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Space Technology

B

Volume 67, Issue 7

October 24, 1990

Magellan spacecraft continues mapping the unknown

by Joshua S. Mussaf
Space Technology Writer

The *Magellan* spacecraft, currently on a 243 day mission to map the surface of Venus is continuing to amaze scientists since it arrived on August 10, 1990. *Magellan* was sent to Venus with the help of the Space Shuttle *Atlantis* in May 1989.

The controllers and engineers at the Jet Propulsion Laboratory (JPL) hope to accomplish four specific objectives by the time the mission is over. The mission objectives are: (1) to obtain near global radar images of the planet's surface, (2) to obtain a near global topographical map, (3) to obtain near global gravity field data, and (4) to develop an understanding of the geological evolution of the planet, principally its density distribution.

Magellan continues performing well although there have been a few instances where problems with ground and space communications have caused the loss of some data. However, *Magellan* has completed more than 170 mapping orbits with good data received from at least 165 orbits.

Magellan is in an elliptical orbit that takes it as

close as 155 miles and as far as 4,889 miles from Venus. On a typical orbit, the *Magellan* spacecraft takes 3.15 hours to complete one orbit. During each orbit, the spacecraft spends 37 minutes mapping the surface of Venus through the use of its synthetic aperture radar. After the mapping is complete, the spacecraft turns around to face Earth to downlink the recorded data from the completed mapping swath. The playback takes 114 minutes.

After playback, *Magellan* performs 14 minutes of star calculations to verify its orbit and position. The spacecraft then turns back towards the surface to map another portion of the planet. The planet's mapping coverage increases daily by 0.4 percent.

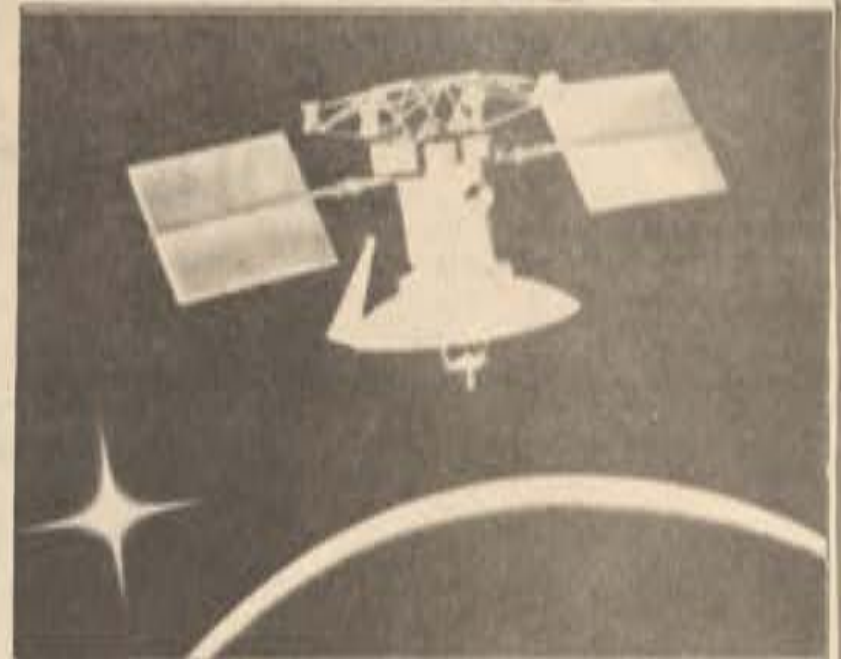
Scientists studying the breakdown in communication that occurred in mid-August have released some of their results. During both instances, *Magellan* used fault protection logic that it had been equipped with which would enable it to survive a wide variety of threats until help could be sent from Earth. Fault protection is an integral part of spacecraft design and has also been called into action during the *Voyager* and *Gallileo* missions.

After restoration of contact with *Magellan*, it was found in both cases that protective measures

directed from the spacecraft's read-only-memory (ROM) had included: pointing the solar panels at the Sun to insure adequate electrical power (without solar input, the spacecraft's batteries would drain in less than one-half day, ending the mission). Also found were the switching of telecommunications systems to the low data rate for uplink and downlink (to increase the probability of achieving and holding a communications link with Earth). And finally the establishment of a coning motion of the spacecraft designed to attempt to sweep its medium-gain antenna through Earth (a certain set of anomalies will leave a spacecraft with a lack of knowledge concerning its orientation with respect to Earth and Sun).

On October 29, the spacecraft's computers will automatically halt mapping for at least 9 days. The mapping is being stopped because Earth and Venus are near their maximum distances with the sun in between. The maximum distances between the planets, called the superior conjunction, occurs November 1. The time of the superior conjunction was known and planned for early in the *Magellan* mission planning. The mapping could be halted for as long as two weeks, depending of solar activity.

The *Magellan* mapping is to end its mission on April 28, 1991, giving scientist here on Earth the first global geological analysis of the planet comparable to those that have been done for the other planetary bodies of the inner solar system.



ACME mapping company, inc.

The *Magellan* spacecraft has been mapping 0.4 percent of the surface of Venus per day since its rendezvous with the planet on April 10, 1990. Mapping of the surface will stop temporarily in early November when the Sun will be between Earth and Venus.

During each orbit, the spacecraft spends 37 minutes mapping the surface of Venus, through the use of its synthetic aperture radar...

NASA Technology will benefit medicine

by Jose Luis Vazquez-Delgado Jr.
Space Technology Editor

Traditionally when the name of NASA comes up it is with no doubt related with space, rockets and the shuttle. Some people might think of airplanes, after all, one of the A's in NASA stands for aeronautics. But it seems almost impossible for people to relate space with our every day life.

As a result of on-going, never-ending research going on constantly at different NASA centers and on board the shuttle, the life style of everyone on the ground is affected. Semiconductors, ballpoint pens, miniature tape recorders, weight-relieving devices, artificial hands and computer systems are

derived from space related research. The amount of spin-offs that are a result of space exploration are many, sometimes lives depend on them.

