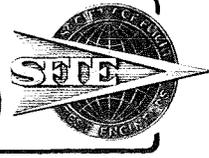


# Flight Test NEWS



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JANUARY 1986  
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## SEATTLE CHAPTER ACTIVITIES

by Anne Pennella,  
Secretary/Treasurer, Seattle Chapter

### OCTOBER MEETING - MUSEUM OF FLIGHT

The Seattle Chapter conducted its October dinner meeting at the Museum of Flight which featured a presentation on the history of Flight Test by Dr. Richard Hallion. The evening started off with a get-acquainted hour with complimentary wine being served followed by a tour of the Museum of Flight conducted by Museum Curator, Mr. Vic Seely.

A "Pasta Bar" dinner with salads, vegetables, etc. preceded Dr. Hallion's talk entitled, "Flight Testing - From the Wright Brothers to the Space Shuttle." Dr. Hallion was curator of Science and Technology at the National Air and Space Museum in Washington D.C. before accepting the post of Chief Historian at Edwards Air Force Base. His talk, accompanied by slides which took us through the history of flight testing from the Wright Brothers to the Space Shuttle, was extremely interesting and entertaining and the whole evening was thoroughly enjoyed by those who attended.

### November Meeting - Wind Tunnel Visit

A field trip to the Boeing Aerodynamics Laboratory wind tunnel facilities on November 11, 1985 was attended by approximately 30 members and guests. After a briefing by the Laboratory staff describing the capabilities of the facility, the party was split into three groups for a tour. Members of the tour were surprised by the extent of the facilities which included the Transonic and Supersonic tunnels, model shop, machine shop, calibration laboratory and data reduction and computer facilities.

### Christmas Dinner Closes Out 1985

The close of 1985 ended on a festive note for the Seattle Chapter. Our Christmas dinner party was held at the Seattle Trade Center on December 11, 1985. Despite the weeknight scheduling, about 55 members, spouses and guests attended and enjoyed the dinner and dancing. Thank you to all who helped organize and decorate and to those who participated to make this a merry and fun event. Best wishes to everyone in the New Year!

The February meeting of the Seattle Chapter will be a joint AIAA/SFTE meeting at the Pacific Science Center's IMAX theater to view the space shuttle film, "The Dream Is Alive."

## General Dynamics and Cessna Aircraft Co. Merger Postponed

ST. LOUIS, Mo., Jan. 8, 1986 -- In view of the December 3, 1985 suspension against General Dynamics making it ineligible to receive awards of further government contracts, General Dynamics and The Cessna Aircraft Company announced today that they have agreed to postpone their merger until some unspecified date in the future. As previously announced, General Dynamics owns over 95% of the outstanding shares of Cessna common stock as a result of its \$30 per share cash tender offer which expired on January 3, 1986 and Cessna shares it owned prior to the commencement of its tender offer. General Dynamics intends to purchase Cessna shares on the open market or in privately negotiated transactions.

## AIR FORCE AWARDS C-17A FULL-SCALE DEVELOPMENT CONTRACT

WRIGHT-PATTERSON AFB, Ohio, Jan. 2, 1986 -- The U.S. Air Force announced on Tuesday, Dec. 31, award of a \$3.387 billion fixed-price, incentive-firm, full-scale development (FSD) contract to Douglas Aircraft Co., Long Beach, Calif., for continuing development of the newest Air Force airlifter, the C-17A.

Management for acquisition of the new airborne transport is by Aeronautical Systems Division's (ASD) Deputy for Airlift and Trainer Systems, Maj. Gen. Elbert E. Harbour. Deputy Director for the C-17A program is David G. Ward.

The C-17A is being designed to augment the Air Force transport force by moving large Army combat equipment to almost any location world-wide and landing at small (3,000 foot), austere airstrips. With this capability, the Army can obtain needed equipment in a short time span and also have it delivered near the potential trouble spots.

