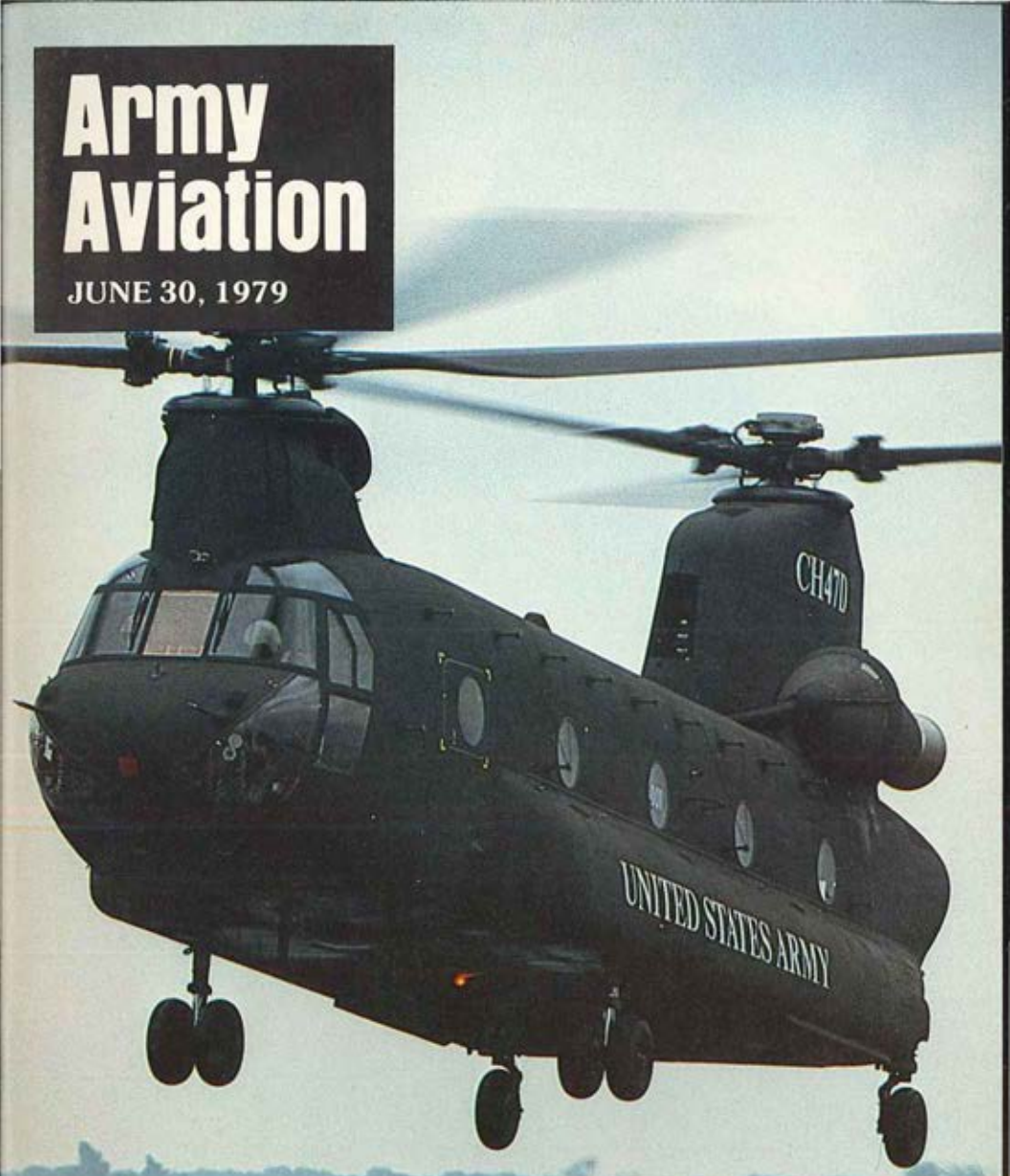
Army Aviation

JUNE 30, 1979



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ARMY AVIATION

Volume 28 — June 30, 1979 — Number 6

COVER PHOTO
The CH-47D's first flight on 11 May, four months ahead of schedule, is pictured on our June cover. The same aircraft lifted a 16,222 lb. external load in a test flight on 14 May.

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HELPMATE
David Hubble (below) of the CH-47 Mod Project Management Office, was the all-important go-between on the "Mod" section of this issue, dotting the i's and crossing the t's in the draft copy and tieing together the many photos and charts. Thanks again, David!

David Hubble

ARTICLES

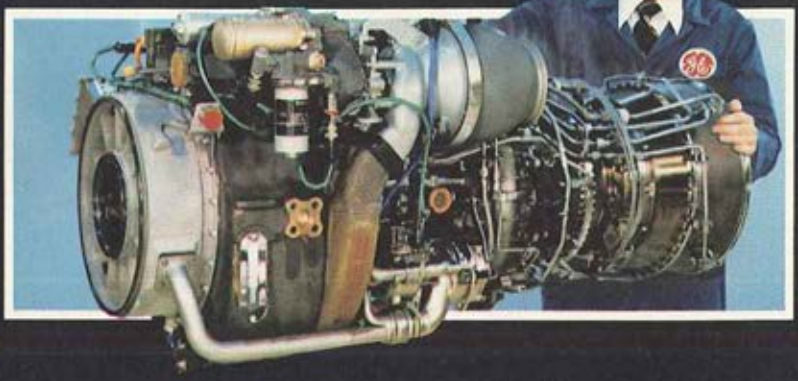
FEATURE: THE CH-47D — A REALITY!

PHOTOSTORY: '79 AAAA NAT'L CONVENTION

LIST OF ADVERTISERS

Black Hawk Power

T700-POWERED SIKORSKY UH-60A BLACK HAWK



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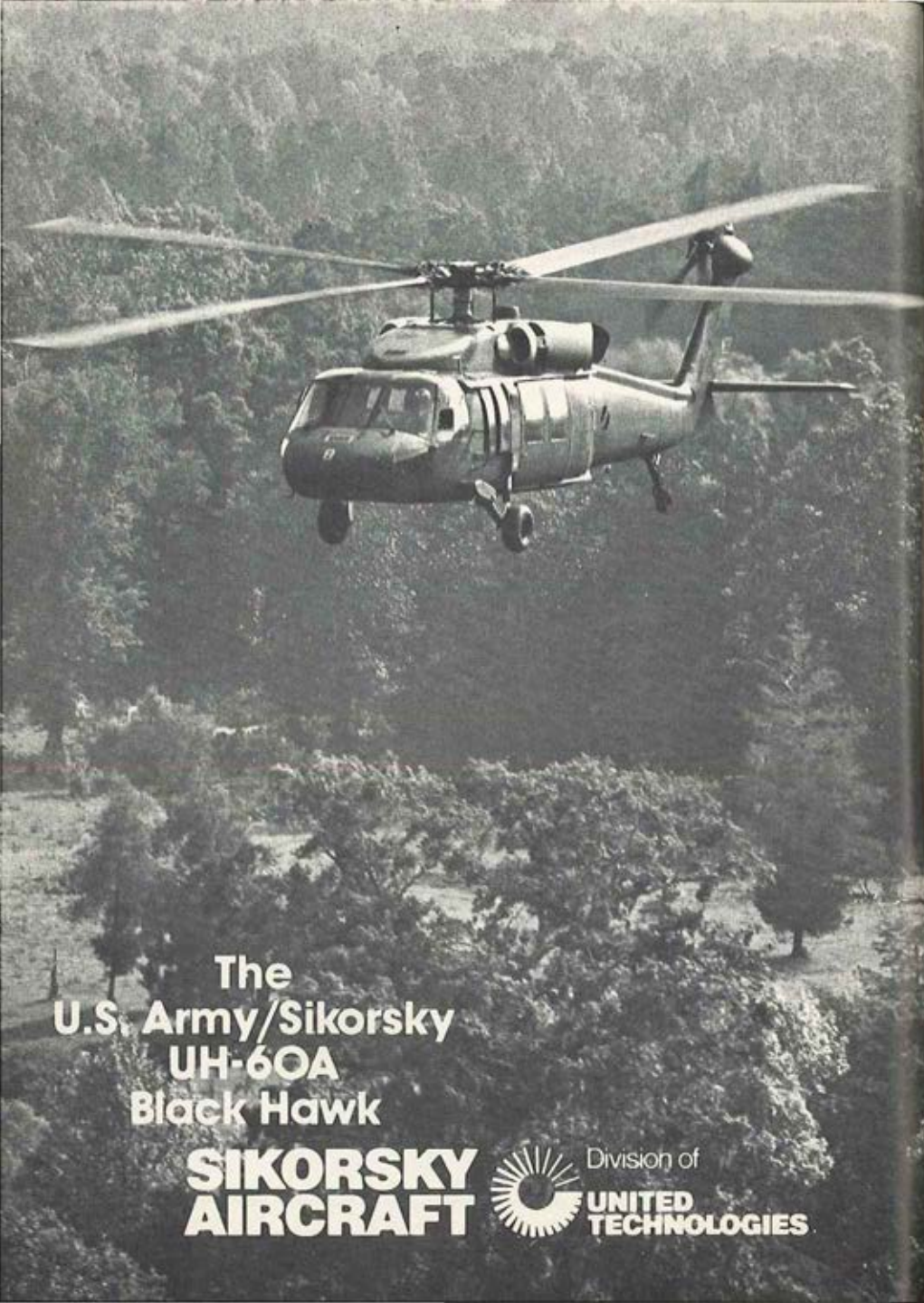

The
U.S. Army/Sikorsky
UH-60A
Black Hawk
SIKORSKY
AIRCRAFT
Division of
UNITED
TECHNOLOGIES

Omissions, Awards, Shortages, EW, and Musical Chairs!