The latest application of NASA's modern technology comes from the structural mechanics department. Design optimization and computer codes are finding applications in medical orthopedic science. The ultimate objective is to provide the capability of custom design prosthetic joint implants.

Today's orthopedic joint replacement is accomplished by fitting the patient to a prosthesis rather than a prosthesis to the patient. By using computer programs a prosthesis will be structurally fit to the patient and increase the life span of the proce-

dures to as much as twenty years. Today's average life span of a prosthetic joint is about seven years.

The life enhancement of the surgically replaced human joints is being worked on by NASA Lewis Research Center and medical specialists from Case Western Reserve University. The University provides expertise in the area of orthopedic biomechanics while NASA Lewis provides expertise in computational mechanics.

NASA is charged with stimulating the widest possible use of the large storehouse of technology built over the last 25 years of space exploration and six decades of aeronautical research by a Congressional mandate.

Delta is still flying after 200 launches

by Brian D. Marchesseault
Space Technology Writer

After 14 years of successful *Delta* rocket launches, McDonnell Douglas is scheduled to launch their 200th *Delta* aloft on October 30.

Delta Launch 200 is to continue in the prominent role that *Deltas* have played in boosting medium-weight satellites into orbit, thus alleviating the build-up of space shuttle payloads. The launch is to use a *Delta II* expan-

ded launch vehicle. An additional 13 *Delta II*'s were then contracted in 1988 in order to upgrade America's workhorse, the *Delta I*. The *Delta II* was first commissioned by the military to lift GPS satellites into orbit, however, it is also available for commercial launches such as the INMARSAT-2.

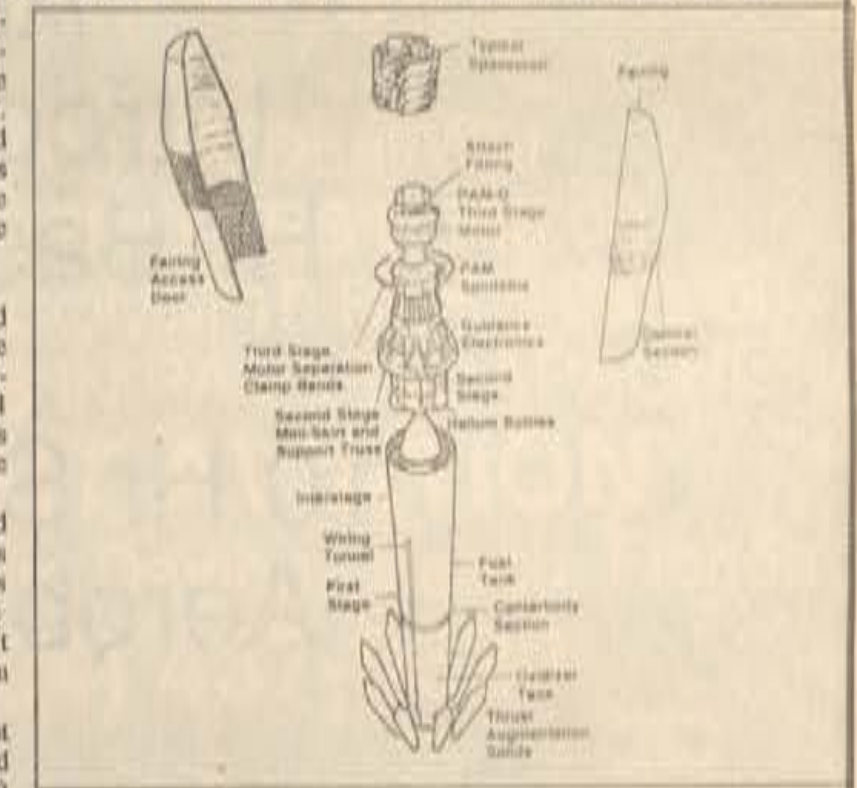
Delta II - three stages

The first stage consists of a liquid oxygen fueled main engine with nine thrust augmentation solid rocket motors attached to the exterior.

The second stage houses the rocket's guidance electronics. It is propelled by helium and nitrogen oxidizer fuels in the Aerojet engine.

The third stage Payload Assist Module (PAM) then uses its solid rocket motor to boost the spacecraft attached to it.

Payload Assist Module
The PAM has been successfully used to deploy 40 satellites and Radioisotope Thermoelectric Generator (RTG) powered vehicles. It



The tower of power... The picture clearly shows the launch configuration of the Delta II launch vehicle.

was used in conjunction with the inertial upper stage in the *Ulysses* RTG propelled mission to the Sun last October.

The original PAM was created by McDonnell Douglas Space Systems Co. as the world's first commercial space launch vehicle. Satellites are released in a spin-stabilized stage from the electrical interface connections between the PAM and the spacecraft.

INMARSAT-2
British Aerospace Ltd.'s INMARSAT-2 communications satellite is the latest *Delta* payload. It is to be the link in INMARSAT's global mobile communications network. The satellite is measured at nearly twelve feet high with a deployed span of 55 feet from tip to tip. It weighs 3,020 pounds.

INMARSAT-2 is to mark the sixth commercial satellite launch by McDonnell Douglas, six more commercial launches are already contracted.