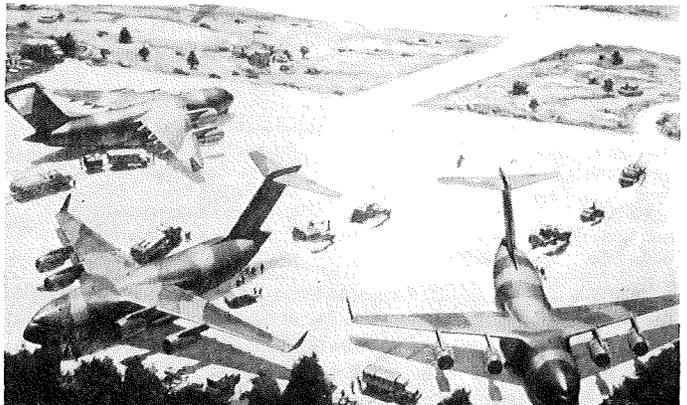
Douglas Aircraft Co. has been working on the C-17A concept since being awarded a modestly-paced, low-level development program contract in 1982.

Full-scale-development is scheduled to continue until July 1992 with a total estimated cost of \$3.387 billion which includes design, development, fabrication and testing of the C-17A airlift transportation system.

Included in the development program is the construction of one flight test aircraft and two articles for static and durability structural testing in ground laboratories at the Douglas Aircraft Long Beach facility. Air Force plans call for production of up to 210 of the new generation airlifter.

The C-17A will be a high-wing, four-engine, wide-body transport which can be operated by two pilots and one loadmaster. It will be powered by Pratt and Whitney PW2037 turbofan engines certified for commercial jet transport operation.

The new transport will be 175.2 feet long, have a wingspan of 165 feet and measure 55.1 feet tall at the tail. The C-17 cargo section will allow for 20,900 cubic feet of cargo volume, or enough room to carry trucks, helicopters and other large Army equipment, such as the Abrams M-1 tank, as far as 2,400 nautical miles.



In this artist's rendition, large, Army-type track vehicles are being unloaded from the U.S. Air Force's newest airlifter, the C-17A, as ground crews prepare the aircraft for a return flight.

## WELCOME NEW MEMBERS

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Barbara J. Evans  
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Kitty Hershberger

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## IS THIS YOUR LAST NEWSLETTER?

The SFTE is continuing to grow at a rapid rate. Our current membership is over 1100, including 21 lifetime members. Corporate membership is 28 and student membership is 113. Formation of a new chapter in White Sands, New Mexico is being worked on.

This is the last newsletter for 295 members who have not renewed their membership for 1986. The larger our organization is, the more effective we will be. We need your support. Please send in your renewals.

Jim Upton, Membership Chairman

## SFTE Briefing Slides Available

SFTE Briefing Slides have been updated and one set of 18 slides (35mm) has been sent to each chapter.

These slides can be used at meetings, luncheons, technical presentations, schools, etc., to brief the Society's goals, objectives, reasons for joining and so forth. There is no script furnished; but the slides are designed to be self-explanatory, and the presenter can easily ad lib as necessary.

Presentors may wish to embellish their presentation with some additional slides of local flight test activities and aviation events of historical significance.

Additional sets of slides can be purchased from Society Headquarters for \$5.50 per set, including postage.

## North American Wins Wing Contract

Rockwell International's North American Aircraft Operations has just received a \$400,000 NASA contract for the design of a pivoting wing for a supersonic aircraft.

Like the B-1B swing-wing, the pivoting wing is set in the conventional aircraft flight position for take-off and landing operations. However, for faster flight, the wing is pivoted so that one side is swept forward and the other side is swept aft, forming an oblique angle with the aircraft's fuselage. In the oblique wing configuration, the aircraft encounters less air resistance in high-speed flight. The pivoting wing capability offers greater flight efficiency at both low- and high- speed flight.

