

# Flight Test NEWS

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## *Third National Symposium to be Hosted By North Texas Chapter*



The North Texas Chapter has announced firm plans to host the third Society of Flight Test Engineers symposium in September 1972. Mr. J. A. Mangum of Bell Helicopter Company is the Symposium Chairman. The North Texas Chapter agreed to sponsor the symposium at the 1971 National Business Meeting in Patuxent River.

The topics of the symposium are: first day, "Flight Test Management and Control"; and second day, "The Capabilities of Government Test Facilities." The committee chairmen have been named, but the location for the symposium has not been set. Mr. Mangum will announce the site in January.

The call for papers will occur in December. Three days are planned, with four technical sessions on the first and second days. Tours of LTV, Bell and General Dynamics are planned for the third day. A tour of the American Airlines Flight Simulator Center is tentatively scheduled for the evening of the first day.

The National Business Meeting and Banquet are set for the evening of the second day. The Banquet speaker has not been named at this writing.

Chairmen of the Committees were announced as follows: Symposium - J. A. Mangum; Registration - TBA; Speakers - Paul Brewer; Publicity - Steve Schmidt; Facilities and Transportation - Tom Collins; Banquet - Tom Collins; Tour Committee - GD - Vern Salzman, LTV - Tom Owens, and BHC - Bill Jennings.

## **Bell Premieres the KingCobra**

KingCobra, an advanced armed helicopter capable of performing anti-armor missions in the most adverse weather, terrain and threat environments, made its premiere here Tuesday, Sept. 28.

The company is proposing the KingCobra to the U. S. Marines and Army in slightly different versions to meet their specific requirements.

KingCobra expands the proven concept of the AH-1G HueyCobra and the AH-1J SeaCobra. Nearly 950 of the Army and Marine HueyCobra version aircraft have been manufactured to date.

President E. J. Ducayet noted that, "Bell and 10 other KingCobra team members are providing two flying prototypes, one with complete systems, all on company-sponsored basis. We are taking advantage of production

hardware, qualified components and systems in pre-production stages of government sponsorship to maximize mission performance and minimize cost and risk."

In addition to static and flight presentations of the KingCobra, systems provided by the participating members were on display at the premiere.

Bell's experimental test pilots started flight testing with the new helicopter Sept. 10.

Within the first five hours of flight test, the initial prototype KingCobra exceeded 200 knots dive speed. In maneuver flight at cruise speed it has exceeded three G's. Still to be determined in flight test are VNE and level flight cruise speeds.

Prototype No. 1 is powered by

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# Chapter News

## Los Angeles

Following some "sustenance" and prime rib at the Los Alamitos Naval Air Station, a report on the National Business Meeting and Symposium was presented by delegate Roger Jones and attendee H. Wasinger. Major probabilities, with obvious benefits, include extending the term of office to two years for next year's National Officers and adjusting the membership to a common annual renewal date. The Symposium was a success and plans were laid for the North Texas Chapter to sponsor a double theme symposium next year (see page 1). Our outgoing president urged that the Los Angeles Chapter be represented.

The new officers were presented and incoming president, James Murray, expressed his feelings that our main goal should be to make this chapter truly the Los Angeles Chapter. He then introduced our guest speaker, Mr. Eniar Enevoldson, holder of the DIAMOND C. Award, and his wife who is also a qualified sailplane pilot.

Mr. Enevoldson, an Engineering Test Pilot (NASA-EAFB) and member of the Soaring Society of America, presented "Sailplanes and Soaring - A Test Pilot's View," utilizing general slides on soaring to create the mood, and data slides of flight testing results to describe sailplane performance. These data were accumulated by Mr. Paul Bikle, recently retired Director of NASA Flight Research Center at Edwards AFB, on his T-6 sailplane. This work was done, as part of a hobby, to check his craft's performance against manufacturer's data and to further evaluate the design utilizing tuft studies. Extensive airspeed calibration and static relocation was undertaken to qualify his T-6 as a pacer to

evaluate other types of sailplanes.

