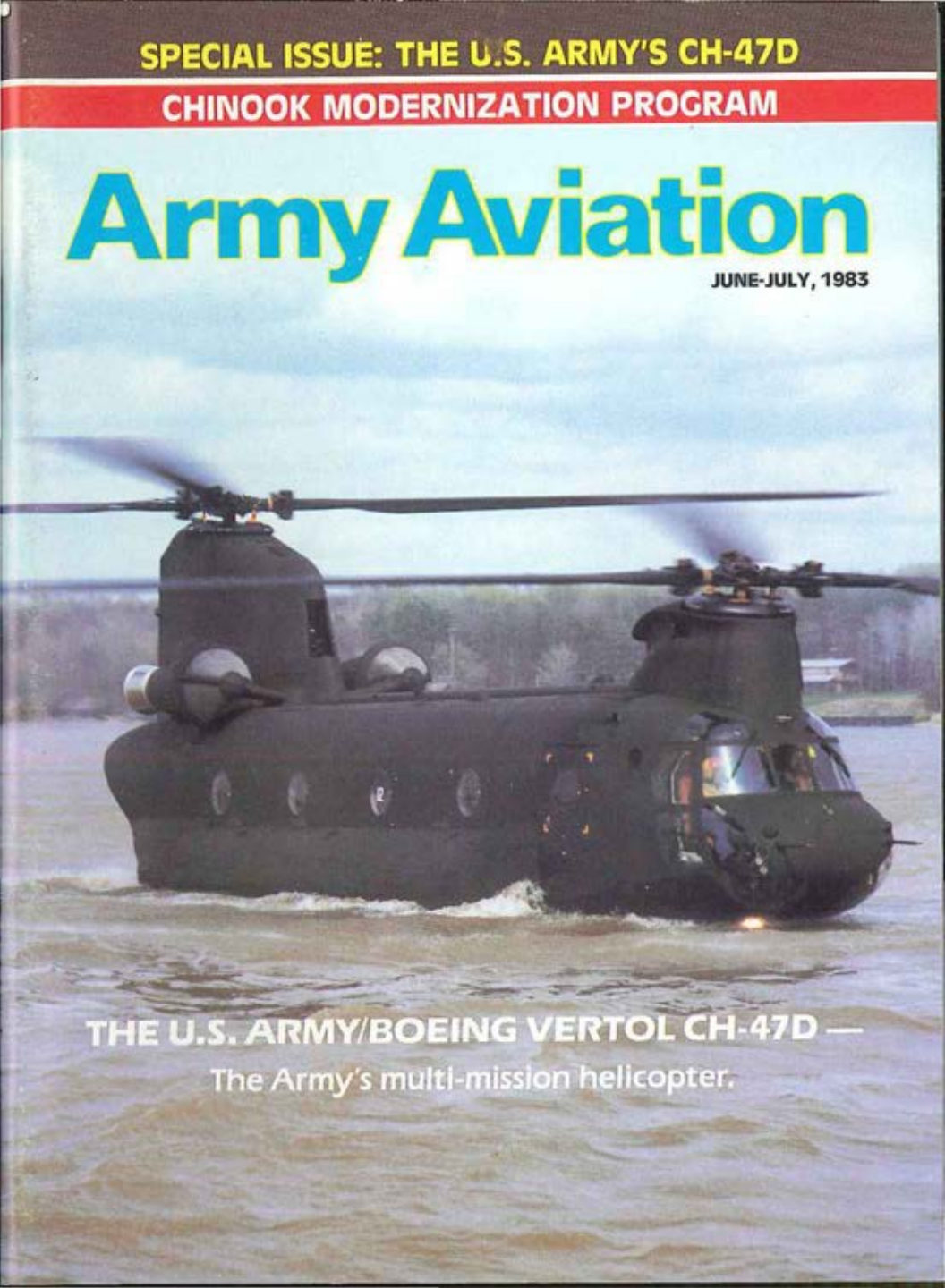
SPECIAL ISSUE: THE U.S. ARMY'S CH-47D

CHINOOK MODERNIZATION PROGRAM

Army Aviation

JUNE-JULY, 1983



THE U.S. ARMY/BOEING VERTOL CH-47D —

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MG Jim Smith installed as 15th Nat'l President

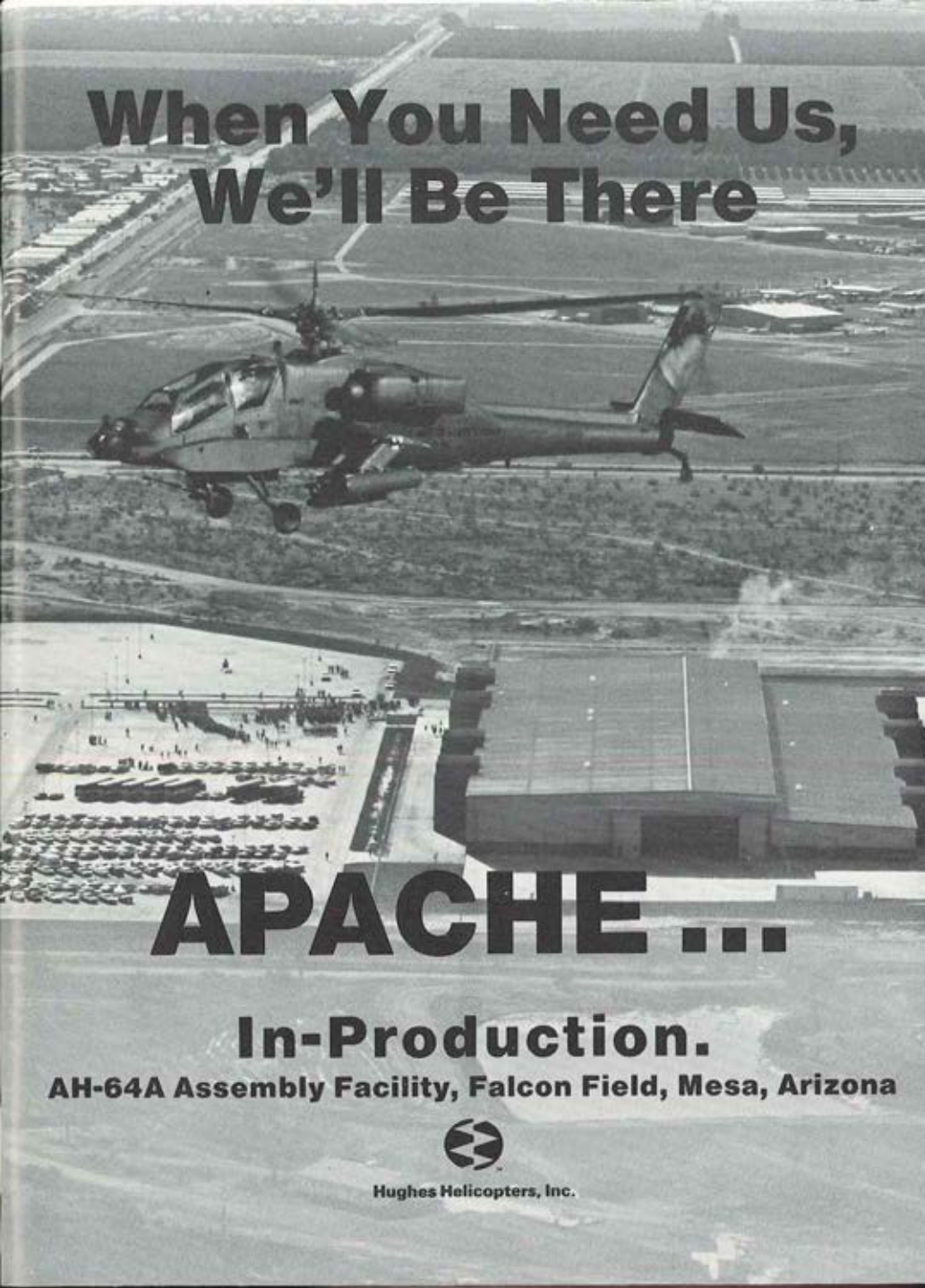
INSTALLED at a National Executive Board meeting held at the conclusion of the 25th AAAA National Convention in Atlanta, Ga., newly-elected President Major General James C. Smith, Ret., looks forward to increased '83 activity at the Board's first business meeting to be held July 16 in Arlington, Va.

An executive of ABA Industries, Inc., of Pinellas Park, FL, Smith heads a 55-member National Board slate that includes MG George W. Putnam, Jr. (Sr VP), Falls Church, VA; Paul L. Hendrickson (Sec-Trea), Ferguson, MO; and incumbent Vice Presidents, MG Story C. Stevens, Hilton Head, SC; BG Charles E. Canedy, San Antonio, TX; Mrs. Thyra V. Bonds, Webster Groves, MO; and William P. Jones, Philadelphia, PA. Newly-elected Vice Presidents are COL John J. Stanko, Aberdeen PG, MD; CW4 David E. Helton, Fairfax, VA; and Leonard D. Kulik, Washington, D.C.

Completing the full Board are Arthur H. Kesten, Executive Vice President, Westport, CT, an appointee, and Past Presidents GEN Hamilton H. Howze (Ft. Worth, TX); LTGs Harry W.O. Kinnard (Arlington, VA), Robert R. Williams (Ft. Worth, TX), and John M. Wright, Jr. (Irving, TX); MGs Delk M. Oden (Alexandria, VA) and George S. Beatty, Jr. (Savannah, GA); BG O. Glenn Goodhand (McLean, VA); COLs Richard L. Long (Hampton, VA), Edward L. Nielsen (N. Palm Beach, FL), and John W. Marr (Arlington, VA); and Bryce Wilson (Glenbrook, NV) and Darwin P. Gerard (Alexandria, VA).

ABOVE: In a traditional "change of office" ceremonial action, COL John W. Marr, left, hands the gavel to MG James C. Smith, incoming National President, at the end of the 1983 AAAA Awards Banquet.

A USAREUR Regional President, COL Andrew J. Miller, Jr.; twelve appointed National Members-at-Large, including BGs James M. Hesson and Richard D. Kenyon (both of Springfield, VA), and Robert F. Molinelli (Arlington, VA); COLs Leslie H. Gilbert (Alexandria, VA), John A. Todd (Arlington, VA), and Donald F. Luce (Bridgeton, MO); and LTC Dan C. Riley and Joseph P. Cribbins (both of Alexandria, VA); and nineteen Chapter Presidents representing Chapters with 150 or more members round out the large, but democratic and representative 1983-1984 Executive Board. IIIII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MAJOR AVIATION LEADERSHIP CHANGES, P. 7

THE U.S. ARMY'S CH-47D PROGRAM, P.25

Army Aviation

JUNE-JULY, 1983

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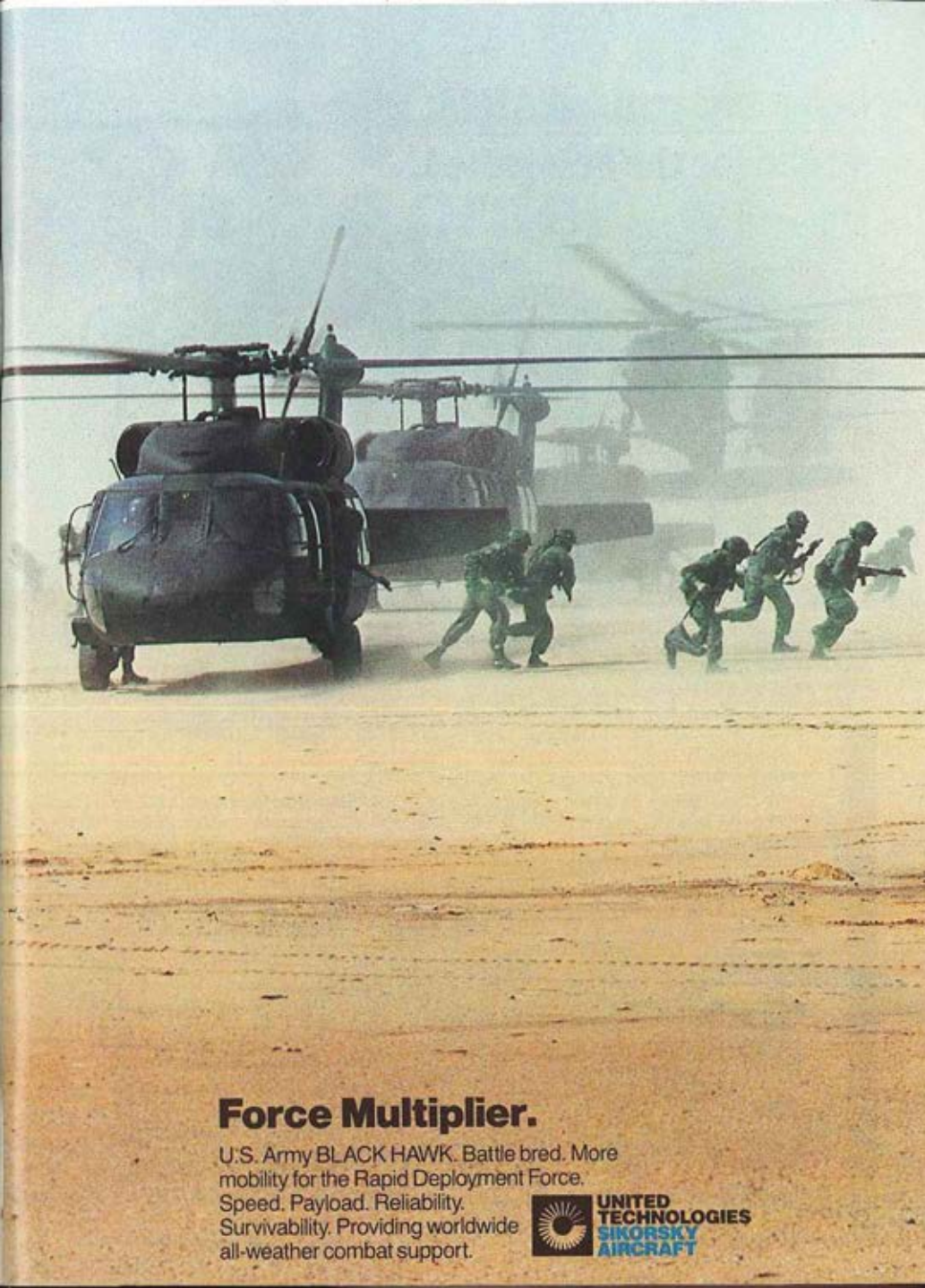

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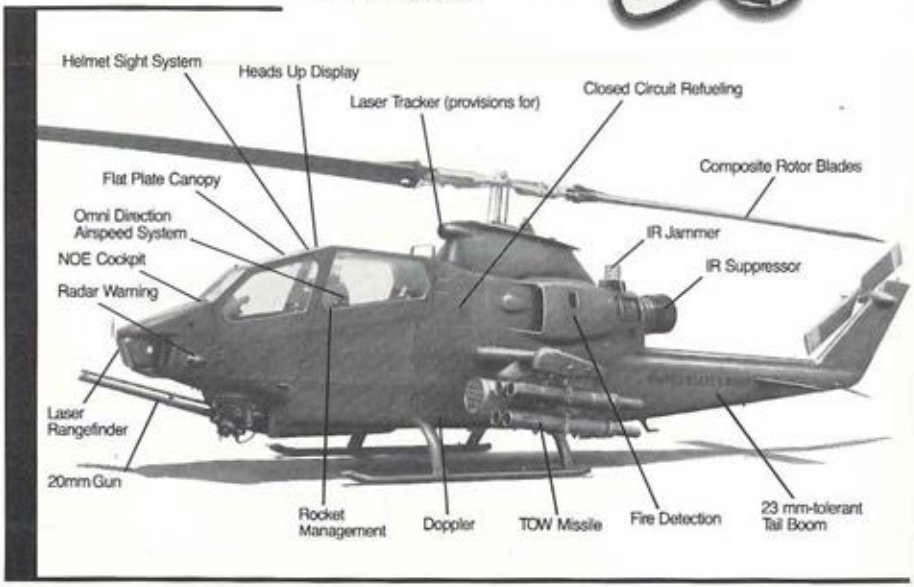

The old order changeth . .

ABOVE: MG Bobby J. Maddox, r., accepts the colors as the new USAAVNC CG, June 17, from GEN William E. Richardson, Cdr, USA TRADOC, as MG Carl H. McNair, Jr., left, looks on.

THE old order changeth yielding place to the new." In five major changes to be completed before mid-July ten senior Army officers affiliated with Army Aviation will change assignments or retire.

Major General Carl H. McNair, Jr., the Commanding General, U.S. Army Aviation Center & Ft. Rucker, departed USAAVNC on June 17 PCS to Hq, US TRADOC, where he'll serve as the Deputy Chief of Staff for Training. He'll be replaced by **Major General Bobby J. Maddox,** the ADC(O), 101st Airborne Division (Air Assault) (See p. 10).

Brigadier General Ellis D. Parker, the Deputy Director of Requirements and Army Aviation Officer, ODCSOPS, Department of the Army, departed Washington, D.C., on a June 4 PCS to Ft. Campbell, Ky., where he'll serve as ADC(O), 101st Airborne Division (Air Assault). He was replaced by **Brigadier General Robert F. Molinelli** (see p. 11) on June 27.

Major General Harold I. Small, Commanding General, U.S. Army Transportation Center & Ft. Eustis, Va., has been reassigned as the Commander, Military Traffic Management Command, Washington, D.C. He has been replaced at USATC by **Major General Aaron L. Lilley, Jr.** (see p. 12).

Major General Story C. Stevens, Commanding General, U.S. Army Aviation Research & Development Command*, is retiring July 15 and will be replaced at AVRADOM by **Major General Orlando E. Gonzales** (see p. 14). **General Stevens** and his wife, **Sue,** will establish their retirement residence at Hilton Head, S.C.

Major General Emil E. Konopnicki, Commander, U.S. Army Troop Support & Aviation Materiel Readiness Command*, retired June 24, and has been replaced at TSARCOM by **Major General Kenneth E. Lewi,** Commander, 3d Support Command, APO NY. **General Konopnicki** and his wife, **Betty,** plan to begin retirement in Alexandria, Va.