A Potpourri by Brig. Gen. Carl H. McNair, Jr., Army Aviation Officer, ODCSOPS, DA

SCOOPED again! Between *Art Kesten's* editing of these monthly reports to insure that I stay within the prescribed column inches and my eleven year old daugher, *Courtney Ann's* avid reading of each issue, I am allowed little latitude for goofs.

But just to keep the record straight and to acknowledge *LTC Bob Koepp's* letter to the editor in the April edition, we didn't erroneously omit *BG Art Junot* from the list of active duty general officer aviators. For *Bob* and others who might not have known, *BG Art Junot,* a longtime friend and Army Aviator of many years, retired last year from his position as Deputy CG, TSARCOM in St. Louis.

He and his family now reside in Killeen, Texas, where he is still active in AAAA affairs. In fact, the Junots were at the AAAA National meeting in Atlanta in April.

Now for the flogging — the earlier GO aviator listing did fail to include *MG Jim Rockwell,* Director at the TRI TAC office, Fort Monmouth, and our apologies to *MG Rockwell,* an aviator for some 23 years. Just goes to show you that computer printouts as well as individual's memories are not infallible.

And for the good news and reports from the field: The Army National Guard turned in a "super safety" performance in May with ZERO accidents. After experiencing six accidents in May '78 and five in May '77, a concerted effort was made not to fall into the May slump again. The combined efforts of the Safety Center and the Guard units in their "May and Beyond" program paid tremendous dividends. Well done to all concerned!

Kudos to Korea - not only did the 17th Aviation Group capture the AAAA *"Aviation Unit of the Year Award,"* but another Eighth Army Unit, Company B, 2d Infantry Division Aviation Battalion, was selected recently as the first recipient of the *General Carl I. Hutton Memorial Award* in recognition of their contribution to the advancement of safety in Army Aviation during 1978.

Named after *BG Carl Hutton,* first commandant of the Army Aviation School upon its relocation to Fort Rucker in 1955, this award will be presented annually by the order of the Daedalians.

B Company, 2nd Aviation Battalion, was selected from over 30 nominations from aviation units worldwide. *Major Jay Mulcahy,* B Company Commander during much of the unit's 24,800 accident-free flying hours, accepted the trophy in Dayton, Ohio, on 16 June during the Daedalian annual convention.

Only a few weeks earlier, *Captain Alan L. Zall,* formerly also of B Company, 2d Aviation Battalion, received the *American Legion Valor Award* during an Awards Banquet at Fort Hamilton, New York. *Captain Zall* was honored for his heroic efforts in rescuing 56 Korean civilians trapped in a flood under extremely adverse night weather conditions. Due recognition indeed for such a valorous act.

In the aviation awards area, one might ask how they are managed at DA. A description and criteria for the 13 national and international aviation awards (exclusive of AAAA awards which are handled by the AAAA National Awards Committee) are outlined in AR 672-2. Requests for appropriate nominations go out by DA message from ODCSOPS throughout the year.

In turn, nominations are reviewed by a 12 member ODCSOPS National and International

Aviation Awards Board with representatives from ODCSPER, ODCSLOG, ODCSRDA, and ODCSOPS. Award winners are then announced by DA message. So the next time your units receive a request for such nominations, you may be assured, "Yes, Virginia, there are many distinguished awards for our aviation units" - as attested to by the 2d ID Aviation Battalion this month.

A tremendous operation

Meanwhile back in CONUS, I had occasion to visit the Corpus Christi Army Depot recently and observe the overhaul activities in progress. With three tours in Texas behind me, this was my first opportunity to see CCAD first hand and believe me, just as cited in the *"Special Award"* from AAAA this year for their unique contributions to Army Aviation, CCAD is a tremendous operation.

Colonel Chuck Drenz and his team are to be commended for the outstanding job they are doing in support of aviation everywhere. Not simply in their day-to-day overhaul activity but in their quick reaction to safety of flight and other immediate aviation maintainance requirements -the most recent being the combining transmission inspections for the CH-47 and the T-53 engine fuel control bellows.

Evidence of the enthusiasm and spirit of CCAD personnel was the almost 200 members who attended their quarterly AAAA luncheon during my visit. It was especially fitting that their *"Special AAAA Award"* was on display for the first time at the luncheon for all the membership to share. Remember that wherever or whatever you fly, there's a part of CCAD in your system.

In this day of increasingly sophisticated electronic warfare systems and countermeasures, the need to develop tactics and techniques for use in overcoming such systems is becoming more critical. As a consequence, the Army and Air Force are conducting joint tests of ground and air systems in an EW environment.

Titled EW/CAS, the first four of the series of tests have been conducted at Elgin AFB with both FORSCOM and TRADOC troops participating. Not only are the tests providing us data on the impact of EW but are assisting us in developing techniques to operate under adverse conditions. During a visit to the test site last week, I was duly impressed with the ingenuity, innovativeness and dogged determination of our players. Aviation support was being provided by the 121st Assault Helicopter Company out at Fort Benning. As a former "Soc Trang Tiger" myself, I was most pleased to see the unit in action — totally professional as ever.

On the DA scene

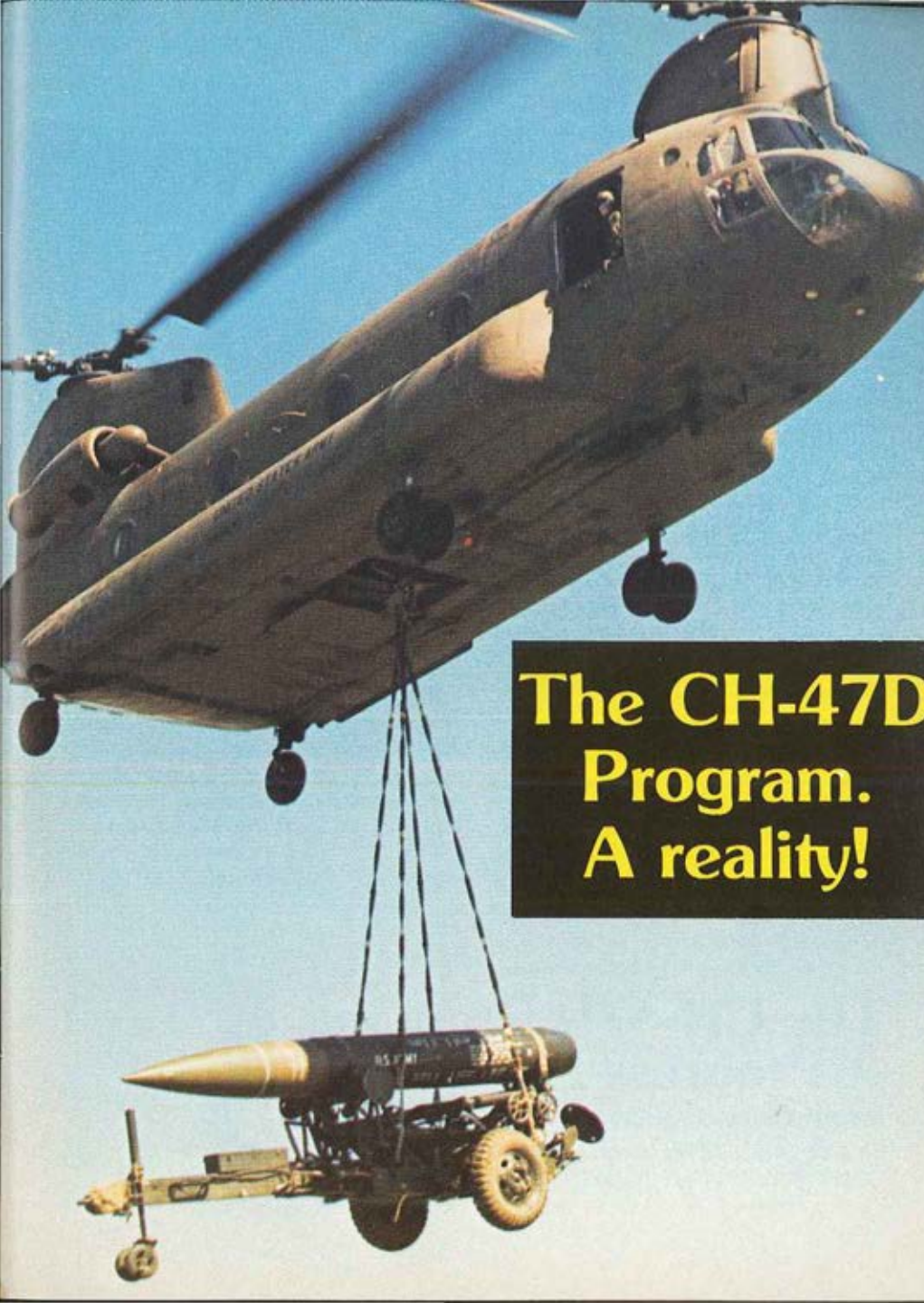
DA happenings in aviation continue unabated. Not only is the long awaited TASVAL test finally underway at CDEC, Fort Ord; but many analyses on key aviation programs are gearing up for later this year, the CH-47 COEA update, HELLFIRE Fire and Forget seeker COEA, AAH COEA update, Division 86 and its spillover to our Heavy Lift Helicopter needs and finally ARCSA IV due in 1980. The Division 86 package contains an alternative for an Air Cavalry attack Brigade in each Army division, a worthwhile objective if we can achieve it.

Our aviator shortage situation continues to concern us all. The Aviation School has now, however, received a significant increase in IP strength and is geared up for increased output. We have turned the corner on increased input, but there will be a time before the field will see the results from the training pipeline. In the meantime, we will continue to manage judiciously our available resources.

During this critical period, each aviator will have to do a little more to take up the slack. This is not new for aviators who have more than met the challenge of personnel shortages before. On the plus side, shortages should mean more flying and more training for each of us.