To those of us unfamiliar with soaring, there was a noticeable lack of specific range, and thrust required and available curves! Such phrases as "wing waviness" "minimum rate of sink," and "tow plane method of airspeed calibrating" pointed out some of the basic differences in testing sailplanes. The speaker explained that MAX L/D is not all there is to it. Optimum climb becomes a function of minimum rate of sink occurring at an airspeed that results in a turn radius small enough to stay in a thermal. Lift is important if one only wants to circle over the field, but to traverse cross-country the optimum becomes a guess, similar to the judgment required in sailboat racing. It may be better to glide slower to get to a stronger thermal which is further away than to glide faster to a weaker, closer thermal. In consideration of the simplicity of the instrumentation utilized, and the tightness of the data presented, a compliment should be extended to Mr. Bikle for his achievement as a test pilot/flight test engineer; especially upon learning that all of his data selection was done prior to reduction.

Contributed by R. W. Piwarzyk

## Seattle

The Seattle Chapter continues as one of the most active centers of SFTE activity. A dinner meeting was held on October 28 at Sand Point Naval Air Station. The evening included a no host cocktail hour, dinner, and a distinguished guest speaker.

Mr. W. E. Bachand, Chief Test Engineer, DC-10 Flight Programs, discussed the DC-10 flight test program. Mr. Bachand received a B.E. (Aeronautical) degree from Rensselaer Polytechnic Institute in 1952. He joined Douglas' Testing

Division immediately after graduation and has been associated with flight testing ever since.

His initial assignments were as a Flight Test Engineer on the F4D (SKYRAY), the F5D and the A3D.

He switched to commercial flight testing in 1957 when he was assigned as Flight Test Engineer on the first DC-8. In 1959 he was promoted to Group Engineer, responsible for all propulsion and mechanical testing on the DC-8.

On the DC-9 program, he was Assistant Test Project Engineer in 1963 and promoted to DC-9 Test Program Manager in 1965.

In 1967 Douglas started their advanced planning on the DC-10 Airbus. At this time Mr. Bachand was made Chief Test Engineer, DC-10 Flight Programs, a position he now holds.

The Seattle Chapter president, Mr. H. B. Klopfenstein, reports that the original number of members in the Seattle area was 122. The official paid-up membership of the Chapter is now 21! Of the original 122, thirteen have left Seattle but are still active in the industry while another 20 have left the aerospace field. This leaves a potential of almost 70 previous members in the Seattle area.

Contributed by H. B. Klopfenstein

## North Texas

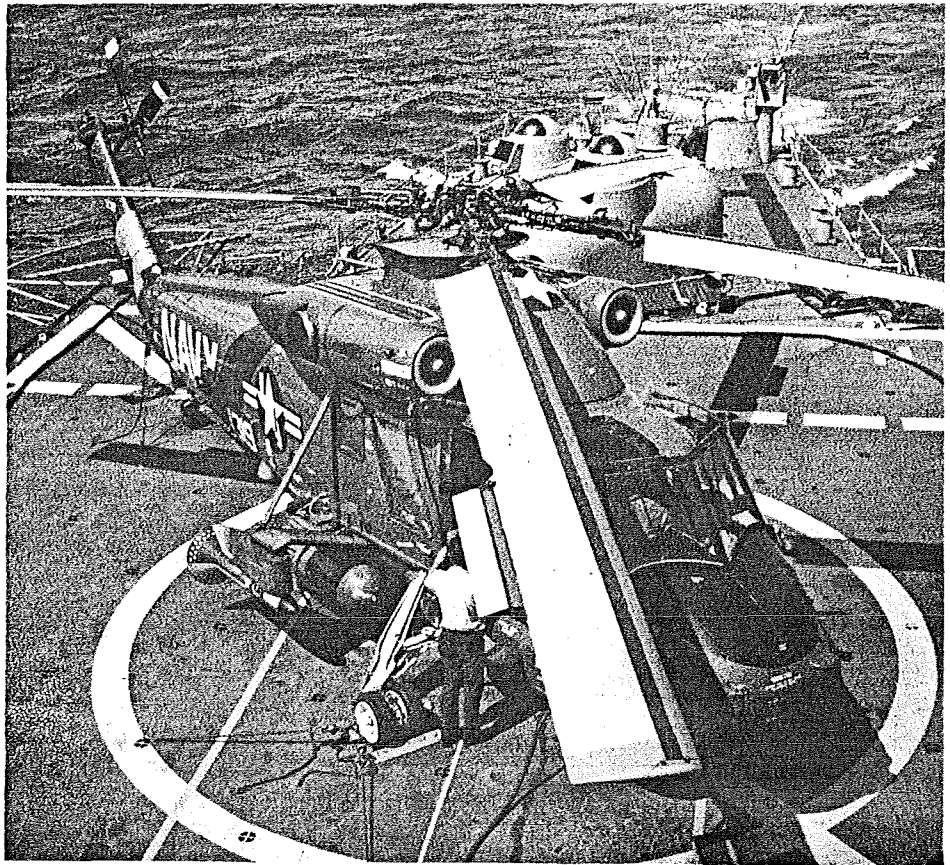
The Chapter is sponsoring the Third National Symposium (see page 1), and all members have been working on plans to make this the most worthwhile in the Society's history. Questions concerning the meeting should be directed to J. A. Mangum, 1215 Academy Place, Arlington, Texas, 76013.