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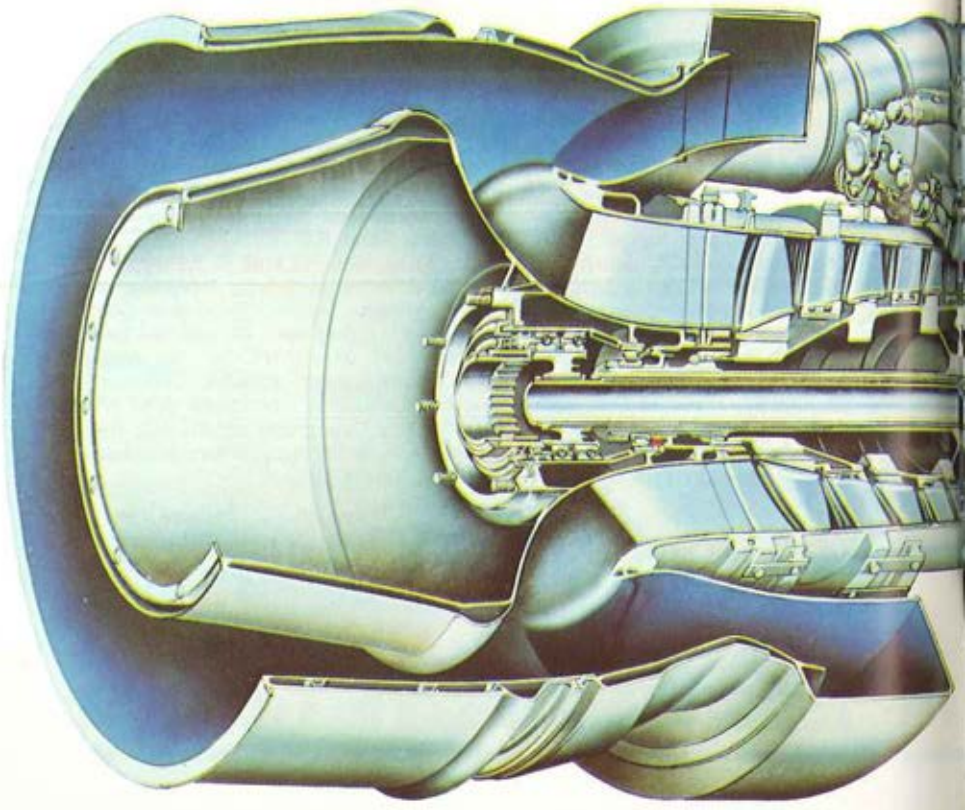

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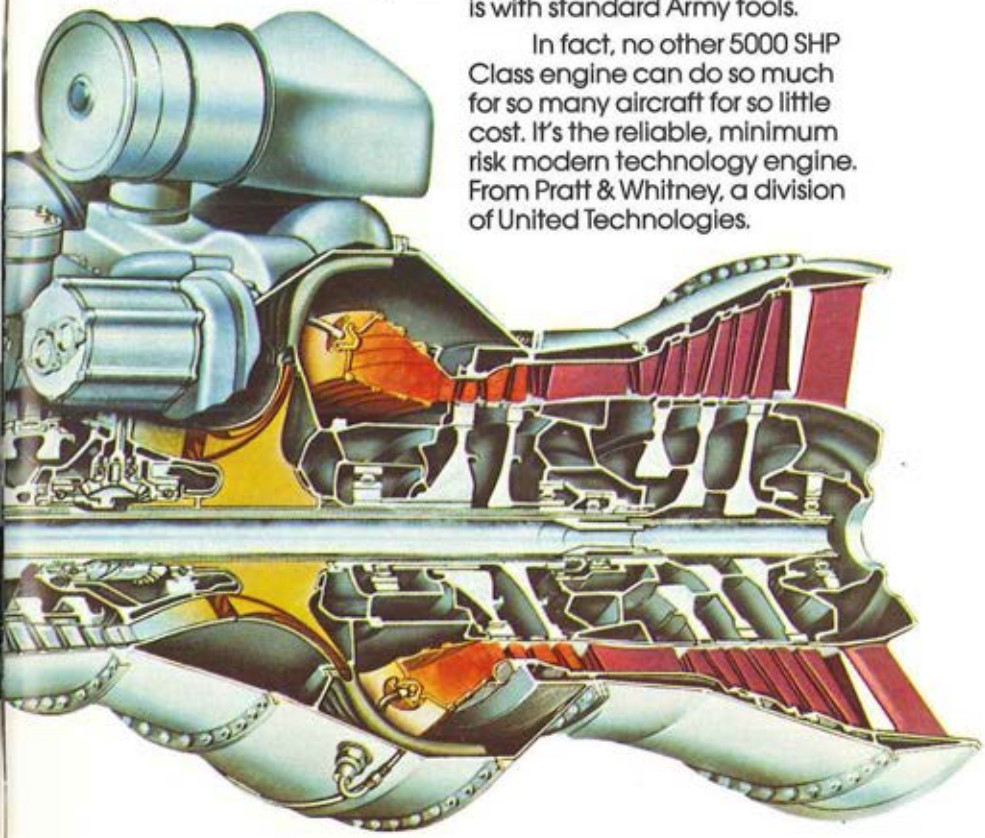

BIO: MAJ. GEN. BOBBY J. MADDOX

A change at Fort Rucker

A Master Army Aviator with over 22 years of active commissioned service, **Major General Bobby Joe Maddox** became the Commanding General of the U.S. Army Aviation Center and Ft. Rucker replacing **Major General Carl H. McNair, Jr.,** in change of command ceremonies held on June 17.

The soft spoken, personable career officer was born in Elk City, Okla., on November 5, 1936, and received an ROTC commission from Oklahoma State University on May 25, 1958.

His academic degrees include a Bachelor of Science Degree from OSU and a Master of Science in Public Administration from Shippensburg State College.

His military education includes completion of the Armor Basic and Advance Courses, the Armed Forces Staff College, and the U.S. Army War College.

His most recent assignment, prior to becoming the CG at the Aviation Center, was service as the Assistant Division Commander (Operations), Headquarters, 101st Airborne Division (Air Assault), Ft. Campbell, Ky.

He had previously served as the Assistant Deputy Chief of Staff for Combat Developments (HQ, TRADOC) during '80-'82 and as a Division Chief, Combat Division, Requirements Directorate, ODCSOPS, DA during 1980-82.

Earlier tours saw **General Maddox** serve as the '76-'78 Commander of the 6th Cav Brigade (Air Combat) at Ft. Hood; and as a Member of the NATO Branch, and a later Politico-Military Planner in the European Division, J-5, Office, Joint Chiefs of Staff, in Washington, D.C., during 1975-76.

Prior to his student tour at the Army War College, **General Maddox** was Assistant Secretary of the General Staff, Office of the Chief of Staff ('73-'74) and a Staff Officer in the Plans and Program Division, Aviation Directorate, OACSFOR, DA, during 1972-73.

He had successive aviation combat assignments in Vietnam during Jan. 1971-Apr. 1972 serving first as the Commander of the 214th Combat Aviation Battalion, 164th Combat Aviation Group, 1st Aviation Brigade, and later as Deputy Commander, and then S-3 of the 164th CAG, 1st Aviation Brigade.

General Maddox's decorations and awards include: Legion of Merit, Distinguished Flying Cross, Soldier's Medal, Bronze Star Medal with Oak Leaf Cluster, Meritorious Service Medal with Oak Leaf Cluster, Air Medal with V Device (with numeral 23), Joint Service Commendation Medal, Army Commendation Medal with Oak Leaf Cluster, and Master Army Aviator Badge.

An 11-year AAAA member, **"Bo" Maddox** served as Senior Vice President of the Fort Hood Chapter during 1977-78, and has been a frequent speaker at AAAA Regional and National Conventions. He and his wife, **Berylene,** have three children, **Bobby, Renee,** and **Michelle,** and will reside at Fort Rucker.

A change in Washington

SELECTED as the "Army Aviator of the Year" for his actions in Vietnam during March 1970 to March 1971, **Brigadier General Robert F. Molinelli** assumed the duties of Army Aviation Officer, ODCSOPS, Department of the Army, on June 27, replacing **Brigadier General Ellis D. Parker** who became ADC(O) of the 101st Airborne Division.

A Master Army Aviator who flew more than 2,000 hours in armed helicopters and survived being shot down nine times, **General Molinelli** was born in Pocatello, Idaho, on June 1, 1934. A 1956 graduate of Idaho State University (B.S., Business & Pre-Law), he completed C&GSC in 1968 and obtained a Master's Degree at Shippensburg State College in 1974 following his graduation from the Army War College in 1973. His military schooling includes completion of the Armor Officer Career Course and both the R/W and F/W Qualification Course at USAAVNC.

His most recent assignments, prior to becoming the Deputy Director of Requirements, ODCSOPS, were in the Office of the Deputy Under Secretary of Defense (Tactical Warfare) in 1981-83, and as Chief of Staff and then ADC of the 2d Armored Division at Ft. Hood during 1980-81. These tours were preceded by 1978-80 service at Ft. Hood as Commander of the 6th Cav Brigade (AC) and as G3 of the 1st Cav Division during 1972-78.

He also held the unique assignment of Commander, 3d Aviation Company (Cheyenne), at Yuma, AZ, in 1968-70. In March 1970 he returned to Vietnam to command the 2d Squadron, 17th Air Cavalry, after completing an earlier tour in 1964-65 as Armed Platoon Commander, 114th Aviation Company.

Among **General Molinelli's** decorations and awards are the Silver Star/1 OLC, Legion of Merit/1 OLC, Distinguished Flying Cross/7 OLC, Meritorious Service Medal/1 OLC, Air Medal wtih V Device/62 OLC, Bronze Star Medal, Army Commendation Medal/2 OLC, Purple Heart/1 OLC, Master Army Aviator Badge, and numerous OSD and foreign awards.

A past president of AAAA's Fort Hood Chapter, he is a 25-year member and along with his wife, **Donna,** is a Convention "perennial". He currently serves on AAAA's National Board as a National Member-at-Large, and is a member of AUSA, Armor Ass'n, and the NRA. His special interests include hunting, fishing, and skiing. The **Molinellis** have two sons, **Robert,** and **David,** and reside in Arlington, Va. IIIII

BIO: MAJ. GEN. AARON L. LILLEY, JR.

A change at Fort Eustis

AN aviation professional with over 28 years of active commissioned service, **Major General Aaron Lycurgus Lilley, Jr.** became the Commanding General of the U.S. Army Transportation Center and Ft. Eustis, Va., replacing **Major General Harold I. Small,** another aviation veteran, in change of command ceremonies held on June 30.

A Master Army Aviator, the well known aviation logistician was born in Gatesville, N.C., on May 7, 1933, and received an ROTC commission from St. Benedict's College, Atchison, Kan., in May, 1954.

His academic degrees include a Bachelor of Science Degree in Business Administration from St. Benedict's and a Master of Science Degree in Contracts and Procurement from the Florida Institute of Technology in December, 1973.

His military education includes completion of the Transportation School Advance Course, the Army Command and General Staff College, and the Industrial College of the Armed Forces.

His most recent assignment, prior to becoming the CG at the Transportation Center, was service since August, 1982 as the Assistant Deputy Chief of Staff for Logistics, Department of the Army.

He had previously served as the Deputy Chief of Staff for Logistics at Hq, FORSCOM, at Ft. McPherson, Ga., during 1980-82; as Director of Logistics, J-4, US REDCOM, during 1979-80 at MacDill AFB, Fla.; and as Deputy Commanding General, USA TSARCOM, in St. Louis during 1978-79.

Earlier assignments had **General Lilley** serving as the '77-'78 DCSLOG, First US Army; the '75-'77 Commander, Division Support Command, 1st Cavalry Division; and the '73-'75 Chief of the Strategic Mobility and Policy Division, ODCSLOG, Department of the Army.

Prior to his June-December, 1973 student tour at the Florida Institute of Technology, **General Lilley** completed the August, 1972-June, 1973 course at the Industrial College of the Armed Forces at Ft. McNair.

He had aviation logistic assignments as the Commander, 1st Transportation Battalion, (USNS Corpus Christi Bay, Vietnam) in '68-'70, and as Aviation Program Officer in ODCSLOG during '70-'72.

General Lilley's decorations and awards include the Legion of Merit with Oak Leaf Cluster, Distinguished Flying Cross, Bronze Star Medal with 2 Oak Leaf Clusters, Meritorious Service Medal, Air Medals, Army Commendation Medal with Oak Leaf Cluster, and Master Army Aviator Badge.

A 23-year member of AAAA, **Aaron Lilley** served as the '79-'80 President of the Suncoast (Tampa, Fla.) Chapter, and has been a guest speaker at various AAAA Chapter and National meetings. He and his wife, **Betty,** have two children; a son, **David,** and a daughter, **Linda,** and will reside at Fort Eustis.

Chinook simulator cockpit

THE CHINOOKS HAVE LANDED

The first Chinook flight training system to be installed outside the United States is operating at Mannheim, Germany.

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BIO: MAJ. GEN. ORLANDO E. GONZALES

A change in St. Louis

A SENIOR Aviator with over 2,700 flying hours and a Distinguished Flying Cross, **Major General Orlando E. Gonzales** will become the Commanding General of the U.S. Army Aviation Research and Development Command, replacing **Major General Story C. Stevens,** another aviation veteran, in ceremonies to be held July 15.

A 1956 graduate of Army Flight Training, **General Gonzales** was born in Model, Colo., N.C., on December 20, 1930. He attended the Univ. of Colorado and the Univ. of New Mexico, but left college to enlist in the Army during the Korean War.

After commissioning from Engineer OCS at Ft. Belvoir in July, 1952, he served in a variety of Engineer platoon, company, and battalion assignments through 1955. Aviation flight training, several aviation assignments, and attendance at the Transportation Company Officers Course and Advanced Course then followed.

A tour in Europe preceded his attendance at C&GSC and the completion of his undergraduate work at St. Benedict's College in Atchison, Kan., where he received a BA in Business Administration in Dec., 1964. **General Gonzales** then held a T-School instructor assignment briefly before a tour of duty in DA with the Office of Personnel Operations.

During 1968-1969, he served in Vietnam, first as Plans Officer in the Aviation Division, HQ USARV, and then as Battalion Commander of the 268th Combat Aviation Battalion. On returning to CONUS, he was assigned to ODCSPER, DA.

General Gonzales attended the Air War College during 1970-1971, obtained his MBA Degree from Auburn University in June, 1971, and graduated from the first course at the Defense Systems Management School in December, 1971.

He served as the Product Manager of the COBRA helicopter program during 1972-1975 and Commander of the 7th Transportation Group at Ft. Eustis in January, 1975. Promoted to Brigadier General in March, 1976, he assumed command of the Military Traffic Management Command Western Area in June.

In February, 1978 he became the DCS for Air Transportation, Hqs, MAC, and the DCS in May, 1979. Following his promotion to Major General in July, 1979, he assumed the duties of the Chief, JUSMAG (Korea) in August. He is currently the Director of Development, Engineering and Acquisition, Hqs, DARCOM.

General Gonzales' decorations and awards include the Distinguished Service Medal, the Legion of Merit with one Oak Leaf Cluster, Distinguished Flying Cross, Bronze Star Medal, Meritorious Service Medal, Air Medal with seven Oak Leaf Clusters, Army Commendation Medal with Oak Leaf Cluster, and the Senior Army Aviator Badge.

A 22-year member of AAAA, he and his wife, **Maye,** have three daughters: **Jo Ann Gonzales Robesen, Maurina,** and **Jema Marie.** IIIII

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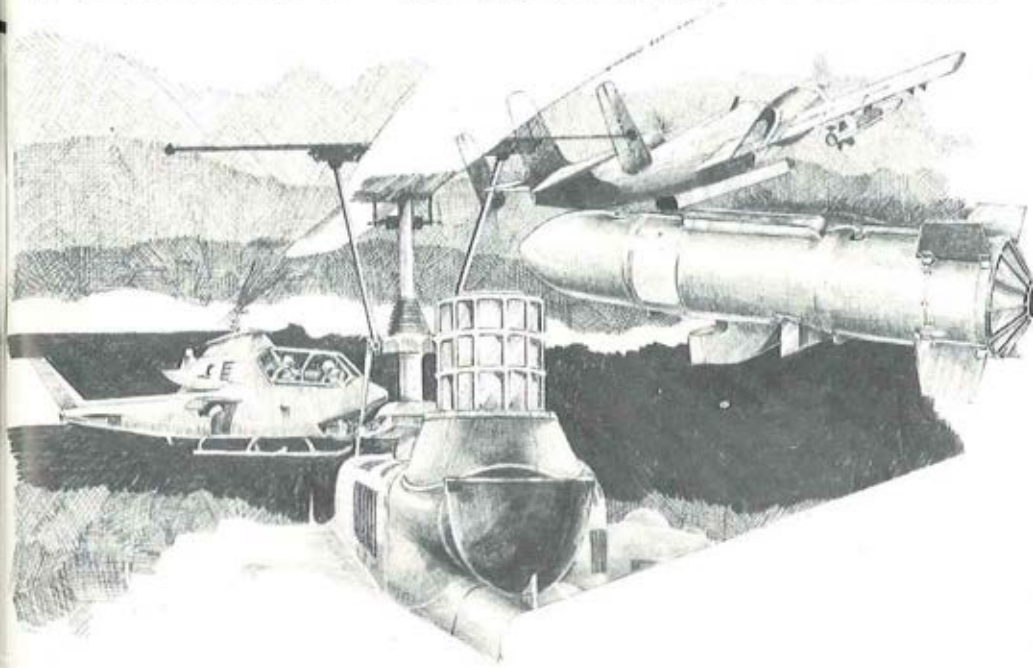

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USAREUR Region-AAAA holds successful 23rd Annual Convention

MORE than 1,100 Army Aviators converged on scenic Garmisch-Partenkirchen in the Bavarian Alps when the USAREUR Region-AAAA held its 23rd Annual Convention during March 16-19.

The big news—in fact, the front page news in the European **Stars & Stripes**—was the announcement, at long last, of official DA recognition of an Aviation Branch.

Many of the questions resulting from the announcement were answered at Garmisch by DA and MILPERCEN representatives. The latter also provided personnel interviews to the majority of the commissioned and warrant officers attending the convention.

"Helicopter Operations in the Falklands" was by far the most fascinating briefing. Presented by **BG C.F. Jebens,** O.B.E., aviation commander of the United Kingdom Land Forces, Army the briefing enabled Aviators to learn of the problems and the timely, innovative solutions that British Army Aviation applied in its contribution to a victory 8,000 miles from home.

Advanced technology in the future of Army Aviation was a prominent feature of this year's AAAA convention in Europe. The attendees were briefed on advanced, but available technology such as that found in the CH-47D CHINOOK presently entering the service, and the promising possibilities of advanced designs, such as tilt rotor aircraft.

This Convention Report and the accompanying photos were submitted by LTC William B. Bauer, the Secretary of the USAREUR Region—AAAA.

Major USAREUR Awards

The annual Awards Banquet marked the close of the convention as **LTG John F. Forrest,** DEPCINC USAREUR, presented AAAA Regional Awards to **MSG Pete Velasco,** 48th Aviation Company, as the "Aviation Soldier of the Year"; **CW3 Mark Metzger,** 3rd Aviation Battalion, the "Aviator of the Year"; and **CW3 Wally Fox,** 180th Aviation Company, the "Safety Person of the Year".

The award for "Aviation Unit of the Year" was won by the **48th Aviation Company,** (Nellingen Barracks, Stuttgart). The "Aviation Support Unit of the Year Award" was won by **D Company, 3rd Aviation Battalion,** (Giebelstadt); and the the **Aviation Section, 59th Air Traffic Control Battalion,** (Schwaebisch Hall), was selected as the "Aviation Detachment of the Year."

This year's convention was hosted by **Air Troop, 11th Armored Cavalry Regiment** (Fulda), and its overall success was due to the outstanding planning and preparation that was apparent in the execution of this event. IIIII

LEFT: A view of the attendees at the 1983 AAAA's USAREUR Region's Awards Banquet at the AFRC, Garmisch-Partenkirchen, Germany, on Saturday, March 19. (Delayed photos).

RIGHT: Lt. Gen. John F. Forrest, the Deputy Commander-in-Chief, US Army, Europe, and COL Andrew J. Miller, Jr., the USAREUR Region—AAAA President.