Finally, a late bulletin on an impending change of faces in some of our key aviation positions later in the summer. BG (P) Jim Patterson, Assistant Commandant of the Aviation Center, will be moving to DARCOM in July as Director of Battlefield Systems Integration. I have been named to replace *General Patterson* and *Colonel (P) Dick Kenyon*, PM *Black Hawk*, will become the Aviation Officer, ODCSOPS in August.

In my new assignment, I welcome the opportunity for continued service to the Army and to aviation through the important work on going at the Aviation Center. Having commanded the Aviation Brigade there four year ago, it is a real pleasure to return to the Home of Army Aviation and the "Wiregrass Area" of Alabama. In the July issue, I will render to you my final sitrep as Aviation Officer.


The CH-47D
Program.
A reality!

The CH-47D Program: A Progress Report

BY COLONEL JAMES H. HESSON,
CH-47 Modernization Project Manager, USA DARCOM

Fiberglass Blades

A year ago, we provided you broad coverage on the **CH-47 Modernization Program.** It has been a year of solid technical progress, which has resulted in flight of the first prototype.

Last year, we described the program, our approach, the systems, the new technology, testing, and how the aircraft looked from a pilot's and mechanic's viewpoint. The pieces are now together and the CH-47D is reality.

We have successfully demonstrated the predicted performance of the **fiberglass rotor blade (FRB)** on the CH-47C. That testing with the new T55-L-712 engine involved flying out to speeds of 180 knots, at gross weights as high as 50,000 pounds and to altitudes in excess of 15,000 feet. The lift/speed performance results were so satisfactory that the decision to retrofit the fiberglass rotor blades on CH-47C aircraft was validated.

Fiberglass blades for the C

Currently, we are in the final stages of contract negotiations to initiate the CH-47C fiberglass rotor blade program. Retrofit of fiberglass blades on the CH-47C fleet is planned to begin in late 1981. While shaking, twisting, and heating and freezing of the rotor blade test specimens was going on we sent a fiberglass blade to St. Paul, MN for lightning tests. The blade was hit by electricity that exceeded 200,000 amps. The damage to the blade was minimal and if it had happened in-flight it would not have resulted in a mission abort.

Extensive icing tests

In January the fiberglass rotor blades were installed on a CH-47C and flown in simulated and actual icing at St. Paul, MN. In this issue is an article describing that test conducted by the **Army Engineering Development Test Activity (ADTA)** and supported by Boeing Vertol. They were a real team of professionals that accomplished the most extensive icing tests on a CH-47 to date.

Based on other developmental programs we felt that if we were going to have developmental problems they would most likely happen in the transmission area. We did have one significant test cell failure that showed we needed to modify the design of the inner portion of a gear. After design modification the entire transmission completed full qualification testing.

In December 1978, all transmissions had met the 50-hour pre-flight qualification, and in March endurance runs were completed on forward and aft transmissions (150 hours) and engine/combiner transmissions (200 hours).

In April, the 100-hour overload test was completed on the forward transmission, comprising 25 hours at 110% of rated power, 25 hours at 120% with the last 50 hours at 130% of rated power. This is equivalent to twin engine power input of 9,750 horsepower.

The subsequent scheduled teardown and inspection revealed no significant discrepancies. At the present time, the aft and the engine/combiner transmissions are going into the test cell to start overload testing. Following this we will be running tests on auxiliary lubrication systems after which we will be running the transmissions with both main and auxiliary lube systems out to simulate total loss of lubrication.

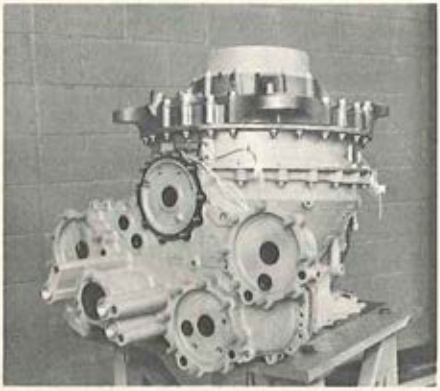


PHOTO ABOVE: The "Iron Bird" laboratory mockup that checks out the essential flight control hardware. BELOW: The CH-47D aft transmission that completed qualification testing.

A new APU system

The T62T-2B, our new APU system, marries a well proven APU mounted gearbox to the RAM upgraded T62T-2AI APU. This marriage allows the APU system to provide electrical and hydraulic power without physical connection to the aft transmission. Again, the past year saw that APU, attached transmission, and the new electronic sequence unit shaken, frozen, and heated to provide severe environments for qualification. The APU qualification testing is now complete.

All of the essential flight control hardware was integrated into and flown in an **"Iron Bird"** laboratory mock-up before being installed in the aircraft. This system check-out process permitted integration and "tuning" of Advanced Flight Control System electronics and identified areas which required correction. The integration and "tuning" of the flight control

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The direct oil spray-cooled generator employs the latest design and manufacturing techniques to ensure the best possible power to weight ratio. Brushless direct oil spray cooling means effective operation at unrestricted altitudes and locations, from the North Pole to the Sahara reliability is the same. Lucas reliability.

The electronic generating control unit contains all the elements necessary for the full control and protection of the system.

Just some of the reasons Boeing Vertol chose Lucas for the YCH-47D Chinook.

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A Reality!

(Cont. from Page 11)

system further reduced risk toward meeting first flight.

Most of the qualification testing on the various hydraulic and electrical components were accomplished during the past year. All of the tubing and wiring was integrated into the airframes and full system runs under hydraulic/electrical power.

70+ Crewchief inputs

Accessibility and ease of maintenance has been enhanced and the probability of hydraulic leakage significantly reduced. The maintenance panel installed in the cabin area for hydraulics system condition monitoring will be a real "plus" for the crew pre-post and in-flight checks. All of the cargo hooks have undergone bench qualification and have been installed on the aircraft, all that remains is flight demonstration.

In our last article we reported how enlisted mechanics had been to the Boeing Vertol plant to review the maintainability/accessibility of the then ongoing design. Their comments resulted in over 70 recommendations with over 40 partial or complete changes. We subsequently sent **Boeing Vertol** design and product assurance engineers to the field. This was followed by an in-house Boeing review to pick up any last minute changes to insure we assembled the aircraft with the crew member who has to maintain it in mind. The result will be an airplane easier to maintain under field conditions.

The original program for CH-47 modernization excluded remanufacturing of early model CH-47A aircraft. This decision was based on the belief that the number of man-hours to remanufacture an early CH-47A was so high that it was better to buy a new CH-47D airframe.

During the past year we have reviewed that decision in light of the actual experience accumulated during our remanufacturing of the three prototype CH-47's. Engineering analysis has now shown that in most cases it is less expensive to remanufacture the early A's than it is to buy new airframes. This cost avoidance has made the **CH-47 Modernization Program** even more cost effective and confirms the soundness of remanufacturing versus new-buy of aircraft.

Not all of the activities associated with the modernizing program get the kind of publicity and attention they deserve. A group of dedicated and absolutely essential people are working at Fort Rucker collecting information to establish a data baseline. I am referring to the RAM/LOG Data Collection Team at the **Aircraft Development Test Activity (ADTA),** Fort Rucker, AL.

This team of 46 enlisted men and two officers has been quietly, and without fanfare, collecting baseline reliability data on CH-47C aircraft. To date they have accumulated over 1,500 hours with a target

A Reality! (Cont. from Page 13)

of 2,500 hours on the CH-47C. They will shift to the CH-47D beginning in 1980 and this will be the major source of our reliability data feeding the production decision.

There are other jobs which can be more fun or perhaps more interesting, but at this time there is no job more important than that of the **"Mod Squad"** data collectors at Fort Rucker.

Ahead of schedule

On the April (National Convention) issue cover of the **Army Aviation Association of American (AAAA)** magazine we had a picture of our roll-out ceremony which took place four months ahead of our contract schedule. The roll-out ceremony was highlighted by the attendance of **Dr. Percy Pierre,** Assistant Secretary of the Army for Research, Development and Acquisition. His remarks pointed out the cost effectiveness of the Modernization Program and highlighted the efficiency of program progress to date.

The aircraft featured at the roll-out was originally CH-47A, No. 65-8008. Prior to modernization, this aircraft had compiled over 3,500 flight hours including two overseas tours in Vietnam and another in Korea. This aircraft is now a 1976 model-year of the contract signature - and has begun a new 20-year life.

On May 7, 1979 the new T55-L-712 engines were fired up for the first time on a CH-47D. Ground runs were accomplished to insure all test instrumentation and aircraft systems functioned properly. On May 11, power was added and the CH-47D was brought to a hover.

BV Flight Test Facility

After completion of additional hover tests and forward flight, the operational envelope was sufficiently expanded to allow the aircraft to fly from the **Boeing Vertol** plant to Wilmington, Delaware. There, at the new **Boeing Vertol** Flight Test Facility, the YCH-47D was introduced to Army and other dignitaries, and the press on 4 June, just 36 months from contract go-ahead.

One of the prototype aircraft will be transferred from contractor to government testing in November 1979 with a second joining the **Developmental Testing (DT)** at the **Test and Evaluation Command (TECOM)** Aircraft Development Test Activity, Fort Rucker, AL in January 1980.

Following developmental testing, the aircraft will be delivered to the 159th Aviation Battalion (ASH), 101st Airborne Division (Air Assault), for operational testing under field conditions. This testing, scheduled to last from March 31 to May 9, 1980, will provide the remaining test information required to support a production decision.

It has been a full year, but one of which we who are associated with the **CH-47 Modernization Program** can be justly proud. ◄

The MLH requirement remains valid!

BY COLONEL Charles J. Oram
Director of Combat Devel, USA Transportation School

THE acceptance of the helicopter as a necessary vehicle for the transportation of Army personnel and material was established when it was recognized that future ground combat operations would be characterized by frequent maneuvering of Army forces over extended distances, and that such forces would generally be widely dispersed while employed in varied climatic and geographical conditions.