Mixed Fleet Program
Included in McDonnell Douglas' future plans for the *Delta* is a contract with NASA to launch scientific payloads as part of NASA's Mixed Fleet program. These include the

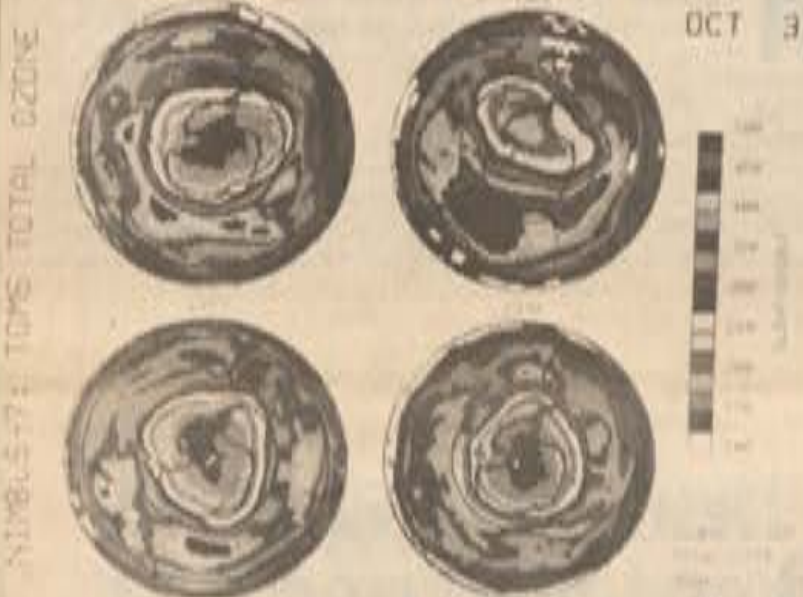
The Delta program boasts an incredible 98.5 percent success rate over the past 14 years of 65 Delta launches ...

The maiden flight

Delta II's maiden voyage blasted into the Florida skies in 1989 carrying the first Global Positioning System (GPS) navigation satellite into space. The *Delta II* was first contracted through McDonnell Douglas by the U.S. Air Force in 1987 for seven

Year	Model	Weight (kg)	Weight (lb)
1962	Delta D	104	(230)
1964	Delta M-6	454	(1,000)
1970	Delta 3914	854	(2,100)
1975	Delta 6928	1447	(3,190)
1982	Delta 7925	1819	(4,017)

All in the family...
The *Delta* family has expanded since its earlier days in 1960. The payload capability has increased by 40 times and the orbit insertion range has also increased.



The incredible shrinking hole... Preliminary data reveals ozone layer is matching levels observed in 1987 and 1989, the lowest ozone years recorded.

Space news...

Atlas gets first Japanese contract... At a ceremony conducted at the Farnborough Air Show, General Dynamics Launch Services (CLS) signed an agreement with General Electric to launch the Japanese BS-3H satellite on an Atlas vehicle in April 1991 from Cape Canaveral.

The direct broadcast satellite will ride atop an *Ariane* rocket and will blast off from Launch Complex 36 at the Canaveral Air Force Station. The BS-3H is a replacement for the BS-2X satellite which was destroyed when the *Ariane V36* launch rocket exploded shortly after take-off last February 22. The cause of the accident was determined to be clogged fuel line from a rag that was left accidentally in the fuel line by an unidentified employee. All *Ariane* flights are monitored by the European Space Agency (ESA) and are launched from Kourou, French Guiana.

China makes a move on outer space... On July 16, 1990, twenty one years after the United States launched three men to the moon, the *Apollo 11* mission, a new rocket made its way to the heavens. But this time it was not an American rocket, but a Chinese rocket.

Chinese officials launched an *LM-2E* (Long March 2E) which was fitted with a cryogenic upper stage. The launch took place at a new launch complex in Xichang, southwest China. The Great Wall Industry Corporation (GWIC) of China is the organization in charge of launching the *LM*'s, which with the new implemented feature will rival Europe's *Ariane 4* launch vehicle.

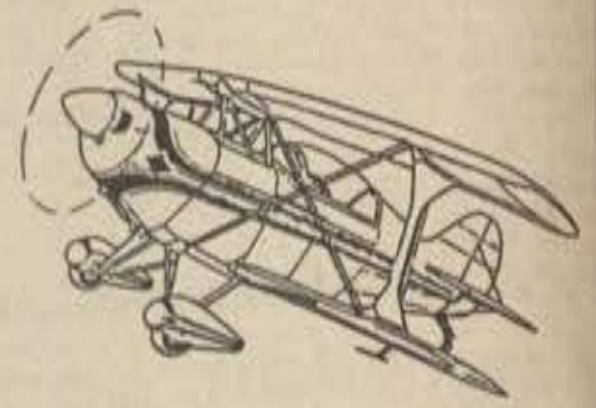
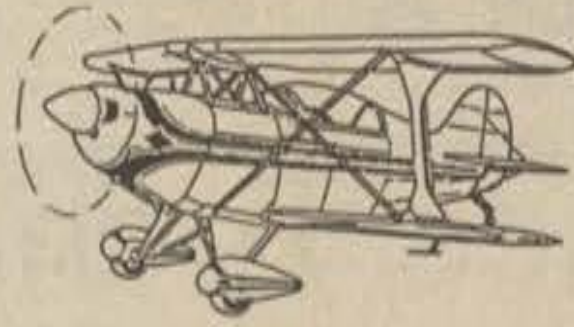
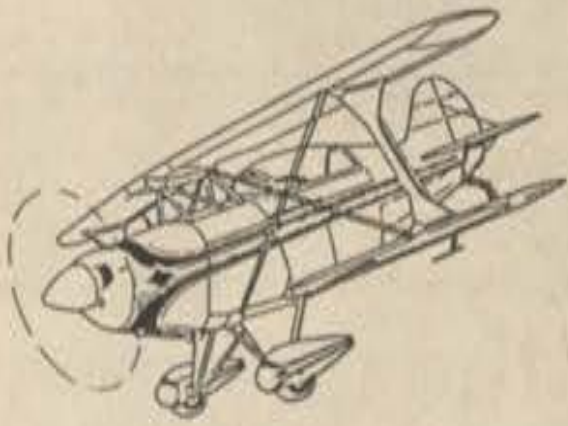
Early commercial flights could carry as much as 8,800 kg into low Earth orbit and will use a PAM-type upper stage to reach Geostationary Transfer Orbit (GTO). Two *Aussat B* communication satellites are scheduled to be launched by the *LM-2E* in 1991 and 1992, while the launch of U.S.-built satellites by the *LM-2E* will not occur until the US Administration gives a final approval.