LEFT: CW4 Mark Metzger, left, 1982 "AAAA Aviator of the Year" (USAREUR Region) and MSG Pete Velasco, the "Aviation Soldier of the Year" (USAREUR Region.

RIGHT: Members of the 48th Aviation Company, 223rd Avn Battalion, the "1982 Unit of the Year" pose with their unit's award plaque in a post-banquet photo.

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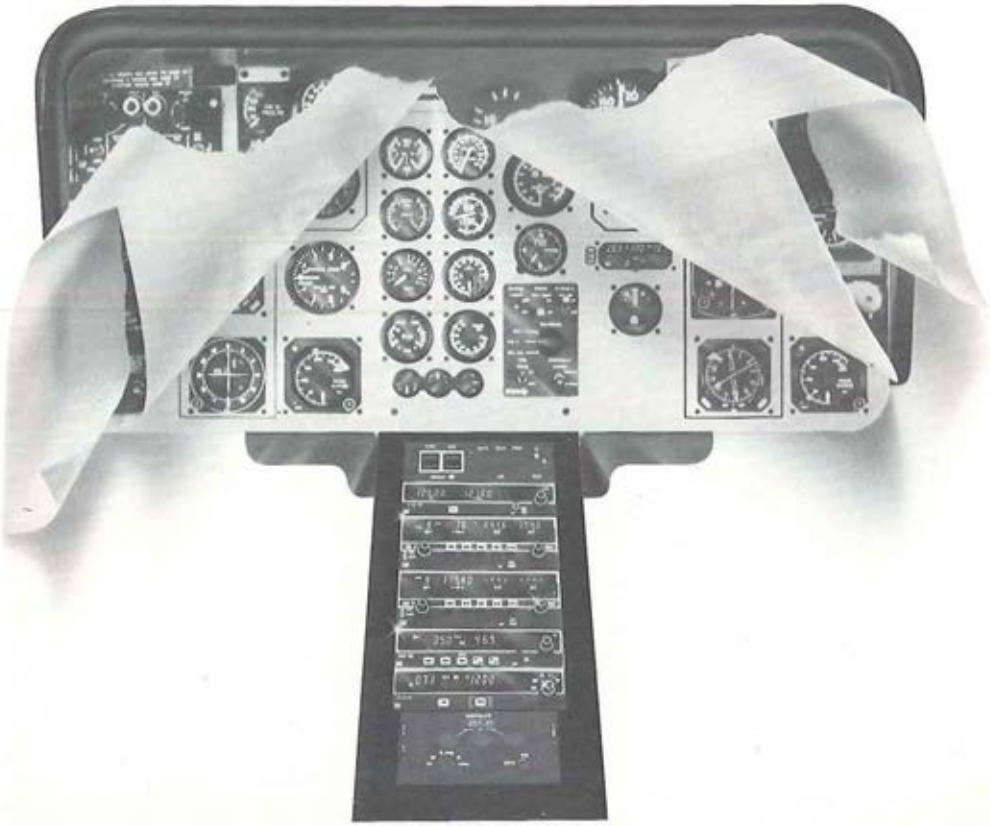

LEFT: Unit representatives of the 59th Air Traffic Control Company Flight Detachment, winners of the "AAAA Detachment of the Year Award."

RIGHT: MAJ Dennis D. Healy, Cdr, D Company, 3rd ABC, accepts the Region's 'Aviation Support Unit of the Year Award' from LTG John F. Forrest, DepCINC, USAREUR.

LEFT: MAJ Ted D. Cordrey, Cdr, and 1SG Iman of the 48th Avn Company, the "1982 Unit of the Year" in USAREUR, accept the congratulations of LTG Forrest and COL Miller.

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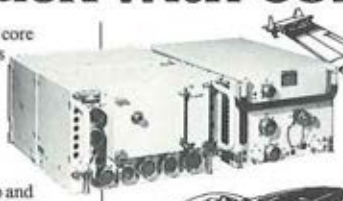

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During the Convention's Membership Luncheon, attendees were told by MG Carl H. McNair of the three-figure Museum donations made by the Corpus Christi and Schwaebisch Hall Chapters.

LTG John J. Tolson, III, the Museum Foundation's Board Chairman, right, congratulates John R. Myers, AVCO Lycoming Division Vice President and General Manager, on the firm's major donation.

Jack G. Real, r., President of Hughes Helicopters, Inc., receives "thanks for the second year in a row" on the occasion of his firm making a major donation to the Museum Foundation's building fund.

LTG Tolson, left, and George Barna, Vice President-Government Products, Link Flight Simulation Division, are shown at the AAAA Luncheon at which the N.Y. firm made a major donation to the Museum.

Gary F. Rast, Vice President-Government Relations, Sikorsky Aircraft, presents a $5,000 check to LTG Jack Tolson, left, the fourth such donation the firm has made to the overall Museum Building Fund.

MG Carl H. McNair, Jr., right, representing Prince Faisal al Saud, the Director of Army Aviation, Saudi Arabian Land Forces, presents a major donation he'd received from the Museum's largest donor.

Corporate Members Aid Museum Drive

REMARKS of MG James C. Smith (then AAAA Sr VP) at the AAAA Membership Luncheon in Atlanta, Ga., on April 9:

"As many of you are aware, the AAAA had been in direct support of the Army Aviation Museum Foundation in its efforts to raise sufficient funds to build a new museum at Ft. Rucker to house our multi-million dollar collection of unique aircraft, and that's a herculean task.

If you haven't bought a book of raffle tickets here at the Convention as yet, this is one of the examples of the ways in which AAAA has attempted to support the Museum. We hope to raise $2,000-$5,000 in this manner.

In a separate 1982 drive, all National Executive Board members contributed $100 each, and I'm sure many of you have taken part in the "$40-4-40" plan that AAAA advertised within the **Army Aviation Magazine** in which members contributed $40 in four or less payments on the occasion of the 40th birthday of Army Aviation with the names of the "$40-4-40" donors to be placed on a separate AAAA Wall in the eventual Museum. Approximately $50,000 has been collected to date, and I'm certain that this AAAA program will continue to generate additional donations to the Museum.

MOVING ALONG!—A model of the design for the new Army Aviation Museum was recently approved by the Museum Foundation Building Committee and Fort Rucker's Military Advisory Committee. The new facility will have a total display area of 72,500 square feet and will cost $2.5 million. The first monetary milestone of $1 million in cash and pledges was reached when COL Joseph R. Koehler, President of AAAA's Army Aviation Center Chapter, presented a $50,505 check to COL James O. Townsend, Ret., the Foundation's Treasurer, for Fort Rucker's 1983 Museum Fund Drive.

In still another 1982 area, the AAAA President, **COL John Marr,** called the attention of the Assn's Industry (Corporate) Member firms to the importance, not only of their support to the AAAA, but of the Assn's efforts with regard to bringing to the Museum Foundation significant monies that will be required to rebuild that facility."

At this point, **General Smith** introduced **LTG Jack Tolson,** the Museum Foundation Chairman of the Board, and the five separate individuals whose photos appear on the opposite page.

AAAA Calendar

June-July, 1983 Activities

JUNE 1983

■■JUN 1-Stuttgart. Professional business meeting. Chapter elections. BG(P) Charles E. Drenz, AAH-PM, speaker. Nellingen Officers and Civilian Club.

■■JUN 4-Chesapeake Bay. Army Aviation's 41st Birthday Party. Cliff Holgate, Boeing Vertol Company, guest speaker. Edgewood O-Club.

■■JUN 6-"Follow Me". Professional luncheon meeting; LTC Joshua Shani, Israeli AF, speaker. Ft. Benning O-Club.

■■JUN 7-Ft. Bragg. Professional-social meeting; Ken Kelly, Gov't Business/John Soehnlein, Army Marketing Rep, Sikorsky Aircraft, speakers. Ft. Bragg O-Club

■■JUN 10-Suncoast. Prof'l dinner meeting; LTG Jack V. Mackmull, Cdr, XVIII Corps, speaker. MacDill AFB O-Club.

■■JUN 11-Air Assault. Family Picnic. Pony rides, games, dunking tank. Clarksville Base Picnic Area.

■■JUN 15-Southern California. Professional noon (Edwards AFB) and evening (L.A.) meetings; MAJ Roy E. Mann, Commander and Head Coach, 1981 World Champion Helicopter Team, speaker.

■■JUN 18-Morning Calm. General membership meeting. Mini-marathon, picnic, martial arts demo, country and western band. Camp Casey; ROK.

■■JUN 23-Army Aviation Center. Prof'l luncheon. George Coutoumanos, Bell Helicopter Textron , speaker. O-Club.

■■JUN 23-Monmouth. AAAA Annual Birthday Ball. Fisherman's Wharf.

■■JUN 23-Suncoast Chapter. Professional luncheon meeting; MG Benjamin L. Harrison, Ret., speaker. Officers' Club, Naval Training Center, Orlando, FL.

■■JUN 27-Rhine Valley. Professional social gathering; BG(P) Charles Drenz, AAH-PMO, speaker. Coleman NCO/EM/O-Club.

TOP CWO—Following his graduation from the Warrant Officer Senior Course at Ft. Rucker, the Class Distinguished Graduate, CW3(P) Charles M. Barr, II, left, receives an AAAA plaque from BG Curtis F. Hoglan, CG, First Reserve Officer Training Corps Region, Ft. Bragg, N.C. Barr's next assignment is in Germany.

■■JUN 21-Greater Atlanta. Quarterly business meeting. Chapter elections. Ft. McPherson O-Club.

■■JUN 23-Coastal Empire. General membership meeting. Hunter Army Airfield O-Club.

■■JUN 23-Monmouth Chapter. Annual Birthday Ball; Installation of New Officers. Fisherman's Wharf.

■■JUN 24-Chicago Area. Professional dinner meeting; Bill Pollard, Sikorsky Aircraft, speaker. Midway Airport Facility.

■■JUN 24-Corpus Christi. Moonlight boat cruise. Concessions, dancing, live band on 400-passenger paddlewheeler. Flagship People's Street T-Head.

■■JUN 24-Jack H. Dibrell (Alamo). AAAA Gala golf scramble and golf awards get-together. Beer, refreshments, and prizes. Ft. Sam Houston Golf Course.

■■JUN 24-Monterey Bay. AAAA Softball Tournament and scholarship fund raising drive. Co-sponsored by the Affiliated Beverages of Salinas. Fredericks Park, Ft. Ord.

■■JUL 16-AAAA Nat'l Board. Quarterly business meeting. Marriott Crystal Gateway Hotel, Arlington, Va.

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SIGNATURE

A 73-page special look at a major U.S. Army modernization effort

The U.S. Army CH-47 Modernization Program

ON 28 February 1983, the 101st Airborne Division received its first modernized D model CHINOOK. With the improved drive, hydraulic, electrical, advanced flight control systems (AFCS), avionics, fiberglass rotor blades, and multi-cargo hook load suspension system incorporated into the CH-47D, our tactical capability will certainly benefit from this modernization program.

Mechanical improvements translate into improved reliability, maintainability, and mission effectiveness. The multi-hook system permits movement of outsized external cargo at speeds in excess of 115 knots, compared to the present limit of 40 to 60 knots. The hydraulic system has approximately 200 less tubes and hoses which has eliminated over 650 potential leak points. The AFCS significantly reduces pilot workload during all flight profiles. With night vision goggle compatibility and improved survivability, the CH-47D, without question, provides greater combat support to the battlefield.

During testing, the CH-47D demonstrated its operational potential by carrying the M-198 Howitzer, Roland missile fire control unit, road scraper, five-ton truck and rough terrain forklift. Division and Corps commanders now have a quick response capability

by Brig. Gen. Ellis D. Parker

with a versatile aircraft where speed is not restricted by the characteristics of the load.

The CH-47 Modernization Program has been well managed and will provide the Army with a much improved aircraft during the 1980s. IIIII

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by Joseph P. Cribbins

Realizing the true potential of the CHINOOK

I have been associated with the CHINOOK since it was first developed and fielded in the early 1960s. I can remember many of the problems associated with concurrent development, testing, and fielding since we did just that with the early series CH-47A when we deployed a CHINOOK Battalion to Vietnam with the 1st Cavalry Division in 1965.

Any problems we may have experienced with the early CHINOOK were more than compensated for. Here was a new state-of-the-art helicopter that could carry sizeable loads of people and things over the battlefield interchangeably in the roles of combat, combat support, and combat service support.

I can remember instances where the CHINOOK carried a sling load of **Petroleum, Oil and Lubricants (POL)** or ammunition out to our troops in the combat area and on the return trip evacuated Vietnam villagers, their families, and their animals to a safe haven.

Now, 20 years later, we are realizing the true potential of the CHINOOK with the modified CH-47D. This helicopter incorporates all we learned about safety, reliability, availability and maintainability while operating nearly two million flying hours, most of them in combat.

The CH-47D will be one of the most valued aircraft in the Army inventory. In peace or war, it will accomplish the airlift missions only it can do. IIIII

ABOUT THE AUTHOR
A recognized authority in Army Aviation logistics, Joseph P. Cribbins serves in the Office of the Deputy Chief of Staff for Logistics, Dept. of the Army.

APM Filter Modules: In
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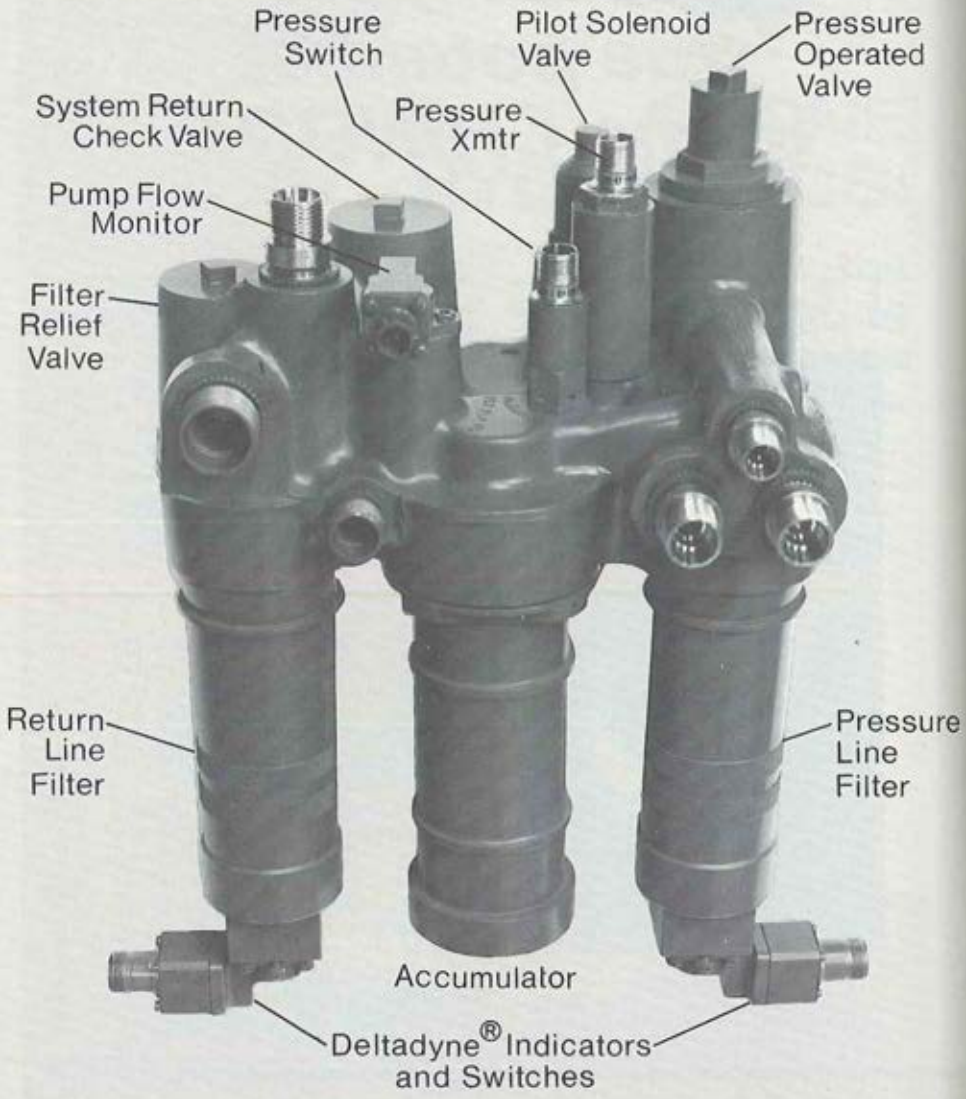

Power Control Module — Just one of seven APM Filter Modules on board the CH-47D

nportant Protection for the stems on Boeing-Vertol's CH-47D

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by Maj. Gen. Story C. Stevens

Development is more than Engineering

ABOUT THE AUTHOR
Major General Story C. Stevens is the Commander of the U.S. Army Aviation Research and Development Command located in St. Louis, Missouri.

IN past articles I have concentrated on the engineering aspects of the CH-47D development process as that was where the technology was being introduced to the fielded Army and where the high visibility issues were. Our engineering successes have led to significant improvements in CH-47 performance, **Reliability, Availability, and Maintainability (RAM).**

Logistics: The cornerstone

As engineering and technology matured into the final configuration and the aircraft entered production, the products of heretofore unsung and behind-the-scenes people began to emerge. These were the logisticians. The CH-47D logisticians were hard at work alongside the engineers at an early date, understanding the pros and cons of this greatly improved helicopter and its impact on the technical manuals, training and training devices, provisioning, **Test Measurement and Diagnostic Equipment (TMDE),** supply and maintenance system, depots, and transition into the various field units.

Though logistics was an equal part-

ACCEPTANCE—Shown, l-r, at the Feb. 28 initial CH-47D turnover at Ft. Campbell, Ky., to the 159th Avn Bn are LTC Paul L. Joplin, Cdr, 159th; COL Dewitt T. Irby, Jr., PM, CH-47D Mod; MG Story C. Stevens, CG, AVRADCOM; MG Charles W. Bagnal, CG, 101st Abn Div (AA); Joseph Mallen, Pres., and William P. Jones, Director Helicopter Programs, Boeing Vertol Co.; and COL Rodney D. Wolfe, Cdr, 101st Aviation Group.

ner with engineering throughout development, it moved to the forefront during maturity and became the cornerstone of all decisions as we entered production. This magazine issue repeatedly tells the success story of the proper way to field a new aircraft system, a story that will become the standard to follow for future aircraft systems.

The many "firsts"

I am proud, and I know other Army aviation supporters will be also, of the way **COL Dewitt T. Irby** and his predecessors, **BG James M. Hesson,** and **COL Terry L. Gordy, Ret.,** and all members of the AVRADCOM team have accomplished the many "firsts" achieved and demonstrated by this program. Accomplishments such as the development of highly detailed, easy to use **Skill Performance Aids (SPAS)** manuals, intensive training, 100% of **Authorized Stockage List/Prescribed Load List (ASL/PLL)** on-site, all tools and TMDE on-site prior to delivery of the initial fielded aircraft, and all trainers and training devices on contract and on schedule. Quite an achievement. This integrated and intensive teamwork by managers, engineers, and logisticians to accomplish the very difficult tasks of developing and fielding a new aircraft system is what **USA Aviation Research and Development Command (AVRADCOM)** project management is about. We deliver! IIIII

by Colonel Dewitt T. Irby, Jr.

