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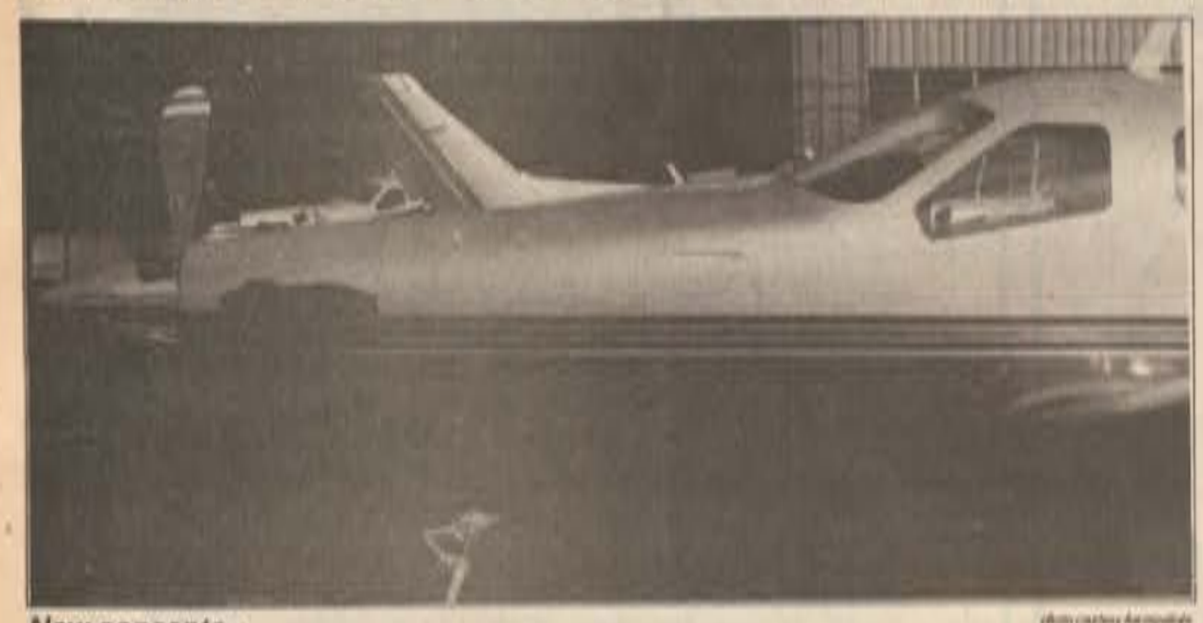
Aeronautica

B

Volume 64, Issue 11

April 4,1990

TBM 700 receives first airworthiness certification



New concepts...
The newly certified TBM 700 has met with positive feedback from consumers who say they like the idea of a high-performance corporate aircraft.

by Joseph A. Salerno
Aeronautica Editor

One of the newest concepts in airplanes today is the Franco-American TBM 700, a cabin-class, single-engine turboprop designed jointly by Aerospatiale and Mooney (70- and 30-percent partners respectively). It is powered by a 700-shp Pratt & Whitney PT6A-64 engine which is classified as a 'mature engine' and is capable of 1,485 thermodynamic horsepower. The wing for the plane was designed from a 'clean sheet of paper' and the overall design of the plane is remarkably streamlined, with speed capability in excess of 300 knots. As a result of the engine being placed far forward of the cabin area, there is very little if any noise from the engine and no engine vibration.

Certification

The TBM 700 has finally cleared its first real regulatory hurdle of basic aircraft certification from the French civil avation authority DGAC, after four years of development and flight testing.

"Next to its first flight, this is the second most important milestone in the evolution of the airplane, says Pierre Gautier, chairman of TBM s.a. supervisory board.

Says Claude Lelaie, director of TBM700 design and development, the ruling issue on Jan.31, 1990, "guarantees production of the airplane and validates everything about the TBM's basic design and performance capabilities. Ninety percent of what's left in the certification process in the United States and other countries is mostly paperwork."

Ninety percent of what's left in the certification process in the United States and other countries is mostly paperwork.

Claude Lelaie

It is expected that basic FAA certification up through FAR 23 Amendment 33 will be received, and then the TBM will undergo supplemental certification for IFR operations and icing conditions. Complete certification is expected by mid-1990 and deliveries are scheduled to begin in July.

Interest in the concept of a high-performance personal/corporate aircraft with a single turboprop engine has continued to grow since the introduction of the TBM 700 at the 1987 Paris Air Show. To date approximately 45 orders and 10 options have been placed for the aircraft.

Prototypes

The TBM 700 has a total of three prototypes in the air with the successful first flight of prototype number three on Oct. 11, 1989.

According to Alain Aubry, president of TBM s.a. executive board, multiple prototypes provide test beds for the ongoing certification process while allowing one prototype to serve as a demonstrator for the marketing effort. Prototype number one, which made its maiden flight in July 1988, has accumulated more than 363 flight hours in 287 flights. Number two, which made its first flight in August 1989, has flown 104 hours in 91 flights. Since October, prototype number three has accumulated 72 hours in 69 flights. Number three also is scheduled to begin a six-week demonstration tour of the United States.

Demo tour

Having begun last March, the North American demonstration tour of TBM prototype number three is intended to be more than a formal unveiling for potential North American buyers.

Another purpose of the tour is to test market the airplane, particularly the interior, so that input from the North American flying community can be considered and incorporated into the final production model. To test its heating and cooling systems, the tour will also expose the airplane to a wider variety of environmental conditions and temperatures.

Brant Dahlfors, vice president of sales and marketing for TBM North America, was one of the first people to experience prototype number three in flight after the installation of environmental control, sound-proofing, and air ducting systems. "I felt the noise level was extremely good," Dahlfors says. "It will undoubtedly provide for a much more comfortable cabin environment than has ever been available before in a single-engine airplane. In fact, I believe it's actually quieter than any turboprop twin that I've ever been in."