Ulysses starts up its instruments... *Ulysses* initiated its five year trek to the Sun via Jupiter with the thruster firings of its *Centaur* rocket last Thursday. This was the first of a series of trajectory corrections for *Ulysses*. The joint mission between NASA and the European Space Agency (ESA) will send the satellite to study the Sun's poles and the interstellar space beyond the poles. Previously, only elliptical orbits on the same plane as Earth were possible.

The second of *Ulysses*'s two trajectory maneuvers is scheduled for November 2. This maneuver will make final adjustments in the spacecraft's flight plan on its way to Jupiter in February 1992.

NASA started turning on *Ulysses*' nine science instruments last Friday. The covers on all the instruments except the Heliospheric Instrument for Spectra, Composition and Anisotropy at Low Energies instrument (HISCALE) were released.

The first instrument to be turned on was the Energetic-Particle Composition and Neutral Gas Instrument (EPCNG). Also, heaters for the Solar-Wind Ion-Composition Spectrometer. All systems were reported to be operating normally and no problems were reported.

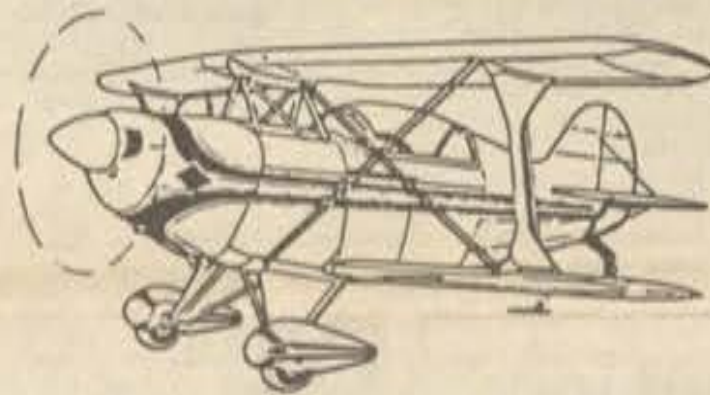


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Battle Chess II leaves players in a stalemate

by Roland Houle
Data Tech Editor

Interplay's new game, *Battle Chess II: Chinese Chess*, gives players a new mind working (or even bogging) video game to work on mastering.

The central theme in any form of chess is that chess is a representation of war without the inequalities of real war. Until I started to figure out what the entirely new pieces were and how they moved, the only thing *Chinese Chess* seemed to have was all the chaos of war.

If you think that *Battle Chess II* is just like the first *Battle Chess*, but with new battles between the pieces, as I thought it was, you are very mistaken. *Chinese Chess* is as close to regular chess as Chinese checkers is to regular checkers.

All the pieces move differently, but that just matches the fact that most of the pieces are very different, also. Each part of the board and each piece has a unique

history linked to Chinese culture, history and philosophy.

For example, a piece depicting a cannon represents the fact that the Chinese were the early developers of gunpowder. Also, a river splitting the board into two halves symbolizes the Yellow River splitting China into the Northern Territory and the Southern Territory.

Similar to *Battle Chess*, *Battle Chess II* can be played with one or two players, only one move per turn can be made and there are different settings for difficulty. Also, the main objective is the same -- to get your opponent's King into checkmate.

The movements of each piece is the most difficult part to master. The King and his two Counsellors may only move within the Imperial Palace. Sound confusing yet? Read on.

The Imperial Palace is a three by three square marked by diagonal

lines, which is located centered on each side's outer edge.

The Ministers may move two points in any diagonal direction, but may never cross the river. The Knights may move one square forward, backward, left or right, followed by one point diagonally left or right. However, unlike conventional chess, the Knight may not leap over any other pieces.

Rooks may move any number of unobstructed points in a horizontal or vertical direction. Cannons move in similar manner to the Rooks, but cannot capture another piece without first jumping over another piece to get to the piece it intends to capture.

Finally, the Pawn may move only a single point forward until it crosses the river. Then it may move one point left or right in addition to forward. One difference I did not know existed until I got trapped is that when the Pawn reaches your opponents far side, he does not turn into anything more helpful. Instead,

you end up with a Pawn stuck on the far side of the screen.

After finally figuring out which pieces move in what directions, then you can try for planning a strategy.

In Chinese chess, a positional advantage is very important, since the King has such limited mobility. Often, a substantial advantage can be offset by a single rook deep in the enemy territory.

Chinese chess seems to be a much quicker and deadlier game because of these factors and the lack of an "all-powerful piece" like the Queen in conventional chess.

This may pose as big of a hassle as the first problem. For any avid chess player who has obtained world class status, I highly recommend this game. Also, if you have a great deal of time to sit down and learn all the moves, this game may offer a good alternative to the many mindless but enjoyable games that are out there.



Battling...
Electronic Art's *Battle Chess II: Chinese Chess* gives an entirely new meaning to chess. The game has new pieces and movements when compared to conventional chess.

Reasonable language translation programs are now available for universities and PC's

Campus Technology Incorporated and Globalink Incorporated have announced a strategic partnership through which Campus Technology will distribute Globalink's line of foreign language translation software to colleges and universities as well as to faculty members and students for use on their personal desktop microcomputers.

Described as a technological breakthrough, Globalink brings mainframe translating power to the PC for under \$500 per language and allows for the creation of first draft translations of a foreign language document in far less time than ever before possible.

Software programs are available for translating Spanish, German and French to and from English. The Russian product provides one way Russian to English translation. And the company has recently released its Chinese-English dictionary which translates selected words as they are typed on-screen. Globalink has announced a January, 1991 release of their

full scale English to Chinese translation program.

