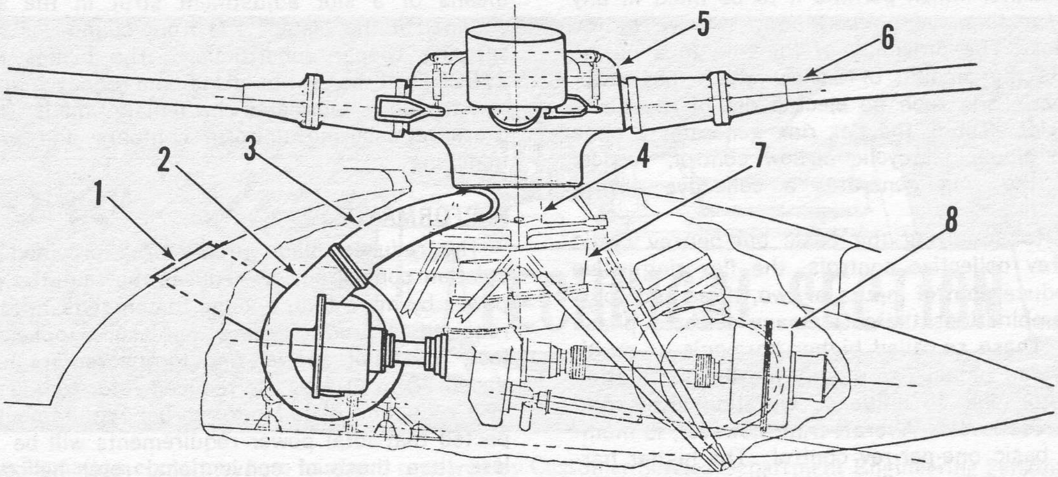


FIGURE 1



1. Air inlet.
2. Compressor.
3. Duct-scroll to plenum.
4. Stationary mast/plenum.
5. CCR rotor hub.
6. CCR rotor blade (1 of 4).
7. H-2 main gearbox.
8. H-2 combining gearbox.

XH-2/CCR Component Installation Concept
Figure 2

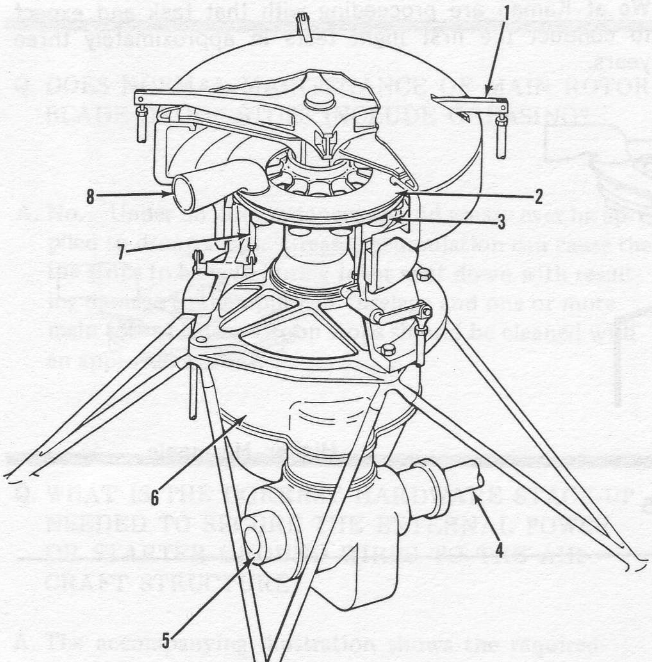
CCR Installation

The XH-2/CCR installation is shown in Figure 2. Air, ingested through ports in the rotor pylon fairing, is compressed by a radial flow compressor, and delivered to a plenum in the rotor hub. The compressor is driven by a takeoff from an existing pad on the main gearbox. This pad was used to power the accessory gearbox in single-engine H-2 models, the UH-2A and UH-2B.

The rotor installation (Figure 3) consists of a stationary mast, rotor hub, a mechanical collective system, and the circulation control rotor blades. The stationary mast attaches directly to the existing H-2 transmission mount while the hub rotates about the mast on large diameter bearings. All rotor loads are carried through the stationary mast to the airframe. The rotor shaft transmits rotor torque only through a quill shaft to the hub torque plate. The mechanical collective system is a simple, spider-type device, supplementing pneumatic collective control.

Housed within the control airflow plenum chamber created by the hub and the stationary mast, is the heart of the CCR system, the control valve. This valve modulates the airflow to the individual rotor blades to provide cyclic and collective lift control. The control device, termed a "Flex Ring Valve" or FRV, is a novel, simple, and reliable cyclic and collective pneumatic control device.

In use, rotor blade nozzles, which carry airflow into the individual rotor blades, rotate above a nonrotating steel flex ring. A mockup of the Flex Ring Valve is shown in Figure 4. The Flex Ring is mounted in the non-rotating



1. Mechanical collective linkage.
2. Flex ring.
3. Higher harmonic control actuators.
4. Existing main drive shaft.
5. Existing drive pad (used for air compressor).
6. Existing main transmission and mount.
7. One-per-rev and pneumatic collective control link (1 of 3).
8. Blade nozzle (1 of 4).

FRV and Hub Installation Concept
Figure 3

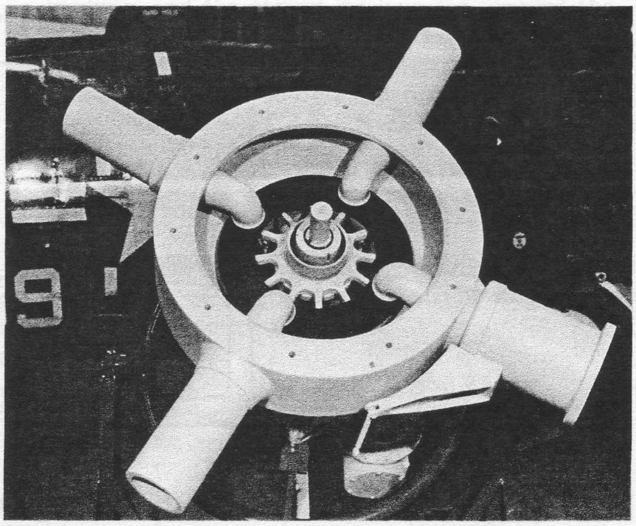


Figure 4

system in a manner which permits it to be tilted in any direction and/or to move up and down relative to the rotating nozzles. The proximity of the ring to a nozzle mouth controls the amount of airflow which may enter that blade nozzle and then be ejected out of the blade trailing edge slot. Tilting the flex ring generates a once per revolution sinusoidal cyclic airflow control; vertical movement of the ring generates a collective airflow control.

In addition to supplying the basic one-per-rev cyclic and zero-per-rev collective controls, the flex ring valve can also introduce control inputs of two, three and four-per-rev (or combinations thereof) at any selected phase or amplitude. These so-called higher harmonic or multi-cyclic controls can be used to modify the lift distribution around the rotor disc to influence vibration levels and blade cyclic stress levels. Aircraft trim, however, is maintained by the basic one-per-rev control. The higher harmonic control inputs are achieved by distorting the flex ring out of its normal plane. Note that the entire control system is in the non-rotating frame, thus highly-loaded rotating bearings, oscillating pitch links, etc., are eliminated. (In conventional systems, pitch links must oscillate at 5 to 6 cycles per second, changing blade pitch at that frequency.) Even with this new approach, however, pilot cockpit controls are conventional. The control modes of the FRV are shown in Figure 5.

The rotor blade and hub are a "hingeless" configuration. The blade design is shown in cross section in Figure 6. The airfoil is a cambered ellipse with a rounded trailing edge and a full-span tangential slot located at the 97% chord point. Note that the rounded trailing edge presents an extremely rugged, damage-resistant contour.

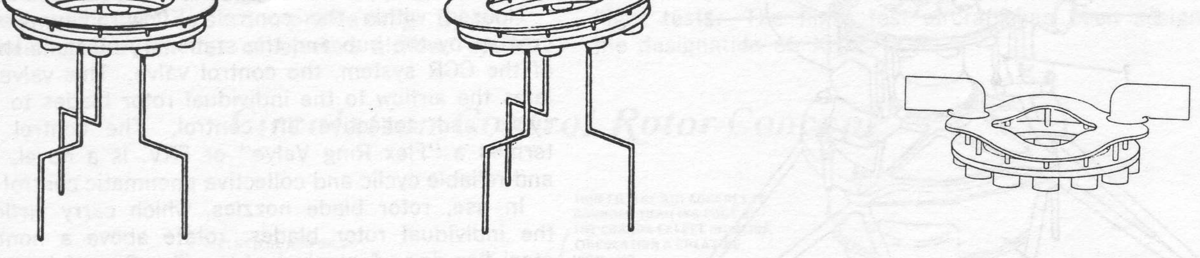
The air slot height is factory adjusted to provide proper dimensional and blade track characteristics by means of a slot adjustment strut in the aft air duct channel of the blade. The front channel is a basic load carrying D-spar construction. The blades for the XH-2/CCR will be a fiberglass and honeycomb composite construction, fabricated in female molds with internal pressure assuring uniform contours and precise blade matching.