This contract covers phase "B" of a joint NASA/Navy program to design, develop and flight test an aeroelastically tailored, pivoting-oblique wing for transonic and supersonic flight evaluation.

The phase "B" contract is part of a four-phase procurement program for modifying the NASA Ames-Dryden F-8 fly-by-wire research aircraft to a supersonic, oblique-wing configuration.

The contract includes preliminary design of the oblique wing, its pivot assembly and flight control laws for use in the F-8's computers. It also will define the aircraft's flight envelope and assess the operational capabilities of oblique wings for potential naval applications.

Follow-up contract phases will provide detailed design, fabrication, ground testing and flight support for a 12-month flight program approximately 40 flights.

The F-8 Oblique Wing program will expand upon the AD-1 oblique-wing aircraft subsonic research conducted by the Ames-Dryden Flight Research Facility from 1979 through 1982.

## FLIGHT TEST VIDEO TAPE AVAILABLE

Thanks to the generosity of the Boeing Company, the SFTE National Headquarters has a video tape entitled, "Flight Test, Evolution and Revolution." The tape is VHS format, 30 minutes long, and has a lot of interesting material covering flight testing, both military and commercial.

The video tape can be rented from the National Headquarters for \$5.00 plus \$15.00 deposit, returnable upon return of the tape. This tape was shown at the reception in Seattle at the recent SFTE Symposium.

## COLUMBIA GATHERS DATA WITH LTV-BUILT, ONE-OF-A-KIND NOSE CAP

DALLAS, -- For the Space Shuttle Orbiter Columbia's seventh flight into space, it will be wearing a one-of-a-kind experimental nose cap, developed and built by the Vought Missiles and Advanced Programs Division of LTV Aerospace and Defense Company.

The special nose cap assembly, known as Shuttle Entry Air Data System or SEADS, contains NASA and Rockwell International instrumentation to measure the distribution of air pressure around the nose during reentry. The cap has 14 coated columbium ports to allow pressure measurement from an altitude of 56 miles to the ground.

Pressure data gathered by SEADS is needed to define angle of attack, angle of side slip, mach number and velocity, all necessary to evaluate the spacecraft's design capabilities. "The best place for gathering this data is at the front end of the orbiter," said Garland Whisenhunt, the division's director for the space shuttle. "But that was not possible until SEADS was developed because the temperatures at the front and end were too high."

The SEADS nose cap is built of Reinforced Carbon Carbon (RCC), protecting the assembly against metal-melting temperatures as high as 2,700 degrees Fahrenheit. The wing leading edges and nose caps of all the orbiters are made of RCC which is basically an all-carbon material reinforced for strength and treated to resist oxidation.

Columbia was outfitted with SEADS during an 18-month modification at Rockwell's Palmdale facility. Rockwell was the prime contractor to the National Aeronautics and Space Administration for the space shuttle orbiter and the industrial integrator for the overall shuttle system.

## \$400 Million Engine Order For Pratt & Whitney

EAST HARTFORD, Conn. -- United Technologies' Pratt & Whitney PW2000 series engine has been selected by United Parcel Service (UPS) to power up to 35 Boeing 757 cargo planes that UPS plans to acquire.

The order for up to 90 installed and spare engines is valued at \$400 million to Pratt & Whitney.

The PW2000 series engines will power 20 Boeing 757PF aircraft that UPS has ordered plus 15 additional aircraft on which the carrier has options. Engine deliveries will be made over a six year period starting in 1987.

The UPS order is the second for the PW2000 engine program in two months. In November, Northwest Airlines ordered 20 additional PW2000s to power 10 Boeing 757 jetliners it will begin acquiring in 1987.

## General Electric Company F404 Engines Support French Rafale Roll Out

LYNN, Massachusetts -- When the French Rafale Experimental Prototype Aircraft was recently unveiled at the Avions Marcel Dassault-Breguet Aviation's St. Cloud development facilities, its engines were a pair of General Electric Company F404s. With its first flight scheduled for mid-1986, the twin-engine Rafale is slated to be the first non-U.S. designed and built aircraft to fly under F404 power.