To use the translation software, a person need only type, or scan a document in the selected language and Globalink software will translate the document automatically. "Think about this," said William R. Hornbeck, CEO of Campus Technology, "a person receives a letter typewritten in Russian and when that document is scanned into Globalink, the software automatically translates the message into English! And what a great way to for someone to learn or review language skills."

Dominic Laiti

Each software package includes a comprehensive general dictionary of basic words and phrases in addition to the translation program. The user can type an English word or phrase on-screen for a quick translation to the appropriate language. Or, reverse the process by typing a foreign word to get the English translation.

In addition, the product dictionaries can

be modified by the user so that new terms and phrases can be added to the dictionaries, a very important feature when translating documents that are subject-specific, such as medical correspondence. This ability to alter the dictionaries gives the user significant control over the quality of the translation.

Dominic Laiti, Chairman of Globalink Language Services is particularly proud of his firm's accomplishments in providing a product that so many other companies have attempted. "We have an incredible breakthrough here in international communication," he said, "and we know that the educational community will grasp its applicability in a quick fashion. Our relationship with a national reseller such as Campus Technology will give us the reach necessary to bring this amazing product into the hands of educators and students at our special pricing. These translation products are being used by commercial organizations all over the world. We are confident that, in just a short time, these products will become just as popular within the educational market."

In the interest of making the Data Tech Section even better, please answer the following questions.

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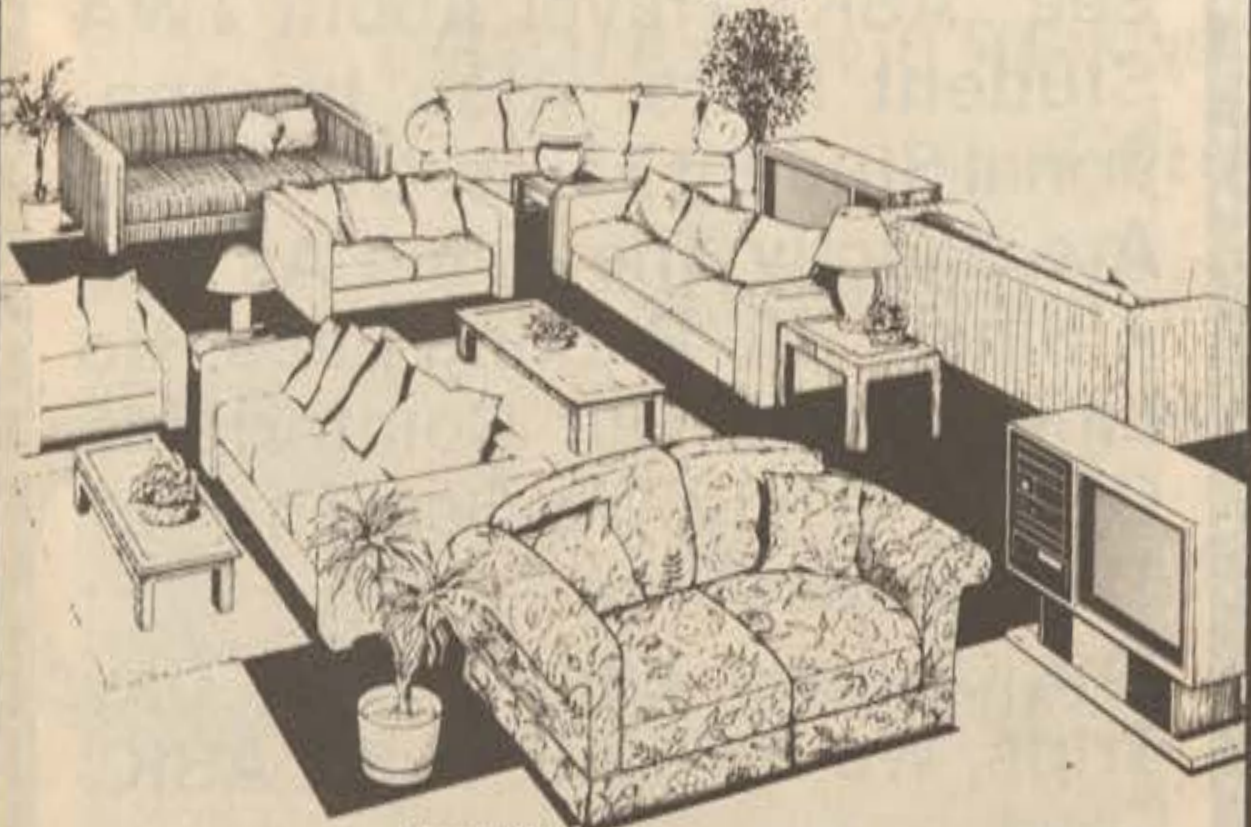
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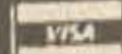
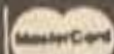
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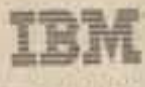
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Marine Corps plans upgrade on Harrier II

by John McDermott
Staff Writer

McDonnell Douglas, Spain, Italy, and the United States have approved a plan to integrate a radar system into the AV-8B Harrier II. The radar equipped aircraft will be known as the Harrier II Plus.

A memorandum of understanding was signed by the three nations outlining a plan to integrate the Hughes APG-65 radar into the AV-8B, which is built by McDonnell Douglas and British Aerospace. Funding of the Harrier II program will enable the U.S.

Marine Corps to fill a requirement for radar equipped aircraft in the close air support role. The final 27 Marine Corps aircraft that were

funded in a multiyear buy from fiscal 1989 through 1991 will be delivered in the Harrier II configuration. Spain has expressed a requirement for 18 of the radar equipped aircraft and two TAV-8B trainer jets. Italy is expected to acquire 16 Harrier II

Plus aircraft, along with two TAV-8B's.