PERFORMANCE

The reduced blade profile drag provided by the circulation control airflow reduces the required rotor horsepower by more than enough to compensate for the power required to produce the compressor supplied airflow. In fact, rotor horsepower and torque requirements are reduced 20 to 30%. The reduced rotor torque also results in a reduction of tail rotor thrust requirements. It is expected that total power requirements will be 10 to 15% less than those of conventional rotor helicopters. This available power can be used to increase payload, increase range, or improve flight performance.

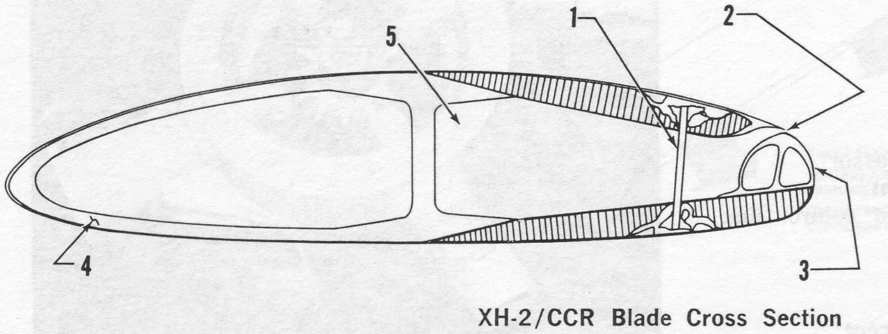
In autorotation, the compressor is driven by the rotor system much as the tail rotor, hydraulic pumps, and generators. Remember, however, the compressor is not parasitic because it more than pays for itself through the reduction in rotor profile drag. Autorotative descent rates will be the same as, or better than those of similar disc loading conventional rotor aircraft.

In summary, the CCR system promises a mechanically simple, high performance, reliable, low maintenance, smooth flying rotor system. The task at hand is to prove the validity of the analytic predictions and the extrapolation of model wind tunnel tests to full scale aircraft. We at Kaman are proceeding with that task and expect to conduct the first flight tests in approximately three years.



Collective　　Cyclic　　Higher Harmonic

Figure 5



1. Adjustment strut.
2. Air ejection slot.
3. Coanda surface.
4. Molded composite blade spar.
5. Air duct.

XH-2/CCR Blade Cross Section
Figure 6

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Rotor Tips

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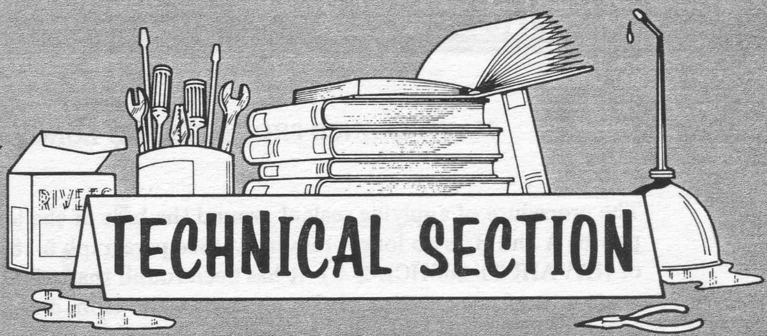

TECHNICAL SECTION

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.

Table of Contents

Starter Ground Hardware Stack-Up 7
Main Rotor Droop Stop Lube 7
Maintenance Procedure No Longer Required 8
Check this Maintenance Incident 8
UHF/DF, AN/ARA 25A, OTPI Block Diagram ... 9
Pedal and Cyclic Stick Lock Assembly 10
Combining Gearbox Support Rods 11
Main Transmission Support Assembly Tubes 12
Maintenance Incident Answer 13
Publications Information 14

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Q. DOES NORMAL MAINTENANCE OF MAIN ROTOR BLADE DROOP STOPS INCLUDE GREASING?

A. No. Under no circumstances should grease ever be applied to droop stops. Grease accumulation can cause the the stops to hangup during rotor shut down with resulting damage to the upper aft fuselage and one or more main rotor blades. Droop stops should be cleaned with an approved solvent.

Normal maintenance of droop stops should include the following:

a. Remove weight of blade from droop stop.

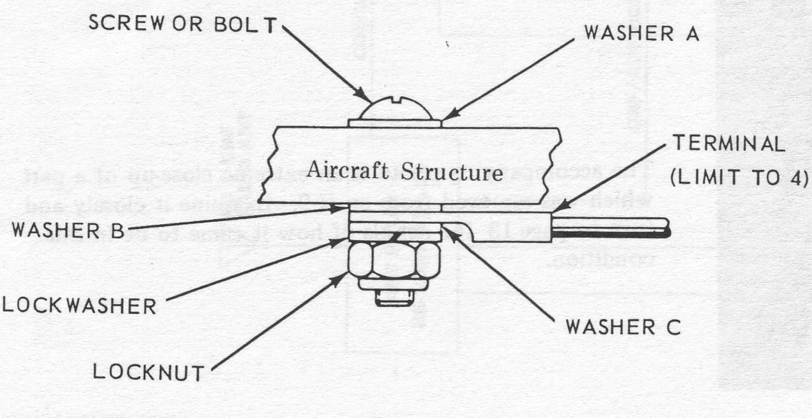
b. Using solvent, clean off all accumulations of dirt, grease, oil, or any other foreign material.

c. Check to be sure that the droop stop is free to pivot and is properly adjusted.

W. Wagemaker, Service Engineer

Q. WHAT IS THE CORRECT HARDWARE STACK-UP NEEDED TO SECURE THE EXTERNAL POWER OR STARTER GROUND WIRES TO THE AIRCRAFT STRUCTURE?

A. The accompanying illustration shows the required hardware and the correct stack-up for securing the external power or starter ground wires to the aircraft structure. Additional information on bonding and grounding can be obtained from Section VIII of Installation Practices, Aircraft Electric and Electronic Wiring - NAVAIR 01-1A-505.



NOTE

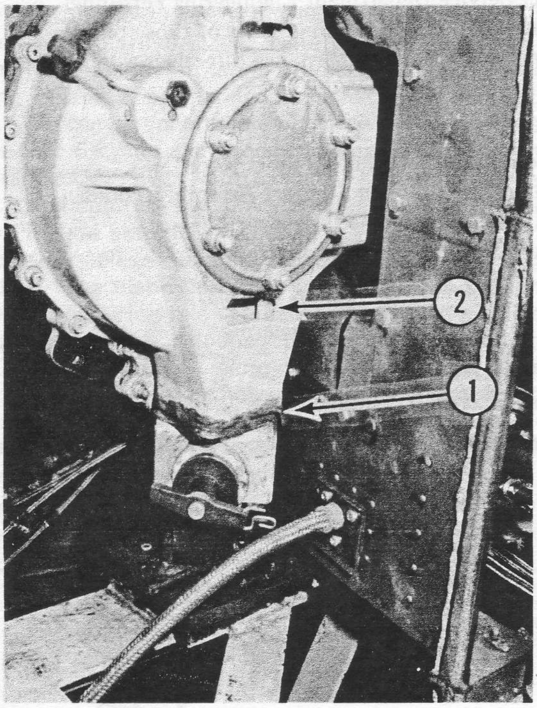
Insure the bonding and grounding surfaces are clean of all grease, paint, anodic film or other non-conducting material.

Bolt	—	AN6-6A
Washer "A"	—	AN960D616
Washer "B"	—	AN960D616
Washer "C"	—	AN960-616
Lockwasher	—	MS35337-46
Locknut	—	NAS 679A6

N.L. Hankins, Service Engineer

MAINTENANCE PROCEDURE NO LONGER REQUIRED

The procedure of applying sealant around the base of the lower engine mount, item 1, photos A and B, is no longer required. (See paragraph 5-18, f, and Note in Figure 5-10 of NAVAIR 01-260HCA-2-4.) It has been found that while the sealant effectively prevents water from entering, it also prevents water from draining. Water enters at arrow 2 in both photos; the entrapped water then accelerates corrosion of the magnesium housing.



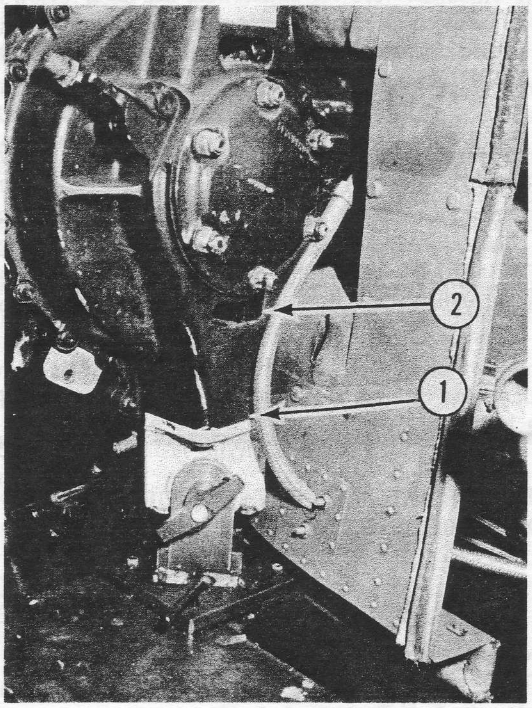
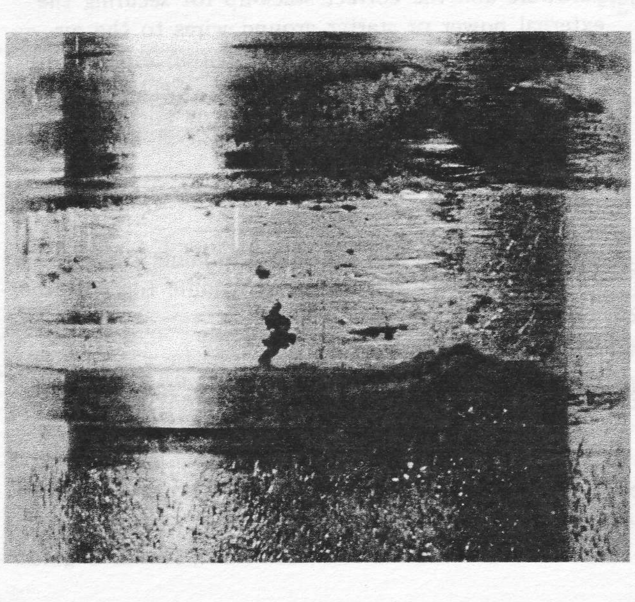


Photo A. Sealant applied.