Burton A. Riemer, general manager of General Electric's F404 Project Department, said, "We are gratified by the progress of this French Experimental Aircraft Program. Flight test engines were shipped to France during the last three months. The engines are currently undergoing altitude performance calibration testing at the French government's Mouches test facility. After this testing sequence has been completed, the F404s will join the aircraft at the flight test center in Istres for final assembly and ground testing in preparation for a May 1986 first flight.

"The Dassault-Breguet Rafale," he continued, "has been developed as a flying test bed for 1990s combat aircraft technology."

## Lockheed Funds Texas A&M Research On Wind Shear Detection System

MARIETTA, Ga., Dec. 17 -- An aircraft sensor system capable of detecting wind shear during flight is being evaluated in tests at Texas A&M University and will be tested on Lockheed-Georgia Company's High Technology Test Bed (HTTB) aircraft.

Developed by Texas A&M research engineer Oran Nicks, and funded for further development by a Lockheed-Georgia research contract, the device is designed to sense the wind shear at the moment the forward part of an aircraft encounters the change in wind direction or speed, measure the severity of the change, and provide visual and audio signals to alert the pilot.

Wind shear is the violent change in wind speed or direction often associated with thunderstorms that have been blamed for several recent disasters.

"It is designed to buy the pilot some time to respond. Maybe only a few seconds, but that could make the difference," said Nicks, a longtime aerospace researcher who heads Texas A&M's Space Research Center.

Nicks developed the total energy sensors several years ago for use on sailplanes and the device currently is in use around the world by soaring enthusiasts.

Using small aircraft from Texas A&M's Flight Mechanics Laboratory, the system currently is being evaluated by several general aviation pilots to determine the utility of the device and the best way of displaying the information in the cockpit.

The system will be installed in Lockheed's High Technology Test Bed, a flying laboratory for aerospace systems. HTTB pilots will help determine the device's usefulness on a tactical airlifter during steep, slow landing approaches.

Dr. Donald Ward, professor of aerospace engineering at Texas A&M, leads two graduate students in the research project. Ward's students, Rosa Oseguera and Tom Anderson, will develop computer simulations of the project from evaluation tests of the system.

"The information this device provides already is available in other forms from other instruments in large aircraft, but not in this way," said Ward, a former test pilot. "This device is relatively inexpensive and might help quantify the wind shear in a way that helps the pilot react more quickly."