Such combat operations demand that a high degree of mobility be built into Army transportation in order that both tactical and logistical missions are successfully accomplished.

A significant factor that has emerged from military studies, test, and actual field experience is that there is a direct relationship between the degree of mobility that an operating combat force can achieve and the degree of logistical responsiveness that is provided on a sustained basis by a supporting force.

Therefore, as the ground combat forces attain greater mobility it is necessary that the supporting forces have access to a transportation system that can provide compatible mobility in order to insure that logistical support is provided on a timely and responsive basis.

Left: CH-47 with MILVAN container. Right photo: A Chinook carrying three fuel bladders.

The modernized **CH-47D Medium Helicopter** will provide the means of transportation that is ideally suited to accomplishing the tactical and logistical mobility requirements of an Army in the field.

Today's Army and the Army of the 80's and 90's is continuing to move toward total mobility. This requires a transportation system which can respond with the needed mobility to meet rapid changes that will take place on the modern battlefield.

Surface modes will provide the majority of this system, but it is the helicopter that will be utilized in those situations where time, terrain, and congested or inadequate networks preclude

Valid CH-47D
(Cont. from Page 15)

the surface modes from successfully accomplishing the mission. The modernized CH-47 will be the commander's edge for those critical situations dictating rapid resupply of critical fuels, munitions, and repair parts or displacement of troops and weapon/systems. Over the long haul, the CH-47 will relieve the pressure which will be placed on our already taxed surface transportation systems.

And relieve the pressure it will! The CH-47's in Europe will more than double by the mid-1980's. This increase in capability, coupled with the improvements in reliability and maintainability, safety, and vulnerability in the modernized CH-47, will make it the most efficient, time sensitive, combat support/combat service support asset available within the Army's transportation system.

The key to fighting and winning any future battle will hinge to a great degree on the mobility of our forces and equipment, the ability to mass these forces where we need them, at the time they are required, and continue that support as the situation dictates.

The modernized CH-47D can do this

and more. This is due to the advances in technology incorporated in the CH-47D. With improved engines, modularized hydraulics, redundant electrical wiring, uprated transmissions, and fiberglass rotor blades, the CH-47D will answer the commander's call with more of what is needed in the places that it's required.

The new modernized CH-47D will be capable of carrying loads up to 23,000 pounds on short radius missions, equivalent to delivering 22 pallets of 155mm projectiles (166 rds) plus fuzes and charges to a firing battery, and up to 15,000 pounds over extended distances. With the new advanced flight control system and triple hook, the CH-47D will be able to deliver in almost any weather or battlefield condition.

A new 20-year life!

In this age of having to do more with less, the new CH-47D answers this challenge, too. We're taking advantage of aging aircraft, giving them a new 20-year life and realizing greater productivity from each aircraft at reduced cost to ourselves. And with the improvements in vulnerability, due largely to a fiberglass blades capable of withstanding a 23mm hit and transmissions which can operate 30 minutes dry, the CH-47D will be capable of delivering loads further forward where they will be needed most.

Regardless of how sophisticated our ground transportation system becomes, the Army of tomorrow is tied to mobility for success, and in the heat of the battle that mobility will depend on a responsive transportation system.

The new modernized CH-47D will provide the logistical responsiveness needed within our transportation system to allow us to fight outnumbered and win.

A CH-47C undergoes preliminary icing tests

BY MAJOR SHERWOOD G. SPRING
Test Pilot, USA Aviation Engineering Flight Activity

The CH-47C Test Aircraft

THE United States Army **Aviation Engineering Flight Activity (AEFA)** recently completed icing tests on a CH-47C with fiberglass rotor blades equipped with a prototype blade de-ice system. The rotor blades were tested under natural and artificial icing conditions at St. Paul, MN, from January 24 to March 2, 1979.

Thirty flight hours were required of which 18 were in an actual icing environment. Testing was conducted in two phases: **Protected,** where the blade de-ice system was allowed to operate automatically; and **Unprotected,** where the blade de-ice system was operational, but retained in a standby condition.

A combined test effort

Testing was a combined effort. AEFA provided the project officer, engineer, and test pilot for the test, plus chase and support crews. The contractor, Boeing Vertol, provided technical and engineering support, as well as a co-pilot/test pilot. The contractor also designed, installed, and maintained the de-ice system, and maintained the test aircraft and the special instrumentation required for testing. Chase aircraft and hangar facilities were provided by the Minnesota National Guard and Reserve units in St. Paul.

De-Ice System

The blade de-ice system was a prototype, and was completely non-representative of any production system. The system consisted of: fiberglass rotor blades with integral electrical de-ice blankets, cabin mounted, government issue, 45 KW gas turbine generator set (power supply); system control and power distribution elements; forward and aft pylon mounted ice detectors; cockpit displays and controls.

Automatic or manual functioning could be selected, and the system removed ice by sending an electrical pulse through the individual blade heater

Icing Tests
(Cont. from Page 17)

elements. Heat or pulse time was a function of outside air temperature. If the system were to go into production, larger aircraft generators would be employed in lieu of the gas turbine generator set.

HISS

The artificial icing environment required for the initial phases of testing and to fill in hard-to-obtain natural conditions was provided by the **Helicopter Icing Spray System (HISS).** The HISS is a CH-47C which has been extensively modified by AEFA for its icing mission. It carries a spray boom assembly and an 1,800 gallon internal water tank. A total of 172 nozzle locations are provided along the boom assembly and engine bleed air is used to atomize the water forming an ice cloud when flown at the proper temperature.

The liquid water content (primary factor in icing severity) of the spray cloud is controlled by varying the water flow rate and the distance of the test aircraft behind the HISS. A radar altimeter is mounted in the rear cargo door opening of the HISS and provides distance measurement between the HISS and test aircraft. A hydraulic ram assembly allows the boom to be raised for landing and ground operations.

Testing

The initial heated blade phase of testing was accomplished in six flights in artificial icing conditions behind the HISS. Some de-ice system adjustment was required to obtain the proper blade heat pulse time, but following adjustments, the system worked well and provided excellent blade de-ice protection. The successful first phase of testing showed that the de-ice system concept was feasible and could be employed on the D-model CH-47 if required. A satisfactory blade de-ice system also opened the door for the second phase of testing: the unprotected rotor blade phase in artificial and natural icing conditions.

The unprotected rotor blades were evaluated in 12 flights at temperatures ranging from -4 degrees C to -15 degrees C in light to moderate icing conditions. Time in the icing environment varied from a minimum of 29 minutes (limited by the amount of water the HISS could carry) to a maximum of two hours and 25 minutes (limited by the fuel endurance of the test aircraft). Up to 4½ inches of ice was accumulated on various parts of the aircraft, but the blades themselves collected much less ice and

TEST TEAM (Partial). L. to R., John Niemann, ProjO; Martin Towner, Contractor Engr; Bruno Forsell, Contractor Data Engr; Ron Mecklin, Contractor Test Pilot; Major Woody Spring, AEFA Test Pilot.

HIGH PERFORMANCE COOLING

Sundstrand provides all the high performance cooling fans for the YCH-47D Helicopter; three shaft-driven fans used in transmission cooling and three electric motor-driven fans used for hydraulic system cooling. These fans are designed for high performance and high efficiency in a smaller, lighter package. More importantly, reliability and maintainability have been improved by design.

Sundstrand's proficiency in designing high performance fans has been refined by the acquisition of Task Corporation. With expertise in Army programs ranging from vehicles to aircraft, Sundstrand has the know-how to meet your requirements and assure program success.

SUNDSTRAND

Committed to aerospace growth.

Technology
(Cont. from Page 29)

recorded on magnetic tape, and high speed air-to-air photography were used to evaluate the icing characteristics. Throughout testing, no torque increases were observed (which would indicate rotor blade or heavy fuselage ice), and with one exception vibration levels did not change as ice was being accumulated.

The exception occurred in moderate natural icing conditions at -8 degrees C and 12,000 feet pressure altitude. A moderate one per revolution lateral oscillation, indicating an asymmetric rotor blade ice shed, was observed; however, this condition only lasted for approximately 45 seconds at which time it succeeded in clearing itself.

Two problem areas

During testing, two significant problem areas were encountered. The problem areas are common to all CH-47 aircraft and not related to the fiberglass rotor blades: the droop stops accrete (collect) ice readily and did not engage on shut down following flights in natural ice; and the fuel cell air vents accrete ice readily and become blocked following flights in natural ice. The CH-47 Modernization Project Manager's Office is initiating action to eliminate those two problems.

Test Conclusions

Within the scope of this test, a number of conclusions were reached. The prototype blade de-ice system worked well proving the concept to be feasible and suitable for incorporation on the CH-47D. The unprotected fiberglass rotor blades showed low ice accretion characteristics and minimal evidence of asymmetric blade ice shedding.

Further testing will be required to fully define an unprotected rotor blade icing flight envelope; however, following correction of the droop stop and fuel vent icing problems, a limited envelope for flight in icing conditions has already been tentatively approved.

Suggested flight envelope

The suggested envelope is an engine start gross weight of 40,000 pounds (the maximum weight possible during these icing tests), temperatures down to -10 degrees C, and light icing conditions evidenced by less than ¼ inch of ice accumulation in 15 minutes on the cockpit **outside air temperature (OAT)** probe. These limits are based on clean rotor blades which appear to have less problems in icing conditions than dirty ones; therefore, whenever possible, rotor blades should be washed or at least wiped clean prior to flight into unknown icing conditions.

An unprecedented success

The test results were very encouraging and represent an almost unprecedented success for icing trials. These test results will provide excellent background and confidence for the CH-47D icing tests which are in the planning phase now. As a result of this test, the project manager has decided not to install de-ice blankets on the fiberglass rotor blades scheduled for the CH-47C fleet, the last aircraft to be converted to D-models.