1 Base lower engine mount.
2. Water-entry cavity.

Photo B. Without Sealant.

H. Zubkoff, Service Engineer



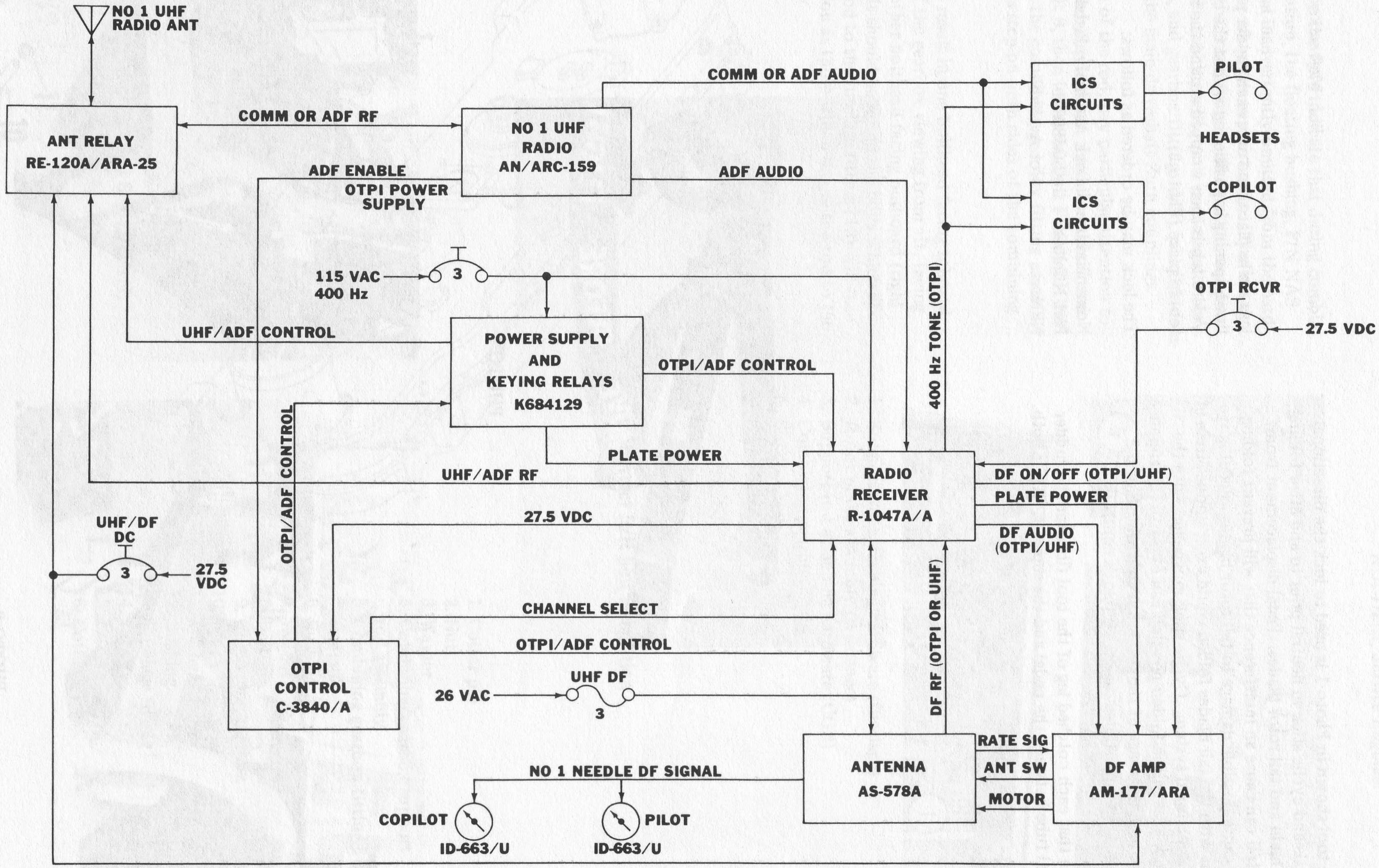
CHECK THIS MAINTENANCE INCIDENT

The accompanying photo is an extreme close-up of a part which was removed from an H-2. Examine it closely and turn to page 13 for details of how it came to be in this condition.

UHF/DF AN/ARA 25A AND OTPI R-1047 SYSTEM - BLOCK DIAGRAM

J.M. Nenichka, Service Engineer

The block diagram shown here is presented in response to inquiries from Fleet personnel. The information will be included in a future change to the applicable manual.



PEDAL AND CYCLIC STICK LOCK ASSEMBLY

W.J. Wagemaker, Service Engineer

The tool shown in Photo 1 is used to lock the directional pedals and cyclic stick in neutral prior to and after folding the main and tail rotor blades. Pedal displacement from neutral can cause an interference that will prevent folding and cause possible damage to tail rotor blades. Pedal movement with the tail blades folded could exert undue stress in the directional system. Cyclic stick movement with the main blades in the folded position can cause an interference and contact damage of the retention controls. Photo 2 shows the tool installed on the co-pilot's controls.

Note that each notched leg of the tool fits over the rudder pedal tube between the pedal and the support. After both legs are in place, one over each rudder pedal, the rubber lined opening is positioned against the cyclic stick. The Velcro tab is then wrapped around the stick to hold the tool in place (Photo 3).

The lock may be ordered as follows:

Nomenclature:	Lock Assembly, Pedal and Cyclic Stick.
Part Number:	K604807-1
NSN:	Not Available.