McDonnell Douglas, British Aerospace, and Hughes began radar integration for the Harrier II Plus program in 1988. That early groundwork allowed

The prototype is expected to fly in 1992, with production deliveries projected to begin in 1993.

production of the prototype to begin the same year. The prototype is expected to fly in 1992, with production deliveries projected to begin in 1993.

The Harrier II Plus will be equipped with a higher thrust Rolls-Royce Pegasus engine, designated the 408, and the Hughes APG-65 radar.

The Hughes APG-65 radar is an all weather, multi-mode sensor providing the features and flexibility needed for both air to air and air to ground missions.

The key to its flexibility is its programmable signal processor -- a high speed digital computer that provides the capability to respond to new threats and to accommodate improved modes and weapons through software changes.



Harrier II Plus...

A memorandum of understanding was signed by three nations outlining a plan to integrate the Hughes APG-65 radar into the AV-8B.

Citation X opens new generation of jets at Cessna

by Tami Strout
Staff Writer

In an unprecedented industry announcement, Cessna Aircraft Company has revealed plans for the world's fastest business jet aircraft. Cessna Chairman Russell W. Meyer said the all-new Citation X ("Ten") will have a maximum operating speed of Mach .90, or just one-tenth of a point away from the speed of sound.

"This is perhaps the greatest performance breakthrough in the history of business jet aviation," Meyer said, speaking to news media and industry officials at the opening of the National Business Aircraft Association's annual meeting in New Orleans.

A true intercontinental jet, the Citation X will fly non-stop from New York to London in just six and one-half hours.

It will cruise at Mach .86 at 41,000 feet, allowing it to fly direct from Los Angeles to New York in just about four hours. At Mach .8 the aircraft has a range of 3,800 miles.

In terms of passenger miles flown per gallon of fuel consumed, Meyer said the Citation X may also be the

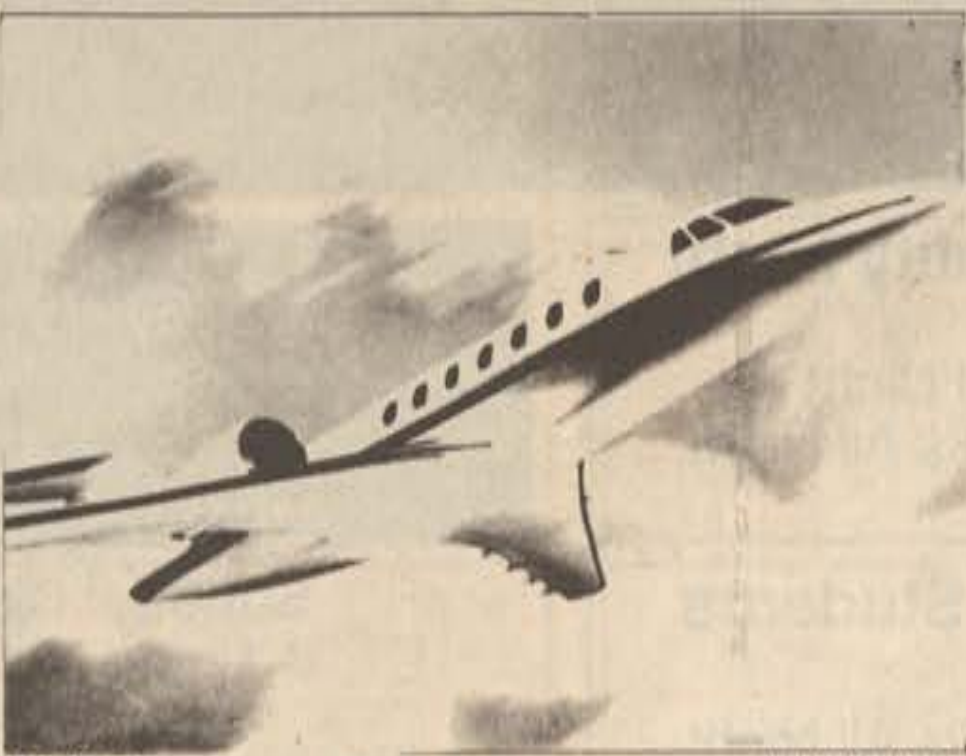
most fuel efficient business jet ever built.

"This unparalleled efficiency will save hundreds of thousands of dollars in fuel costs each year when compared with other business jets capable of flying similar missions at slower speeds."

Twin General Motors/Allison GMA-3007A turbofan engines, each generating 6,000 pounds of thrust power the Citation X. These engines will enable the Citation X to climb straight

through to 41,000 feet in only 17 minutes. From takeoff at maximum operating weight it can climb direct to 47,000 feet in just 30 minutes. It will soon be certified to fly at

51,000 feet. Allison, a business unit of General Motors, has placed more than 40,000 turbine engines in worldwide service. The Citation X contains a spacious cabin allowing up to 10 pas-



Exciting...

A true intercontinental jet, the Citation X will fly non-stop from New York to London in just six and one-half hours.

sengers. It has 633 cubic feet of highly usable space and according to Meyer, it will have all the amenities usually found only in aircraft costing twice as much as the X.

Measuring a full five feet longer than the Cessna Citation III midsize business jet, the Citation X passenger cabin has such standard or optional features as: an executive corner office, complete with telefax, desk and swivel chair; a formal galley with microwave oven; a large, well appointed lavatory; and a three channel video system.

A stand up height aisle extends the full length of the cabin.

The Citation X will have a payload for passengers and baggage of 2,400 pounds and a maximum ramp weight of 31,200 pounds.

The baggage will be carried in a 72 cubic foot heated and pressurized compartment.

March 1993 is the designated date for the first flight of the Citation X. Meyer stated that initial deliveries are scheduled to begin in June 1995 and in accordance will carry business aviation's first five year warranty on airframe, engines and avionics.

The Citation X's equipped price is \$11.85 million, plus interior.