The decision to incorporate de-ice blankets on the CH-47D fleet can be delayed until more information is gained from further testing. ◄

Smooth flying for the new Chinook.

On the 11th of May, the U.S. Army's first CH-47D Chinook accomplished its maiden flight without a hitch. On this and subsequent flights, it met or exceeded every test objective.

This means that the Army is about to acquire a significantly improved medium-lift helicopter while saving millions of defense dollars. With capabilities well beyond that of any of its predecessors, the 47-D utilizes the existing, performance-proven Chinook airframe, remanufactured into a new aircraft which will cost less to acquire, operate, and maintain.

First flight is the eighth consecutive development milestone met ahead of time and below budget. It is another demonstration of Boeing's ability to deliver as promised. And of the Army's foresight in planning for this advanced combat support aircraft. The CH-47D will fly into the next century.

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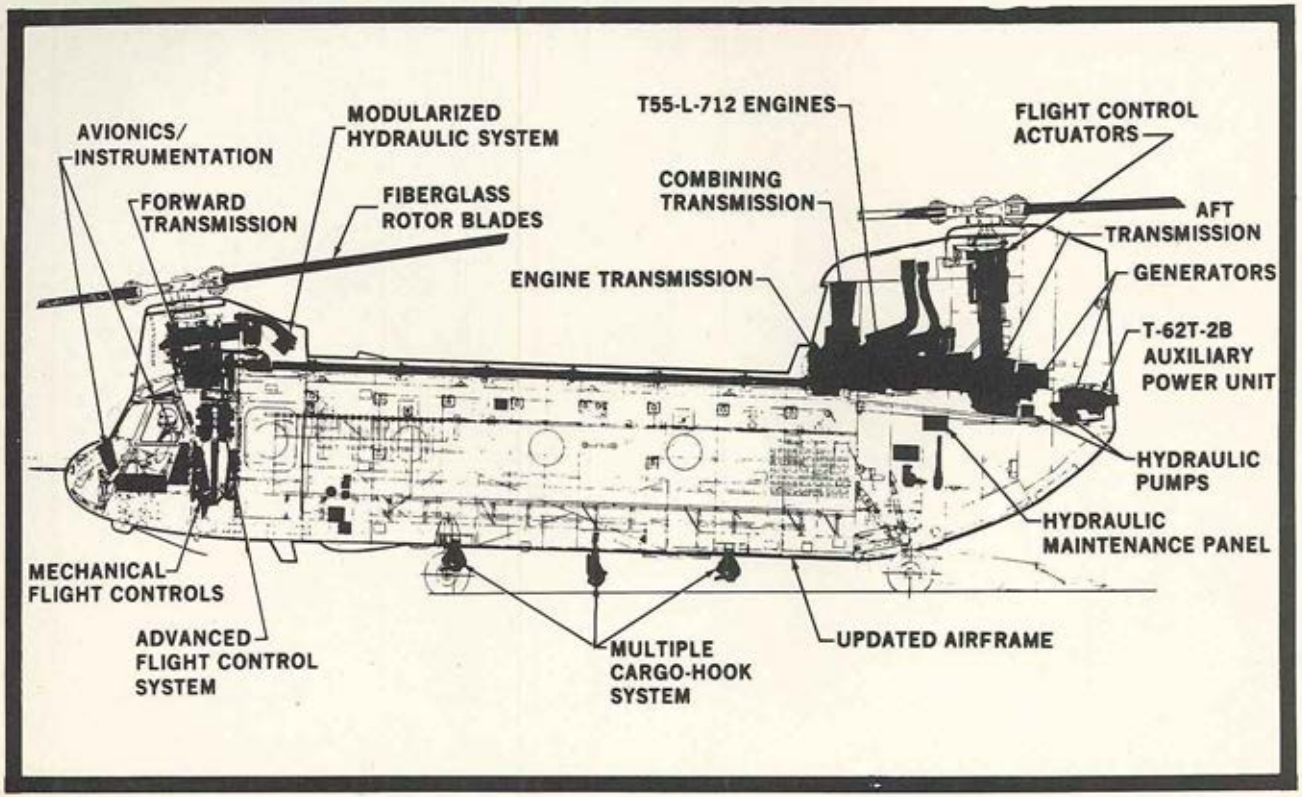
YCH-47D INBOARD PROFILE



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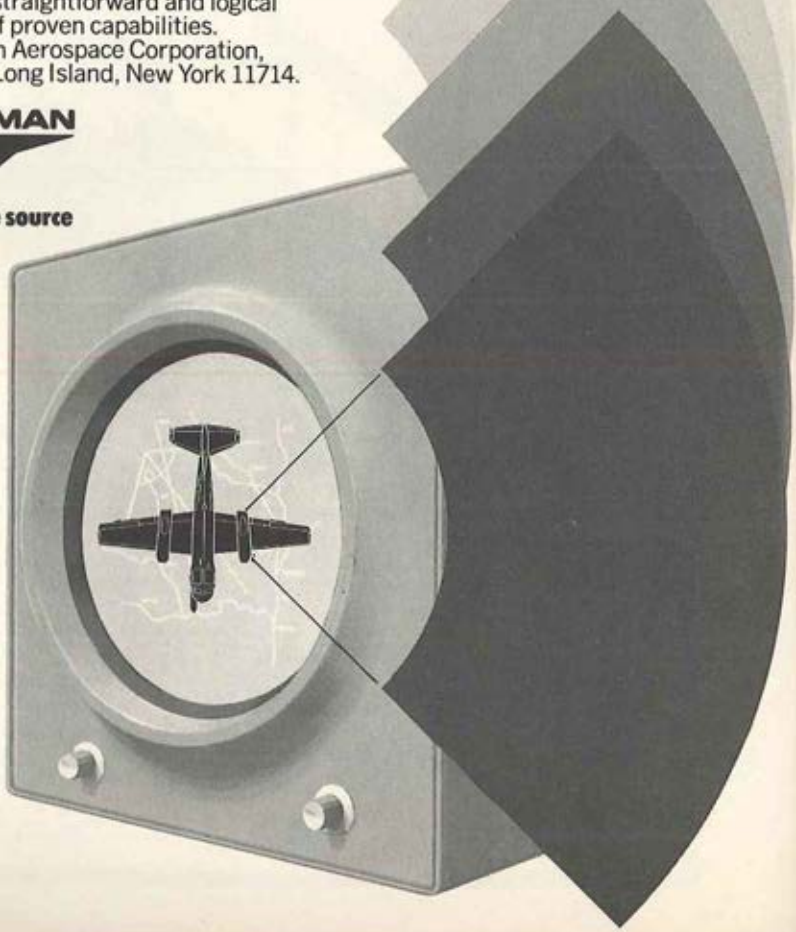


The "D's" Ten Important Points

BY COLONEL RICHARD L. STOESSNER
Assistant Commandant, USA Transportation School

DURING the recent Army budget approval process it became obvious that a number of senior decision makers and staff officers looked at the CH-47A, B, C, and D models as one aircraft.

A point paper was prepared highlighting significant facts which displayed a good comparison of the differences between the various models and why we are modernizing the fleet to the CH-47D configuration.

■1. The remanufactured CH-47D represents an entirely new aircraft, incorporates new technology, and will provide the Army an enhanced medium lift capability into the year 2000.

When the D model is remanufactured it begins a new 20 year life. While the basic airframe may be 20 years of age or older, when it is remanufactured the technology is incorporated in all the major components and systems throughout the aircraft use state-of-the-art aerospace and electronic industry products.

■2. Less than ⅓ of today's CH-47 fleet meet the Army's **Required Operational Capability (ROC)** lift requirements.

The Army's **ROC** for the Army's **Medium Lift Helicopter (MLH)** (CH-47 helicopter) is to lift 15,000 lbs, climb at 200 ft/min, fly a 30 nautical mile radius mission and return with 30 min fuel reserve at the Army hot day 4,000 pressure altitude, 95 degrees F.

None of the A and B models will meet this requirement and when you add in the CH-47C aircraft equipped with T55-L-7C engines only ⅓ of today's fleet will meet this requirement.

■3. For a typical mission on an average European day the CH-47D can lift over 23,000 lbs, approximately 6,000 lbs more than a CH-47C, 8,500 lbs more than a CH-47B and almost twice as much (12,000 lbs) as a CH-47A.