PHOTO 1

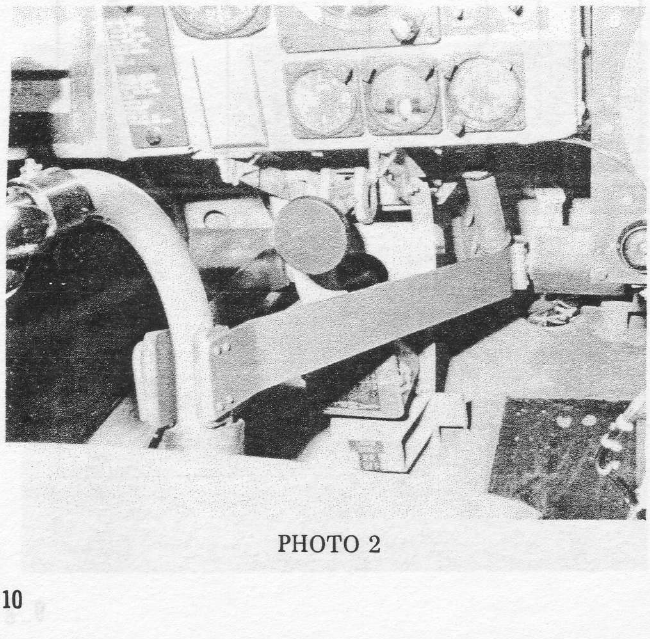


PHOTO 2

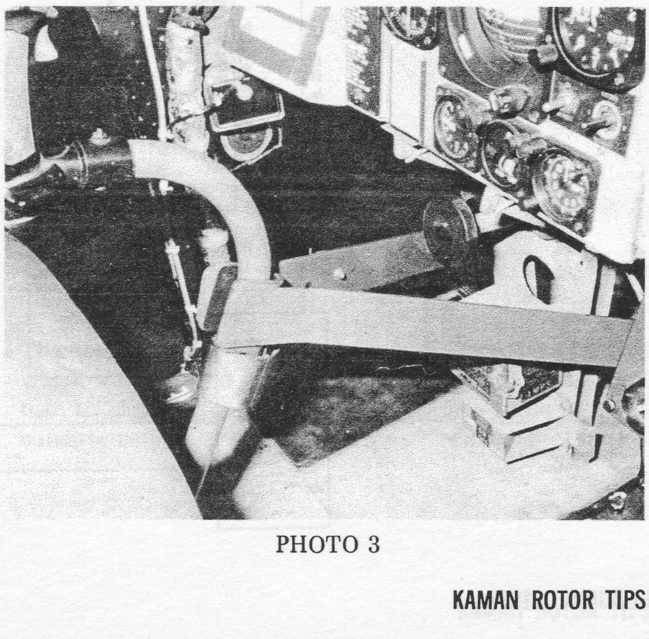


PHOTO 3

TECHNICAL SECTION

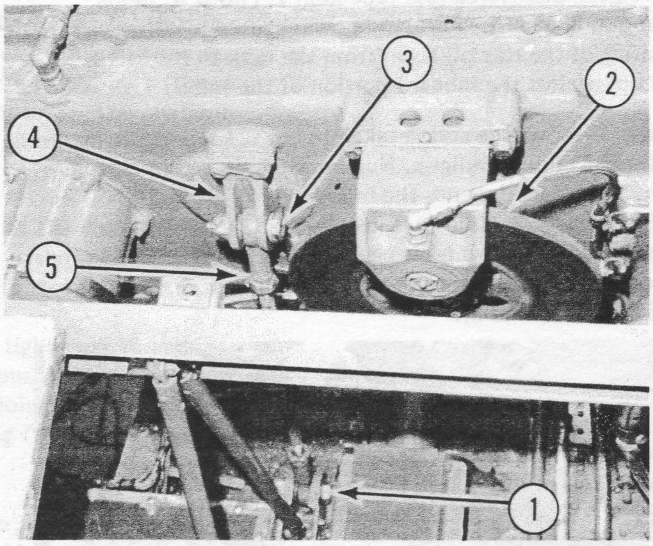
COMBINING GEARBOX SUPPORT RODS - ATTACHING PROCEDURES

R.J. Trella, Service Engineer

Recent reports from the field indicate that during combining gearbox installation, the floating bushing, P/N NAS 75-10-015, has been inadvertently omitted from the hardware stackup on the aft upper support rods. (The installation is shown in the accompanying illustration and photo.) Omission of the bushing will result in damage to the hardware, rodends, and gearbox fitting. Also, possible damage may occur to the main driveshaft Zurn couplings.

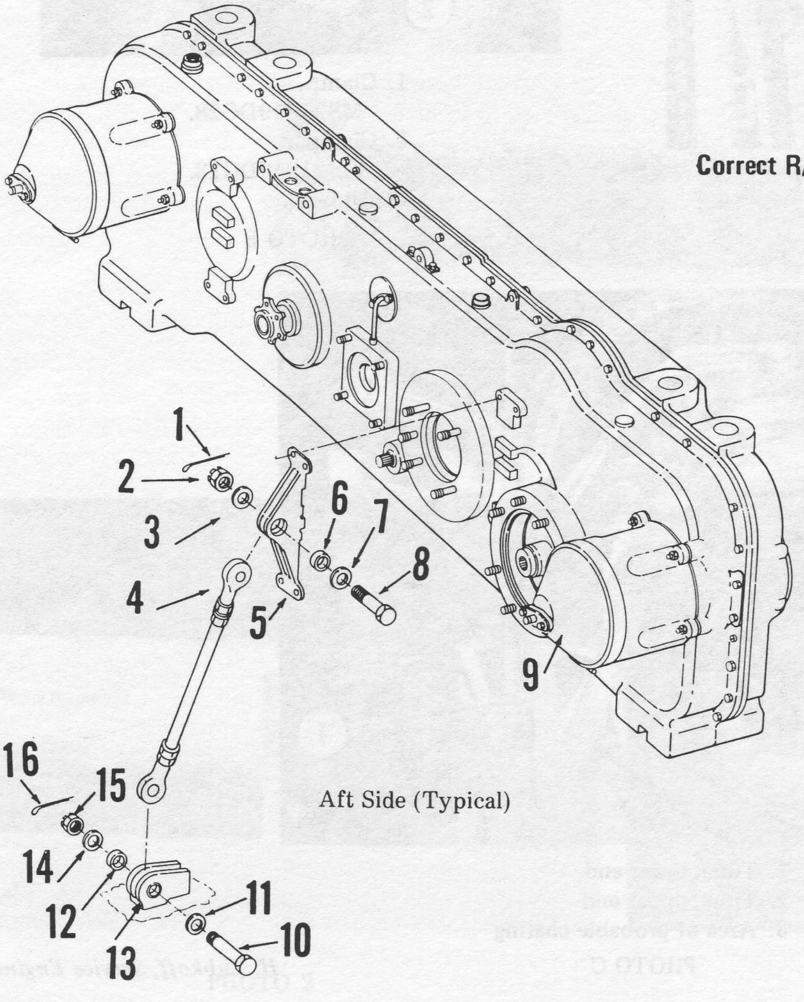
During installation of the rod, pay particular attention to the sequence of hardware buildup. Install washer 7 and bushing 6 onto bolt 8, then insert the bolt FROM RIGHT TO LEFT through the combining gearbox fitting assembly 5. Accomplish this step on both sides of the combining gearbox.

The preceding will result in one bolthead facing inboard (on the left side of the gearbox viewing from aft, facing forward) and the other bolthead facing outboard (right side of gearbox). It should be noted the bolts which attach the support rod to the fuselage fitting (13) will face in the same direction as those which secure the rod to the combining gearbox



1. Support rod attaching hardware (fuselage)
2. Rotor brake assembly (reference)
3. Support rod attaching hardware (CGB)
4. Combining gearbox fitting
5. Support rod

Correct R/H bolt installation



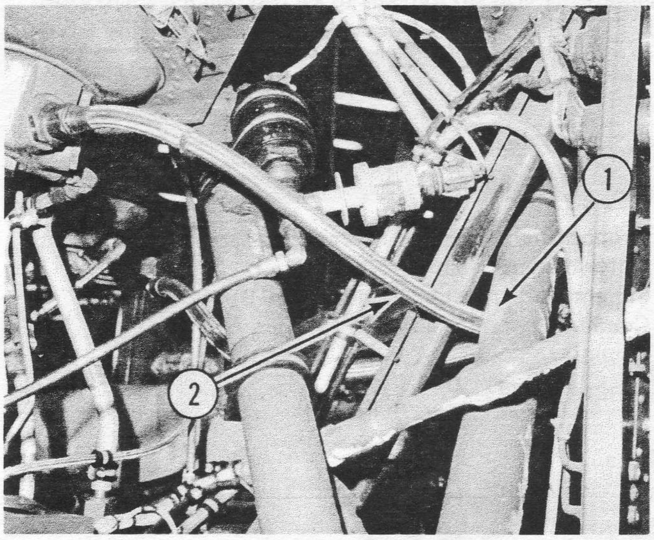
Aft Side (Typical)

1. Cotter pin
2. Nut
3. Washer
4. Combining gearbox support rod assembly
5. Combining gearbox fitting assembly
6. Bushing
7. Washer
8. Bolt
9. Combining gearbox
10. Bolt
11. Washer
12. Bushing
13. Fuselage fitting
14. Washer
15. Nut
16. Cotter pin

MAIN TRANSMISSION SUPPORT ASSEMBLY TUBES

Severely abraded main gearbox support assembly tubes have been discovered (see tube item 1, Photo A; items 1 and 2, Photo C). The damage was caused by abrasive chafing of the flex oil hose (from the tank to the MGB pump) against the inboard portion of the tube.

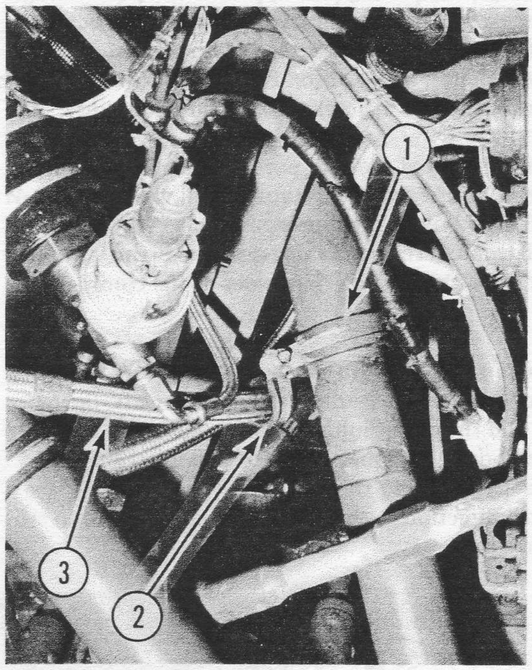
Photo B shows the action taken to correct the chafing condition. Training Bulletin, Number 38, released in November, 1974, recommends the following: A clamp, P/N MS21919DG28 (item 1) is installed around the support assembly tube. A smaller clamp, P/N MS21919DG13 (item 2), is installed around the flex oil hose, P/N K678756-5 (item 3).



1. Area of probable chafing.
2. Oil hose.

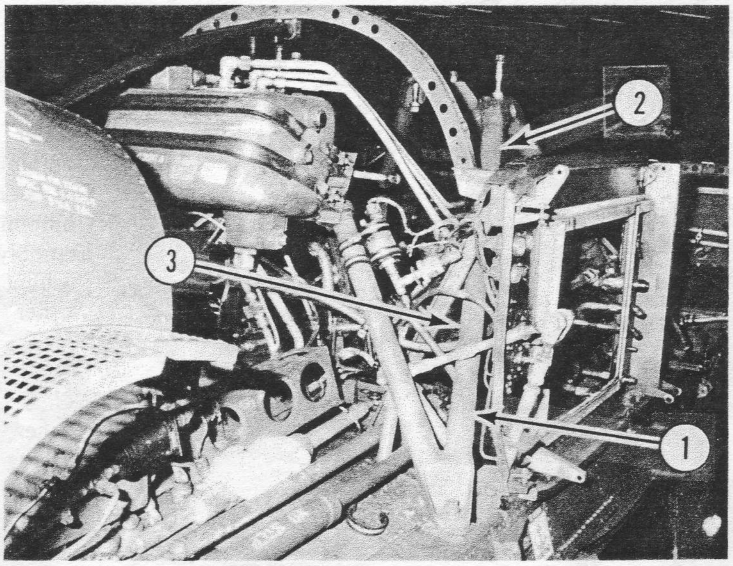
PHOTO A

The clamps are attached to each other with one MS35206-246 screw, one AN960PD10L washer and one MS21042L08 nut. It is recommended these clamps be installed as soon as possible. To rephrase an old adage: "A clamp in time will prevent downtime."