The CH-47D: Combat Ready!

IN the mid-70s, the Army was faced with an aging inventory of **medium lift helicopters (MLH).** As indicated by **Figure 1,** fleet washout, based on the standard 20 year retirement life, would effectively occur by the late 1980s.

ABOUT THE AUTHOR
Col. Dewitt T. Irby, Jr., now assigned to the War College, served as the PM, CH-47 Modernization, at the time this issue was prepared for publication.

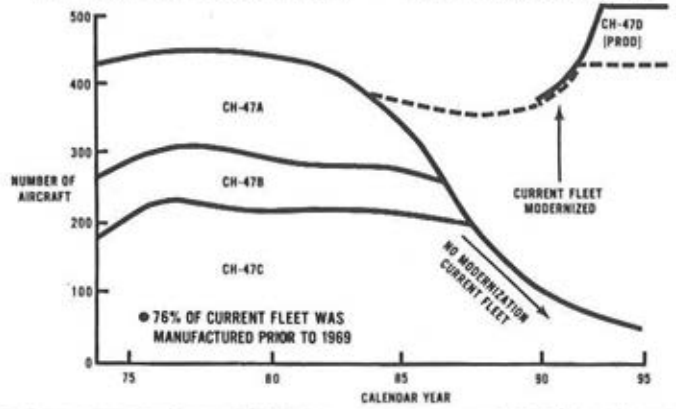
The Army determined that the most cost effective method to retain the required medium lift capability would be to modernize existing fleet assets. The broken line reflects the approved CH-47D Modernization Program of 436 aircraft. The solid line reflects procurement of new CH-47D aircraft to achieve the **Authorized Acquisition Objective (AAO)** of 518 aircraft.

Why the "D" succeeds

The CH-47 Modernization Program Full-Scale Engineering Development Phase was a tremendous success. It was completed under cost, ahead of schedule, and met or exceeded every technical performance requirement. The Initial Production Phase has shown every evidence of being just as successful. Production costs are within budget. Production testing has confirmed the adequacy of corrective actions identified as the result of prototype testing. Production aircraft have successfully demonstrated that all program objectives will be realized and that **Reliability, Availability, and Maintainability (RAM)** characteristics will be met or exceeded.

The bottom line measure of program

FIGURE 1 — WHY THE "D"? EXTENDED FLEET LIFE BY MODERNIZATION — LIFE EXTENSION



success is system performance and readiness in the hands of the operational user. Successful fielding of the CH-47D, including 100% of its required logistics support elements, at Fort Campbell, KY, in February was a very positive first step.

How did we get here?

My objective here is to share some of the practical experience from the CH-47 Modernization Program — specifically, our demonstrated success in integrating both technical and readiness objectives into the development program. I will address the following key points, each of which was essential to program success:

- Development of Readiness Oriented Requirements.
- Management of the Development Program.
- Preparation for Fielding.

Development of Readiness

To assure the integration of readiness consideration into the development effort, it is vitally important that the Government do its homework. While it may sound like an old cliche, we must establish reasonable performance and readiness oriented requirements. This requires close coordination between the user and the developer to understand and thoroughly define the program baseline.

The CH-47 Modernization Program is the result of the Army's requirement to sustain a reliable medium lift helicopter capability through the year 2000. **Figure 2** presents the basic program require

FIGURE 2 CH-47 MODERNIZATION REQUIREMENT

- **EXTEND EXISTING FLEET LIFE**
- **ACHIEVE MIN. LIFT CAPABILITY—15,000 LB**
- **ATTAIN SUBSTANTIAL IMPROVEMENT**
  - **—RAM**
  - **—FLIGHT SAFETY**
  - **—PAYLOAD CAPABILITY**
  - **—VULNERABILITY REDUCTION**
  - **—ENHANCED SURVIVABILITY**
- **MINIMIZE DEVELOPMENTAL RISKS**
  - **—INCORPORATE EXISTING TECHNOLOGY**
  - **—MODERNIZE EXISTING AIRCRAFT VS NEW DEVELOPMENT EFFORT**
- **REDUCE OPERATING AND SUPPORT COSTS**
  - **—IMPROVED RAM**
  - **—RETAIN FLEET COMMONALITY**

ments. The technical program requirements are basically consistent with existing CH-47C performance. The key technical objective was to upgrade the existing fleet to meet the Army's required 15,000 lb. mission payload capability through remanufacture of existing CH-47 fleet assets and incorporation of proven state-of-the-art technology that will reduce **Operating and Support (O&S)** cost while improving RAM.

To satisfy the needs of a readiness oriented development program, the RAM requirements and their supporting program must meet certain basic criteria:

- The requirements must be simple and clear.
- Requirements must be mutually understood (and accepted) by both the Government and the Contractor.
- There must be a firm commitment by both parties at the highest level of management. This commitment must be supported by a well defined, executable program.
- The supporting program must contain provisions for assessment including intermediate milestones.
- There must be motivation to stimulate the Contractor to strive to achieve program goals, not merely to meet minimum requirements.

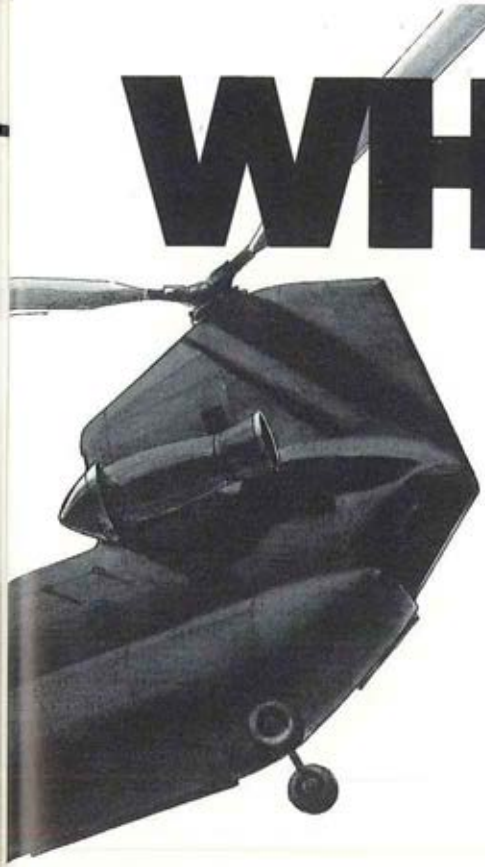
The contractual RAM performance parameters are quantified in **Figure 3.** The CH-47C baseline is provided for reference. These parameters encompass the logistics elements which most influence total O&S cost.

- System Operational Reliability, by measuring the total unscheduled maintenance requirement, describes maintenance personnel requirements by quantity and type.
- Hardware System Reliability measures the removal rate for **Line Replacement Units (LRU),** thus defining the supply support requirement.
- Mission Affecting Reliability measures system effectiveness and operational availability.
- Maintenance Man-hours per Flight Hour combines the total scheduled and

FIGURE 3—RELIABILITY AND MAINTAINABILITY PROGRAM OBJECTIVES

	Baseline CH-47C	Requirements Threshold	Requirements Objective	Current Estimate
RELIABILITY*				
System Operational Reliability	.79	1.10	1.40	1.33
Hardware System Reliability	2.07	2.20	3.00	3.58
Mission Affecting Reliability	15.16	39.50	49.50	46.70
MAINTAINABILITY**				
Aviation Unit Maintenance	14.22	11.65	10.83	10.83
Aviation Intermediate Maintenance	5.17	4.59	4.27	4.27
Totals	19.39	16.24	15.10	15.10

*MEANTIME BETWEEN FAILURE; **MAINTENANCE MANHOURS PER FLIGHT HOUR



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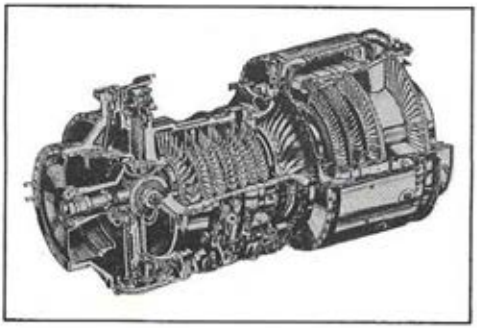

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unscheduled maintenance burden expressed in terms of flight hours and serves as the basis for developing **Table of Organization and Equipment (TO&E)** personnel requirements.

These RAM improvements are based on a detailed understanding of the CH-47C baseline and the changes and improvements incorporated in the CH-47D design. Each parameter is supported by intermediate objectives keyed to critical development and initial production milestones.

To assure mutual understanding of these requirements and to provide a basis for assessing progress, a substantial investment was made to develop a CH-47 baseline. This effort covered almost a two year period and involved over 2,100 flight hours of detailed data collection. Throughout this effort, the major contractors were directly involved (and funded) in the review, analysis, and development of the baseline.

Development Program

The key to success in any weapon system development effort is cost control. Life cycle cost has three major elements: development, acquisition, and O&S costs. Much has been said and written about the first two elements. I will concentrate on the CH-47 Modernization Program approach to understanding and controlling O&S costs as a development objective.

Neither the Project Manager nor the Contractor can determine or directly control all of the cost factors affecting future O&S costs. However, it is possible to identify and control those factors which most influence or drive O&S cost. For the CH-47 Modernization Program, RAM was a major cost driver. Through design, development, and test, the Contractor can:

- Reduce the potential quantity of spares required to support a system at a

SUPPORT—The CHINOOK Delta model can lift six blivets (3,000 gallons of fuel) that weigh almost ten tons.

given level of availability.

- Design to reduce the frequency of both scheduled and unscheduled maintenance.
- Reduce the quantity of maintenance personnel and their associated costs.

The CH-47 Modernization development program was based on three key management thrusts directed toward achievement of readiness objectives and control of O&S costs.

First — Award Fee Incentive

The CH-47D Award Fee Program emphasized attainment of low life cycle operational and maintenance costs through the major cost drivers of improved RAM. The Award Fee Program was divided into four evaluation periods with increasing funds available for each period. The evaluation periods generally coincided with specific development efforts. The first period was primarily paper design and limited specimen test. The second period was final design and prototype hardware fabrication. The third period included component and qualification testing ending with contractor flight test. The fourth period concluded with Government **Developmental Test/Operational Test II (DT/OT II)** demonstration of RAM.

The Award Fee Program and, specifically, each period's evaluation criteria were used by the first Project Manager, **COL (now BG) Jim Hesson,** to assess, evaluate, and direct contractor development efforts. As such, this effort became an indispensable management tool and a major contributing factor to completion of the development effort on schedule and within cost while meeting or exceeding all performance requirements.

Second — Reliability Growth

Reliability growth was used as a management tool to define test requirements and to assess actual progress. Shown below are the program test objectives:

- Identification of failure modes.
- Development of corrective action.
- Incorporation and demonstration of corrective actions.
- Development of technical/logistics data base.

The Test Program was separated into three major phases: DT/OT II, RAM Growth/Maturity, and Initial Production testing. This Test Program was developed and funded to support the primary program objective of reducing O&S cost through demonstrated RAM improvements by implementing an aggressive test-fix-test cycle. Each phase included pauses specifically designed to allow for incorporation of design changes and corrective action.

Two key points should be made here concerning the significance and effectiveness of the corrective action effort. First, key Boeing Vertol personnel devoted time and effort to identify and resolve failures on first occurrence rather than delay until patterns were established. Secondly, Boeing Vertol top management committed management reserve dollars to design, fabricate, and incorporate fixes early in the Test Program. This resulted in significant component reliability improvement and fewer failures during DT/OT II. For example, contractor qualification testing of hydraulic subsystems components produced 61 failure analyses. Early fixes of these problems resulted in 27 failure analyses requirements during contractor flight testing and only 6 during Government DT/OT II.

Component development testing of almost 27,000 hours and prototype testing of over 2,200 flight hours have demonstrated solid reliability characteristics. These demonstrated values have increased program confidence in the engineering estimates used to develop

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spares budgets and to support other logistics planning requirements.

Ongoing production testing (400 flight hours) is designed to confirm various production performance characteristics including RAM and to verify limited production changes. In addition, we are establishing through the **USA Troop Support and Aviation Materiel Readiness Command (TSARCOM),** an extensive field data collection program to determine and to evaluate the impact of troop maintenance and operational use on demonstrated performance and reliability. This "green suiter" factor must be quantified and fully understood if we are to achieve and maintain system readiness objectives.

Third — Involvement

The third management thrust was the early involvement of both the **USA Training and Doctrine Command (TRADOC)** and the **USA Forces Command (FORSCOM)** in the development effort primarily through the **Integrated Logistics Support Management Team (ILSMT)** concept. The ILSMT and the associated working group meeting keyed to specific ILS disciplines provided an open forum for communication and exchange of ideas.

The first ILSMT meeting was held June 30, 1977 less than one year after prototype developmental contract. ILSMT meetings chaired by the Project Manager were conducted at least twice a year thereafter. The most recent, October 19, 1982, was held at Fort Campbell, KY, home of the **Initial Operational Capability (IOC)** unit. These meetings and the resolution of ILS issues through individual action reports resulted in early identification, understanding, and resolution of 59 action reports on the Prototype Developmental Progam. Eighty-four (84) action reports on production contracts were prepared, analyzed, and closed.

A HOWITZER AND AMMO MOVE OUT SMARTLY

Aggressive, dedicated commitment to logistics and readiness as an integral part of the development effort has contributed to program success and our stable program posture as we initiate system fielding.

Preparation for fielding

Finally, to achieve and maintain readiness objectives, it is essential that planning and managing for fielding be done with the same intensity and detail as exercised during the development effort. This necessitates hard work and close coordination with the gaining command. Successful fielding is dependent not only on the Project Manager's ability to deliver materiel, but also on the gaining command's ability to receive and assimilate the new materiel into its operation.

Our formal coordination with the user

began with staffing of the draft **Materiel Fielding Plan (MFP)** in December 1980. The MFP was distributed in May 1982 with a final update in September 1982. These formal documents were preceded and supplemented with numerous coordination and review meetings dating back to early 1979.

The CH-47D **Materiel Fielding Team (MFT),** headed by **MAJ Robert Markham,** has been on-site at Fort Campbell since October 1982. This has allowed for direct interface and coordination with the gaining command on a daily basis. The MFT is performing as the control point for consolidation and distribution of initial **Authorized Stock Level/Prescribed Load List (ASL/PLL),** ground support equipment, publications, and associated support requirements. In addition, the MFT has assisted the gaining organizations to inventory and order common support items required to support fielding. The MFT was placed in the field early to assure that my objective of 100% supportability was achieved. It will remain active as long as required to assure initial fielding is followed up with continuing support.

Ingredients for success

As we began to deploy aircraft, we looked back over the efforts of my distinguished predecessors and the combined Contractor/Government team. We see some things we could have done better, but the bottom line is that the program is a successful acquisition. The CH-47 Modernization Program has demonstrated that the Army's well structured acquisition process from research and development through production works. To assure integration of readiness considerations into the development effort, it is vitally important that the Government do its homework well. We must establish reasonable requirements that relate technical development to life cycle logistic support objectives. We must understand and define the program baseline. Finally, we must assure incorporation of advanced, but proven technology.

During the development phase, we must stress readiness both in word and in action and back it with strong management of the design process. Innovation, both in hardware design and support planning, is a key contributor to improving readiness. At the same time, conservatism in design analysis, predictions, and initial support must be used to allow for the unknowns which jump up when least expected. All of this can be summed up in my strong conclusion that logistics, particularly the cost drivers of reliability and maintenance planning, be given equal consideration with technical design objectives.

Conclusion

Finally, we must plan and fund to support testing and provide for specific pauses in the process to incorporate fixes. Management effort directed toward these intervals has caused significant dividends to this program. This effort must be carried into the production program. Test the production article both in test facilities and in the field. Get that data, understand it, but don't change just because it seems like a good idea. We are planning for a specific cut-in point for block improvement, and in the interim we will maintain configuration stability.

Teamwork, meticulous management, and determined configuration stability result in success and the delivery of a ready, sustainable system. The bottom line is support to the ground commander with a more productive, reliable, survivable, and maintainable MLH. The CH-47D CHINOOK is fully supportable and ready to take its place with the BLACK HAWK, COBRA, and APACHE as a critical element of today's and tomorrow's Army. IIIII

SUCCESS STORY.

TITAN APU POWER AND THE NEW CHINOOK

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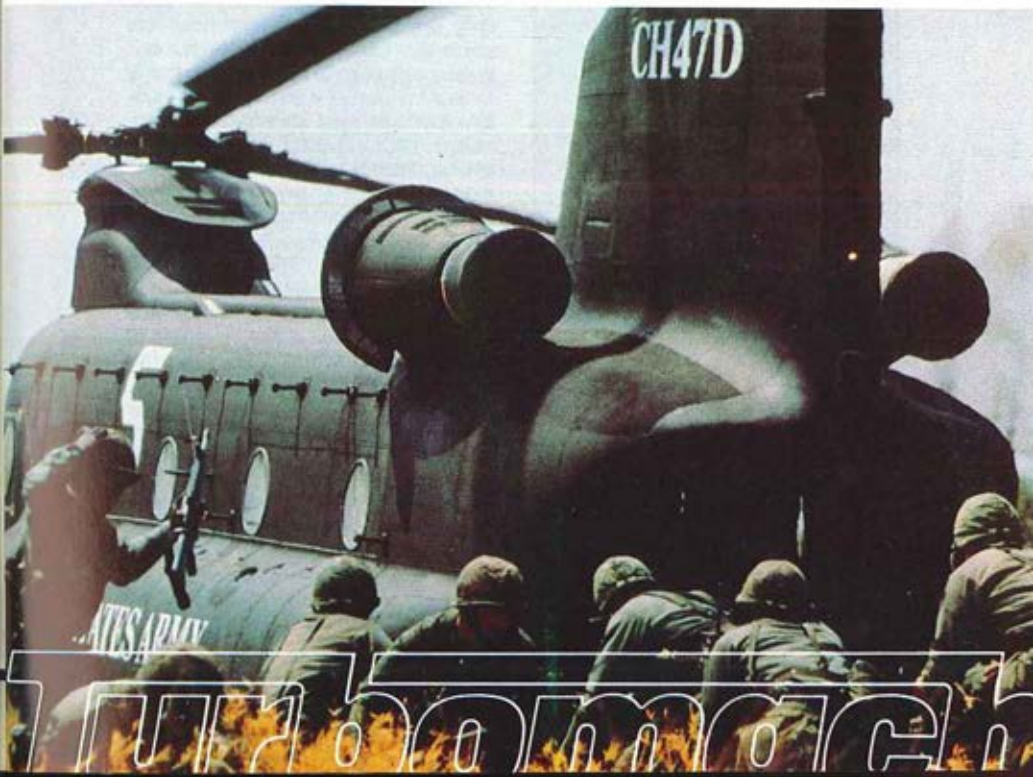

by Chester Schroer

Teamwork is the answer

A major factor of combat readiness is the availability of modern, effective, and supportable weapon systems. How does an Army Program Manager develop and deploy such a system on time and within the budget? **That is the question.** The CH-47 Modernization Program is a case worthy of review in the search for the answer.

The development and production of a totally new system was impractical because of austere budgets and the time factor involved. The existing fleet of medium transport helicopters would be obsolete and maintenance burdened before a new aircraft could be delivered. At the same time, the emphasis on operating and support costs demanded fuel efficiency, ease of maintenance, and greater reliability. A decision was made to take the best of a combat proven system, add the latest state-of-the-art technology, and remanufacture the existing aircraft. The CH-47D has demonstrated major advances in performance, maintainability, and sustainability.