Boeing laminar flow research continues

by Joseph A. Salerno
Aeronautica Editor

The latest phase of ongoing research into a technology that could sharply improve aerodynamic efficiency of future aircraft is a series of recent wind-tunnel tests at Boeing Commercial Airplane Group. The tests have set the stage for in-flight trials expected to start within two months.

The research is aimed at preventing much of the turbulence, which increases skin-friction drag and fuel consumption, that occurs naturally in flight on the boundary layer of air — the thin layer immediately next to the surface of a wing or other parts of the airframe.

It was shown by early research that careful shaping of the wing could achieve some laminar flow, but this approach, known as natural laminar flow, works only under rather restricted conditions. A more powerful technique, called laminar flow control, extracts a small amount of the boundary layer air through a porous or slotted wing skin by means of a suction system.

Laminar flow control has limitations, too, as the holes or slots along major portions of the wing surface could compromise structural soundness, but Boeing has met this challenge by developing and patenting a new variation known as hybrid laminar flow control (HLFC), which limits the air extraction system to just the leading edge, followed by a run of natural laminar flow.

...this concept holds potential for reducing fuel consumption of an airplane by up to 10 percent...

The HLFC concept was tested in late 1989 on a simulated section of wing during more than 300 hours in a Boeing wind tunnel, whose leading edge was fitted with a specially fabricated skin made of titanium perforated with two million tiny holes drilled by an electron beam and spaced 1/20 of an inch (0.127) apart.

Air over the leading edge was extracted through the holes into a series of long metal channels or flutes bonded to the reverse side of the titanium skin. An ejector pump created a gentle suction in the flutes, drawing in just enough air to maintain a laminar flow on the leading edge.

During the wind-tunnel tests, Boeing researchers used a sensitive instrumentation on the wing surface to measure the amount of laminar flow obtained, and results confirmed that careful design of the wing had obtained laminar flow for up to six feet (1.83 m) beyond the perforated leading edge. This combination of active control by suction followed by a run of natural laminar flow is the basis of HLFC.

It is believed by Boeing's researchers that this concept holds potential for reducing fuel consumption of an airplane by up to 10 percent or even more, depending on length of light and extent of HLFC application on the airframe.

Beginning in the second quarter of this year, flight testing of the HLFC concept will be conducted under a cooperative program which is jointly funded by Boeing, NASA, and the U.S. Air Force, and will be done on a Boeing 757 jetliner. It will be the first in-flight evaluation of HLFC.

Flowing smoothly...
developers at the Boeing wind tunnel facility test a laminar flow wing construction which has met with success.

A new suit...
The new Chance-Vought YA-7F, a derivative of the Corsair II, employs new wing structures, a lenghthened fuselage and a new powerplant.

Vought releases the YA-7F close air support aircraft

by Ron Young
Aeronautica Writer

The YA-7F, a re-engined and modernized Air National Guard A-7D, has successfully begun its flight test program.

The YA-7F is an upgraded A-7D Corsair II designed to provide a unique combination of responsiveness, lethality, and survivability. The airframe modification program is one of the most extensive upgrades ever done on an in-service aircraft.

The aircraft is CTV's direct response to a U.S. Air Force request for an interim aircraft to fill the Close Air Support/Battlefield Air Interdiction (CAS/BAI) requirement.

CAS/BAI involves close air support of friendly ground troops engaged in combat with the enemy on the front lines and air strikes deep into enemy territory. It is an integral part of the way the U.S. Army intends to fight the next war - currently referred to in military doctrine as the "Air Land Battle."

Airframe enhancements

Modifications to the A-7 include both wing and fuselage alterations. Externally, the most obvious change is fuselage length. Plugs of 18 inches aft and 29.5 inches forward of the wing provide additional space for both fuel and avionics in addition to redistributing the proper weight and balance.

Strakes, lift dump spoilers, and trailing edge flap augmenters are included into the new wing design and aid in a reduction of both landing approach and touchdown speeds. A 20 percent decrease in landing ground roll also benefits from the new wing design.

The YA-7F also incorporates a new vertical tail fin cap for additional stability during high angles of attack.

Engine configuration

see Vought, page B9

NASA developes reconfiguration system

by Joseph A. Salerno
Aeronautica Editor

NASA research pilots have met with success during testing of a flight control system that detects in-flight failures and automatically reconfigures an aircraft's ailerons, rudders, and elevators, allowing pilots to continue their missions or land safely.

The first system of its type in the aerospace industry, the self-repairing flight control system has been demonstrated on NASA's F-15 Highly Integrated Digital Electronic Control research aircraft based at Ames-Dryden Flight Research Facility, Edwards, California.

"This is a very significant and far reaching development in aviation..."

James F. Stewart

The primary purpose of the system is to detect damaged flight control components and adjust undamaged flight surfaces so the pilot can maintain good aircraft response, and when a failure is sensed, the system will select the best pre-computed solution from a set of control laws loaded into the F-15's computer. The system also can constantly monitor subsystems throughout the aircraft to diagnose and identify failures that are hard to repeat and isolate during post-flight maintenance.

"This is very significant and far reaching development in aviation," said James F.Stewart, project manager of the F-15 research program at Ames-Dryden. "Once it is fullt developed and operational, the self-repairing flight control concept could greatly increase tactical aircraft survivability in combat and enhance safety during training missions. It also has the potential for adaptation to civil aircraft, enhancing aircraft and passenger safety.

NASAresearch pilot James Smolka, flying at Mach 0.7 on the initial self-repairing system demonstration flight, purposely locked the F-15's right horizontal stabilator to represent a failure of hydraulic or electronic systems, whereupon the self-repairing system instantly reconfigured the remaining stabilator, ailerons, and rudder to establish aircraft pitch and roll control with the right stabilator remaining in the "failed" state.