1. Clamp, MS21919DG28.
2. Clamp, MS21919DG13.
3. Oil hose.

PHOTO B



1. Tube, lower end
2. Tube, upper end
3. Area of probable chafing

PHOTO C

H. Zubkoff, Service Engineer

TECHNICAL SECTION

MAINTENANCE INCIDENT

The part is a bolt, P/N K672770-11, shown in photo 1. The bolt was installed in the engine mount assembly, P/N K672730-1 (the "jawbone") shown in photo 2. The jawbone attaches the engine and combining gearbox to the airframe.

The correct bolt was installed at the correct location but unfortunately, it was installed without the required bushing, P/N NAS538-12P35. See photo 3.

Once the bolt is installed and tightened, it cannot be determined whether or not the bushing is installed. If the bushing is omitted, the loose joint is subjected to high frequency vibrations emanating from the combining gearbox and/or the engine.

Both the MMI and the IPB are clear in this respect...install all the parts and if something appears loose, as this just had to be...(look again at photo 3)...do something about it. Remember, the air crew depends on you.

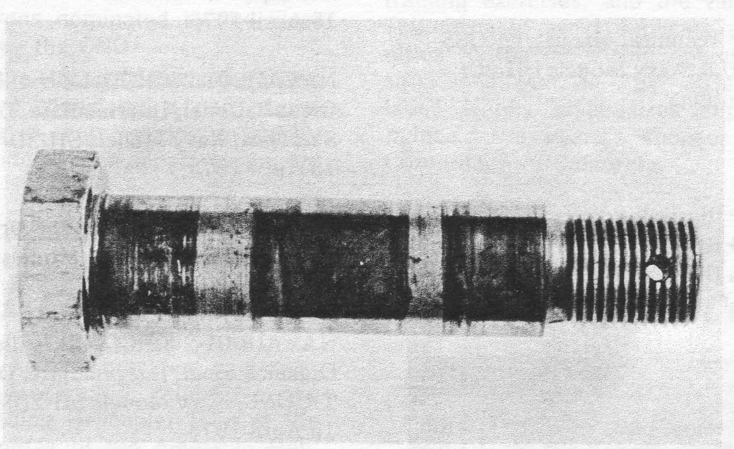


PHOTO 1

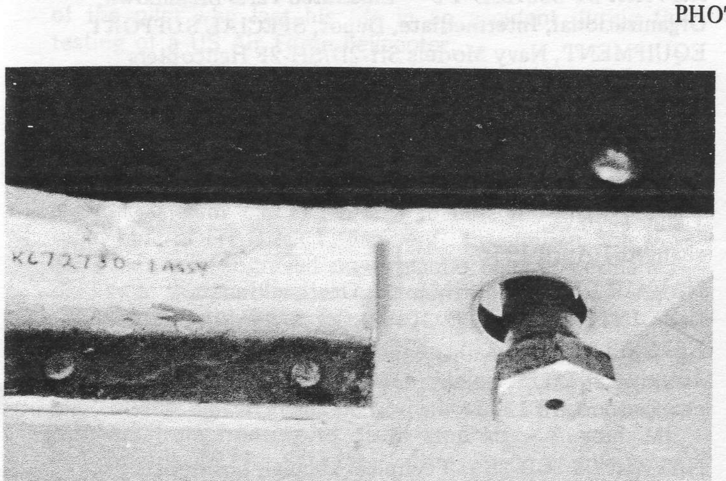


PHOTO 2

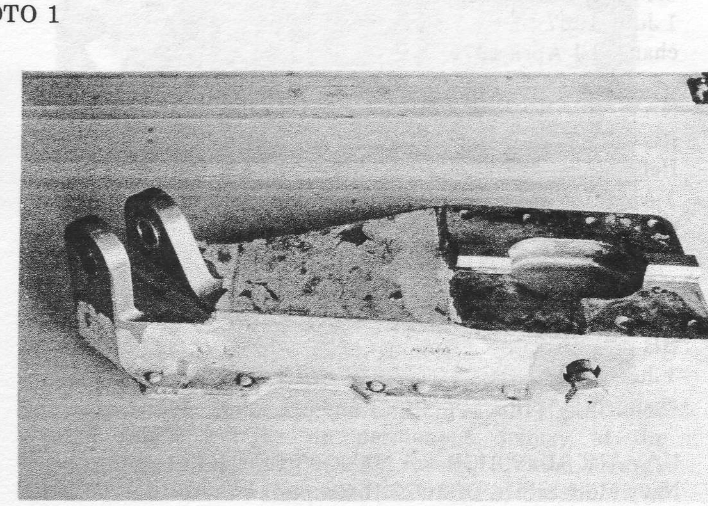


PHOTO 3

PUBLICATION INFORMATION

This list reflects latest manual changes and technical directives to the field.

R.H. Chapdelaine, Manager, Service Publications

NAVAIR 01-260HCA-2-1 — Manual, Maintenance Instructions, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters, GENERAL INFORMATION
15 February 1972
changed 15 May 1975

NAVAIR 01-260HCA-2-4.1 — Manual, Maintenance Instructions, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters, TRANSMISSION SYSTEM
1 July 1971
changed 1 April 1975

NAVAIR 01-260HCA-2-4.2 — Manual, Maintenance Instructions, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters, ROTORS
1 April 1973
changed 15 May 1975

NAVAIR 01-260HCA-3 — Technical Manual, STRUCTURAL REPAIR, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters
1 August 1974
changed 15 May 1975

NAVAIR 01-260HCA-N2 — Technical Manual, CROSS SERVICING SCHEDULE, U.S. Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters
15 August 1972
changed 15 May 1975

NAVAIR 01-260HCB-4-1 — Illustrated Parts Breakdown, NUMERICAL INDEX AND REFERENCE DESIGNATION INDEX, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters
1 April 1973
changed 15 May 1975

NAVAIR 01-260HCB-4-6 — Illustrated Parts Breakdown, TRANSMISSION SYSTEM, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters
1 June 1967
changed 1 April 1975

NAVAIR 01-260HCB-4-7 — Illustrated Parts Breakdown, ROTORS, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters
1 April 1973
changed 15 May 1975

NAVAIR 01-260HCB-4-9 — Illustrated Parts Breakdown, SPECIAL SUPPORT EQUIPMENT, Navy Models UH-2C/HH-2D/SH-2D/SH-2F Helicopters
1 June 1967
changed 1 April 1975

NAVAIR 01-260HCD-1 — NATOPS FLIGHT MANUAL, Navy Models SH-2D/SH-2F Helicopters
15 April 1974
changed 15 May 1975

NAVAIR 01-260HCD-4-1 — Illustrated Parts Breakdown, Organizational, Intermediate, Depot, NUMERICAL INDEX AND REFERENCE DESIGNATION INDEX, Navy Models SH-2D/SH-2F Helicopters
15 April 1975

NAVAIR 01-260HCD-4-2 — Illustrated Parts Breakdown, Organizational, Intermediate, Depot, AIRFRAME, Navy Models SH-2D/SH-2F Helicopters
15 April 1975

NAVAIR 01-260HCD-4-3 — Illustrated Parts Breakdown, Organizational, Intermediate, Depot, FLIGHT CONTROLS, Navy Models SH-2D/SH-2F Helicopters
15 April 1975

NAVAIR 01-260HCD-4-4 — Illustrated Parts Breakdown, Organizational, Intermediate, Depot, EQUIPMENT (FURNISHINGS, Hydraulics, Instruments, Utilities) Navy Models SH-2D/SH-2F Helicopters
15 April 1975

NAVAIR 01-260HCD-4-5 — Illustrated Parts Breakdown, Organizational, Intermediate, Depot, POWER PLANT AND RELATED SYSTEMS, Navy Models SH-2D/SH-2F Helicopters
15 April 1975

NAVAIR 01-260HCD-4-6 — Illustrated Parts Breakdown, Organizational, Intermediate, Depot, TRANSMISSION SYSTEM, Navy Models SH-2D/SH-2F Helicopters
15 April 1975

NAVAIR 01-260HCD-4-7 — Organizational, Intermediate, Depot, ROTORS, Navy Models SH-2D/SH-2F Helicopters
15 April 1975

NAVAIR 01-260HCD-4-8 — Illustrated Parts Breakdown, Organizational, Intermediate, Depot, RADIO AND ELECTRICAL, Navy Models SH-2D/SH-2F Helicopters
15 April 1975

NAVAIR 01-260HCD-4-9 — Illustrated Parts Breakdown, Organizational, Intermediate, Depot, SPECIAL SUPPORT EQUIPMENT, Navy Models SH-2D/SH-2F Helicopters
15 April 1975

NAVAIR 03-95D-14 — Manual, Overhaul Instructions, TAIL ROTOR GEARBOX ASSEMBLY, P/N K671302-1, -3, -5, -7; K671652-1, -3
1 May 1970
changed 1 April 1975

NAVAIR 03-95D-18 — Manual, Overhaul Instructions, INTERMEDIATE GEARBOX ASSEMBLY, P/N K671402-1
15 July 1965
changed 1 April 1975

NAVAIR 03-95D-28 — Technical Manual, Maintenance Instructions with Illustrated Parts Breakdown, Depot, SPRAG CLUTCH, P/N K674709-3
15 May 1975

HSL-32 Wins Isbell Trophy

VAdm H. E. Greer, COMNAVAIRLANT, left, presents Isbell Trophy to Cdr R. V. Buck, Commanding Officer of Helicopter Anti-Submarine Squadron Light Thirty-Two (HSL-32). The trophy, of antiqued gold, depicts the continents and oceans in the form of an oceanographic projection because these areas are patrolled by Navy ASW Squadrons. The base is decorated with the three sets of wings worn by Naval Aviators, Naval Flight Officers, and Naval Aircrewmen.