In an effort to unify the efforts of the Chapter and provide each member the best services possible, three SFTE representatives have been named - one from each major

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# LAMPS Helo Shipboard Tests Completed

The SH-2D helicopter is being procured by the Navy for deployment in the LAMPS (Light Airborne Multi-Purpose System) mission aboard the DLG-26 class destroyer (Guided Missile Frigate). The SH-2D service acceptance Shipboard Trials were conducted aboard the USS WAINWRIGHT DLG-28 from 12 to 23 September 1971. The Rotary Wing Branch of Patuxent River's Flight Test Division conducted the shipboard trials and at the same time conducted tests to establish an operating envelope for the SH-2D helicopter aboard the DLG 26 class destroyer. During the test flights additional data were obtained on the usable operating envelope for the VLA (Visual Landing Aids) on the DLG-26 class destroyer. Between flight operations the Naval Air Engineering Center's REST (A securing and traversing system) equipment was tested to determine if the concept was feasible and determine its problem areas. The objectives of the four programs were obtained.

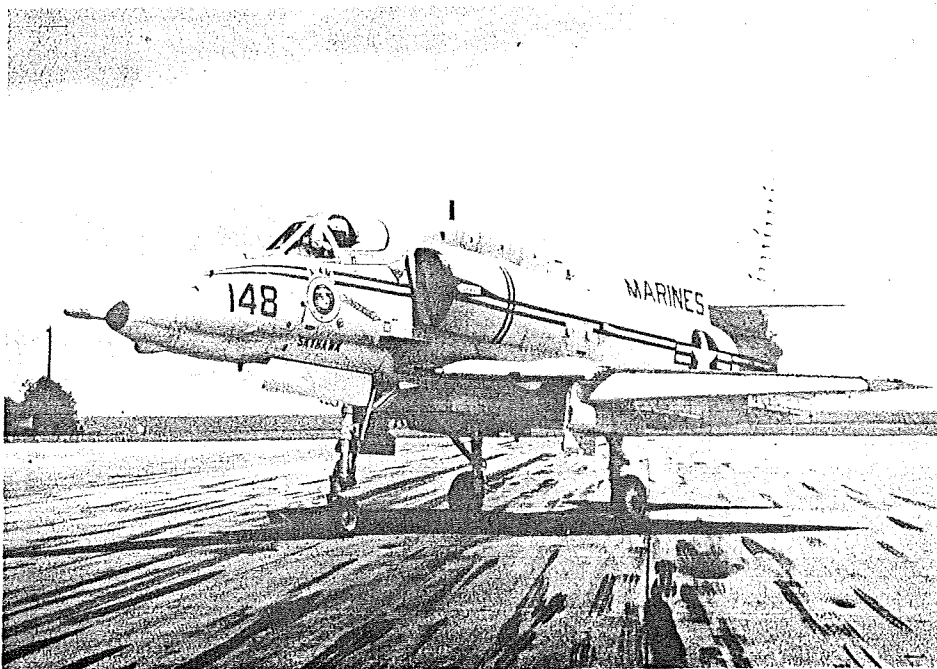


## A4M Service Acceptance Trials Completed

The Marine Corps' most recent acquisition, the A-4M Skyhawk has

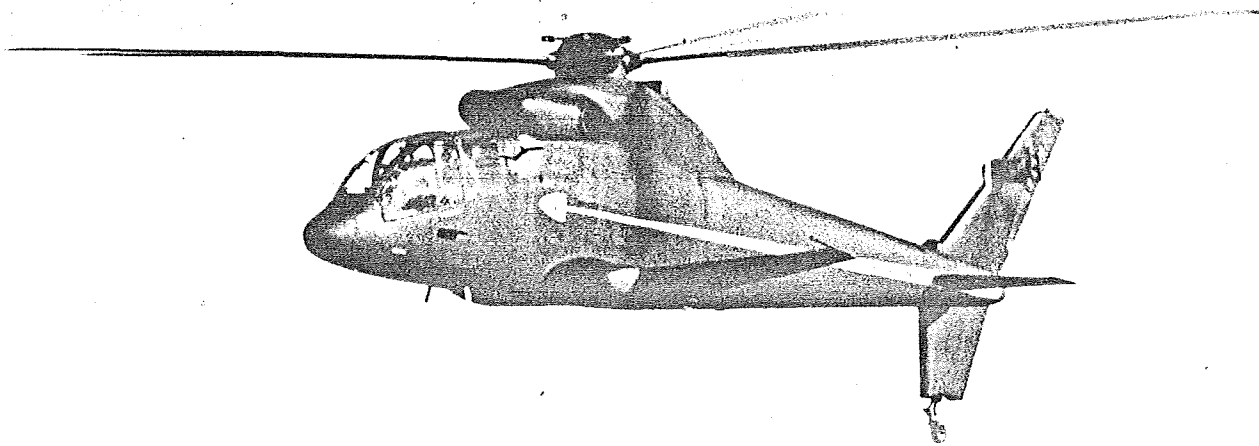
recently completed Service Acceptance Trials at NATC, Albuquerque and Pt. Mugu. Major changes from earlier Skyhawk models include an improved J52 engine with a 20% increase in thrust, a drag chute, a larger canopy, and a 100% increase in ammunition capacity. A

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*"There was a time when a flyer sat at the centre of a complicated works. Flight set us factory problems. The indicators that oscillated on the instrument panel warned us of a thousand dangers. But in the machine of today we forget that motors are whirring; the motor, finally, has come to fulfill its function, which is to whirr as a heart beats - and we give no thought to the beating of our heart."*

*A. de Saint Exupery  
Wind, Sand and Stars, 1939*



## Sikorsky S-67 Blackhawk Tours East Coast

The Sikorsky S-67 "BLACKHAWK" has been demonstrated by company pilots to several East Coast installations. The S-67 is a conventional twin-turbine helicopter using off-the-shelf components installed on a low profile gunship fuselage. Sikorsky predicts the following performance:  