The system correctly identified the "damage" and reset the other flying surfaces to restore normal controlled flight during a battle damage scenario in which control effectiveness of the right stabilator was changed to simulate flight with 80 percent of the span missing.

The pilot receives new flight limits, such as reduced speed or maneuvering loads that the failure or battle damage may impose, during self-repairing system activation, when a preprogrammed visual warning appears on the cockpit heads up display that explains the type of system failure.

The maintenance dianostic capability of the self-repairing system was demonstrated by five types of failures programmed into the F-15 research aircraft's flight computer, each selectable by the pilot and set to activate only under specified maneuver conditions. The system was able to identify all five intermittent electrical, mechanical, and hydraulic faults, and after the F-15 aircraft returned to Ames-Dryden, the failure data and appropriate repair instructions were displayed on a ground station screen that would have facilitated repair work to return the plane to 100 percent flight status.

Before the technology is used in future aircraft designs or retrofitted on existing aircraft, an advanced self-repairing system is expected to be developed and thoroughly tested. The operational envelope of such an advanced system may include landing tasks, supersonic speeds, and flight in automatic terrain-avoidance and terrain following modes.

Feasability studies on the system began in 1984 at the Air Force's Flight Dynamics Laboratory, Wright-Patterson AFB, Ohio. Ground-based and in-flight simulators verified the data before development of the system demonstrated on NASA's F-15 research aircraft.

Tom McMurtry, chief of Ames-Dryden's Aircraft Operations Division and Ames-Dryden chief test pilot Bill Dana are other NASA pilots taking part in the system development.

McDonnell Aircraft Co., St. Louis, and General Electric's Aircraft Control Division, Binghamton, N.Y., developed the self-repairing system under contract to NASA's Ames-Dryden facility. The U.S. Air Force Wright Research and Development Center, Wright-Patterson AFB, Ohio, sponsors the program.

DRAWING SHOWS HOW THE SELF-REPAIRING FLIGHT CONTROL SYSTEM CAN PRESERVE MANEUVERING CAPABILITY OF A DAMAGED MILITARY AIRCRAFT

NASA photo

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EXCELLENCE!

photographs by Ron Rogers and Brian Orr
layout by Ron Rogers

Excited... NASA photo
Kathryn Sullivan is fully suited up during training procedures for her next flight aboard *Discovery*. Although no EVAs are planned, the crew practiced several maneuvers should they become necessary in the deployment of Hubble.

Hubble launch draws near

Lift off to be attempted two days earlier after readiness review

*by **Jose L. Vazquez-Delgado***
Space Technology Writer

At the conclusion of last week's flight readiness review, NASA set April 10 as the target date for the launching of the Hubble Space Telescope

The STS-31 launch window opens at 8:45 a.m. and closes at 11:15 a.m. Duration of the mission is five days, one hour, and 15 minutes and *Discovery* will be returning to Edwards AFB in California.

The original launch date for this mission was April 12, but because workers were ahead of schedule, the date was moved up by two days.

...the shuttle will fly a 320 mile high orbit...NASA hasn't flown any spacecraft that high since the Apollo moon missions...

During this mission the shuttle will fly a 320 mile high orbit being the highest orbit flown in the shuttle program. NASA hasn't flown any spacecraft that high since the Apollo moon missions back in the late 60's and early 70's.

While the astronauts are orbiting the Earth at a speed of 18,000 mph, they will conduct medical research after the Hubble deployment is accomplished. The Hubble Space Telescope will be released during the second day of the mission. The orbiter will then follow Hubble for two days while all systems onboard the telescope are checked out by ground controllers.

In the eventuality of any malfunction, the astronauts will grapple the satellite with the remote manipulator arm and stow it back in the cargo bay for return to Earth. If kept in orbit, a two to four month systems check will be conducted before the telescope is declared operational and any pictures are taken.

Astronauts McCandless and Sullivan, who have been space walk training for this mission for the last five years, will be able to perform a contingency space walk if the need arises.

The telescope has grapple fixtures and maintenance panels with easy accessability for in orbit shuttle repairs.

The five man crew, Shriver, Bolden, Hawley, McCandless, and Sullivan, are all prepared for America's most impressive scientific payload of this decade. The Hubble Space Telescope will be the most exciting payload ever to be deployed from the shuttle and the first of NASA's four great observatories to be launched this year.

Space walk tests station systems

Free flying... NASA photo
Bruce McCandless performed the first free flight EVA in 1984. EVAs have not been a feature of the past several missions, but many are planned on upcoming flights to test the systems for space station *Freedom*.

*by **Michael Fried***
Space Technology Reporter

The last time the U.S conducted a space walk was in 1985, and for that reason NASA plans another in November.

Its been five years since there has been an EVA (Extra Vehicular Activity) and the first opening for such a mission will be this November. After the Gamma Ray Observatory is released, the cargo bay will be empty, allowing NASA to brush up on their EVA techniques.

The plan is to test out future space station equipment. NASA will be relying on EVAs to construct and maintain the station, which NASA has little experience doing.

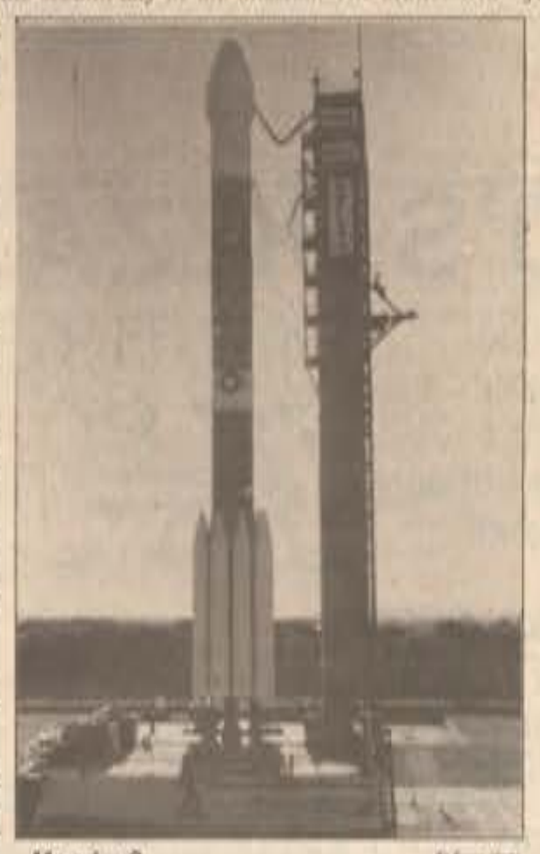
The use of carts will be used to accelerate astronauts the length of the beams instead of the tedious hand over hand method currently being used. If the astronaut work load can be decreased, the endurance and productivity will improve.