The CH-47 Modernization Project Manager assembled a team of experts in program management, logistics, engineering, testing, contracting, and related disciplines to work under his personal supervision. An **Integrated Logistic Support Management Team (ILSMT)** was organized, which drew on the knowledge and experience of the testers, trainers, supporting commands and agencies, and evaluators. The ILSMT meetings were dynamic affairs. Problems and concerns were aired, at times heatedly, but this was primarily a working group, and solutions were derived and tasks assigned to keep the program on-track. The development of a major system is not a spectator sport. The mem-

ABOUT THE AUTHOR
Chester Schroer is an equipment specialist assigned to the U.S. Army DARCOM Materiel Readiness Support Activity (MRSA).

bers of this team were constantly aware of the program objectives — to meet all requirements, on time, and within budget. Who will forget the PM's oft-repeated notice that he would open the world's biggest parking lot rather than field an aircraft that was not supportable by the user?

Unique approaches to system evaluation and problem solving were hallmarks of the CH-47 Modernization Program. Updated engines, drive systems, and fiberglass rotor blades were tested on CH-47Cs concurrently with the development of the D model. **Reliability, Availability, and Maintainability (RAM)** data was collected on C models concurrently with the prototype D aircraft to verify the achievement of program objectives long before initial operational fielding.

"New look" for pubs

Maintenance publications presented a major challenge. The publications for the B and C models were programmed for upgrade to the "new look" format prior to the fielding of the CH-47D. If this project were accomplished on time, only changes to reflect D-unique modifications would be required, resulting in considerable savings for the Modernization Program. This effort fell by the wayside, and the **Project Manager's Office (PMO)** was forced into an effort to lead the fleet in the publications area. A concentrated effort by specialists from the **USA Materiel Development and Readiness Command (DARCOM),** the **Materiel Readiness Support Activity (MRSA),** the **USA Troop Support and Aviation Materiel Readiness Command (TSARCOM),** the **USA Training and Doctrine Command (TRADOC),** and the PMO provided fully validated and verified draft manuals prior to the first delivery to Fort Campbell, KY.

A **Logistic Status Review (LSR)** was completed by MRSA in May 1980. Logistic support elements were identified which posed potential problem areas which could affect the fielding schedule. The findings were presented to the PM and Headquarters DARCOM. The major findings did indeed develop into pacing concerns which required exceptional management attention and unified efforts by several agencies for resolution. The payoff of the LSR and related evaluations culminated in the timely fielding of the CH-47D accompanied by a fully adequate support package.

The Materiel Fielding Plan, in itself, was yet another example of exceptional effort by the PMO. The document was prepared with the active participation of the gaining unit and MRSA prior to publication. This document is deservedly a model for future system fielding planning. The plan was prepared according to current guidelines and with full consideration of specific user circumstances and requirements..

Fielding the total system

A major lesson from the CH-47 Modernization Program is that logistic supportability is not a miracle or luck, but rather the product of a team effort where every member of the team knows the schedule, the rules of the game, and shares a determination to win. The CH-47D effort was successful because management efforts at all levels were directed to the fielding of a total system, rather than a piece of hardware.

How does an Army program manager develop and deploy a modern, effective, and supportable weapon system? The CH-47D answer is effective management, utilizing a competent DARCOM/ USA Forces Command (FORSCOM)/ TRADOC team working together for a common goal. It takes teamwork to win.

by Maj. Gen. Harold I. Small

Bringing the user in early in the process

ABOUT THE AUTHOR
Major General Harold I. Small served as the Commanding General, USA Transportation Center and Ft. Eustis, at the time this article was prepared.

THE **USA Transportation School (TSCH),** proponent for the CH-47 Helicopter (CHINOOK), included the aircraft's ultimate first user, the 101st Airborne Division (Air Assault), early in the planning stages of training development for the D model. This is the first time in any major development program that the user was included throughout the developmental cycle.

Though the user has normally been brought into the development process at a training session just prior to receiving the new equipment, the 101st Airborne Division was involved in development from the test and development stages through aircraft delivery.

This early involvement allowed the using unit to provide valuable input to both training and aircraft development prior to **Initial Operating Capability (IOC).**

Early user involvement insured that the resident training base was properly equipped with tools, equipment, devices, and maintenance-training aircraft — both Category B and flyable.

Most important to the soldier in the field, all CH-47D technical manuals

were verified for accuracy and usability.

Early user involvement allowed soldier training to start at the TSCH prior to delivery of the first helicopter to the 101st Airborne Division. Soldier mechanics and their supervisors exposed to the training development process were able to make suggestions from the user's viewpoint. This user input will insure that training conducted in the field meets the soldier's needs — an especially critical requirement in the allied trade skills.

Close working ties

Another first for the CH-47D Modernization Program was the close working relationship between the Army and the Contractor. TSCH worked with Boeing Vertol to develop a training program which would both insure adequate skills and knowledge to support the CH-47D and encourage user maintenance requirement input.

The "D" was the first training program in which the Contractor developed the training task list with TSCH guidance.

A multi-benefit action

The significance of the training task list being Contractor-developed is that it can be developed along with the maintenance engineering analysis and will reduce the time for the start of resident course development. Training task analysis developed early also provides a more accurate description of training devices.

Early involvement by the user in the CH-47D Modernization Program has insured the development of a fully supportable helicopter, as well as an adequate training base with supply support and accurate and usable technical manuals, special tools, and test measurement and diagnostic equipment.

UP AND AWAY!—The CH-47D CHINOOK lifts four Vulcan guns (six tons) during tests conducted at the Yakima Firing Center.

by Major Edward H. Grazier

The D's Composite Trainer

THE CH-47D Composite Trainer is the most sophisticated aircraft maintenance training device yet developed for the maintenance training of Army aircraft.

The composite trainer will provide the **USA Transportation School (TSCH)** the capability to teach a large number of students simultaneously due to greater accessibility and visibility of components, systems and systems interrelationships. The trainer system will be utilized by the TSCH to instruct technicians and flight personnel in the maintenance disciplines required to support the CH-47D. Students will be able to routinely perform operational checks, adjust, troubleshoot, and locate and repair faults in the CH-47D systems. The trainer provides a realistic environment to teach maintenance personnel diagnostics and servicing of the CH-47D **Auxiliary Power Unit (APU),** engine, fuel control, flight control hydraulics, rotary wing heads and blades, power train, fuel system, and cargo system.

ABOUT THE AUTHOR
Major Edward H. Grazier serves as Project Officer, CH-47D Training Development, at the U.S. Army Transportation School, Fort Eustis, Virginia.

The trainer will be used in 67 Medium Helicopter Repairer; 68B Power Plant Repairer; 68D Power Train Repairer; 68F Aircraft Electrician; 68H Pneudraulic Repairer; 66U Medium Helicopter Technical Inspector; and 71A/100CG Aircraft Maintenance Officer Programs of Instruction. One trainer will be built for and used exclusively at the TSCH of Fort Eustis, VA.

The trainer will be able to portray all operations of the CH-47D systems. The system will be displayed in such a manner that normal functioning conditions can be observed by the student. Actual

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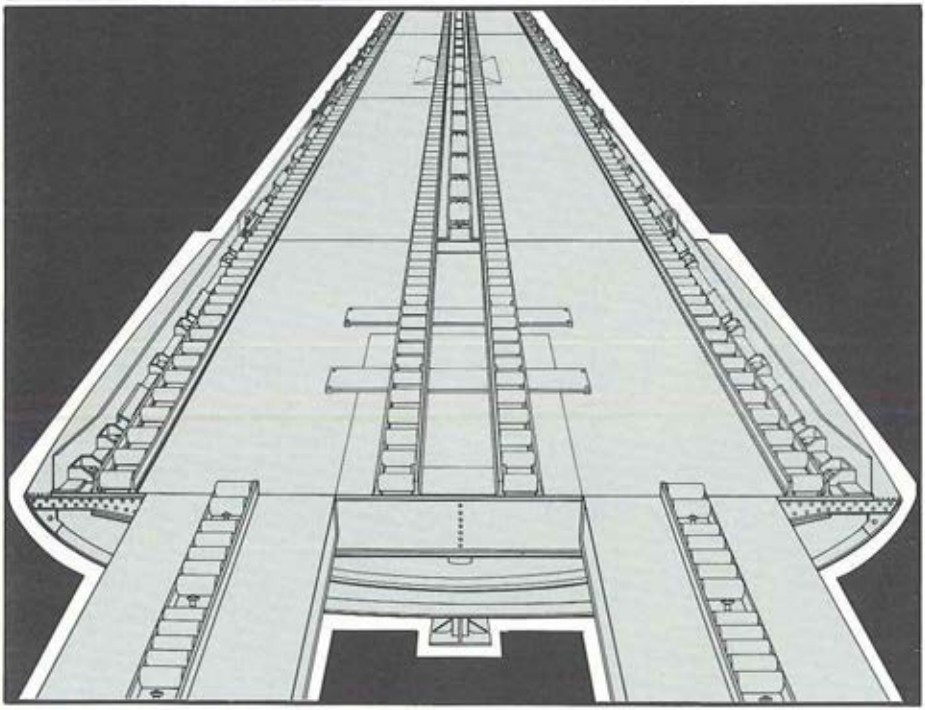

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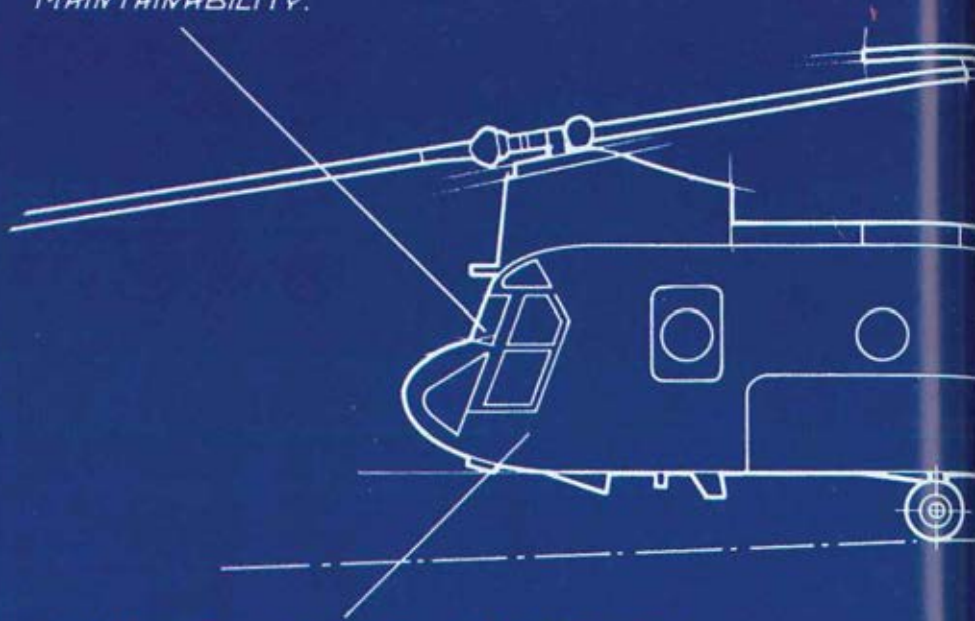

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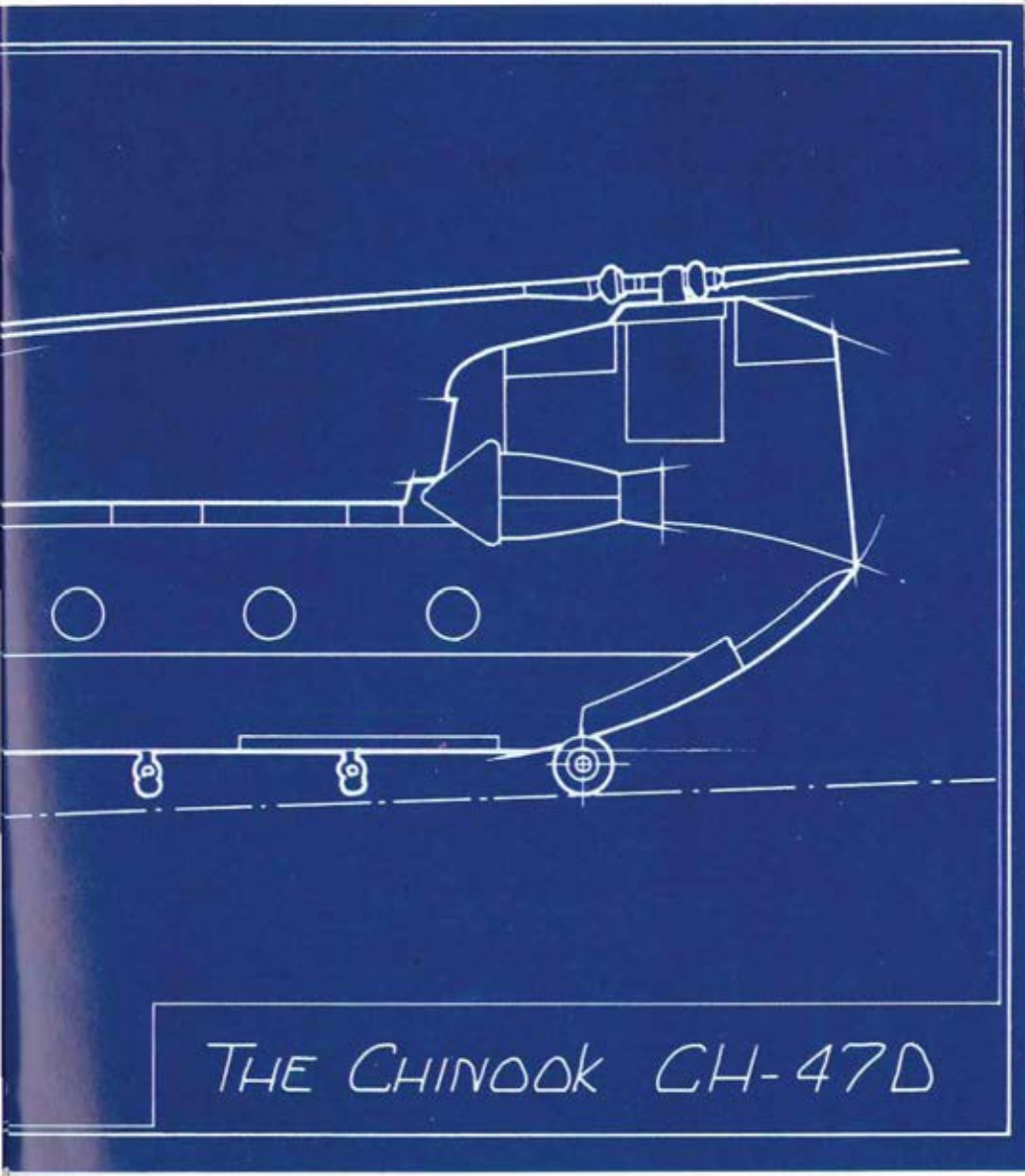

Together, we can find the answers.

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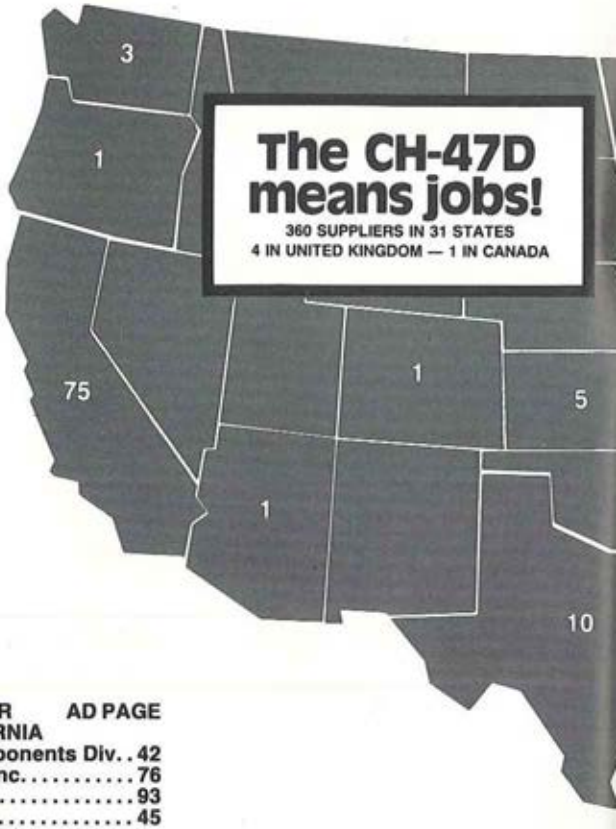

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or simulated components will be incorporated so as to illustrate the interaction and coordination within the systems.

Incorporated in the trainer will be all meters and gauges which function in an authentic mode in order that students can observe a normally operating system. Noise levels of the trainer will not exceed that which will require hearing protection.

There will be 385 faults which can be demonstrated on the trainer. The malfunctions will be programmable into the trainer to include on-trainer fault indicators. Corrective action of a malfunction will result in a corresponding on-trainer indication. Malfunctions which can be demonstrated on the trainer correspond exactly to CH-47 maintenance manuals. No special texts or trouble-shooting procedures are required.

Four distinct systems

The CH-47D Composite Maintenance Trainer has four separate and distinct systems. The main system is the aircraft system. The CH-47D helicopter being modified is CH-47 Serial Number: 76-18479. It began life as a CH-47B, then was converted to CH-47D, Prototype Number 2. It has now been modified further for trainer use and updated to the production configuration.

The computer system will accept control inputs, perform a real-time solution of the trainer system mathematical model, and provide outputs necessary to accurately represent the static and dynamic behavior of the respective CH-47D helicopter systems. The computer system used to control the trainer is a Digital Equipment Corporation VAX/11-730 computer with two megabites of prime memory. The VAX is a fully supported system with disc and tape back-up.

The interface system is the communications and control link between the computer system and the aircraft system. It also includes the instructor's console, trainer intercommunications, emergency shutdown, power (electrical and hydraulic) control and monitoring, and other subsystems.

The interface system accepts analog and digital signals from the aircraft systems, formats, and stores the data in memory for computer access. The interface system also interrogates the memory for computer-generated commands and converts them to aircraft system faults and displays. The instructor, through the use of the control console and computer, creates and displays aircraft faults. The instructor has total control of the trainer systems. The interface system is provided by the Boeing Vertol Company.

The CH-47D Composite Trainer support systems include those items furnished by the Government and Boeing Vertol. The support systems include hydraulic and electrical power units, facilities, and the power distribution subsystems.

Systems which are supported on the composite trainer are the APU, engines, transmissions, drive systems, rotors, flight controls, electrical and hydraulic systems, fuel system, including single point refueling, and the utility system.

The composite trainer is being procured by the CH-47 Modernization Project Manager. The total cost of the trainer is approximately $19.3 million; $9.4 million for conversion of the aircraft, $9.0 million for Government Furnished Equipment, including the aircraft, $.90 million for facilities at Fort Eustis, and training costs of $94,800. The trainer is scheduled to arrive 1 January 1984. It will be assembled, checked out, and training will be conducted for operator and maintenance personnel. The trainer will be ready for training in April 1984, and will begin supporting the CH-47D resident training base in July 1984. IIIII

by Maj. Gen. Charles W. Bagnal

Improved mission accomplishment

ABOUT THE AUTHOR
A veteran aviator, Major General Charles W. Bagnal is the Commanding General of the 101st Airborne Division (Air Assault) at Ft. Campbell, Kentucky.