Partnership agreement for HSCT engine signed

by Dan Moughamian
Aeronautics Writer

Earlier this month, history was made when the two largest and most competitive aircraft engine companies, Pratt & Whitney and General Electric, agreed to a partnership in developing the jet engine for the HSCT, or High Speed Commercial Transport.

The division of responsibility will depend on the results of extensive studies being done on the proposed engine.

Arthur Wegner, who is the President of Pratt & Whitney, said, "America's two leading engine makers are teaming up to develop the next generation propulsion system for supersonic commercial aircraft... We recognize neither company could realistically embark on this project alone. By working together we greatly increase the prospects of resolving

numerous technical problems."

Brian Rowe, who is Senior Vice President for General Electric Aircraft Engines, concurred by stating, "We look forward to taking on the technical challenges presented by a supersonic transport propulsion system. We are convinced the road to success lies in this effort between G.E. and Pratt."

Program managers from Pratt & Whitney and G.E. are Richard Hines and Sam Gilkey, respectively. They will participate in a joint-strategy board in an effort to direct the program.

Other important phases of the joint venture include: Technology development and validation, Systems development and HSCT engine certification and production.

The companies anticipate the aircraft itself could be fully certified by 2005.

We are convinced the road to success lies in this effort between G.E. and Pratt."

Florida Air Fair opens

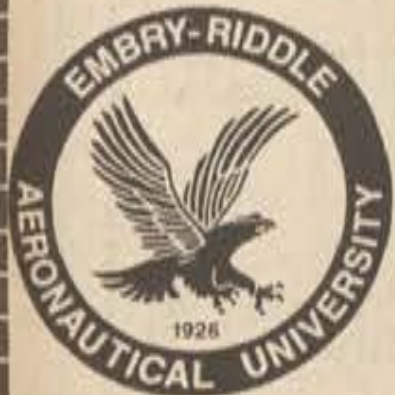
by John McDermott
Staff Writer

The Florida State Air Fair is being held this weekend at Kissimmee airport, October 27 and 28.

Admission is \$10 for adults and \$5 for children under 17, and the gates open at 9 a.m. with events lasting until 5 p.m.

Scheduled performers include an F-15, U-2, AV-8B, Formula V Racers, Bob Hoover in the Shrine Commander and the Misty Blues female parachute team.

There will also be military and civilian aircraft on static display, and an antique car show.



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600 North Attitudes

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Wednesday: Hospitality Night
\$.50 Taco's
\$ 1.00 Margaritas All Night
\$1.00 Well And Call Drinks All Night

Saturday: Progressive Night

Thursday: Starving Students Night !
\$1.00 Well And Call Drinks All Night
\$.20 Chicken Wings All Night

Sunday: Comedy Night
9-12 pm. Comedy Show
10-12 Slave Party
All Bar & Restaurant Employees Drink Free And Get In Free

Friday: Ladies Night
9-11 pm. Nasty Boy Male Review
Free Drinks, Free Admission
Men Drink Free 1/2 Price
11-Close Double Shot Drinks

600 North Attitudes
600 N. Atlantic Ave.
Daytona Beach
255-4471

GREAT BARRIER REEF

Monday Night Football:
40 Screens, \$.20 Chicken Wings, \$.50 Hot Dogs,
\$.75 Draft, 1/2 Price Drinks

Thursday: Ladies Night:
9-11 Free Drinks Free Admission
\$100.00 Foosball Tournament

Tuesday: Live Progressive Band
\$.25 Draft' \$.20 Chicken Wings
Live Band Is Big Wide World

Friday :Free Drinks 9-11
World Gym Presents The \$200.00 Strong Man Bench Press Contest
2 Weight Divisions

Wednesday: Margaritaville
\$.50 Hot Dogs \$1.50 32oz Margaritas
\$100.00 Pool Tournament
\$50.00 Fouseball Tournament

Saturday :Free Drinks 9-11
World Gym \$100.00 Cash
Strong Man Arm Wrestling Contest
Live Music Big Wide World

Sunday :Super Football Sunday
We Show All The Games!
45 Screens, Super Food & Drink Specials
NFL Jacket Giveaway!
(By Athletic Attic Of Volusia Ave)

G.B. REEFS THE BEST OF BOTH WORLDS!!! 600 NORTH
In The Howard Johnsons Hotel 600 N. Atlantic Ave
255-4471

Calvin and Hobbes

by Bill Waterson

HOBBS, DO YOU THINK OUR MORALITY IS DEFINED BY OUR ACTIONS, OR BY WHAT'S IN OUR HEARTS?

I THINK OUR ACTIONS SHOW WHAT'S IN OUR HEARTS.

I RESENT THAT!

THEY SAY WINNING ISN'T EVERYTHING, AND I'VE DECIDED TO TAKE THEIR WORD FOR IT.

I STAND FIRM IN MY BELIEF OF WHAT'S RIGHT! I REFUSE TO COMPROMISE MY PRINCIPLES!

I DON'T NEED TO COMPROMISE MY PRINCIPLES, BECAUSE THEY DON'T HAVE THE SLIGHTEST BEARING ON WHAT HAPPENS TO ME ANYWAY.

VOOM
VOOOM
RRR!

VOOM
VOOOM

ALGH!

I WOULDN'T MIND THIS SO MUCH IF HE DIDN'T KEEP A LOG.

WOULD YOU SAY YOU WERE 'VERY SURPRISED' OR 'COMPLETELY SURPRISED'?

LOOK MOM, I MADE A MASK.

ARE YOU GETTING READY FOR HALLOWEEN?

HUH? NO, THIS IS FOR EVERY DAY. YOU KNOW HOW HOBBS ALWAYS SNEAKS UP FROM BEHIND AND POUNCES ON ME?

NO...

WELL, HE DOES. BUT IF YOU WEAR A MASK LIKE THIS ON THE BACK OF YOUR HEAD, TIGERS CAN'T TELL WHICH WAY YOU'RE FACING, AND THEY CAN'T SNEAK UP.