For many ground controllers, the EVA will be a new experience due to a changing workforce. For NASA, it's time to practice its techniques.

Astronauts Jerry Ross and Jay Apt will perform the space walk. During the walk the astronauts will test three different carts designed to slide along beams. The total cost of the equipment is $5 million which can all be directly applied to the space station.

The spacewalk will be looked at closely by station designers as the construction phase of flight hardware is slowly approaching. Designers are not yet certain on whether or not to depend on robotics or EVAs for construction and maintenance of the space station *Freedom*.

STS-31 may entail an EVA if the deployment of Hubble needs assistance.



Monday?.. Air Force photo
If *Discovery's* launch is not attempted Tuesday, a McDonnell Douglas Delta II rocket is scheduled to lift off from Cape Canaveral Monday at 6:28 p.m.. The rocket launch will occur Thursday at 6:29 p.m. if STS-31 lifts off as planned.

Free-flight testing of Pegasus rocket begins today

*by **Derrick Seys***
Space Technology Editor

The Pegasus rocket may surpass a testing milestone today by being released from a B-52 aircraft over the Pacific Ocean.

According to Don Haley of NASA's Dryden Flight Research Facility Edwards, Calif, the release will occur approximately 62 miles southwest of Monterey, California shortly after 3:00 p.m. EDT.

The flight plan calls for the B-52 to depart from Edwards Air Force Base at 11:00 a.m. PDT Wednesday with the streamlined Pegasus rocket under its wing. Inflight tests will be conducted during the one hour climb to 45,000 feet.

This test will be the first release of an inert vehicle and be a dress rehearsal for upcoming tests.

After successful drop tests of the inert vehicle, an active rocket will be tested. These flights will require the first-stage motor to fire five seconds after Pegasus is dropped from the B-52 pylon. In an actual mission, two more stages will carry the payload into orbital altitude.

The three-stage Pegasus rocket is designed to place small one-ton satellites into space from an airborne B-52. The Defense Advanced Research Projects Agency (DARPA) is the first customer of the small rocket.

Last February, the final captured test occured and no problems arose. This allowed Orbital Sciences Corporation, builder of the vehicle along with Hercules Corp., to proceed with free-flight tests.

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Notices

Graduating Seniors receive a reminder

If a prospective employer requests an official transcript for a job interview, we must have a written request from you before that information can be released. For your convenience, be sure to fill out a Transcript Request Form with the Records and Registration before leaving campus.

Scholarships Available

Applications for Orville Redenbacher's Second Start Program are now available in the Financial Aid office. Ten $1000 scholarships will be made available to qualifying students for the 1990-91 school year.

To be eligible, the student must be 30 years old or older at the time of application. Recipients may enroll in either an associate., bachelor, or graduate degree program at an accredited college or university and can be either full or part-time students. The deadline for the application is September 1, 1990.

University Bookstore

The University Bookstore cashiers are accepting orders for faculty/staff academic apparel for April's Graduation.

Parking Policy

Effective immediately, all regulations concerning parking violations are being enforced for ERAU student vehicles and other vehicles.

Management Club hosts FAA Administrator

The Management Club will entertain James B. Busey, the FAA Administrator here at ERAU on April 10, 1990 from 10 a.m. to 2 p.m.. The point of contact for this endeavor is Tracine Anderson, box 7614.

Free Information

The Counseling center has books and cassette tapes that can be checked out, plus many free handouts and brochures. The materials deal with numerous subjects such as stress reduction and relaxation, study skills, depression, grief, sexuality and relationships. The Counseling Center also has a biofeedback machine for stress reduction and video tapes that can be viewed in their Resource Room. The Counseling Center, located on the first floor of the Student Center, is open from 8:00 a.m. to 5:00 p.m., Monday through Friday.

Students anticipating summer '90 degree completion

We suggest that you fill out your Degree Completion Application for a Preliminary Evaluation for Degree Completion. Your evaluation can be used to check that the courses you may have Advanced Registered for are correct. Any changes can be made before the summer terms begin.

Applications are available in the Registration and Records Office on the Second Floor of the John Paul Riddle Student Center Extension.

Attention April Graduates

The final meeting for April Graduates will be held in the Student Center on Monday, April 9, 1990 at 8 p.m. All details concerning commencement, cap and gown pickup, etc., will be reviewed at that time. Since there is no rehearsal for Graduation, it is important that you attend. Voting for Outstanding Faculty and Staff Awards will be conducted.

If you are unable to attend, please stop by the Student Activities office.

Graduating Seniors need Exit Interviews

If you were awarded a Perkins/NDSL or Repayable Educational Assistance Loan (REAL), and a Stafford/GSL as part of your financial aid package while a student a Embry-Riddle Aeronautical University, you are required to complete an Exit Interview before leaving the University.

If you have not yet scheduled an appointment for your Exit Interview with the University Collections Office, please do so immediately.

Please call 239-6040 to make your appointment. Be advised that there will a *hold* placed on release of your cap and gown for graduation until you have fulfilled your Exit Interview requirements.