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

On April 30, in NAS Norfolk, the Commander Naval Air Forces Atlantic Fleet, Vice Admiral Greer, presented Commander R. V. Buck, Commanding Officer of Helicopter Anti-Submarine Squadron Light Thirty-Two (HSL-32), with the Captain Arnold Jay Isbell trophy for its operational expertise in Anti-Submarine Warfare (ASW). This is the first time a Light Airborne Multi-Purpose Squadron (LAMPS) has won this trophy, which is awarded to those squadrons that, by their professionalism and operational record, have excelled in airborne ASW. In the past, six awards were made each year, three each, within the Atlantic and the Pacific Fleets. An award was made to the VP, VS, and HS squadrons nominated by the Fleet Commanders and approved by the CNO.

For Calendar Year 1973, the HSL squadrons dedicated to the LAMPS program were considered a part of the overall HS category. However, commencing in 1974, LAMPS squadrons were considered as a separate category which resulted in four awards per year in each Fleet. In recent years, there has been an increased emphasis on evaluation of performance of operational ASW missions.

The battle efficiency "E" is generally awarded to air ASW units based on the readiness index, completion of training exercises, and the various periodic inspections. Therefore, to avoid duplicate awards and to give recognition to the increasing operational role of the aviation squadrons with an ASW mission, the awarding of the Isbell trophy emphasizes superior operational performance. The award's sponsor is the Lockheed Aircraft Corporation of California.

The Frederick L. Feinberg Award

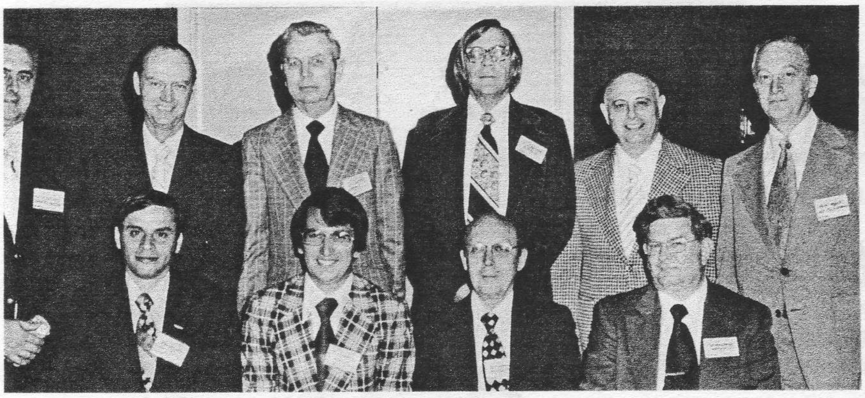
Early in 1960, Charles H. Kaman, president of Kaman Corporation, established the Frederick L. Feinberg award to be given to the "Outstanding Helicopter Pilot of the Year" by the Awards Committee of the American Helicopter Society. The National Award is given in memory of the pilot who lost his life in an accident during the testing of a US Air Force helicopter.

In setting up the standards for choosing a winner, Mr. Kaman gave the Committee the widest possible latitude. The pilot selected may be honored for outstanding piloting during a rescue, during flight testing, or during military or commercial flight operations. The winner is awarded a sum of cash and a medallion with the bas-relief bust of Frederick L. Feinberg. In addition, the winner's name is engraved on a plaque held in permanent display at the Smithsonian Institution in Washington, D.C.

This year's winner is Major Eugene Richardson, former CO of the 112th Medical Company (Air Ambulance) Maine National Guard at Bangor, ME. Major Richardson was pilot of the rescue helicopter which saved five mountain climbers from freezing to death atop Mt. Katahdin, ME, in February, 1974. Assisting in the daring rescue were: Capt Paul W. Wheeler, copilot; Sgt 1st Class Jay Tennant, medic; and, Sgt Edward Harvey, crewchief.

In photo above, Major Eugene L. Richardson, right, holds plaque which will be on permanent display at the Smithsonian in Washington, D.C. James F. Atkins, Awards Chairman, presented the award on behalf of the American Helicopter Society.

12TH H-2 LAMPS Integrated Logistics Support Management Conference



The 12th ILSMT Conference Committee Chairmen. Standing, from left, Cdr R. L. Kershner, NAVAIR, Ships Interface; J. Miller, NAVAIR, Maintenance Engineering; R. Carter, NAVAIR, Training/Trainer; F. DiFonzo, ASO, Phila., PA, Spares, and; R. J. Myer, KAC, Director, Customer Service. Seated, from left, P. Cataldo, NAVAIR, Conference Chairman; P. Kovalsky, NAVAIR, Assistant Conference Chairman; B. J. Johnson, NATSF, Phila., PA, Publications and; C. V. Zimmerman, NAVAIR, Spares. (Ruggiero photos)

The 12th Integrated Logistics Support Management Conference was held at the Ramada Inn, Windsor Locks, CT, June 10-12. The LAMPS community again gathered to provide a further update of the program. As the 11th ILSMT conference drew to a close in November, 1974, attendees were aware of each other's problems and had provided valuable "on the spot" direction. These suggestions resulted in positive statements termed "Action Sheets" and indicated what steps were necessary to correct existing support problems, or prevent related problems from occurring in the future.

Reconvening the LAMPS management team thus provided attendees with an opportunity to determine what measures have been accomplished and, when necessary, to determine any new ideas needing action. In addition, personnel new to LAMPS received a quick overview of ideas, problems, methods, and goals, and met the people who work to make it all dovetail into a system. For example, two new LAMPS Squadrons are scheduled to be Commissioned this year: HSL-36 in Mayport, FL; and, HSL-37 in Barbers Point, HI. What better way for these squadrons to "get up to speed" than by attending this conference?

A brief synopsis of the discussion/action subjects follow:

LCdr D. Smolnik (Acting Chief, DCASO Bloomfield) welcomed attendees and offered DCASO services as required. LtCol Cresci was introduced as the new Chief, DCASO Bloomfield.

Mr. William R. Murray, president of Kaman Aerospace, welcomed all conferees on behalf of the company. He indicated his gratification in the part KAC has been able to play in development and support of the LAMPS Program to date and the company's desire to continue to provide any additional support required.

Cdr F. D. Smith, ASW Team Leader (H-2/H-3) greeted all attendees on behalf of NAVAIR 04, the Navy office responsible for convening the conference.

Cdr R. L. Kershner welcomed participants on behalf of Capt Thomas, PMA-266. He related the change-of-command of PMA, Capt Boh's orders to BIS and Capt Thomas's arrival from USS Inchon.

In response to Cdr D. P. Myers introduction of the subject, Cdr Kershner gave an informal report on the results of the DD-963 builders' trials and LAMPS incorporation into the ship building specification of future combatants; DD-963, FFG-7, CSG(n) and possible DD/AEGIS.

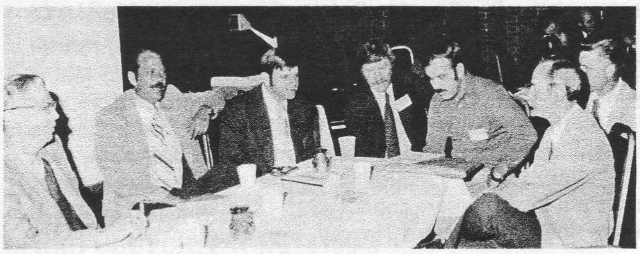
LCdr B. D. Strong (COMNAVAIRLANT, Rotary Wing Class Desk Officer) reminded attendees of the primary mission for LAMPS: deploying a single helicopter to remote areas to operate in a hostile environment with limited material and personnel support.

LCdr H. J. Wynn (COMNAVAIRPAC, Rotary Wing Class Desk Officer) introduced Cdr T. C. Bartholomew, CO, HSL-31, NALF Imperial Beach, who presented the COMASWWINGPAC LAMPS Community Status Report covering the four HSL squadrons. In addition to mention of ongoing activities of HSL-31, 33 and 35, he indicated that HSL-37 establishment scheduled for 3 July 1975 is on schedule and all milestones with a few exceptions have been met.