Dive .....200 KTS

Dash ..... 173 KTS (Clean)  
168 KTS (with Armament)  
Cruise ..... 170 KTS (Clean)  
163 KTS (with Armament)  
Best R/C ..... 2,500 FPM  
Medium Endurance  
Combat Mission GW18,500 lbs.  
Hover Ceiling (IGE)  
90° F, 18,500 lbs. . . 4,700 ft.  
The S-67 is a derivation of the

H-3, but with reduced profile drag, reduced blade stress and vibration through blade twist change, and swept blade tips. The rotor head fairing reduces parasite drag and the engine inlet design reduces drag at high speed. The aircraft also features speed brakes which allow a 38% steeper dive angle.

## Navy to Develop Test Techniques for New Flying Qualities

Advancements during the past decade in aircraft flying qualities have resulted in the adoption of a revised flying qualities specification for piloted airplanes, MIL-F-8785B. This revised specification was drafted by Cornell Aeronautical Laboratories under contract of the Air Force and approved as a military specification in 1969. This new specification has many changes in parametric requirements that are believed to be important governing variables in the field of flying qualities. These changes reflect a leaning toward direct specification of stability derivatives and mode ratios instead of flight related parameters. Although the direct

specification of stability derivatives is an advancement in the guidelines for the design of future aircraft, it poses a problem for the test community in that existing flight test methods will not yield sufficient information to determine these new parametric characteristics.

The Flight Research and Development Section of the Flying Qualities and Performance Branch of the Flight Test Division at NATC has been directed to pursue a program designed to define those requirements of MIL-F-8785B for which the present flight test techniques are inadequate and to establish new techniques and data reduction

procedures where possible. Presently defined problem areas are those associated with aircraft in which coupling occurs between the flight control system dynamics and the basic airplane response. Emphasis will be given to flight test methods and data reduction procedures pertaining to in-flight frequency response techniques and analog matching of airplane motions.