WE at the 101st Airborne Division (Air Assault) are very pleased to be receiving the CH-47Ds. During the capabilities demonstration of our first CH-47D, it was most impressive to see the D carry the combined loads of a B and C.

When viewed from a mission accomplishment standpoint, the new CHINOOK will, in effect, double the medium lift capability of the Air Assault Division and save maintenance and flight hours. Further, with the new CH-47D **Night Vision Goggle (NVG)** compatibiltiy, our CHINOOKs can be fully integrated into night Air Assault operations with the Division's other aircraft.

Without question, the D's state-of-the-art technology and resultant increased lift capability will greatly enhance our Medium Lift Helicopter Battalion's ability to support the Division on an "around-the-clock" basis, with increased payloads. An Air Assault soldier is such only when he has the airframes to support him. The CH-47D will improve our battle capability as we continue to develop Air Assault doctrine and tactics for the Combined Arms Team. IIIII

by Lt. Col. Paul L. Joplin

Unit preparation and use of the "D" model

THE 159th Aviation Battalion was formed in Vietnam on 1 July 1968. Organized as the medium and heavy lift Assault Support Helicopter Battalion of the 101st Airborne Division, the Liftmaster Battalion was comprised of three CH-47 companies and one CH-54 company. In February 1972, the Battalion returned to Fort Campbell, KY, as the only CH-47 CHINOOK Battalion in the Army. Since then the Battalion's aircraft have provided support for the Division on many occasions; and the Liftmasters, true to their motto, have continued to "Press On".

ABOUT THE AUTHOR
Lieutenant Colonel Paul L. Joplin is the Commander of the 159th Aviation Battalion, 101st Airbone Division (Air Assault), at Fort Campbell, Kentucky.

The first "D" arrives

On 28 February 1983, the first CH-47D CHINOOK helicopter was delivered to the 159th Aviation Battalion, 101st Airborne Division (Air Assault). However, this was not the beginning of the Battalion's relationship with the D model. The Liftmasters had become players in the force modernization arena in August 1982, with the start of the **Initial and Key Personnel Training (IKPT)** for aircrew and maintenance personnel. The first courses were for the Instructor Pilots and Maintenance Test Pilots. These were followed in October and November by courses for airframe, electrical, hydraulics, power train, **advanced flight control systems (AFCSs),** avionics, and engine personnel. During this time battalion soldiers were participating in the **Test Measurement and Diagnostic Equipment (TMDE)** training, testing, and verification. The **Aviation Unit Maintenance**

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(AVUM) equipment verified included an AFCS Line Test Set and an **Auxiliary Power Unit (APU)** Test Set.

However, the majority of the Liftmasters were busy during that time removing forward, aft, and combining transmissions from our fleet of B and C models and reinstalling them after inspection resulting from the worldwide grounding of CHINOOKs.

There were other ongoing actions which continued into this year. Arrangements were made for the Materiel Fielding Team's arrival at Fort Campbell and their support requirements. The **Prescribed Load List (PLL)** was received with the unheard of 100% fill rate. Three of our older aircraft were prepared and turned-in to the CH-47D Modernization Program. During February our soldiers were taught to use the D model's **Skill Performance Aids (SPAS)** concept Technical Publications. The SPAS manuals were written for use on two levels. The steps for the inexperienced mechanic are spelled out in detail, while the experienced mechanic need only read the bold print. There are more visual aids used throughout the manuals and everything needed to complete the task is identified at the beginning of each task. All of this will assist in saving time and make the manuals easier to understand.

NETT in full swing

With the arrival of the first CH-47D, the **New Equipment Training Team (NETT)** came into full swing. Pilot and Flight Engineer ground school led the aircrew training while maintenance supervisors, engine, AFCS, and avionics personnel worked with the maintenance NETT. This daily training, throughout the month of March, engaged as many as 46 personnel from the battalion at any one time. As we continue to receive D models over the next few months (one per month until July, then two per month) our efforts will be directed toward continuing the training and qualification of our pilots and flight engineers. Included in that is an expanded **Night Vision Goggle (NVG)** training program. In the past, the lack of NVG compatibility in our B and C models, and the limited flight time versus refuel time for the CH-47B, caused extreme difficulty mixing CHINOOKs with other division aircraft to support around-the-clock missions.

Improved mission capability

As we look ahead, the D model, with its NVG compatibility, provides the capability for us to support the Air Assault Division on a 24-hour basis; augmenting flights of BLACK HAWKs in air assaults, conducting artillery raids, engineer equipment moves, and resupply from the **Brigade Support Areas (BSAs)** forward. Let's examine some of these missions in greater detail.

- **Air Assaults.** In such operations it is visualized that UH-60s will be used for the initial assault to secure the **Landing Zone (LZ)** with the CH-47s in subsequent lifts. One of our goals in air assault operations is to get an Air Assault Bat-

talion Task Force on an LZ in the shortest possible time, both real time and flight time. Considering the current **Allowable Cargo Load (ACL)** for the UH-60, which is 12 troops, the CH-47 can place 2½ times more soldiers in the LZ per sortie. We must all recognize this is a "peacetime" limit on the UH-60, yet the same is true for the CH-47 when you consider, in the Falklands, the British lifted 80 soldiers to an objective in a CHINOOK.

Let's look at it another way. Consider that an air assault has been augmented with CH-47s. Given a flight leg **Pickup Zone (PZ)** to LZ of 30 minutes and the fuel flow for a CH-47D (ACL 30) at 2,650 pounds/hour, and that of a UH-60 (ACL 12) at 945 pounds/hour, if the CH-47D lifted 60 soldiers it would take a total of two hours flight time and 5,300 pounds of fuel. For a flight of UH-60s, working as we have in the past, moving the same 60 soldiers would take five flight hours and 4,725 pounds of fuel. In other words, working as a team with the UH-60s the CH-47D would, in this example, reduce three hours of flight time at a cost of only 575 pounds more fuel.

- **Artillery.** The CH-47D gives us that extra lift we need to support the "Big Guns" of the 2/31st Field Artillery. The M-198s, which weigh approximately 15,700 pounds, required two CH-47s to move the gun, basic load of ammunition, and gun crew.

Also, with only a single cargo hook, the CH-47C carrying the gun had to hover while the gun crew pulled the tag line to orient the gun in the LZ before it could be landed. Now, in a single lift, the D model can carry the M-198 Howitzer, its 10-man gun crew, and basic load of ammunition — a total of 22,500 pounds. In addition, the D model's triple cargo hook system, used in a tandem configuration for the M-198, not only allows much faster enroute speeds than the single-point of the C model, but the aircraft crew orients the gun to the direction of fire during placement. Again, the D model provides the capability for superior mission accomplishment and reduced flight time.

- **Engineer.** Another mission which was all but out of reach, until now, was support for the Division's Enginer Battalion. Most engineer equipment exceeds the lift capability of the B model and the cargo hook limit of the C model. The 26,000-pound center hook capability, and the 25,000-pound forward and aft dual point load capacity of the D

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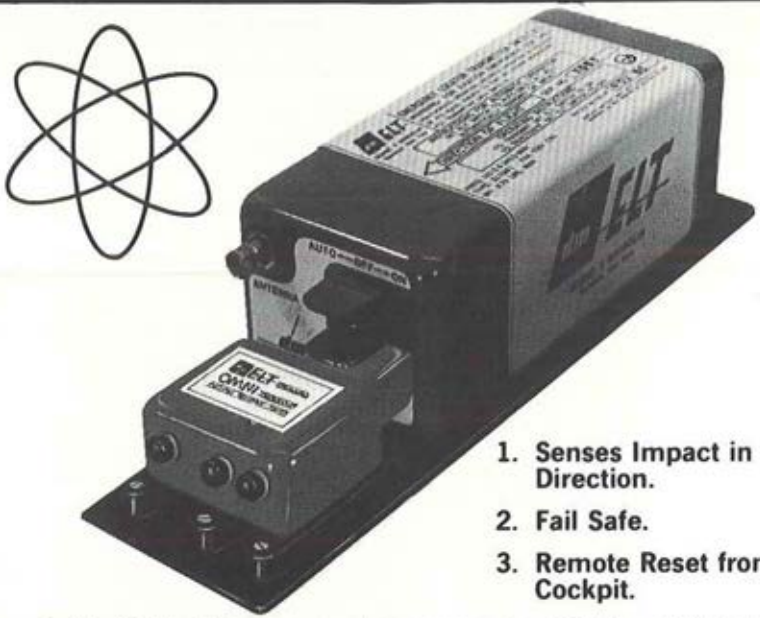

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allows us to lift most of the engineer equipment without disassembly.

For example, the CAT112F Grader (weighing 25,000 pounds) can now be carried single-point by the D model. It could not be carried in any configuration by the B or C.

The D-5 Dozer (23,000 pounds) and the TL 645 Scooploader (22,860 pounds) had to be broken into two pieces to be lifted by the C model.

The MRS 100 Tractor (26,030 pounds) and the MS Scraper (14,420 pounds), which has to be broken into three pieces to be carried by the D model, had to be broken into five pieces (4,520 pounds; 9,910 pounds; 6,130 pounds; 3,540 pounds; and, 13,370 pounds) when carried by B and C models. The savings in equipment preparation time and flight time, as well as the increased support capability, provided by the D model is tremendous.

● **Resupply.** The Liftmasters are called on for many resupply missions. However, the one that stands out over all the others is supplying fuel to **Forward Area Refueling Equipment Systems (FARES)** and **Forward Area Rearming Point Systems (FARPS).**

In the 101st Airborne Division (Air Assault) there are over 450 helicopters. As a result, the **Screaming Eagles** area of influence is fast moving and wide ranging. Carrying fuel to the FARES and FARPS of the 101st Aviation Battalion, the 158th Aviation Battalion, and the 229th Attack Helicopter Battalion is one of our most important and frequently performed missions.

Under most conditions the B model can carry only two blivets (1,000 gallons of fuel). The C model can carry twice as much as the B; but the D can carry as much as the B and C combined. It can deliver in a single lift six blivets, containing a total of 3,000 gallons and weighing almost 10 tons. That is enough fuel to refuel an entire UH-60 BLACK HAWK Company of 15 aircraft! If necessary, the CH-47D trip cargo hook system can position the load at three separate locations (e.g., two blivets at each location).

We in the 101st are convinced the CH-47D is going to have a great impact on Air Assault doctrine and tactics. The CHINOOK's versatility, coupled with the D model's increased lift capacity and state-of-the-art technology, make it a vital asset to the Division.

A new ballgame

The April 1983 issue of ARMY contains an article by **MAJ Joseph R. Finch** and **Colleen K. Holmes** titled, "Gearing Training to Modernization: A New Ball Game". Addressing the Army's force modernization program and the fielding of over 400 items of new equipment in the 1980s, the article states, "The introduction of these new systems requires training and strains available resources".

From our experience with the CH-47D in the 159th Aviation Battalion that statement is true. It is a new ball game; exciting, demanding, and one that requires a team effort. In that regard, I want to express our appreciation to some of those team players. **COL Dewitt T. Irby, Jr.,** Project Manager for the CH-47 Modernization Program, **MAJ Bob Markham,** Chief, Materiel Fielding Team, and all of those who have worked in the CH-47D project. Their support, helping us prepare for the D model, has been tremendous.

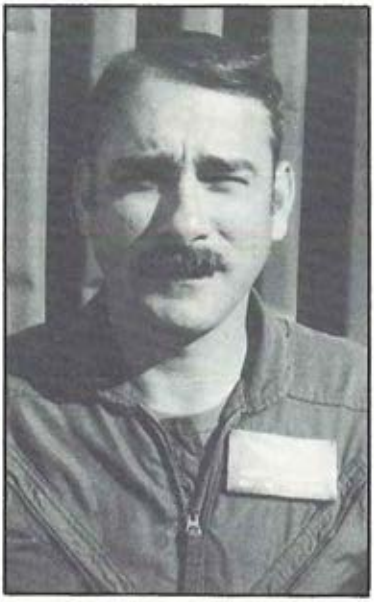
Also, to the soldiers of the 159th Aviation Battalion, my appreciation for their work over these past months, and my thanks or giving that extra 10% when it was needed.

In closing, we realize there is still much to be done in the fielding of the CH-47D, and the Liftmasters of the 159th Aviation Battalion stand ready to "**Press On.**" **Air Assault!** IIIII

by Major Robert E. Markham, II

The Materiel Fielding Team

SUCCESSFUL fielding of a major weapons system depends on the skilled execution of a multitude of management challenges. Of these many challenges, the key challenge in the fielding of the CH-47D was user involvement. This paper does not address the "superficial" involvement, most commonly encountered at structured program reviews, but rather details the extensive user community, and day-to-day involvement at Fort Campbell, KY.



ABOUT THE AUTHOR
Major Robert E. Markham, III, is Chief of the Materiel Fielding Team (MFT) in the CH-47D Modernization Project Management Office.

MFT team forms

Although user involvement began as early as January 1981, the actual involvement started four months before initial fielding in October 1982, with the arrival of the **Materiel Fielding Team (MFT)** at Fort Campbell. Through a series of meetings and inspections, the nucleus of a "team" began to form. A policy of nonattribution and a "tell it like it is" attitude set the groundwork for a cohesiveness that would develop into a total commitment by all members of the team. This type of commitment was particularly important as the team began to look for better ways to do business.

Team members understood from the beginning that spare parts were at a premium. The **Selected Essential Stockage Availability Method (SESAME)** concept employed with supply and maintenance procedures had to be changed as they were not responsive or flexible enough to accommodate

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Full-up AVIM capability

The first major issue developed as a result of the team's effort in developing a **Direct Exchange (DX)** List. In order to "best guess" the most likely DX candidates, a detailed inspection of the **Aviation Intermediate Maintenance (AVIM)** unit's production control work request register was conducted. Much to the surprise of the team members, most CH-47 components were, in fact, being returned to the **Aviation Unit Maintenance (AVUM)** offices as **non-repairable this station (NRTS).** Further investigation confirmed the fact that only a reduced AVIM capability for CH-47 aircraft existed at Fort Campbell.

Knowing that success of the "bare bones" provisioning effort was dependent on component repair capability at the AVIM level, the team members developed a plan that would provide for the complete development of a logistics package that would support a full-up AVIM capability for the CH-47D weapons system. Today that capability does exist at Fort Campbell, which, along with revised DX procedures, assures progressive and timely response to AVIM component repair of CH-47D model parts.

This user involvement was also successful in other logistics areas. The early involvement by the **Property Book Officer (PBO)** allowed for the preassigning of document numbers for all "high dollar" special tools prior to shipment from the vendor/depot. This allowed for complete in-transit visibility of tools, as well as the complete 100% accountability of all new 'D' peculiar special tools at Fort Campbell. This effort was a first not only for Fort Campbell, but also for the fielding of any major weapons system.

Another example of user involvement includes the **Memorandum of Understanding (MOU)** reached between the **Installation Supply and Services Office (ISSO)** and the MFT. This agreement, the first of its kind at Fort Campbell, assures the dedicated and committed support of the ISSO personnel in assisting the MFT with the **Automatic Return Items (ARIs)** Program. Important to the success of initial fielding of a major weapons system is the timely return of depot repairables from the installation. This MOU spells out the key responsibilities of each activity in the ARI Program and also allows for a few shortcuts that insure timely and responsive support for depot repairable components.

Another example of user involvement includes the multitude of dedicated support rendered by the **Direct Support Unit (DSU)** warehouse and the **Division Materiel Management Center (DMMC).** The key individuals in these organiza-

tions rendered selfless dedicated support that contributed to achieving 100% of the **Prescribed Load List (PLL)** and **Authorized Stockage List (ASL)** on-hand and available prior to the arrival of the first two aircraft in February 1983. This support has been key in the continued and sustained supply support of the aircraft since arrival at Fort Campbell.

Draft publications were made available to the MFT in November 1982. Although not directed, the team members began an extensive review of the manuals with particular emphasis on the AVIM component repair and troubleshooting procedures. The team reviewed the manuals and concluded that some major deficiencies existed in the crossover between the AVIM repair procedures and the troubleshooting manuals, even though a panel of DOD and industry members, as well as user representatives, had previously validated and verified these manuals.

This information was documented and routed back through the **Project Manager's Office (PMO)** for corrective action. As a result of this team effort, corrected and comprehensive manuals are available in field today.

Total success

Many other management-directed actions contributed to the successful fielding of the CH-47D at Fort Campbell; however, without total user involvement and dedication, these efforts would have achieved only the partial successes enjoyed by previous fielding efforts.

As Chief of the Materiel Fielding Team, I'd like to express my gratitude to the professional members of Fort Campbell that contributed immeasurably to this fielding effort, and especially to **CW3 Stanley Gregory** and **MSG Fred Huber**, 5th Transportation Bn, and **CW3 Dean Weithe** and **CW2 Mike Dorsett**, 159th Aviation Bn. IIIII

Going from an "A" to "D"

The CH-47D CHINOOK delivered to the **159th Aviation Battalion** at Ft. Campbell on 28 February 1983 was given a new serial number (S/N 81-23386) and a new face, that of the "D", but prior to its modernization, this particular aircraft was a CH-47A Model (S/N 66-19088) that experienced a long and active past.

The Army first took delivery of S/N 66-19088 in April, 1967. This particular "A" Model began its Army service with the **178th Aviation Company** in Vietnam and by August it had suffered combat damage.

Following field repairs, the aircraft was assigned to the **180th Aviation Support Helicopter Company (ASHC)** and resumed field operations.

In 1969, having logged 1,800 flight hours, "19088" was returned to the U.S. for High Time Depot Mainentance, It then returned to Schwaebisch Hall in West Germany in January, 1981, joining the **4th Aviation Company.**

Somewhat later it rejoined the **180th Aviation Company** for the second time, and then returned from Europe for a second tour in being assigned to the **132rd Aviation Company** at Hunter Army Airfield, Savannah, Georgia.

Finally, with 2,811 flight hours to its credit, S/N 66-19088 was inducted into the CH-47 Modernization Program in January, 1981. Now with a new serial number, new equipment and a new unit, the **159th,** this CHINOOK appears ready to do it all over again! IIIII

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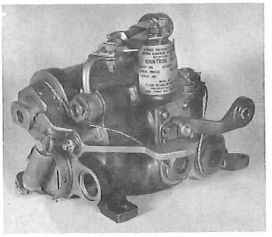

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by Colonel Dewitt T. Irby, Jr.

Fielding the CH-47D

UPON assuming the duties of Project Manager of the CH-47 Program in July 1981, I established as one of my top priorities the fielding of an aviation system that is 100% supportable.

The program had just transitioned from the full-scale development to the production and deployment phase with the initial production contract for nine aircraft being awarded in October 1980.

An overall ILS assessment

I began an assessment of the **Integrated Logistic Support (ILS)** disciplines impacting fielding, particularly training, publications, repair parts (supply support), special tools and test equipment. I was confident that the CH-47D could be operated in its intended environment if the means to maintain it were available.