Lt B. G. Bettis from COMNAVSURFPAC, San Diego, discussed the merger of COMCRUDESPAC, COMPHIBPAC and COMNAVSERVPAC to become COMNAVSURFPAC and the organization of the Aviation Department within COMNAVSURFPAC, and Codes N-4 and N-3. Lt Bettis discussed maintenance and removal of the non-skid surface on aluminum flight decks and efforts to standardize aircraft launch and recovery procedures throughout surface forces.

Cdr D. P. Myers, COMNAVSURFLANT, presented an overview of current LAMPS operations. Thirty-three LAMPS ships will have completed conversion by the end of 1975, and during 1975 eleven LAMPS Dets will be available to support operations with these ships. Cdr

In photo above, the Spares Committee with the first female attendees to the conference, Mrs. S. B. Tingle and Miss R. M. Willis, MCAS Cherry Point, SC, and Ms. Marie Vester, NASCREPLANT, NORVA. In photo below, the Training/Trainer Committee discusses the recent Trainer Design Conference held on the West Coast.



Myers requested that additional ship oriented Audiscan Training Programs be developed for:

— Organizational Level Maintenance on SKR-4.
— General safety precautions and operations RAC-403/NiCad Battery Chargers.
— SQR-17 Tape Recorder and time code general operation, and periodic/corrective maintenance.

Kaman representatives O. Polleys, Program Manager, H-2 LAMPS Helicopters, and R. J. Myer, Director, Customer Service, presented a general review of KAC SH-2 program and logistic activities since the last ILSMT Conference. In addition to working with NAVAIR on **R & M** ECPs, Kaman is continuing to analyze potential areas of mission enhancement including assistance to Navy in incorporation of new ALR-66 ESM equipment, ARR-75 Sonobuoy Receiver and ARN-84 Tacan. Another major development under consideration is the Over-The-Horizon system for targeting Harpoon Missiles involving new radar and tactical navigation systems as well as the new ESM equipment. In conclusion, Mr. Myer presented a review of KAC support activities since the last conference. He also reiterated Kaman's desire to continue to assist the Navy in support of the H-2 LAMPS program wherever required.

Mr. Jack Weiss of ASO presented a status of the NAVAIR 00-35QB-201 10L Review Conference that was held at NAS Norfolk from 22 April thru 2 May 1975. During this period, a dedicated review of the range and depth of items contained in the LAMPS pack-up took place. The efforts of this recent review, and those conducted in the past have resulted in more effective pack-ups and prepositioning of spares at a substantial cost savings to the Navy.

Mr. R. C. Carlton, PMA-266, Configuration Manager for LAMPS Mark I, related the status of the **R & M** ECPs to the conference attendees.

Cdr R. Schwartz (NAVAIR AIR-5104E) provided a list of RAMEC's that have been finalized as Technical Directives.

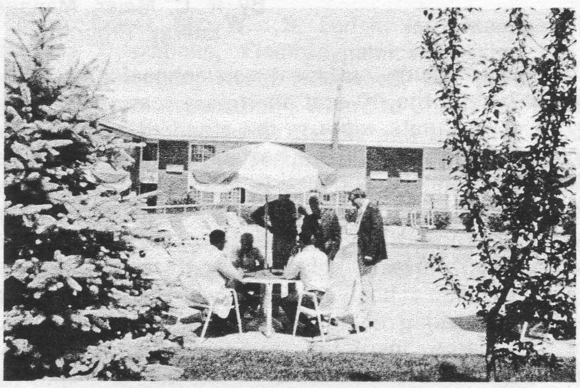
Cdr Melvin Runzo was introduced as the new H-2 Class Desk Officer. Cdr Schwartz will continue as LAMPS MK-III class desk.

Paul R. Cataldo, LAMPS APML, provided a brief summary of the Top Ten Readiness Improvement Status Evaluation (RISE) Summary (MSOD Report 4790.2 A3364-01) for April 1975 and the action being taken in order to maintain the SH-2F to CNO's O.R. standard.

Presentation by Cdr P. Frommer, Surface Readiness Desk at PM-4 (MASWPO) and Mr. Dick Hatcher of NUC, San Diego (Code 655) provided status of a CONARS, (Commanding Officer Narrative Action Report) which identifies, collects, reports and follows-up ship-air interface problems and internal ship design problems in connection with LAMPS. They indicated that a feedback section will be added to report progress to the Fleet users. DCAP apprises the community of problems and points towards solutions and action responsibility. (Note: It does not authorize alterations or engineering changes.)

W. E. Landon, NAVAIR and A. Amarosa, NAEC, of the GSE Committee provided current LAMPS GSE status.

Mr. R. Carter presented LAMPS Training/Trainer program review and emphasis was placed on actions taken to resolve problems generated at the November 1974 Conference.



In photo left, the poolside lunch which usually became a problem-solving session as the attendees tried to complete their work in the time allotted. In photo above, Lt John Grove, center, representing the latest LAMPS Squadron, HSL-37, is welcomed by F. L. Smith, KAC, Chief, Test Operations, Customer Service, left, and R. J. Myer.

HSL-37 Squadron Emblem

by Lt(jg) Bernard Aller
HSL-37 PAO

"HI" . . abbreviation for the "Hawaiian Islands" where Helicopter Anti-Submarine Squadron Light Thirty-Seven (HSL-37) will soon be based. Realizing they were to be the first LAMPS squadron to be established outside CONUS, HSL-37 wanted to emphasize the fact and did so with their new Squadron Emblem, shown on the left. The figure represents King Kamehameha I, the individual responsible for unifying the Hawaiian Islands. The shark symbolizes the unfriendly submarine which, although attacking, is vulnerable to King Kamehameha's barbed spear. The rainbow, which depicts the bright colors and atmosphere of Hawaii, reinforces the Squadron's association with the friendly island.

Kaman Awarded Contracts

KAMAN TO BUILD ARMY ROTOR BLADES

Kaman Aerospace Corporation has been awarded a contract by Aviation Systems Command of the United States Army to design and produce prototypes of a new helicopter rotor blade for the AH-1Q Cobra helicopter.

The contract was awarded as a follow-on to a study program in competition with two other prime helicopter manufacturers. Kaman Aerospace will design a new rotor blade to achieve improved hover performance and reduced vulnerability. The new contract incorporates the DTUPC (design-to-unit-production-cost) concept which works to a production cost ceiling as part of the initial design.

Under terms of the contract, which runs to mid-1977, Kaman Aerospace, a wholly owned subsidiary of Kaman Corporation, will fabricate 33 rotor blades for prototype-test. At Kaman Aerospace, other major rotor research and development programs in progress include the CTR (controlled twist rotor) study for the United States Army, and the CCR (controlled circulation rotor) program for the United States Navy. The prominence of Kaman Aerospace in use of composite structures and their use in rotor blades started with the Kaman HH-43 Huskie helicopter for which the company built over 1,000 composite blades. In 1960, Kaman Aerospace flew the world's first all-glass fiber rotor system on a HH-43 helicopter. Company-funded research in this area has continued.

In 1969, Kaman undertook a similar new rotor program with the development of the "101" rotor for the UH-2 Seasprite helicopter. In service the "101" blade has increased the UH-2's capability in speed and maneuverability. Also achieved was gross simplification of rotor system hardware for easier maintainability. The service life of the "101" rotor is 3,000 hours compared with 800 hours for the prior rotor system. At the same time, by tuning the rotor system of the "101" rotor, high speed vibrations were cut in half and rotor stall margins were increased by almost 50 knots.

Hercules, Inc., joined with Kaman in bidding for the new rotor contract. Their expertise in filament winding is second to none. Hercules has made filament-wound missile capsules for the U.S. Army and numerous filament-wound structures for the NASA space programs.

In announcing the award to Aerospace company employees, Charles H. Kaman, president of Kaman Corporation said, "We are proud that the technical skills and reputation of our Aerospace engineering team has produced a winning design and development plan; it provides our Aerospace group, with a unique opportunity."

SOLAR HEATING

By R. C. Meier, Manager
Energy Programs

The State of Connecticut has announced plans for the country's first multifamily, elderly housing project using solar heat. While many single-family homes around the country use some form of solar energy, until now, no multifamily projects are known to utilize solar heat. The new facility is planned for construction in Hamden, CT.

The National Science Foundation has provided a planning grant and the State of Connecticut has also committed money to the project. The responsibility for planning and design of the housing project rests with architects McHugh and Associates, consulting engineers Minges Associates and Kaman Aerospace Corp.

The plans include sufficient conventional heating capacity to handle the 40-unit apartment complex although only 20 of the units will use the standard system. The remaining 20 units will be heated with the new solar heat system with the conventional system available as a backup.

As planned now, the solar collectors will be the customary, flat, black-surfaced, glass-covered enclosures which will trap the sun's heat. A liquid will then be pumped through the heating enclosures to pick up the heat and route it to large, insulated storage tanks. The heated liquid will then be drawn from the storage area into the dwelling units as needed.

PRESTRESSED ROTOR SPARS

by J. Barzda, Chief
Systems Research

Kaman Aerospace Corporation has been awarded a subcontract from the ARDE Corporation of Mahwah, New Jersey, for a design study to assess the potential benefits of the ARDE prestressed rotor spar in realistic applications. The study will develop data for making valid comparisons to other rotor blade structural concepts.