The benefits received from a program of this type will be reflected in the increased ability of the military test community to insure high quality in future aircraft.

Contributed by  
Robert Traskos  
NATC Patuxent River

# Bell Premieres the KingCobra

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The UACL Pratt & Whitney T400-CP-400 "Twin Pac", the same as on the Marines SeaCobra. However, a growth program would increase the current 1,800 shaft horsepower rating to 1,970 shp, with further potential growth to 2,400 shp.

Prototype No. 2, with working systems, will be ready during the first half of 1972. It will be powered by a Lycoming T55-L-7C engine with 2,850 shp, flat rated to 2,000 shp.

The KingCobra's updated dynamics and slightly elongated (49 feet), strengthened fuselage provide greatly improved performance, systems capability and useful load, but will result in reduced maintenance.

The swept tip main rotor incorporates a high-life airfoil section, extended chord and diameter (48 feet) and an elastomeric hub.

Bell's transmission and drive train are rated at 2,000 hp take-off and 1,650 hp continuous. Under development since 1964, they have been tested extensively on the HueyTug and HueyPlus and have accumulated more than 1,000 flying hours since 1968.

The fuselage retains the general configuration of the HueyCobra, but has been strengthened to accommodate the increased rotor thrust and gross weight capability. Other fuselage changes include the nose modification for the stabilized multi-sensor sight and enlarged ammunition bay for the linkless ammunition drum, larger wings (13-foot span) to accommodate additional fuel (2,300 lbs. in its crash-worthy fuel cells) and ordnance. Also, strengthened landing gear, tail boom extension to compensate for the larger rotor, and a ventral fin for increased longitudinal stability and tail rotor protection.

As a result of these improvements, the KingCobra can hover out of ground effect (OGE)

at 4,000 feet at 95 degrees at a gross weight of 14,000 pounds.

The KingCobra incorporates a multi-sensor fire-control system for day-night delivery of anti-tank missiles, 20 mm shells and rockets. Other systems include radar warning, night vision sensors, a self-contained inertial navigator, dual station IFR and improved passive and active defense systems.

Bell officials stated that the KingCobra's combination of offensive weaponry, defensive systems, vehicle performance and small size give it unequalled ability to survive.

Bell, as KingCobra team leader, provided the airframe/dynamics, stability control augmentation system (SCAS) and attitude retention unit (ARU), plus total systems integration.

Major subsystems suppliers:

General Electric, Binghamton - Stabilized multi-sensor sight, including 3X & 12X day optics, 2X & 6X night optics, neodymium laser, computer and electronics, heads-up display (HUD) and fire control integration.

Sperry Rand, Univac - Helmet sights.

Texas Instruments - Night fire control including FL-33 forward looking infra-red (FLIR), FLIR power supply and compressor.

Dalmo Victor - Pilot's night vision 40/25 low light level television (LLTV).

General Electric, Burlington - 20/30 mm turret and ammunition storage system.

ITEK, Applied Technology - Lightweight aerial warning system (LAWS).

Litton, Systems Division - LN-30 inertial navigator.

Honeywell, Aerospace Division - APN-198 radar altimeter.

# Chapter News

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aerospace company in the area. They are: Steve Schmidt - Bell; Lou Garrett - GD; and Jim Barrett - LTV & LTVE.

The programs committee has set the schedule through February 1972. The October meeting featured Roger R. Reed, Jr. (LTV), who presented his paper on Photogrammetrics. Others include:

November 18 - Certification of Aircraft by FAA

December 16 --, Joe Mashman, V. P., Bell

January - Tour FAA Traffic Control Center

February - Tour General Dynamics Flight Test Facility.

# A4M Trials

(Cont'd from Page 3)

self-contained starter is currently under development. During the Trials, the A-4M completed 48 hours of sustained operations without a major material discrepancy. In comparison with its predecessor, the A-4F, the "M" reduced take-off distance 16%, increased maximum airspeed by 5%, and added approximately 2000 feet to the Skyhawk's combat ceiling. Rate of climb, acceleration, and sustained maneuverability were also noticeably increased, especially at combat loadings. The higher thrust combined with the drag chute provides for an unassisted shortfield capability in close air support operations. Follow-on tests will include accelerated service trials and technical evaluation for complete performance information.