Spring Break hours for Library

The Library will be closed for spring break on Thursday, April 12 and Friday April 13. Regular Hours will resume on Saturday, April 14.

Embry-Riddle hosts ATC examination

Embry-Riddle Aeronatical University will hold the FAA Air Traffic Control Qualifying Examination on April 7, 1990 from 9 a.m. to 1 p.m. in M03B, the Mobile buildings near the Catalina Ave entrance to ERAU.

The test will be administered by the federal Office of Personnel Management (OPM) at no charge to applicants. The test is open to all who meet the basic requirements including: being a U.S. citizen, being able to read and write English, have general work experience and be at least 18 years old but less than 31 years old. The point of contact is Marvin Smith/A-TS at (904) 239-6448.

Autos for sale

1987 Chevrolet Europort Wagon--Silver gray, 17000 mi., excellent cond., PS, PB, auto door locks, rear gate opener, Stereo and cassette. Fuel injection, rear defogger, A/C, auto transmission, cruise control. Velour upholstery, luxury floor mats, delayed action wipers, remote control mirrors. $7895. Call Josephine at 239-6800.

1974 Mercedes 450 SEL--(Quay market car). loaded, well maintained (books from new), high mileage, but runs very good. Asking $4000 obo. Call 255-8646. Serious inquiries only.

1968 VW Bug--Sunroof, rebuilt transmission, 1600 cc engine, runs good, must see. $995 obo. Call 239-6940 (8 a.m. to 5 p.m.) or 761-6391 after 5:30 p.m.

1984 Bronco--40000 mi., new tires, 4 by 4 drive, excellent shape. $6000 obo. Call 258-0939.

1983 Charger--A/C, 2.2 liter, good condition. Actual price $2200 sacrifice for $1000. Call 258-0939.

1974 Datsun 260Z. (2 plus 2)--No rust, recently primed. New carpet, mag wheels, very clean. $1095 obo. Call 239-6940 (8 a.m. to 5 p.m. or 761-6391 after 5:30.

1986 Chevy Astro 8 Passenger Van--V6 automatic, AM-FM cassette stereo. PS, PB, PW, silver gray, like new, one owner, also has hook to pull trailer. Very good on gas. I will take a trade in for an automatic car - Toyota, Nissan, or Honda, 1986 and up. Call 788-0751 all day till 11:30 p.m.

1977 Toyota Celica GT--In good cond. $750. Graduating must sell. Call Rob at 253-1125.

1977 Caprice Classic--2 dr., PS, PB, AC, CC, AM/FM Cass., V8, painted last summer. Fair cond. Must Sell. $500 obo. See me at Dorm II room 256 (Jeff).

1979 Celica GT--Reliable Transportation, solid air, sunroof, stereo. $800 obo. Call 756-2526.

Attention--Government Seized Vehicles from $100. Fords, Mercedes, Corvettes, Chevys. Surplus Buyers Guide. Call 1-602-838-8885 ext. A18183.

Cycles for sale

1987 Suzuki GSX-R 1100--Blue and white. Yoshimura exhaust, Mikuni carbs, brand new Metzler racing compound tires. Very fast. Call Kenyon at 238-3345, only those serious please.

1981 Kawasaki CSR 750--Good cond. Dependable. Asking $650. Call 252-5388 or (407) 323-9797.

1986 Honda Elite 250 Scooter--Bought new in spring '87, 50 mpg, only 3K mi., black with gold trim, cover and helmet included, new condition. Graduating, must sell. $1700 obo. Call Scott 274-4161 or box 2731.

Cosmo Cub Moped--Runs good, looks good. $99 obo. Contact box 7753.

For Sale--Motorcycle Trailer. Three channels for up to three motorcycles. Includes tie-downs. $150 obo. Call Brad at 258-0269.

1986 Ninja 600--Just tuned, New Metzlers, never down, runs strong, great cond. $2100 firm. Call John at 254-6865.

KZ 650--Great Shape, must see. Asking $700 obo. Call Joe at 238-7422.

1981 Yamaha 250 cc Exciter--New battery, strong engine, 5 speed, 4500 miles. Remember Insurance is not required for motorcycles in the state of Florida. First $220 takes it obo. Leaving. Call Ray at 788-3095 weekdays before noon or after 6 p.m. or weekends all day.

1989 FZR 1000 Yamaha--Slip-on header, custom seat and grips. 8000 mi., cover included. Call John at 257-7831 or (407) 327-5037 or box 6720.

Roommates

Roommate Needed--Share three bedrm house. Have own room. House is complete, needed for summer A or B. Stay if you like thereafter. $185 mo. plus fourth of utilities. For complete details call Jeff at 767-5917.

Hang Gliding--Spring Break trip April 12 to 15. Organizational meeting next week. Call 677-4332 for more information.

Learn to Scuba Dive--PADI certification $100. Call Jan at 761-2021.

Respectable Spanish-American lady with very good references needs a job as a companion for an elderly person. I have my own transportation with Fl. license. I prefer to take care of a woman, but will take care of an honest respectable old man or an invalid, for more than 6 hrs a day or night. Prefer day. Call 788-0751 between 9 to 11:30 a.m., only serious replies please.

Roommate wanted--Male or Female, 2 bedroom-2 bathrooms Cypress Landings. $270 mo. Call 257-6951 after 4 p.m.

Apartment for Rent--Take over lease (expires 8-14-90). 2 bedroom, 2 bathroom. $539 mo. Call 257-6951 after 4 p.m.

For Rent--Available April 1. Clean, furnished, quiet room in a beautiful big home. Plenty of parking space, lighted at night. $180 mo. and you pay no utilities. No lease either. Must be a non-smoking, quiet, sober gentleman. 1.5 miles from ERAU. Call 258-5901, evenings.

For Sale--Good Buy. 8 rooms, 4.5 baths, living and dining rooms, kitchen, attic, cellar. Very dry, big, beautiful, historic landmark. Professional zoned and residental. $110000 cash. Call 258-5901, evenings.