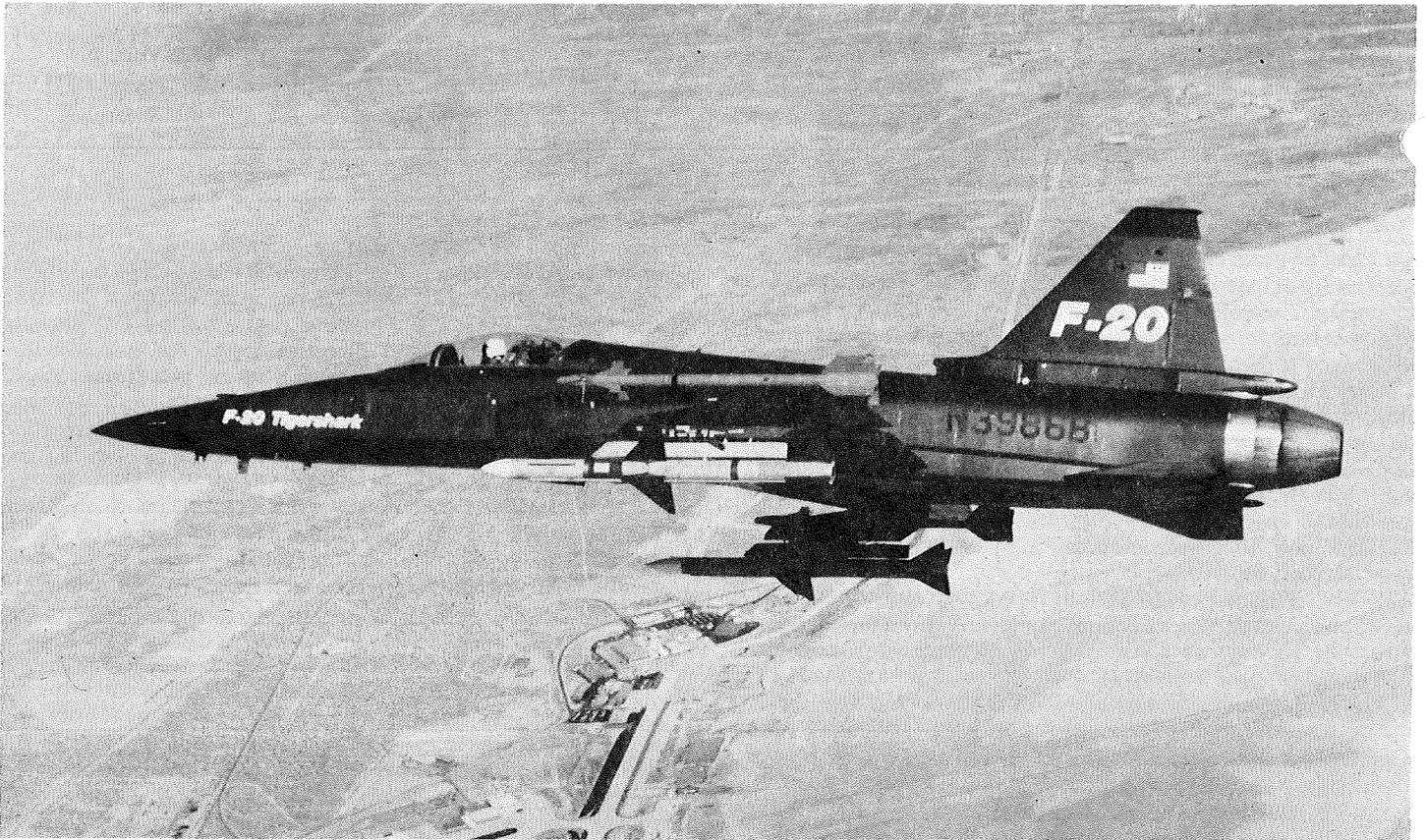
The device is a sensor in the form of a cylindrical tube mounted on the front of the aircraft and instrumentation to record and display the measurements in the cockpit. Special gauges that combine a vertical speed indicator and a total energy indicator have been developed for the project by Redwood Instruments of Redwood, Calif.

Tests conducted previously by NASA's Langley Research Center resulted in recommendations that the device be further investigated.

In the future, if the device proves helpful for pilots, Ward said, the system might be integrated with the aircraft's propulsion control scheme, allowing automatic reaction by the throttle if the aircraft encounters a sharp loss of its total energy -- a signal of encountering wind shear.

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*Editor's Note: The April 1984 issue of MD Flight Approach has an excellent discussion of meteorological hazards that can cause wind shear: Microbursts, Downbursts, and Macrobusts. The April 1985 issue of MD Flight Approach published flight procedures and precautions which supercede those presented on page 14 of the April 1984 issue. MD Flight Approach is published by the Flight Operations Group of Douglas Aircraft Company, 3855 Lakewood Blvd., Long Beach, California 90846.*



**TIGERSHARK TESTING** -- Northrop's F-20 Tigershark has completed its third year of flight testing during which time it has met or bettered all planned performance, reliability and maintainability test objectives in nearly 1,400 sorties. The Mach 2 Tigershark made its first flight August 30, 1982 over Edwards Air Force Base, Calif. The U.S. Air Force has overseen the Tigershark flight test program from the start.

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