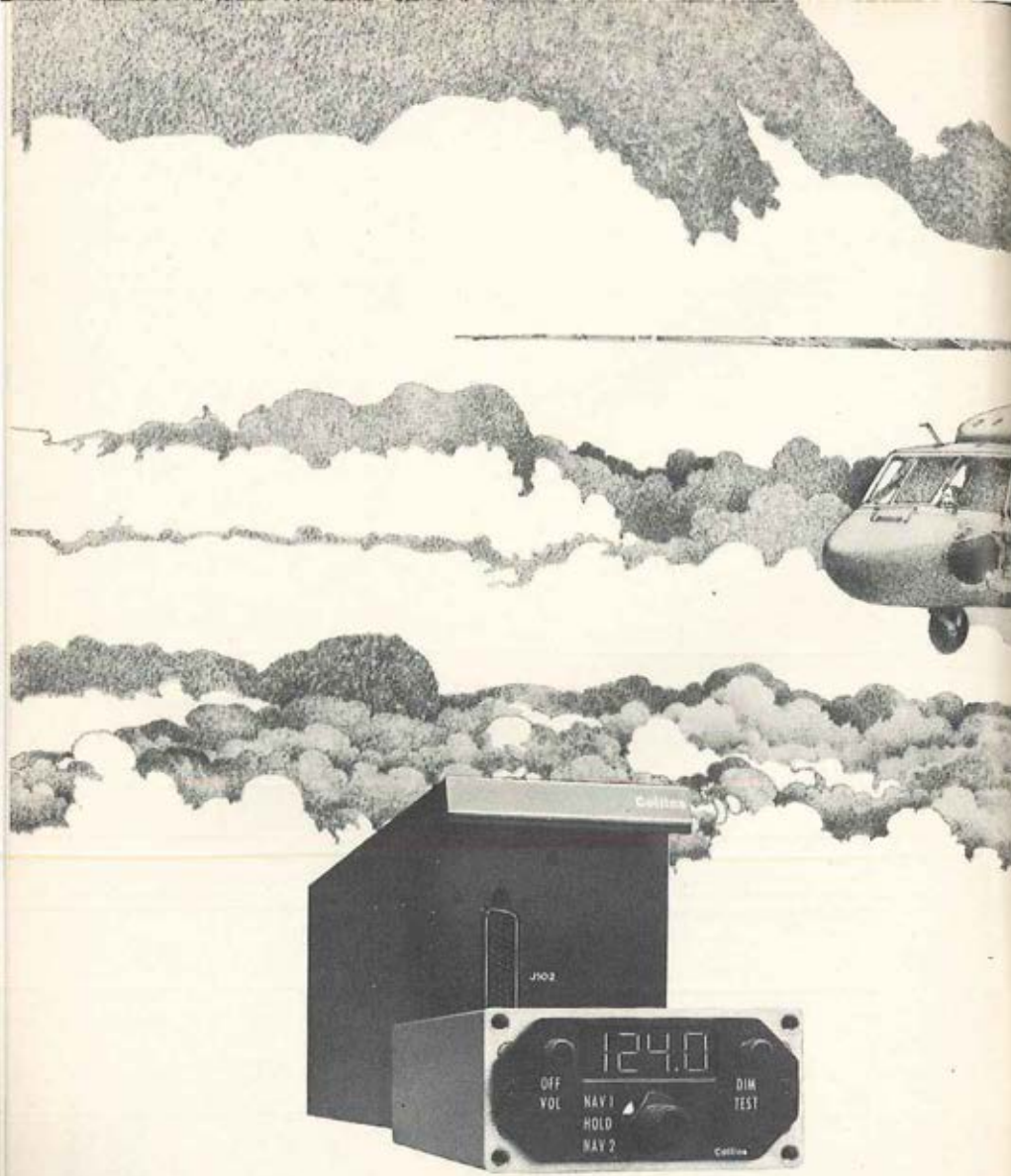
Significant Improvements

While various mission profiles can be developed, looking at a typical mission of a European day the improved fiberglass rotor blade thrust, transmission horsepower rotor blade thrust, transmission horsepower ratings, and available engine power all combined to provide significant improvements in lift over the CH-47A, B and C.

■4. The CH-47C, today's first-line medium lift helicopter, lacks in staying power (reliability, maintainability and survivability) and productivity when compared to the CH-47D.

The ability of a weapon system to remain with the forces it supports for pro-

(TEN POINTS/Cont. on Page 30)



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MART BUILDING, ST. LOUIS, MO.

Ten Points!
(Cont. from Page 25)

longed periods of time in combat has been defined as "staying power." The significant improvements of the CH-47D in reliability, maintainability, and survivability and productivity are significantly higher than that of the C even though the CH-47C is our present first-line medium lift helicopter.

■5. 20-year life cycle cost estimates show that doing nothing (no modernization - but maintaining the inventory) is more costly than modernization of the entire fleet.

The **Cost and Operational Effectiveness Analysis (COEA),** updated in 1976, and reviewed again in 1979 in preparation of the last budget submission for the 1981-1985 time frame, clearly points out that in terms of total defense budget dollars the most costly alternative for CH-47 fleet is to do nothing (maintain the fleet and buy CH-47C aircraft as replacements for attrition and to fill shortages).

In spite of the apparent high cost to modernize the Cs in addition to the CH-47As and Bs, modernizing the entire fleet remains the most cost effective alternative.

■6. CH-47A and B model aircraft are non self-deployable to Europe.

The B's and C's are not deployable.

In this era of high demands for Air Force cargo aircraft and ships to support a war-time contingency for Europe, alternatives to movement of CH-47s have been looked at.

A major test of deployability of the CH-47C (and ultimately the CH-47D) is to be undertaken late this summer. The CH-47A, B and those CH-47C aircraft equipped with T55-L-7C engines are not capable of hauling sufficient fuel to deploy themselves to Europe.

■7. CH-47 airframe depot programs have been severely curtailed in anticipation of fleet modernization. Delay in initiation of modernization or a slow build-up to rate production will require extending or resurrecting an airframe depot overhaul program.

In anticipation of the modernization program some very prudent decisions were rendered on cutbacks in the long term of airframe and component overhaul. These cost avoidance decisions were hinged upon the fact that in FY 81 aircraft would begin to be inducted into the modernization program and would, in the process of modernization (remanufacturing), have any depot level deficiencies and be returned to like new condition.

If delays in starting the modernization program or a slow down in build-up in an economical rate occurs we may be forced

Ten Points!
(Cont. from Page 30)

to rethink our planned reduction in the depot program.

■8. New items of Army equipment, such as the M198 Howitzer, and selected engineer equipment, designed to a target weight of 15,000 lbs, exceed the lift capability of both the CH-47A and CH-47B.

We size the CH-47 **ROC** airplane to operate under a severe condition 4,000 ft/95 degrees F and by assuring that we can reach a specified 15,000 lbs weight in most areas of the world where the Army may be required to operate accordingly. Selected items of Army equipment, designed to weight constraints of 15,000 lbs insure they may be transported by a CH-47 helicopter. Neither A nor B fit this requirement.

■9. The CH-47D, incorporating new technology, is the Army's primary intra-theater cargo aircraft for priority air movement.

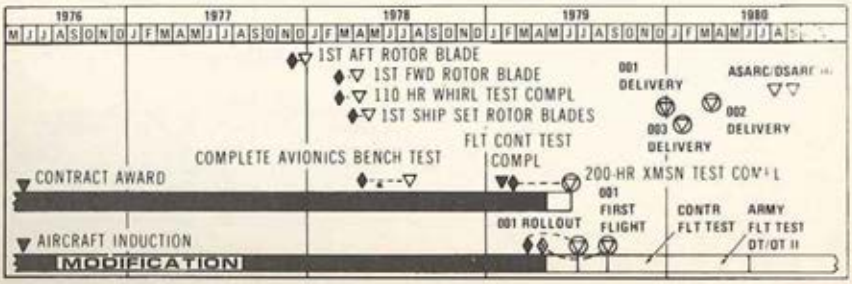
With the extended range capability, large internal capacity, multi-hook load suspension system the CH-47 helicopter is the largest and will be the Army's primary intra-theater priority air movement cargo aircraft. A cursory review of the lines of communication in Europe and requirements to move priority transportation will make the CH-47D a significant contributor to USAREUR's air movement plan.

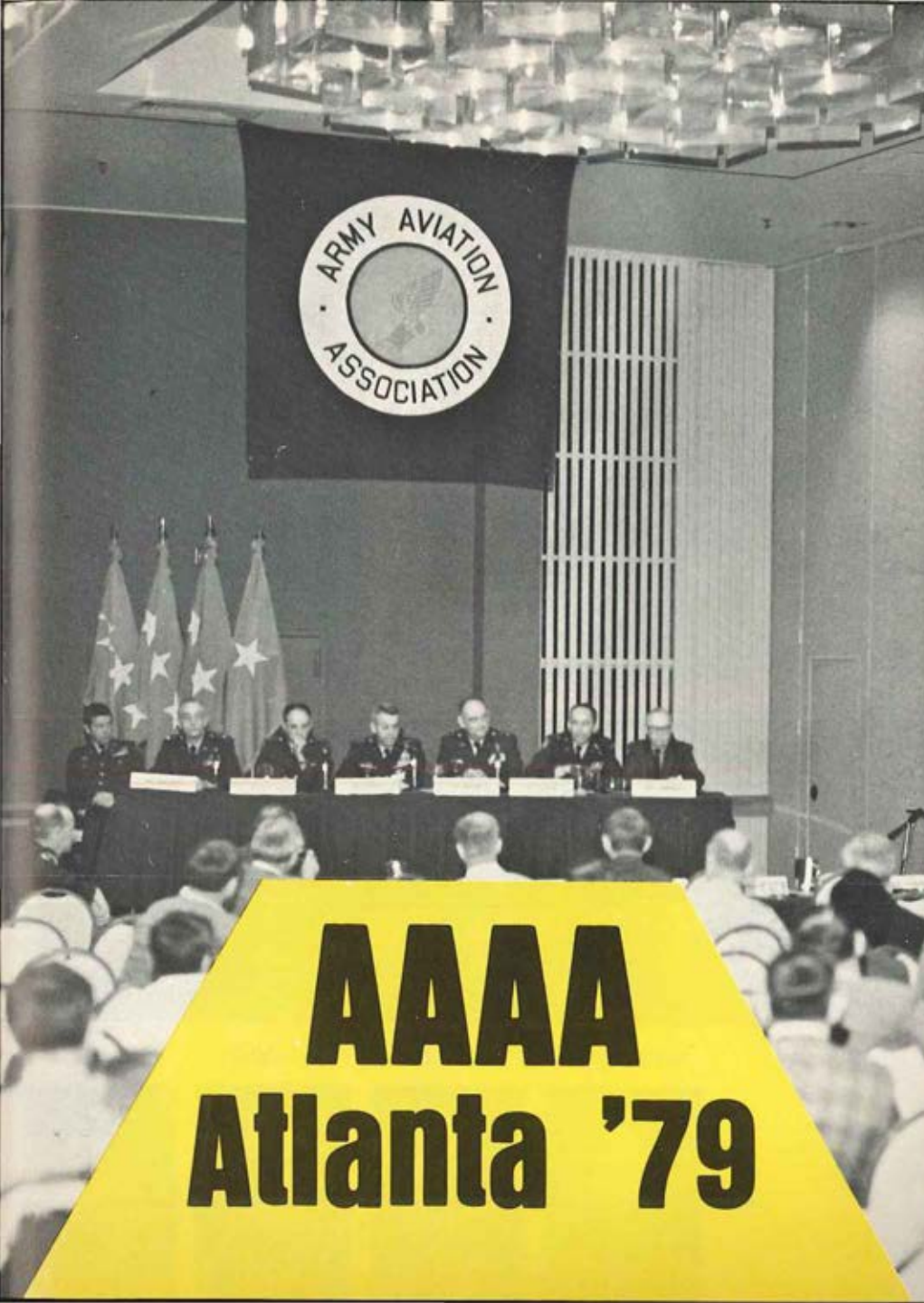
■10. The CH-47D multi-cargo hook system provides a load stabilization system allowing rapid aerial movement of **Medical Unit, Self-Contained, Transportable (MUST)** hospital units and cargo containers at air speeds up to three times as fast as the CH-47C.