New Home--2 bedroom, 2 bath, split plan, many extras, $59900. If you buy now and sell at graduation you can live rent free or take a roommate and make a profit. 920 Hanford Ave. between 9th and 10th street, east of Ridgewood. Call Nancy at Adams Cameron, phone 677-7911.

Apartment for Rent--Sublet clean 2 bed, 2 bath apt. from May thru July. Security, pool, tennis court, laundry, air cond. 1 mile from ERAU, unfurnished. $440 mo. plus deposit. Call Alexa at 253-0427 from 6 to 8:30 p.m.

Roommate Needed--Non-smoker only, starting Summer A. Nice 2 bedroom furnished apt. with washer and dryer, hot tub, pool, tennis courts, cable. $259 mo. plus phone and elec. In the Island Club 3 mi. from ERAU. Call Jeff at 760-7417.

Roommate Needed for Summer A and B in 3 bedroom, 2 bath house. Call 676-2909.

Miscellaneous

Citation Jet Time--Become Citation jet qualified. Includes jet systems ground school, advanced crewmember training, jet flight time and all materials. When finished you will be signed off and Citation Jet co-pilot qualified. $995 guaranteed. Call 253-2378 or (407) 330-4670.

I need a witness to an accident that occured Monday, March 26 at 4 p.m. at the intersection of Clyde Morris and Catalina. Please. Call Fran at 239-6811 in Flight Maintenance.

Lost--1 weight lifting glove. Rafael Daniels. Blue back and and grey leather front. If you have the glove or know where it is, please call Jim at 255-4663 or box 5427, leave a message.

Attention All Scouters--If you are interested in getting involved with local Scout troops or Explorer Posts either now or in the Fall please let me know. The local OA chapter is in need of responsible help of all ages. Call Duane Bird at 239-9672 or box 8020.

CLASSIFIED AD POLICY

- Non-commercial classified advertising and personals are **free** to the student body, faculty and staff of Embry-Riddle with a 35 word limit.
- All other non-commercial advertising is $10 with a 35 word limit. Each additional word is 10 cents.
- Commercial advertising is available through the *Avion* advertising department.
- Classified advertising is carried out by filling out a classified ad card in the *Avion* office.
- Only one classified ad per card. Name and address of advertiser must be included for the ad to run.
- Ads will run for two issues and may be renewed by filling out another classified ad card.
- No classified ads will be accepted over the phone.
- For more information, stop by or call the *Avion* office at (904) 239-6049.

Need a paper typed? Let me do it for you. Typed. Spelling and grammar corrected, only $1 a page. Call Matt at 255-3057, leave a message.

Attention--Easy Work, Excellent Pay! Assemble products at home. Details. Call 1-602-838-8885 ext. W-18183.

Attention--Hiring! Government jobs - in your area. Many immediate openings without waiting list or test. $17840 to $69,485. Call 1-602-838-8885 ext. R18183.

Help Wanted--Do you know Fortran and/or ADA? Would you like to earn some extra cash? I need your assistance. Please call Felicia at 761-2580 or box 2054, leave a message.

Aircraft for Rent to those interested in acquiring certificates or additional ratings. Low rental rates. For more information concerning rental, call Matt at 254-6854.

Earn Cash on the Beach--$20 to $25 per hr. possible. Call Matt at 257-5915 or box 4406.

Help Wanted--Larry's Ice Cream. Apply in person, Volusia Point Shopping Center across from Speedway.

Help Wanted--Sorrento Deli, Port Orange. Car required. Apply in person.

Misc. for sale

* $899 New EGA IBM Compatible *
This unopened, unbelievably low priced computer operates over twice the speed of IBM's original XT. Includes full 640K, keyboard, and EGA color monitor and card. 101 keys. A complete system...CALL 238-7355

* $1399 IBM EGA AT Clone w/Hard Drive
This unopened system operates at 15.3 times PC speed and includes Intel's 80286-12 chip. OS/2 capable. 0 Wait State. 1.2 Meg drive. Color EGA monitor and card...CALL 238-7355

For Sale--Canondale 12 speed Road Bike. $400 obo. Contact Jeff at box 5395.

For Sale--Light brown couch. Very good cond. Seats 4 confortably. Only $50 neg. Contact Dorm II, Room 211.

For Sale--Graduating Must Sell. Desk, bookshelf, table and chairs, lazy boy rocker. Best offer. Call Scott at 767-9005 and leave a message.

For Sale--Yamaha Compact Disc Player. Only $80. Call Brian at 255-7819.

For Sale--Apple IIe computer, 128K, monitor, disk drive, and printer. Call Joe at 676-2909.

For Sale--15 in. RCA Color TV. Good condition, $50. Call Jim at ext. 6640.

For Sale--Mens 12 speed bike, one year old in excellent condition, $100. Overstuffed love seat with hand made slip cover, $50. Call Matt at 255-3057 or box 6767, leave a message.

For Sale--Diamond Engagement Ring. 3 diamond ring is centered by one marquise cut diamond surrounded by 2 round brilliant cut diamonds. Mounted in 14 karat gold. Appraised $1150 will sell for $700 obo. Call Scott at 257-6847.

For Sale--Town and Country Surfboard. 5 ft. 8 in. twin fin, excellent cond., pipeline leash. $125. Hondaline Magnetic Tank Bag. Great cond., black and has all accessories. $40 obo. Kenwood complete home stereo system. Includes amplifier, tuner, cassette deck with music search and Dolby NR, turntable with cleaning disc, and 14 band graphic equalizer. $250 for everything. Call Kevin at 255-8646, leave a message.

For Sale--King Size Waterbed. $90. Call (407) 323-9797.

For Sale--B.C. Rich Platinum Series Warlock. $200. Crate G-60 practice amp, $100. Ore Ibanez Tube Screamer Classic Distortion pedal, $20. $300 for everything. Call Bill at 239-6567.