This meant that the soldier had to be trained to troubleshoot and make repairs in accordance with technical publications, while using the **Peculiar Ground Support Equipment (PGSE),** special tools, and **Test Measurement and Diagnostic Equipment (TMDE)** developed for the CH-47D and to have access to repair parts and replacement components as required.

Training

We have worked closely with the **USA Training and Doctrine Command (TRADOC),** and particularly the **USA Transportation School (TSCH),** in identifying training requirements, including the need for flyable and nonflyable maintenance training aircraft, six new training devices, and a composite maintenance trainer. This last trainer consists of a modified YCH-47D, computer controlled, which operates all systems and incorporates actual and trainer peculiar components.

The system provides for normal functioning conditions as well as fault insertion and fault isolation capability. Students will use the actual aircraft technical and troubleshooting manuals to detect and correct instructor selected faults in this programmable device. The computer is a microprocessor that accepts control inputs and provides outputs necessary to accurately represent the static and dynamic behavior of the helicopter systems.

The trainer will simulate all helicopter

system functions for ground maintenance operations and will be utilized by TSCH for the instruction of technicians and flight personnel in the maintenance disciplines required to support the CH-47D helicopter.

A NETT variation

The acquisition process of a major weapon system does not allow for all training devices to be on-hand and resident training begun prior to initial fielding to an operational unit. To compensate for this, the TSCH provided a variation of a **New Equipment Training Team (NETT)** in residence at Fort Eustis for the peculiar maintenance skills required for the CH-47D.

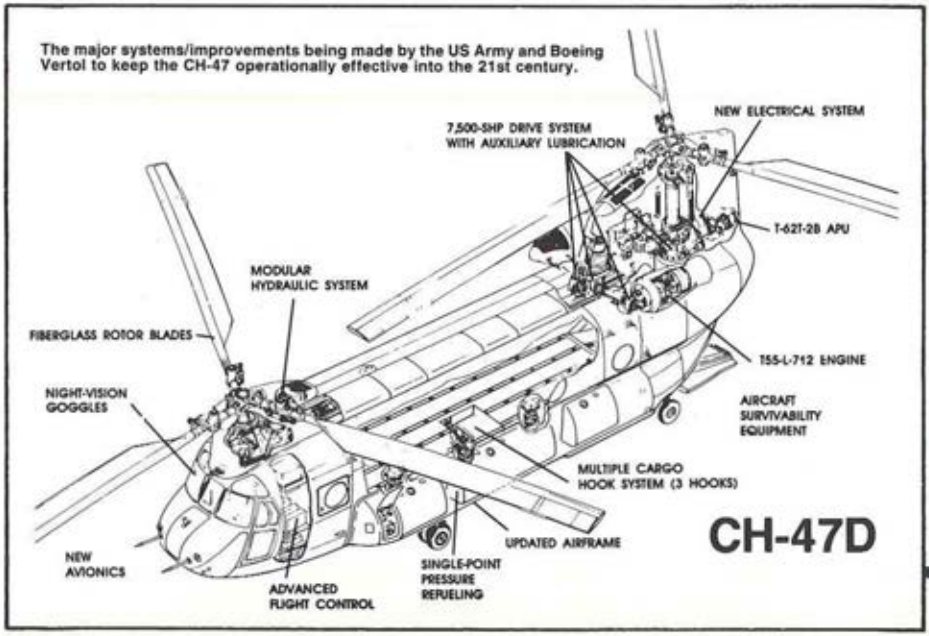
Maintenance personnel from the 101st Airborne Division were trained on actual systems of the aircraft by instructors trained at the Boeing Vertol Facility during **Instructor and Key Personnel Training (IKPT).**

This "resident training" was and still is being augmented by a NETT effort onsite at Fort Campbell, KY. Personnel from the **USA Troop Support and Aviation Materiel Readiness Command (TSARCOM), USA Communications — Electronics Command (CECOM),** and TRADOC staff this team and primarily provide aircrew transition and supervisor familiarization.

Allied shop and hands-on maintenance training is still being conducted at Fort Eustis on an as required basis prior to the start of formal **Military Occupational Specialty (MOS)** producing resident TRADOC courses. The Team's purpose is to bridge the gap between initial fielding and start of resident training.

Publications

As I stated earlier, maintenance includes troubleshooting as a prerequisite to repair to preclude the expensive and wasteful practice of unnecessary parts



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replacement. In this area we embarked in two new directions for publications; a troubleshooting manual and **Skill Performance Aids (SPA).** The troubleshooting manual commonly referred to as a T-Manual is new to Army Aviation and was introduced with the CH-47D.

It provides the procedures for **Aviation Unit Maintenance (AVUM)** and **Aviation Intermediate Maintenance (AVIM)** organizations to make logical maintenance decisions rather than simply replacing parts until the problem is corrected.

SPAs are a unique and new concept in military technical publications designed to provide maintenance personnel with a detailed task logic flow and supporting illustrations. They are written at a basic educational level to assure readability and comprehension.

In addition to providing basic maintenance direction, the format will support both classroom and on-the-job training. The basic objective is to improve field maintenance capability and ultimately improve system capability.

A good TSCH relationship

As with training, a close working relationship with the TSCH was essential to the successful fielding of these publications. During the development of the maintenance manual, TSCH provided **subject matter experts (SMEs)** to the CH-47D Project Manager for technical guidance to each manufacturer.

The Transportation School provided detailed samples of SPAs technical manuals, developed target audience descriptions of the user population, and provided the technical guidance throughout the development process. The manual development process involved approximately 10 man-years of TSCH effort.

Beginning in February 1982, and concluding one year later, TSCH, the CH-47 Modernization proponent, concluded the most comprehensive and complete tech manual verification of a major weapon system. This made the CH-47D the first weapon system to be fielded with a complete set of SPAs maintenance and troubleshooting manuals.

Some 3,500 tasks were verified hands-by the ultimate user, the soldier. Each task was reviewed for technical accuracy, useability, and compatability with the target audience soldier.

We felt that these new publications were so critical to the successful fielding of the CH-47D that I made the very unpopular decision to delay delivery of the first aircraft to Fort Campbell for approximately 45 days until complete sets of publications were available.

PGSE and TMDE

All PGSE and TMDE items were assembled and provided to Fort Campbell in push packages prior to fielding of the CH-47D helicopter. This group of PGSE/TMDE included 38 AVUM items, 29 AVIM items, four TMDE items and three items required for air transportability of the aircraft.

All of us are particularly proud of completing extensive testing by the USA Aviation Board and obtaining type classification standard for all items of TMDE before delivering the first aircraft to an operational unit. I made this one of our major objectives after being on the receiving end of lesser efforts while commanding an AVIM Battalion in Europe.

We were also determined that we would not saddle the gaining unit with having to manufacture or fabricate tools or shop aids locally. In general, "make tools" or locally-fabricated shop aids do not have the degree of complexity or sophistication usually associated with

PGSE. Under the old four-level maintenance concept, enhanced machine shop capability was available. Transition to a three-level concept removed much of that, and the capability to fabricate these aids locally has almost been eliminated.

CCAD fabrication assistance

To overcome this problem for initial fielding to Fort Campbell, we had these items fabricated at Corpus Christi Army Depot and provided them as free issue to the appropriate units. There were 40 AVUM items and 10 AVIM items fabricated and sent to Ft. Campbell prior to fielding. The units were responsible to assuring that all of the common tools were available.

In addition, we have initiated a detailed review of the items with TSARCOM Directorate for Maintenance, to determine if any should be reclassified as PGSE, those which could be developed as kits and those which through simple redesign are within the capability of the field units. This problem will be resolved before fielding to the second unit in 1984.

THE CH-47D CHINOOK MOVES CORE-SAMPLING EQUIPMENT TO ASSIST IN OPERATIONS CONDUCTED AT MT. ST. HELENS, WASHINGTON.

Repair and replacement

Authorized Stockage List/Prescribed Load Lists (ASL/PLLs) are normally provided to the **Initial Operational Capability (IOC)** unit at a 90% fill rate. We targeted a 100% fill for the CH-47D IOC unit. We met this objective using the Army supply system only and with no contractor supply support.

A 100% fill at first aircraft delivery is an Army first for a major weapon system. This did not just happen. We established a direct link with TSARCOM Directorate for Materiel Management by dedicating one employee full-time to insure that all required line item components were assigned **National Stock Numbers (NSNs)** and were input to the Master Data Record.

The volume of these maintenance significant items was staggering (approximately 14,000 items). From these 14,000 items an ASL list was derived which consisted of 320 "D" peculiar lines from a total PLL listing of 1,503 lines. Two major obstacles in obtaining our objective were tracking the **Procurement Work Directives (PWDs),** which numbered up to 4,000 at one time, and the **Procurement Lead Time (PLT).**

CHINOOK:

Boeing Vertol tells UAP to cool it

United Aircraft Products will supply five of these plate-fin coolers for each Boeing Vertol CH47 Chinook Helicopter being modernized by the Army. The coolers use fan air to cool transmission oil for the forward and aft rotor transmissions, the combiner transmission, and two engine gearboxes.

Putting together the pieces

Putting together the pieces of a "special issue" — whether the general subject area pertains to an aircraft system or a support area, such as ASE — can be likened to working a jig saw puzzle. There are plenty of pieces and they (the articles, the photos, the charts, and the illustrations and maps) must fit together if the reader is to eventually see the "Big Picture".

We at the magazine can't and don't do the assembly and the coordination alone. While we get great help from the authors, from the PM, and from the prime manufacturer, we would like to single out the young Army Aviator who wore the "Expediter's Hat" for this issue, **Captain Stephen K. Wells** (below) of the CH-47 PMO, and another "Mr. How Can I Help You?," the most cooperative **Bob Torgerson** of Boeing Vertol. Both of these professionals certainly made our job a lot easier and we're most appreciative of their many efforts to bring you a most informative, up to date CH-47 report.

New CH—47 PM

LTC(P) N.I. Patla (left, below), became the PM, CH-47 Mod, in late June, replacing **COL D.T. Irby, Jr. Colonel Patla** served in the Office of the Deputy Chief of Staff for Research, Development and Acquisition as the DA Systems Coordinator (DASC) for the Aeronautical Technological Program and for the Propulsion Technological Program. In addition, he also supported the Army Science Board.

PATLA

WELLS

PWDs were expedited through intensive management and the PLT was reduced from an average of 90 to 30 days by obtaining a **Not To Exceed (NTE)** price from Boeing Vertol. All of these objectives were met only as a result of the close working relationship we had previously established with TSARCOM.

To insure successful delivery to the gaining unit, a central consolidation point was established at Red River Army Depot with a project code. This was successful in insuring part availability at time of fielding. This is now Army policy for all fielding of IOC units.

Direct Exchange (DX) is a supply support concept at the AVIM level. It is designed to expedite the supply of high utilization recoverable/repairable items by exchanging unserviceable assets for serviceable assets from AVIM support stock. DX capability is determined by availability of equipment and personnel to perform repair/rework of components.

The development of the Fort Campbell DX Program was a joint **Materiel Fielding Team (MFT)** and 5th Transportation Battalion effort with the goal of establishing an AVIM DX Program capable of supporting the CH-47D. The DX components list will be continuously reviewed and components added or deleted as usage data is developed.

Fielding

The integration of all the ILS disciplines I have discussed was, and still is, the responsibility of the MFT under the direction of **Major Robert E. Markham, II.** His task in essence is to head a team of **USA Materiel Development and Readiness Command (DARCOM),** TRADOC, and contractor personnel which provide a warranty to the user.

They arrived at Ft. Campbell several months prior to fielding to establish

THE "D" CAN LIFT SEVEN DUNE BUGGIES/FAST ATTACK VEHICLES (FAV'S), ONE INTERNALLY, SIX EXTERNALLY, AND 14 PAX.

liaison with the 159th Aviation Battalion (the gaining unit), the 5th Transportation Battalion (the AVIM support unit), and other supporting agencies of the Division and Post. The MFT coordinated the efforts of NETT, assisted where required in obtaining ASL/PLL fill, distributed publications, and ensured the availability of tools, PGSE, and TMDE.

I am convinced that the early involvement of key personnel from the 101st Airborne Division in the CH-47 Modernization Program and early introduction of the MFT into Fort Campbell was instrumental in the successful fielding of the CH-47D. For this effort, those involved from DARCOM, TRADOC, and the **USA Forces Command (FORSCOM)** can be justly proud of fielding a major aviation system that was fully supportable at the time of fielding! IIIII

by Dean D. Hemmer

ILS Today

INTEGRATED Logistics Support (ILS) today, tomorrow, or yesterday would and should be all the same story. As the Logistics Management Division Chief assigned to a Project Manager's Office, I know our mission is not glamorous and exciting like designing or creating a new helicopter. However, without our support the new idea or helicopter would never fly.

ABOUT THE AUTHOR
Dean D. Hemmer serves as the Chief of the Logistics Management Division of the CH-47 Mod Project Management Office, Hq, USA TSARCOM.

Early identification

Early in the conceptual stages, logistic requirements must be identified and appropriate budgeting actions taken. The CH-47 Project Managers throughout the life of the program recognized this aspect and developed an **Integrated Logistics Support Management Team (ILSMT).** This included members from the training, readiness, engineering, electronics, and testing communities, as well as the ultimate user. Members were from both the Government and the Contractor. The most difficult task was to keep the interest intense for something which would not be tangible for five to eight years. This included maintaining funds within their respective budgets to support all the logistic disciplines.

During this program, direction was received to revise our maintenance manual format. We developed the first **Skill Performance Aid (SPA)** manual for an aircraft system. This manual is structured to meet the needs of a lot of

folks. First, it has bold print for the journeyman technician who only requires a quick refresher on a procedure or a torque value. It also contains detailed instructions with accompanying illustrations for tasks to be completed by the student and/or novice.

Similar publications

One big dividend of this concept is that the same publication is employed by the field and also by the student who is being trained to be a technician on the CH-47D. The composite trainer is programmed to assist in the training of 385 tasks. These tasks are directly related to the tasks within the SPA manuals. This provides an extra dimension: the ability to teach troubleshooting to tomorrow's mechanics and maintenance test pilots. We published a troubleshooting manual in an understandable "go-no-go" format. Training devices also were built to complement the SPA concept.

More of what is taught is retained by the technician. The student uses the same publication in the field which is employed at the Transportation School. Peculiar and common ground support equipment, as well as **Test, Measurement, and Diagnostic Equipment (TMDE)** is provided for instructional use. This should increase productivity with less on-the-job training required.

Overcoming funding cuts

Typically, the first time a financial crisis arises during a normal developmental program, a cut in logistic funding is entertained to maintain production aircraft quantities. We in the CH-47D Project Manager's Office would reduce annual production quantities rather than cut or water down the true logistic requirements. Composite trainers, training devices, and category A and B trainers are not cheap but they will prove to be a good investment. Today's helicopters are quite expensive and sophisticated which requires better training to maintain high operational readiness and to reduce operating and support costs.

Another major logistic discipline is spare parts. This includes early identification and ultimate timely procurement of the proper spares in the correct quantities. A new acronym was identified during my tenure, **Selected Essential Stockage Availability Method (SESAME).** This is a new computerized model to assist in establishing and defending spares budgeting. Prior to this model, we employed a percentage factor for computing spares requirements.

I feel that SESAME is a better system since many engineering factors are used to compile the budgeting figures. The logistic community must use all available tools and avoid mistakes since lead time and costs of spares have significantly increased. Some of the major considerations for SESAME are part repair turnaround time, identifying the level of maintenance that will repair the parts, requisition, order ship time, fleet density, and location.

Major milestone: ASL/PLL

In some instances, "good" is good enough. However, in the area of field support and particularly in the area of the **Authorized Stockage List/Prescribed Load List (ASL/PLL),** the Project Manager decreed that 100% of all parts and tools available and with intensive management made the almost impossible goal. Since all parts and tools were available the Materiel Fielding Team could concentrate on training and addressing the field maintenance problems.

I believe the CH-47D ILS story will be the same tomorrow as it is today, and in this article have attempted to provide an insight into some of the major milestones which should be considered. IIIII

by Leonard L. Howard

Engineering for the battlefield

THIS article will not extoll the increased performance virtues of the CH-47D helicopter, although it would be easy to cite a 27% increase in productivity on a daily basis due to the increased power and gross weight.

Nor will the increased mission flexibility be discussed which results from the multi-drop of sling loads while on one mission or the increased airspeed which results from load stabilization with a tandem hook-up. What this article will do is iterate those design features which enhance the CH-47D combat support role. These design features were evolutionary and the end result of 20 years and almost two million flight hours of hard field use by the CHINOOK fleet.

Designing for combat support

In the cockpit are the pilot and co-pilot armored seats which are lightweight aluminum oxide composite material designed to defeat 30 caliber bullets. The pilots also have an **Advanced Flight Control System (AFCS)** which improves the flight handling characteristics and maintains altitude, airspeed, and heading for a large reduction in pilot effort. This will be especially helpful in reducing fatigue under combat conditions. In addition, the pilots have an array of **Aircraft Survivability Equipment (ASE)** to detect and defeat various threats. The ASE includes the AN/APR-39(V)1 radar warning system; the AN/ALQ-156 missile detection system, and the M-130 flare dispenser system.

ABOUT THE AUTHOR
Leonard L. Howard serves as the Chief of the Technical Management Division of the CH-47 Mod Project Management Office, Hq, USA TSARCOM.

The **fiberglass rotor blades (FRB)** are a composite material designed to give more survivability by being ballistically tolerant to 23mm projectiles. Increased lift and airspeed are positive by-products. The FRBs have an infinite life which means an "on condition" life with no **time between overhaul (TBO).** Also, the repair of the FRBs above the AVIM level is so unlikely that no plans have been made for an FRB depot program.

The transmission system has a 7,500 SHP rating and each transmission has its own self-contained primary lubrication system, an auxiliary lube system, and a 30-minute run-dry capability. The oil coolers for the two engines and combining transmissions are separated by armor plate to increase survivability. This is the only place where critical component armor is used. All transmissions are "on condition" with no TBO.

The electrical system is new with two 40 KVA generators and either one has the capability to sustain all electrical requirements by redundant and separate wiring and power distribution. In addition, the typical CH-47 tunnel wire bundle has been replaced with physically separated wiring paths routed through the lightening holes of the cabin overhead.

The hydraulic systems (two flight control systems for redundancy and one utility system) have been simplified by use of highly reliable modular components which eliminate approximately 700 possible fluid leak points. This feature, when coupled with the use of swaged hydraulic fittings, is the major contributor toward the reduction of maintenance in the field.

The T55-L-712 engine adds to the modernization effort in that more shaft horsepower is available as a spin-off of the **reliability, availability, and maintainability (RAM)** improvements. Further, this engine has an emergency single engine rating of 4,500 SHP for 30 minutes — which can be very useful in combat area.

The incorporation of two additional cargo hooks provides a triple hook system for increased battlefield flexibility and capability. The load rating of the center hook has been increased to 26,000 pounds while the new hooks have a 17,000 pound individual rating or 25,000 pounds in tandem. The load carrying capability of "the hooks" is only limited to the maximum gross weight of the CH-47D which has been set at 50,000 pounds.