The prestressed spar is a stainless steel liner overwrapped with filament-wound fibers. Cryogenic straining of the metal pretensions the fiber overwrap, and enhances the liner strength and resistance to fracture. The tensioned filaments keep the metal in compression under bending and centrifugal loads, thus suppressing crack growth. The new spar structure potentially offers improved safe-life operation, attractive stiffness/weight tradeoffs, and rotor blade spar fabrication cost benefits.

The ARDE Corporation has demonstrated the design and fabrication feasibility of the spar in previous contracts from the NASA Langley Research Center. The company's current effort is funded by the Langley Directorate of the United States Army Air Mobility Research and Development Laboratory.

The prestressed spar concept study is one of a number of research and development programs performed or being conducted by Kaman Aerospace Corporation on advanced rotor systems and blade structures.

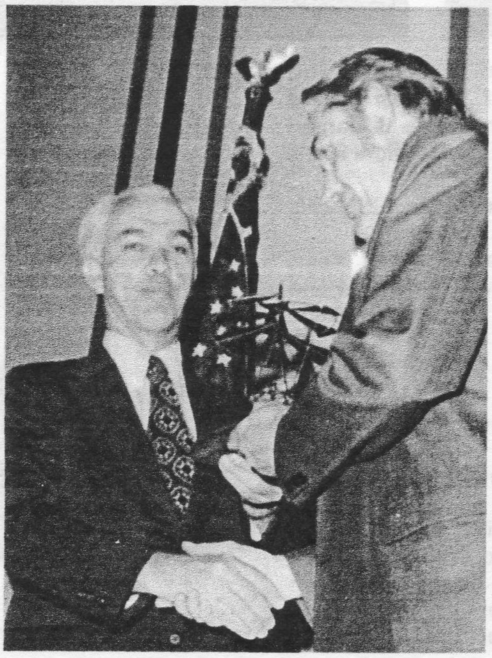
Navy Helicopter Association Honors Charles H. Kaman

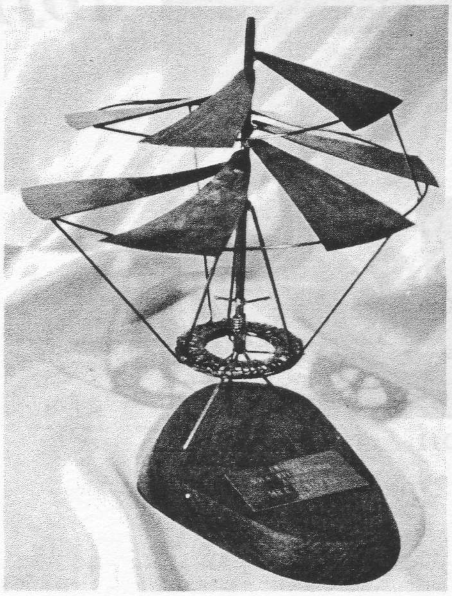
Mr. Charles H. Kaman, president of Kaman Corporation, Bloomfield, CT, was recently honored by the Navy Helicopter Association for his outstanding contributions to the helicopter industry.

Each year, the NHA (Navy Helicopter Association) sponsors a convention/reunion for its members. A highlight of the activities is the Awards Banquet where the NHA presents an award to the individual who has made major contributions to the development or use of helicopters. Past recipients include Capt Frank Erickson, USCG (Ret) who was a pioneer in the development of the helicopter as a rescue and lifesaving vehicle. The 1974 award went to Mr. Frank Piasecki, who designed and developed the first dual-rotored production helicopter, often referred to as the "Flying Banana." This year, the award was presented to Mr. Charles H. Kaman, president of Kaman Corporation and one of the major developers in helicopter aviation.

Charles H. Kaman is founder and chairman of the Kaman Corporation, a widely diversified Connecticut-based company serving five principal markets — Bearing and Supply, Music, General Aviation, Sciences, and Aerospace.

In photo below, Mr. W. S. Leitch, left, Manager, Engineering Operations, Electrodynamics Division of the Bendix Corporation, North Hollywood, CA, presents the Navy Helicopter Association's Award to Charles H. Kaman. The award is sponsored by Bendix and the NHA Awards Committee selects the recipient. It is fitting that Mr. Kaman receive this award at a convention whose theme was, "Focus on the Future." While Mr. Kaman believes "history is relevant because it can teach us what not to do," he admittedly is, "looking toward the future and new beginnings."





The Navy Helicopter Association Award . . . a model made from the original line drawing of the helical air-screw drawn by Leonardo Da Vinci in the fifteenth century.

The founding of Kaman Corporation by Mr. Kaman, at the age of twenty-five, represented another step of a brilliant career in aeronautical engineering — as a youthful record-breaking model builder, *magna cum laude* graduate of the Catholic University, Washington, D.C., and chief of aerodynamics for the Hamilton-Standard Division of United Aircraft Corporation. In the helicopter field, under Mr. Kaman's leadership, Kaman Aerospace has made notable contributions to the state-of-the-art — most especially, the first servo-controlled helicopter, the first successful inter-meshing rotor helicopter, the world's first turbine helicopter and the first twin turbine helicopter, the first remotely-controlled helicopter and the first pilotless helicopter, also the first U.S. cold cycle tip-jet helicopter.

In 1967, Mr. Kaman's own talents in music opened a new area of company interest. As a youth, he was a professional-calibre musician and turned aside from a potential career in entertainment to pursue aeronautical engineering. In the music field, his talents were essential to the development of Kaman's revolutionary, new Ovation guitar with its round Lyrachord bowl. The Ovation guitar is now an accepted standard of excellence. In less than a decade it has won endorsement from over 30 percent of leading professional performers.

One expression of Mr. Kaman's humanitarian interest has been the creation of a unique strain of German Shepherd dogs for use as guide dogs, and for use by security and law enforcement agencies. As president of Fidelco Foundation, Inc., his contributions were essential to the selective breeding program which developed a line of German Shepherds free from hip dysplacia but with the discriminating intelligence necessary to serve as family pets, guide dogs or for security work. Fidelco, in its twelve years, has maintained detailed records on German Shepherds, enabling them to assure a unique breed of dog.

Mr. Kaman's ability to inspire people to higher levels of achievement puts a heavy demand on his time. His concern for people, and capability in helping others is evidenced by the number of schools, hospitals and social service agencies whom he has served. This is all in addition to service on the boards of directors of several large industrial, insurance, and financial institutions.

ADJ1 J. T. Litzinger

ADJ1 John T. Litzinger Honored

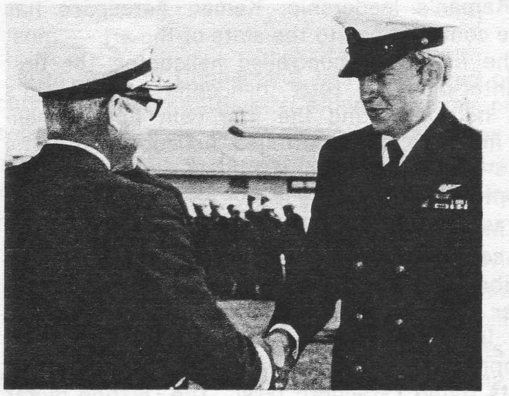
The Secretary of the Navy, the Chief of Naval Operations, and the two Fleet Commanders-in-Chief simultaneously announced the three "Sailors of the Year" for 1975. Noteworthy among the three was ADJ1 John T. Litzinger, winner of the Sailor of the Year, Atlantic Fleet Award. Litzinger is a member of Helicopter Anti-Submarine Squadron Light Thirty-Four (HSL-34), the LAMPS squadron commissioned last year. The winners will be invited to Washington, D.C., for the "official" congratulations from CNO and the SecNav. In addition, each will receive meritorious promotions to Chief.

During his fourteen years of Naval service, Petty Officer Litzinger has received several letters of commendation for his personal contribution to the Navy; among them a COMSEVENTHFLT Letter of Commendation from VAdm J. J. Hyland for participating in over 300 combat support missions as a Rescue Aircrewman.

Recently, while undergoing training at HSL-30 FRAMP he volunteered many off-duty hours to assist HSL-34 prior to its commissioning in establishing its Maintenance Technical Library.

Shown on this page are Sailors of the Year from other LAMPS squadrons, all of whom deserve recognition for outstanding personal contributions. HSL-33's winner was named runner-up for the Commander Naval Air Force, U.S. Pacifiic Fleet's Sailor of the Year.

Atlantic Fleet Sailor of the Year



In photo above left, AX1 Robert Earl Lemaster, right, receives COMASWWINGPAC's Sailor of the Year Award from RAdm J. B. Stockdale. Lemaster later was named runner-up for the Naval Air Force, U.S. Pacific Fleet's Sailor of the Year.

In photo, above center, PN1 Bernard Clay, HSL-35's Sailor of the Year.

In photo above right, HSL-30's Sailor of the Year, AMH2 Michael A. Silevinac, right, receives the Award and congratulations from his Commanding Officer, Cdr Wade J. Pharis.

In photo on right, HSL-31's Sailor of the Year, AE1 James Orville Bays.

In last photo, on left, HSL-32's winner, AW1 Benjamin D. Holder.

It would be impossible to list all the accomplishments credited to the men presented on this page. We should all be aware, however, that the "Sailor of the Year" award is a great honor and is awarded only after much deliberation on the part of each Awards Committee. Each man has demonstrated superior leadership qualities in all his actions and words . . . Congratulations.