For Sale--Waterbed, queen size, 60 by 84, waveless, head board has book case and mirror, heater, fill kit, 3 sets of sheets, new cond., will deliver. $200 obo. Call Scott at 274-4161 or box 2731.

For Sale--RC Car, Tamiya Frog. Great cond., many new and spare parts. Very Fast. Extra motors and tires. With Futaba Magnum Jr. controller. Call Bill at 252-9292 in Dorm II Rm. 330 or box 5201.

Graduation Sale--Everything must go. Twin bed, $35. Nightstand, $10. Dresser with mirror, $35. Chest of drawers, $25. Desk, $20. Couch, $20. Stereo cabinet, $20. TV cabinet, $20. Lawn mower, $30. Call Rob 253-1125.

For Sale--Surfboard Richenburg OCW, 6 ft. 3 in. trifin, leash included. Awesome colors, excellent cond. Will sacrifice for $165. Call Greg at 253-4071 or box 6679.

For Sale--Flight Acct at Eagle. Nearly $500 credit. $400 obo. Contact John at box 8655.

For Sale--Brand new sofa, 2 months old. Must sell, paid $600, will sell for $350. Call Rick at 767-6425 or box 6399.

For Sale--Commodore 64 Computer, 1541 disk drive, tape drive, 1531 mouse, some bought and some copied software (including a good, bought word processor and CAD program) plus joysticks. Will need $50 worth of work, $100 obo. Call Jim at 255-4663 or box 5427.

For Sale--Air Force Issue Autocom Headset. $125 obo. Call John at 767-1356 after 7 p.m.

Personals

MY SWEET HONEY BUNNY...
Did you like your dance lessons under the starry heavens on those crisp cool march nights? More to come! What's your favorite...Swing, Fox-trot, Rumba, Cha-cha, Bananova...Lambada? Practice makes perfect, so let's do it again... and again... and again! I love you alot, Honey!
YOUR LIFE LONG PARTNER

STUDENT OF WISCONSIN,
Ban Together! There's a bunch of us here, let's get to know each other. If interested, contact box 6372.

HEY CHRIS,
Gimme a call and we'll study best transfer together. It's easier than studying alone.
SIGNED: ONE HALF OF DYNAMIC DUO

DEAR LMBG,
If you want to join the PFI you've got to really hate the Romans!
BIG NOSE

DEAR FISH,
No more pizza and cookies for you. Try staying upright a little longer next time!
POPS

TERRA,
Oh, so that's an invisible barrier! I always wondered what one looked like.
CAPT. CHAOS

ARIOTTI,
Nice Message. When's the party at the festhaus?
SPORE

YO GREG,
Test 3 here we come. Let's do it!
DAVE

HEY CLAUDE,
How'd you like the EE201 Test? Lets get ready for PS202 test.
DAVE

YOU TAMI AND MARTY,
EE201 and PS202 have got me. Ouch.
DAVE

MH,
Well, I knew what I was going to say, but now I can't seem to write it down. Maybe we can talk about it if you can find the time. I'm one up on you now.
KC

Thanks for the rose.
BOX 3051

CHUCK,
What is the landspeed velocity of an unladen swallow?
THE BRIDGEKEEPER

DEAR DAD,
Thanks for the visit. Hope it was as much fun for you as it was for me!
JOE

SANDY,
Have a great summer, and enjoy the life of the New England States. If you're near D.C. look me up, we'll do lunch.
THE TRAVELER

CHUCK,
You have to know these things when you're a king.
ARTHUR, K.O.B.

TO THE I95 CRAZY DRIVER,
Next time you want to change lanes, make sure both lanes are clear!
THE UNFORTUNATE PASSENGER

DEAR RASH,
Thanx for the last 2 month. I only hope we get to share many more together.
LOVE, MF

SMACK PACK,
Jewel and Baby say No Navy.

TO ALL GRADS,
Those deserving of an outgoing blanket party...H. Buckner, Tim "Abortion" M., Derrick S., Bigchin Mike.
BIG BIRD AND HIS DEATH SQUADS

CLUBHOUSE MEMBER STEVE,
Only one more week!!
MHIP MF

CLUBHOUSE MEMBER SPARKY,
March 27, 1990...Happy 21st birthday. We'll have a blast this weekend. Membership has its privileges.
MHIP MF

MAUREEN AND REECE,
Welcome to Daytona Beach, and Spring Break 1990.
MHIP MF

DEAR LAURA,
Hows the Burgers and Fries treating you?
THE BIG MAC KID

TO THE LOVE OF MY HEART,
Where are you, when I need you?
THE LONELY WANDERER

TO MY ECONOMICS BUD,
Glad your feeling better, and hope you did OK on your test.
THE ONE IN FRONT

LORRAINE,
You are a babe and I got a crush on you. (get in line, right?)
AN ADMIRER

Love is ever reaching, and knows no time nor distance. Just filling the emptiness to overflowing.

Die Shawn Die
THE RAQUET BALL KING

YO, BABE IN ECON
Throw the stereo out, and make room for higher class merchandise. When the time comes you'll be glad you did. Keep lookin' good and have a great summer.
WAITING!

I see you walk by me, and say hello. Yet you keep on going. I am a nice guy, rather an older brother of sorts. Who will listen to you, let you cry on his shoulder, and laugh with you. I focus on my work, but will make time for you. Just say hi.