After a very thorough review of the above cited design features, which were made to improve the survivability of the CH-47D, it is clear that the use of the fully combat ready **Delta** will make a difference on the battlefield. IIIII

by Colonel James R. Brier

ARPRO: Insuring a quality product

THE **USA Plant Representative Office (ARPRO)** at Boeing Vertol Company and the service men and women who fly and support the Army's fleet of CH-47 cargo helicopters all have one common interest — we desire the remanufactured CH-47D to set the standard of quality for fielding future aircraft weapons systems.

ABOUT THE AUTHOR
Colonel James R. Brier is the Commander of the U.S. Army Plant Representative Office (ARPRO) at the Boeing Vertol Company, Philadelphia, Pa.

Quality that's affordable

A key element in the common interest and one that underscores the uniqueness of the CH-47D program is manifested in the word "remanufactured". The CH-47D is not a new helicopter! It is a modernized version of a proven and reliable workhorse. Incoming CH-47A, B, and C models are disassembled, stripped, de-spliced, inspected, repaired, modified, modernized, and reassembled using many of the serviceable parts and components installed on the aircraft prior to induction into the remanufacturing process. The final product is an aircraft that is safe, serviceable and represents advanced state-of-the-art in **Reliability, Availability, and Maintainability (RAM)** features at an affordable cost. Large increases in cost for the sole purpose of cosmetic improvement can only be tolerated with fancy women and race horses. The responsibility to insure that the CH-47D performs as contractually advertised rests with the ARPRO.

One method for insuring the user gets

LEFT: THE ARPRO FLIGHT CREW, L-R, SFC CHARLES LEWIS, MAJ AL WEINNIG, AND CW4 JIM GRIPP, INSPECT A CH-47 AIRCRAFT PRIOR TO AN ACCEPTANCE TEST FLIGHT.

the best possible aircraft is through **Quality Assurance (QA).** It is a fact that quality is a function of design — you can not inspect quality into a product. Nevertheless, QA plays a major role in the acceptance sequence. At selected points during the remanufacturing process, ARPRO QA Inspectors perform detailed checks to insure the Boeing Vertol Company's Quality Control is in place and is remanufacturing the helicopter in accordance with Military Specifications, approved engineering designs, and other contractual documents. Finally, a team of QA Inspectors perform a comprehensive evaluation of the total aircraft as it moves from the remanufacturing process into the flight test phase.

Over and above repairs

One of the primary functions accomplished by ARPRO in the acceptance cycle is the determination for **Over and Above (O&A)** repairs on the aircraft. Most of the improvements/modernization (T55-L-712 engines, fiberglass rotor blades, new drive system, advanced flight control system, multi-hooks, single-point pressure refueling, modularized hydraulics, new **Auxiliary Power Unit (APU),** upgraded electrical system) are covered under the basic purview of the contract. O&A repairs are "those unanticipated conditions identified during the remanufacturing process outside the purview of the basic contract". The ARPRO O&A Team, headed by an industrial engineer, determines the feasibility, scope, and value of each fix. Man-hours for all repairs are negotiated in detail between the Government and the Contractor. Unnecessary repairs for cosmetic purposes are not allowed since O&A funding is limited.

The final effort and certainly one of the most visible and important checks in the procurement cycle is accomplished by members of the ARPRO Flight Test Office. This office is staffed with qualified acceptance pilots and flight engineers whose responsibility, in conjunction with the overall quality assurance effort, is to verify through preflight inspection and flight test that each helicopter procured by the Government meets every aeronautical specification and is, in fact, ready for issue to a field unit.

The CH-47 Modernization Program has been on cost and schedule from its initial conception. The men and women of the ARPRO, cooperating with their counterparts in St. Louis, will insure that the CH-47D is a quality product, and that it will continue its established record of outstanding performance.

They are, Sunday through Saturday, a "dedicated" Last Stop prior to Acceptance. IIIII

by Maj. Gen. Emil L. Konopnicki

Managing the fielded system

THE task of maintaining the Army's Aviation Readiness posture has always been, and continues to be, of utmost importance to us at the **USA Troop Support and Aviation Materiel Readiness Command (TSARCOM)** and to the logistical community as a whole.

ABOUT THE AUTHOR
Major General Emil L. Konopnicki serves as the Commanding General, US Army Troop Support and Aviation Materiel Readiness Command.

It is incumbent that we, as logisticians, effectively and efficiently manage all fielded aviation systems, while at the same time economize both fiscal and human resources. The introduction of the CH-47D helicopter will make the task of maintaining readiness a somewhat simpler one.

In an age of fiscal restraints, the CH-47D brings upon the scene **Reliability, Availability and Maintainability (RAM)** improvements which will reduce the logistical costs required to maintain this aviation asset at a high state of mission readiness and, at the same time, reduce associated downtime. Decreased logistical costs and reduced downtime equate to an increased readiness posture.

As with many other aircraft systems, the TSARCOM community has been involved with the CH-47D model program since its beginning. Through the preparation of logistical support concepts, this Command has demonstrated its commitment to support the CH-47D through all phases of its development.

The CH-47D is a welcome asset to the aviation community, and TSARCOM has been, and will continue to be, totally committed to the maintenance of this system's readiness posture. IIIII

by Joseph Mallen

The Mod Program: An On-Cost and On-Schedule Winner!

THE members of industry involved in the CH-47 Modernization Program have all shown during the past seven years that they are winners.

ABOUT THE AUTHOR
The President of the Boeing Vertol Company, Joseph Mallen is the current Chairman of the Board of the American Helicopter Society and a 12-year member of the AAAA.

Together we have proven to the U.S. Congress, the Department of Defense, and the U.S. Army that major defense systems — such as modernized Chinooks — can be fielded on schedule and within cost estimates.

Results tell the story: After 82 months and $263 million, the CH-47 Modernization Program remains on-cost and on-schedule while exceeding technical objectives.

Credit for this outstanding achievement must go to all members of the strong military/industrial team assembled for this long-term program. I want to personally thank all of our 360 sub-contractors in 31 states throughout the U.S. as well as those in Canada and the United Kingdom and their employees who have provided, in a timely and cost-conscious manner, the material needed to modernize the Army's Chinook fleet.

A dedicated effort

I want to thank the employees of Boeing Vertol - including those in manufacturing operations, material procurement, engineering, customer support, and program management - for their dedication in making this program the winner it is.

I pledge to the U.S. Army Boeing Vertol's continuing commitment in meeting all CH-47 Modernization Program schedule and cost goals. IIIII

by William P. Jones

Modernization: A demanding job!

Modernizing the Army's CH-47 CHINOOK fleet is a demanding job! It requires Boeing Vertol — in a timely and cost-conscious fashion — to modernize several different CHINOOK models (A, B, and C) to one standard configuration — that of the CH-47D. In addition, modernizing CHINOOKs requires great flexibility as CH-47's crash-damaged in the field are also brought into the production line to have their damaged-area repaired.

ABOUT THE AUTHOR
The Director of Helicopter Programs at the Boeing Vertol Company, William P. "Bill" Jones is an 11-year member of AAAA and serves as a Vice President on AAAA's Nat'l Executive Board.

How's all of this accomplished?

The general answer is through a well-coordinated military-industrial team effort spearheaded by Boeing Vertol as the CH-47 Modernization Program's prime contractor. Boeing Vertol's nearly 4,500 employees, many of whom have been involved in CHINOOK production for more than 20 years, are backed by Boeing's commitment to manufacturing excellence, as well as a $78 million capital improvement program that's increasing productivity and reducing costs.

Partners in this "D" team effort with Boeing Vertol are the 360 major suppliers in the United States, Canada, and the United Kingdom who provide the materials needed to modernize the Army's CHINOOK fleet (See partial list appearing on pages 58 and 59).

The modern components and materials these firms supply are helping to increase the CH-47D's performance envelope by 52%, while reducing its operating costs by 25%, when compared with early model Army CHINOOKs.

Studies show that modernized CH-47's save the American taxpayer $3 million

per aircraft compared with the cost of building new production CHINOOKs. With the Army planning to modernize 436 CHINOOKs during the next ten years, the American taxpayer is being rewarded with a $1.3 billion defense savings in investment costs alone from this modernization program.

The results compiled by the "D" team during the program's initial seven years show that the job is being done! Currently into the second year of production with 14 CH-47D's delivered, the CH-47 Modernization Program is on-schedule (and on-cost!) at a production rate of two aircraft per month. In addition, all the necessary systems and plans are in place to support the Army's maximum production rate of five CH-47D's per month. That's a brief overview of the industrial structure that is in place to build CH-47D CHINOOKs.

The specific process

Now let's examine the specific process used to modernize these versatile, multi-mission helicopters so they can provide the Army useful service to the year 2,000 and beyond!

Since the potential exists during modernizing for the removal of as many as 11,765 parts from any one CHINOOK, there's a high degree of intrinsic detail work associated with modernizing advanced aircraft systems such as CHINOOKs.

So the modernization process has been broken down into two phases. The first phase of modernization is pre-modification. During this phase each aircraft is inspected for corrosion and fatigue, and is then stripped to its frame and disassembled.

The second phase is modification. In this phase the airframe is reinforced and several major new systems are installed, including upgraded engines and transmissions, an auxiliary power unit, modularized hydraulics, and composite rotor blades, among many other systems.

MAJ John R. Wrinkle, left, CDR, B Co, 205th Trans Bn, USAREUR, is shown receiving his Master Army Aviator Badge from BG Kenneth E. Lewi, CDR, 3rd SUPCOM. LTC Dennis P. Vasey, CDR, 205th Trans Bn, became a Master Army Aviator in follow-on ceremonies.

Upon completion of the modernization process, each CH-47D is flight tested for customer acceptance by pilots from the Army's Plant Representative Office at Boeing Vertol. The newly-modernized CH-47D's the Army will be receiving have a maximum gross weight of 50,000 lbs., compared with 33,000 lbs for the CH-47A, 40,000 lbs. for the CH-47B, and 46,000 lbs. for the CH-47C.

The CH-47D greatly enhances the field commander's operational flexibility by giving him a payload capability equalling the combined payloads of the CH-47B and CH-47C model CHINOOKs.

By working closely as a "D" team member with our suppliers, by upgrading our facilities, and by knowing how to build CHINOOKs, Boeing Vertol is providing the Army with an efficient and highly flexible production line for the CH-47 Modernization Program.

Throughout the course of this long-term program, Boeing Vertol is committed to giving the U.S. Army the product it needs — **on-schedule and on-cost!**

Aviation Center Chapter. . . . . 48 pictured, 179 attendees

21 Chapters host Convention attendees at nighttime suites

OF major importance at each AAAA National Convention is the degree of ease with which attendees members and their spouses can meet and mix with their friends and contemporaries, and do so in pleasant surroundings.

To enhance the social aspects of attendance, the Association supports a program involving Chapter hospitality suites. Chapters having 150 or more members, i.e., those with a seat on the National Executive Board, are invited to co-host a hospitality suite on one convention night.

The National Ass'n underwrites the hotel suite charge and appropriate room taxes, and provides an additional cash underwrite to cover mixers and ice. The host Chapter provides whatever beverages are needed for a three-hour period, and four to six members and spouses to serve as hosts and hostesses.

Fourteen of AAAA's 17 eligible Chapters opted to host hospitality suites on the three nights of the 1983 National Convention; three provided their own "music." Three Georgia Chapters, three Texas Chapters, and three USAREUR Chapters supported co-hosted "Georgia", "Texas," and "USAREUR" suites. All of the hostees agreed the 1983 hospitality "was exceptional" and expressed their sincere thanks to the Chapters involved. Group photos of many of the host Chapters are shown on the following pages. Missing are photos of the Delaware Valley Chapter and the USAREUR, each of which hosted a suite. IIIII

Lindbergh Chapter . . . . . 47 pictured, 129 attendees

Colonial Virginia Chapter. . . . . 27 pictured, 37 attendees

S. California Chapter. . . . . 25 pictured, 136 attendees

Air Assault Chapter. . . . . 17 pictured, 48 attendees

Monmouth. . . . .

Washington, D.C. . . . . 23 pictured, 187 attendees

Follow Me. . . . .

Morning Calm (Korea). . . . . 17 pictured, 18 attendees

Greater Atlanta. 1

ctured, 37 attendees

Corpus Christi Chapter. . . . . 15 pictured, 22 attendees

ctured, 15 attendees

Connecticut Chapter. . . . . 19 pictured, 76 attendees

ured, 165 attendees

Fort Bragg Chapter. . . . . 19 pictured, 34 attendees

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Winners of '83 AAAA National Scholarships

William B. Bunker Memorial Scholarship of $1,000.00
(Requirement: Selectee is to be an applicant to Engineering School)
WINNER — Linda K. Abornoz
Daughter of Mr. G.M. Albornoz, Corpus Christi, TX. AAAA Interviewer: LTC John P. Real.

Delbert L. Bristol Memorial Scholarship of $500.00
WINNER — Gregory A. Clarkson
Son of CW4 Clarence R. Clarkson, Jr., Norman, OK. AAAA Interv'r: LTC Donald E. Hendrickson, Ret.

B. Howard Dean Memorial Scholarship of $500.00
(This Award is limited to the children of Monmouth Chapter members)
WINNER — John Stuppi
Son of Mr. Charles Stuppi, Iselin, NJ.

B. Howard Dean Memorial Scholarship of $500.00
(This Award is limited to the children of Monmouth Chapter members)
WINNER — Stuart Slutsky
Son of Mr. Robert Slutsky, Oakhurst, NJ. AAAA Interviewer: Mr. Ralph C. Goodwin.

Jack H. Dibrell Memorial Scholarship of $500.00
WINNER — Eric Richards
Son of LTC Harold B. Richards, Huntsville, TX.

Charles V. Graft Memorial Scholarship of $500.00
WINNER — Kathleen E. Dunnington
Daughter of LTC Warren H. Dunnington, Fairfax, VA. AAAA Interviewer: COL Harry G. Christopher.

Randolph Kahl-Winter Memorial Scholarship of $500.00
(This scholarship is sponsored by the Monmouth Chapter of AAAA)
WINNER — Keith E. Stults
Son of LTC Theodore M. Stults, Canton, OH.

Randolph Kahl-Winter Memorial Scholarship of $500.00
(This scholarship is sponsored by the Monmouth Chapter of AAAA)
WINNER — Erik Neu
Son of LTC George T. Neu, Ret., Simsbury, CT.AAAA Interviewer: COL Jay W. Pershing.

Joseph and Madelyn McDonald Memorial Scholarship of $500.00
WINNER — Kenith E. Meissner, II
Son of LTC Kenith E. Meissner, Ret., Arlington, VA. AAAA Interviewer: COL William L. Corley, Ret.

Jane Phillips Memorial Scholarship of $500.00
WINNER — Shelli M. Dinius
Daughter of MAJ Alan D. Hix, Coventry, RI. AAAA Interviewer: MAJ Edward J. Sweeney, Jr.

Lindbergh Chapter $500.00 Award
(This scholarship is sponsored by the Lindbergh Chapter—AAAA)
WINNER — Beth Deasy
Daughter of COL William T. Deasy, APO NY 09742.

ODCSOPS Scholarship of $500.00
WINNER — Heidi Kambrod
Daughter of COL Matthew R. Kambrod, Burke Center, VA. AAAA Interviewer: COL Robert E. Filer.

1983 Merit Award Plaque Winners
Richard A. Buswell, son of COL Arthur W. Buswell, Ft. Wainwright, AK
Joy A. Adcock, daughter of LTC Jerry W. Adcock, Vacaville, CA
Robin S. Parks, daughter of LTC Robert R. Parks, Enterprise, AL
Mark R. Duckworth, son of LTC Robert G. Duckworth, Newtown, CT

1983 AAAA SCHOLAR-SHIP WINNERS

Linda K. Abornoz

Gregory A. Clarkson

John Stuppi

Stuart Slutsky

Eric Richards

Kathleen E. Dunnington

Keith E. Stults

Erik Neu

Kenith C. Meissner

Shelli M. Dinius

Beth Deasy

Heidi Kambrod

Richard A. Buswell

Joy A. Adcock

Robin S. Parks

THE OH-58D AEROSCOUT'S MAST-MOUNTED SIGHT: LOW RISK WAY TO LET THE ARMY SEE BETTER.

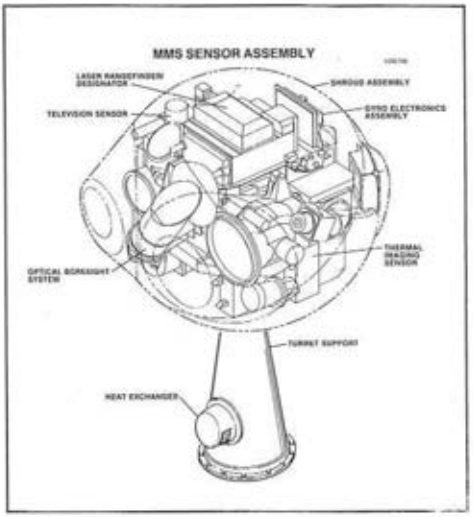
The Mast-Mounted Sight is the first major advance in mobile observation systems since hand-held binoculars were issued to the horse cavalry.

A stabilization platform proven in seven years of development holds advanced sensors; virtually eliminates vibration and jitter. Steady, sharp, magnified views of the battlefield presented on cockpit displays increase stand-off range. Fire control and distribution and target acquisition are improved.

And best of all, the sensors are mounted high above the rotor. The Bell Aeroscout and its crew are safely hidden behind tree and ridgelines, out of sight of the enemy being observed. Only the steerable, ball-shaped housing over the sensors is exposed to hostile eyes.

Our novel "soft mount" design not only lets helicopter crews take advantage of the best new precision optics and aiming systems, its protection from vibration increases system reliability and lowers maintenance costs on the sensitive instruments.

The new sight is the result of research started in 1975–we used the years since to prove that our ideas work. They do. They passed more than 300 hours of Army laboratory tests and 100 hours of Army evaluation flying. The findings built such confidence that we now are progressing toward a late summer fly date on Aeroscout on a Fixed Price Development Contract from Bell Helicopter.



The sensors chosen for the Kiowa Aeroscout permit near all-weather observation: telescopic TV for day missions and flir thermal imaging for missions previously limited by night, weather or battlefield smoke and haze conditions.

The Mast-Mounted Sight is now being readied for full-scale production as part of the Army Helicopter Improvement Program, and for other applications requiring sensor installations in high vibration environments.

MCDONNELL DOUGLAS

The optoelectronic helicopter.

Boeing Vertol continues to press forward in the search for increased helicopter reliability and advanced performance. Now under development, helicopter control systems utilizing a marriage of fiber optics and digital electronics . . . optoelectronics . . . the next step beyond fly-by-wire.

The U.S. Army Applied Technology Laboratory is developing the advanced digital optical control system, or ADOCS, which further increases reliability by being impervious to electrical disturbances. Not only does ADOCS eliminate heavy mechanical linkages, its light weight and low cost permit multiple redundancy for extra protection against crippling enemy fire.

Prior to actual flight, ADOCS will be pre-tested on our moving-base flight simulator with its multi-window, nap-of-the-earth display . . . the only one of its kind in the industry. It's another example of Boeing's leading edge, the restless search that has brought about fiberglass blades, composite structures, high-speed rotors, and electronic vibration suppression . . . a search that continues to develop bearingless main rotors, advanced cockpits, tilt rotor design and more. It's the search for the better helicopter, the Boeing priority.

BOEING HELICOPTERS

The Leading Edge
Philadelphia, PA 19142