As with the intra-theater cargo movement, movement of **MUST** hospital units and cargo containers, while capable of being carried under the CH-47C can be carried because of load stabilization, at speeds up to three times as fast by the CH-47D. This has been demonstrated most clearly by prototype multi-hook aircraft assigned to 159th Aviation Battalion (Medium Lift), 101st Airborne Division (Air Assault), Fort Campbell, KY.

In summary, while there are other important points supporting the modernization of the CH-47 fleet to the cost effective CH-47D configuration, the above ten points generally summarize operational and cost advantages to the Army, and in part, when combined with the aging CH-47 fleet represent major reasons why the Army in 1975 approved the Research and Development program and in 1980 are in the first increment of procurement funds. ◄

SCHEDULE PERFORMANCE





AAAA
Atlanta '79

Professional

RIGHT: The Presentations Committee Chairman, General Robert M. Shoemaker, opens the 1979 AAAA Convention's professional program with an overview, "Army Aviation's Contribution to Total Force Readiness."

BELOW: At the subsequent Friday afternoon, 20 April AAAA Military Panel at the Colony Square Hotel, MG James C. Smith, center, who served as the panel moderator, responds to a question from the floor. Others are, left to right, LTC George Morgan, MILPERCEN; MG Emmett H. Walker, Jr., NGB; MG James H. Merryman, USAAVNC; MG Smith, ODCSOPS; MG Henry Mohr, CAR; BG Carl H. McNair, Jr., ODCSOPS; and Joseph H. Cribbins, ODCSLOG.

MG Merryman BG McNair Mr. Cribbins LTC Morgan

Sessions

LEFT: Pipe in hand, an AAAA member steps to the floor microphone and puts a question to the distinguished industry panel (shown below) as another member moves up behind him with still another question.

BELOW: The AAAA's Saturday 21 April Industry Member panel was moderated by GEN Robert M. Shoemaker, left, FORSCOM Commander, and consisted of (left to right) Gerald J. Tobias, Sikorsky Aircraft President; Howard N. Stuverude, Boeing Vertol President; Thomas R. Stuelpnagel, President, Hughes Helicopters; Leonard M. Horner, Bell Helicopter's Senior VP, Marketing & Programs; and James N. Krebs, General Manager of the Military Engine Division of the General Electric Company.

MG Mohr

MG Walker

COL Keaton

MG McEnery

Hospitality

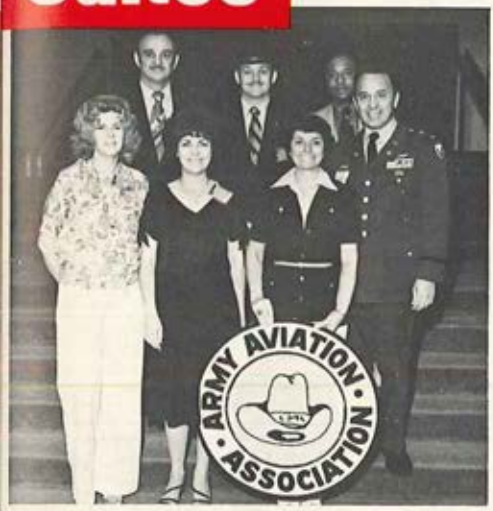
TOP LEFT: "Go Lindbergh!"—15 Members of the Lindbergh Chapter wear three different convention hats in their photo. Dick Long and MG Story Stevens (forefront) wear the goggles and Ace's hats.

TOP CENTER: "Be an Eagle!" was the ticket to the 101st's Air Assault Chapter hospitality suite hosted by the eight Ft. Campbell members shown. Berets were worn by most of the attending members.

RIGHT: Nine of the 19 members of AAAA's Aviation Center Chapter shown wear their distinctive "AAAA 1979" blue baseball hats at the time of their photo.

BELOW: The 21 members of the Connecticut Chapter flaunted their "Damn Yankees!" signs and wore Union Soldier kepi hats for emphasis. Superior Chapter org'n = The largest group photograph!

Suites



ABOVE: Fifteen Washington, D.C. members + an "aviatrix" gather in the lower lobby, three wearing the Top Hats worn in the "Head Shedders" hospitality suite.

LEFT: 'Hospitality Suite' hosts who came a long, long way were the Corpus Christi Texas Chapter "We're No. 1!" members, seven of whom are shown in this group photograph without their cowboy hats.

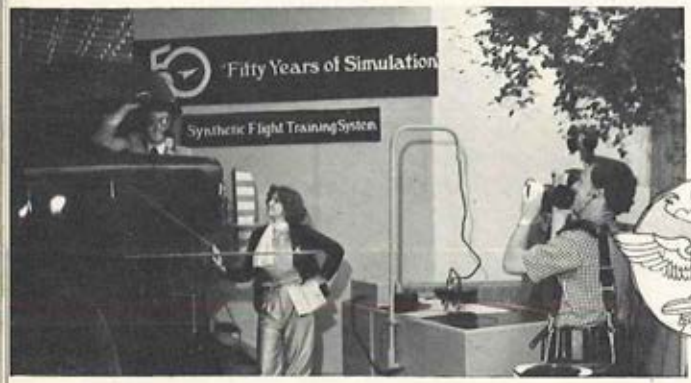
BOTTOM CENTER: "We're wired!" read the tickets and signs of the Monmouth Chapter, and wired they were! Their distinctive baseball hats had complicated antennae and signs attached to them.

BELOW: Straw skimmers were worn by all David E. Condon Chapter members and their ladies at the 1979 Convention. Shown are ten of the "Prime Movers!" of the Ft. Eustis AAAA Chapter organization.

Off M

Colonel Fred Watke, President of Fort Campbell's Air Assault Chapter, briefs Delegates and members at the General Membership Meeting on enrollment incentives.

Coffee breaks? Of course no convention can be with out them. AAAA's 197



A newsman from the Atlanta CBS-TV station hams it up in the cockpit of Singer Link's "Blue Box" as his cameraman and Singer's "aviatrix" observe the clowning.

Shades of Rosemarie! 2 members of WW II's Cu Club pose during their '7

Introduced during the '7 AAAA Awards Banquet, R Rucker's most celebrated

ments!

breaks lasted a full hour to enhance mingling and were held in the exhibit areas.

the Singer Link "aviatrix." Can you find the one rose amongst these thorns?

student, Prince Lieutenant Colonel Faisal Mohamed Al Saud, looks very pensive.

Answering questions at the General Membership Meeting were, l. to r., AAAA's Secr.-Treasurer, Executive Vice President, President, and Senior Vice President.

Howard N. Stuverude, right, Boeing Vertol President, presents a $5,000 BV check to Aviation Museum President, LTG John J. Tolson, at the membership luncheon.

BG "Bob" Leich (at lectern) presents an appropriately engraved "cube" to outgoing National Board member, LTG "Bob" Williams, for his five-year NEB tour of duty.

Off M

⬆ 50-50! — One of the two "Atlanta Tour" busses awaits outside of the Colony Square for AAAA Ladies. Disaster: One had inoperative air conditioning and stuck windows.

⬇ Longtime Army Aviation veteran, Ted A. Crozier, left, now Mayor of Clarksville, TN, presses the flesh of Major Chuck Crescioni, after his ovation at luncheon opening.

⬇ Sikorsky President "Gerry" Tobias, right, presents a $5,000 donation (his company's second) to Army Aviation Museum Foundation President Lt. Gen. Jack Tolson.

⬆ Where's it all at? AAAA's '79 Convention Registration chores were in the capable hands of four Atlanta Convention Bureau temporaries

⬆ After Lunch Group Stretch —"Now you're not finished yet. - just one more exercise. Reach up with your right hand. Reach up with your left hand. Now this is all important! You've got to look

ments!

At the left, Grumman's Joel Dimaggio pins on his "Member" badge under the watchful eye of Peter Stern, Exhibits Manager of AAAA.

straight up at that spot on the ceiling. The head table is looking up there; I'm looking up there . . Now reach down with your right hand and rub your right buttock . . Aaaaaaaaaah!"

Her Royal Highness, Princess Utsa, beams as her husband, His Royal Highness Prince Lt. Colonel Faisal Mohamed Al Saud, is introduced at the '79 Awards Banquet.

After a quick, hand-over-head "Who's the fairest of them all?", "Please applaud!" contest, "Handsome Bob" Shoemaker receives an unsolicited, spontaneous thunderclap of applause from the luncheon attendees indicating he's the best-looking gentleman at that day's dead table.

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There's more than just coffee in the Colony Square's Habersham Room!
Nine aerospace firms have 17 booths of interesting displays to show you!

SEE 'EM ALL!