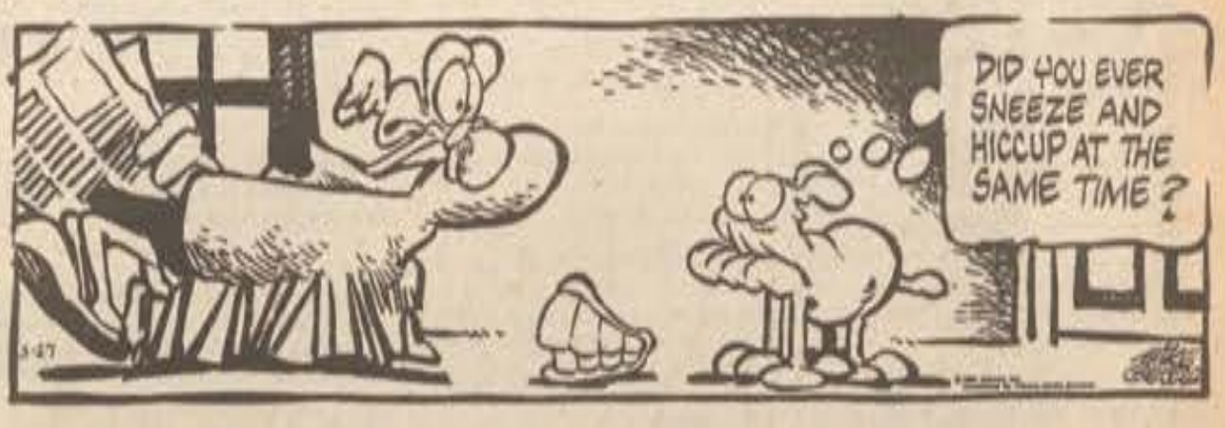
BILL F.
I'm waiting.

COREEN,
Now that we only have 3 Greeks, it shouldn't take long to finish that section. See ya later.
RINO

Calvin and Hobbes — by Bill Waterson

Far Side — by Gary Larson

Mother Goose and Grimm — by Mike Peters



Mister Boffo — by Joe Martin

Cafeteria

(continued from page A2)

limit.

As I hand the cashier my card, she starts shaking her head and ticking off the violations I have committed: I have obtained five side orders. Bacon on the cheeseburger is considered a side order.

I have cucumbers on my salad. A side salad may only consist of lettuce, croutons, and bacon bits.

I have a small cup of frozen yogurt. I can only purchase ice cream.

I have two juices. Only one small drink is allowed when purchasing juices.

Where did all these rules and regulations come from? Now I have to pay the difference and apologize to all the students waiting impatiently behind me.

Morrison's Cafeteria should tone down their regulations. The system is not bad, it just needs to be revised. How can bacon on a cheeseburger compare with french fries as a side order?

As the sign indicates, two small drinks should mean two small drinks of anything. And most of all, a student should be able to purchase anything in the cafeteria, like the frozen yogurt. I predict that a simpler system would be less stressful for both the students and cashiers.

Teresa Powell
Box H222

Jude

(continued from page)

great framework for the music.

Side one starts out with "Hallowed Ground," a heartfelt song with soul. "Baby It's Tonight," a pop influenced song pulls second position. A strong '70s tint is present here.

Side two proves to be the better of the two sides with more expansive selections of music. "Stranger to Myself" powers out right from the start with a heavy bass line setting the framework.

A song with great harmonies, most prominent being the opening one, is "This Time it's Us." This one has some good soul to it.

"Heart of Blues," a song inspired by blues master Robert Pete Williams, proves to be the best track on the album. Jude pulls no punches in this one, ripping out some excellent blues riffs.

Though *A View From 3rd Street* is deeply personal, Jude succeeds in making music that anyone can comprehend. "If you tell a true story from your heart," he says, "people will know what you mean."

As for life on the left coast, the midwesterner says with a laugh, "I've learned to accept Los Angeles, as long as I stay on the unfashionable east side."

And as for the apartment on 3rd Street, Jude Cole has moved onward and upward.

With the simplicity of truth, he says, "It served a purpose."

Skyfest

(continued from page 1)

Patty is currently the top ranked female performer in the United States. This second day also saw a another new attraction, that of a USAF front line F-16 performing dog-fighting maneuvers. The previous days showings made second appearances this day also.

Following the show, and early Monday morning, crowds of people lined the fence around DAB to witness the departures of the static displayed aircraft, and it proved to be almost better than the actual airshow.

Every departing F-16 made fly-bys at speeds only a few knots unde mach and with full afterburner. Not to be outdone, the F-4 Phantoms made their departures with just as much spirit. At one point, an F-4 and an F-16 made high speed passes chasing each other around the airport. For a minute it seemed that they would break Mach.

The most spectacular departure was made by the US Navy F-14 Tomcat, which came closest to breaking Mach speed than any other aircraft at the show, reaching speeds right on the threshold of the speed of sound.

A little known fact is that three of the Thunderbirds who performed were Embry-Riddle graduates. Riddle graduates also flew in one of the static EA-6Bs, one of the A-10s, and were members of the C-5 Galaxy crew, and the Air National Guard F-16 crew.

Vought

(continued from page B1)

The aft section of the Corsair II has been reconfigured to accept either the Pratt & Whitney F100-PW-200 or the General Electric F110 engine and fitted with a new engine removal door and tail cone. With the new more powerful engines , the aircraft has nearly doubled its thrust capabiliy - nearly 26,000 lbs. In addition, acceleration has increased five fold.

The first level supersonic flight of an A-7 occured on Jan. 16 on test flight No. 7, when YA-7F No. 1 accelerated from .85 Mach to 1.04 Mach.

Ordnance

Like the A-7d, YA-7F can carry payloads of up to 17,300 lbs. of virtually any munition in the current Air Force inventory. This is accomodated on the aircraft's six wing- and two fuselage-mounted pylons.

The internal 20 mm gun with 1000 round ammunition capacity and two AIM-9 Sidewinder air-to-air missiles are retained.

Testing

A 10 month flight test program was initiated that will be used to demonstrate the aircrafts enhanced capabilities. First flight occured on Nov. 29, 1989 at CTV facilities in Dallas, Texas and has since progressed to Edwards AFB, California. Aircraft No. 2 is scheduled to complete engine run and taxi tests and is to progress to first flight sometime in early April.