In clockwise order when you enter, visit the UTC, Grumman, Sanders, Hughes, Northrop, Boeing Vertol, Collins, Bell, Avco, and Beech exhibits.

ONE OF MANY! Sikorsky President Gerald J. Tobias, left, and VP-Gov't Relations Gene Tallia, right, point out a Black Hawk features to MG James H. Merryman at one of several exhibit area sessions.

Clockwise, starting at the top left, are

11—Grumman—George Cotter, left and John Kendrick, right, describe their IACS display to MG Ben Harrison and MG George S. Beatty, Jr., Re

12—Sanders—Jim Stone, left, discusses the AN/ALQ-144 with, l-r, Thyra Bonds and MG Bill Becker of AAAA's Nat'l Board, and COL Jack Keaton

1—Beech—COL Ken Burton, and COLs John Marr (Ret.) and Bob Bonifacio (both Nat'l Board) hear Beech's E.J. Todd describe door clearances

3—Martin Marietta—General Robert M. Shoemaker and Hughes Helicopters' John Kerr view a mast-mounted sight during a morning coffee break

5—Canadian Marconi—Joe Cribbins (seated) and COL John Stanko (NEB) get a company pitch from Russell Kelly, Lionel Leveille, and Norman Elliott.

6—Boeing Vertol—BG's Glenn Goodhand and Carl McNair (both NEB); BV execs Howard N. Stuverude and Bill Jones; and COL Jim Hesson at display.

7—G.E.—LTG Harry Kinnard and MG Jim Smith (both NEB) are briefed on GE's T700 engine by Bill Crawford, GM, T700 Dept., and James Krebs, GM of GE's Military Engine Division.

9—Bell—Jack Horner, r., Bell's Sr VP-Mktg & Prog, updates GEN Shoemaker, cen., and MG George Beatty on the Army's AH-1S Cobra program.

Industry Displays

RIGHT: One of the more interesting industry exhibits at the 1979 AAAA National Convention was Singer Link's ANT-18 Link Trainer, the "Blue Box", of which more than 10,000 were built during WW II. With a product familiar to more than a half million airmen in more than 35 countries, the "Blue Box" exhibit (shown at the right) drew major attention during the coffee breaks and other viewing periods, aided and abetted by a most comely Singer "aviatrix (below) who assisted "pilots" into and out of the early simulator. As 'take home souvenirs' Singer Link provided each Uneasy Rider with a wallet card (center of page) and a larger 8½ x 11 certificate for framing.

Blue Box

This certifies that

Lee Kom

has demonstrated birdman ab
in an original "Blue Box" trai
and is a fully-qualified membe
of the Blue Box Brigade.

Chuckside Charlie

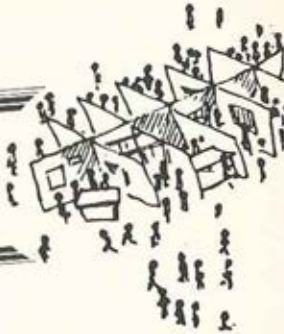
Link Division
The Singer Compa

RIGHT: AAAA National Board member CW4 Leland Komich tries his hand in the Link Trainer simulator that was in operation when he was born. (The Singer Link people didn't tell him they'd activate the "Rough Air" operation after they buttoned him up in the box.)

The AAAA exhibits in the Main Ballroom Foyer and in the Georgia Room are open all day from 8:15 a.m., except during the professional sessions

MORE TO SEE!

Be certain to visit the Canadian Marconi, Emerson, GE, Loral, Marconi Avionics, Martin Marietta, Collins, and Singer exhibits while they're open!



Brigade

LEFT: GEN 'Bob' Shoemaker, who later asked for the full "Rough Ride" treatment, reminesces with Singer Link's John Todd as Bob Savo (rear) gets ready to give a checkride to the four-star student. ABOVE: A news reporter from Atlanta's Channel 7 cuts a TV "tape."

Prince Faisal, GEN Rogers, Princess Utsa, President Williams, and GEN Shoemaker chat prior to the AAAA Awards Banquet.

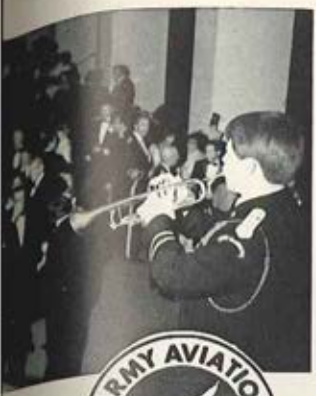
The trumpeteer plays "Me
Call' at the Dinner Receptio

The head table remains standing as add'l guests enter the hall.

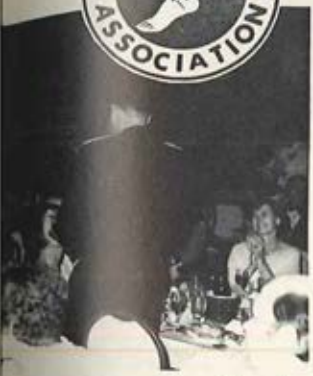
GEN and Mrs. Robert M

Awards Banquet guests LTG Forrester, SFCs Wilburn and Fielder, and GEN Shoemaker shown with President Williams.

GEN Rogers, COL Newt
LTG D'Ambrosio, COL Dr



AAAA President Lt. Gen. "Bob" Williams introduces the banquet head table guests.



Shoemaker are introduced.

The FORSCOM color guard posts the colors at the '79 Banquet.

and LTG Wright dine at the Awards Banquet head table.

The nine guys and gals at Table #55, an Awards Banquet table for ten persons that had a last-minute "no show".

TOP CENTER: Brig. Gen. 'Bob' Leich, left, Chairman of AAAA's National Awards Committee for the past 20 years, after protesting mildly on being introduced as "an institution", then presented a two-sided AAAA "Certificate of Appreciation" to General "Bob" Shoemaker, the FORSCOM Commander. The Certificate (reproduced at the right) informally cited the Master Aviator for his convention help and on its flip side did the same in more formal language.

TOP LEFT: The Loral Electronics Systems display booth doesn't appear to be drawing flies, but the photo was taken while the professional sessions were being held, and the Loral staffers in attendance, as well as all 60 other industry display personnel, were invited to sit in on the sessions. Full hour coffee breaks and daily receptions gave attending members ample time to chat at the industry display booths.

CENTER: The U.S. Army Forces Command multi-media 'Command Review' truly stole the show! There wasn't a dry eye in the audience when the curtain went down at the close of this American pageant.

CENTER RIGHT: Lt. Gen. "Jack" Tolson, a North Carolinian and true son of Dixie, didn't cotton to the Membership Luncheon M.C.'s donning Union soldier garb in an Atlanta, Ga. environment, and rose in wrath when the M.C. cited nine AAAA Chapters for having hospitality suites and omitted his Tarheel Chapter. The pasty-faced Connecticut lieutenant, knowing that the chapter did not host a hospitality suite, blanched and gulped an inaudible "Yes, sir!"

BOTTOM LEFT: As President of the Army Aviation Museum Foundation, Lt. Gen. "Jack" Tolson, left, expected a $5,000 donation and was quite surprised when "Tom" Stuelpnagel, Hughes Helicopters' President, said, "In light of the rising inventory costs in our industry, we'd hoped that Hughes could defer payment into the Museum fund for some time but the pressure at this head table got enormous, so I would present to Jack Tolson this one dollar . . . . advance payment." Sikorsky President "Gerry" Tobias, seated, having just donated $5,000 to the Museum a few minutes earlier, smiles, but wonders if he didn't make a $4,999 mistake. (No mistake was made by either gentleman. The Hughes executive simply pulled off a most amusing, impromptu twit, and happily turned over a $5,000 check to General Tolson before the AAAA Membership Luncheon was over.)

BOTTOM RIGHT: There's absolutely no truth in the cartoon balloon! The photo is one of MG Ben Harrison, left; GEN Bob Shoemaker, center; and E.F. Todd of Beech Aircraft at that firm's AAAA national convention display. The hardworking AAAA Exhibits Manager, Peter Stern, is an in-the-rear interloper.

Army Aviation Association of America Certificate of Appreciation

is presented to

GEN. ROBERT M. SHOEMAKER

in special recognition of his being the only four star aviator known to the AAAA in the Greater Atlanta Convention area, and, secondarily, for putting together one helluva fine, two-day professional program for more than 500 convention attendees.

month's takeoffs

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LEFT: LTC Robert J. Kopecky is shown receiving his Master Army Aviator wings recently during ceremonies with the 95th Div Maneuver Trng Command in Oklahoma City, OK. LTC Jackie Lewis, Ret., another Master AA, makes the award.

RIGHT: LTC Bruce D. Silvey, Commander of the Army Aviation Support Element, US Readiness Command, MacDill AFB, FL, receives his Master Aviator wings from BG(P) Harold I. Small, AAAA's Sun Coast Chapter President.

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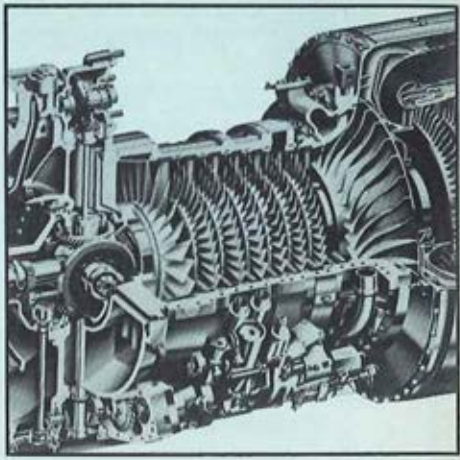
Reliability Revisited.



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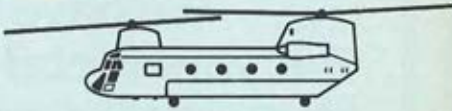

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