I THINK YOUR TRAIN OF THOUGHT IS A RUNAWAY.

I READ THEY WEAR THESE IN INDIA. HERE, I MADE A MASK FOR YOU TOO.

HERE, DAD, I MADE YOU A MASK LIKE MINE. YOU WEAR IT ON THE BACK OF YOUR HEAD TO PREVENT THEIR ATTACKS.

UM...

TIGERS ALWAYS TRY TO GET YOU FROM BEHIND, BUT WITH THIS MASK ON, THEY CAN'T TELL WHICH WAY YOU'RE FACING, SO THEY DON'T POUNCE. I READ IT IN A BOOK.

WELL, I APPRECIATE YOUR CONCERN, BUT I THINK I'LL TAKE MY CHANCES AND NOT LOOK LIKE A LUNATIC.

OK, IF YOU'D RATHER LOOK LIKE RAW HAMBURGER, BE MY GUEST.

HONEY, ARE WE OUT OF ASPIRIN AGAIN?

Far Side

by Gary Larson

KISSING FISH

RESCUE

boink boink boink

For the hundredth time in as many days! ... I haven't got a quarter!

ANGRY HOUR 3-3 PM

It was foolish for Russell to approach the hornets' nest in the first place, but his timing was particularly bad.

EGG EXHIBIT

In the Chicken Museum

Games you can play with your cat.

Mister Boffo

by Joe Martin

"SPLAT" MCNUCKINS WHEN THEY STILL CALLED HIM "CLUMSY"

AND THAT'S JUST THE TIP OF THE ICEBERG!

PAVING CONTRACTOR ON HIGHWAY TO HEAVEN

ROAD CONSTRUCTION NEXT 300 TRILLION MILES

Mother Goose and Grimm

by Mike Peters

YOU'RE FEEDING HIM TOO MUCH SPINACH.

VET

GRIMM, YOU'RE TOO FAT... I'M GOING TO HAVE TO PUT YOU ON A VEGETARIAN DIET.

BUMMER.

ARE YOU A VEGETARIAN?

MAIL

WILL YOU GUYS HURRY UP? I THINK I HEAR FIRE ENGINES.

Self Study Committees focus on reaccridation

Institutional Effectiveness Steering Committee

Purpose of Institutional Effectiveness
 An Institutional Effectiveness review will organize the major components of the University Institutional Effectiveness program and provide for improved planning and evaluation. It will develop procedures for evaluating progress toward desired goals and completion of objectives. It will also assure that evaluation results are used in a continuous planning and evaluation process to improve the effectiveness of Embry-Riddle Aeronautical University.
 An assessment of institutional effectiveness involves a systematic comparison of performance to purpose. Therefore a valid assessment of the University's effectiveness, including both academic and non-academic units requires:

- o an enumeration of expected results,
- o a statement of current assessment procedures
- o an explanation of the administration of assessment techniques
- o a method of using assessment findings
- o a plan for future assessment initiatives

COMMITTEE	
Chair Daytona Beach Prescott CCE Administration Daytona Beach Student Affairs Prescott Student Affairs Institutional Research	Phyllis Salmons Shirley Fedorovich Wesley Stanfield Owen Lee Wendy Gans Maureen Bridger Debra Kent Deborah Osborne

TIMELINE
 An on-going effort evaluating institutional performance using assessment results to assure effectiveness of the University.

Self-study Steering Committee Purpose of the self-study

The principal purpose of the self-study is to increase the educational effectiveness of Embry-Riddle Aeronautical University. A secondary purpose of the self-study is to achieve reaffirmation of accreditation from the Southern Association of College and Schools.
 An ongoing program of comprehensive self-evaluation will serve as a foundation for improving and institutionalizing the strategic planning process. This will enable the University to cope successfully with growth and change to meet the future needs of the aviation community.
 A meaningful self-examination requires broad-based participation from all sectors of the University, including faculty, administrators, staff, students, alumni, and the Board of Trustees. This participation will foster closer communication among all members of a very diverse University community, resulting in quality academic programs with identified strengths, weakness, and continuing recommendations for improvement.
 A self-study report will be produced to document and strengthen institutional effectiveness. The report will be widely distributed for maximum benefit to the entire University community and a copy provided to the reaffirmation evaluation committee.

COMMITTEE	
Chair Institutional Purpose Institutional Effectiveness Educational Programs Educational Support Services Administrative Processes Current Student Member Alumni Member Board of Trustees Prescott Liaison Editor Institutional Research Clerical	Phyllis Salmons Robert Jost Owen Lee David Kim Frank Richey Leonard Hilder David Fekke John Ward Philip Elliott Berta Parrish Jan Goodrich Deborah Osborne Mary Ward

University Planning Committee Purpose of University Planning
 The University Planning Committee has the responsibility for the coordination of institutional planning at Embry-Riddle. The committee is responsible for establishing university planning policies, procedures and writing the University Strategic and Long Range Plans. The procedures will include development of an on-going university strategic planning process providing for a periodic review of individual unit plans and development of a planning review cycle for reassessment of the university statement of purpose, goals and completion of related objectives.
 The completed University Strategic Plan will provide a means to cope with changing environmental conditions, give direction to needed new initiatives and establish a rational basis for resource allocation.

COMMITTEE	
Chair University Administration	John Williams Jeffrey Ledewitz Robert Jost William Motzel Eric Doten Charles Martin Robert Hall Paul Daly Hassan Setoodeh Darryl Niemeyer Claudia Geary Robert Rockett Lee Hays Deborah Osborne Wendy Gans Charles Fountain Shannon Trebbe Ray Ruit Donald Bushnell Tom Connolly Elinor Miller Chester Crosby Frank Richey Scott O'Brien
University Staff	
Faculty	
SGA	

Notices

National Engineering Aptitude Search To Be Offered

Embry-Riddle Aeronautical University will offer the National Engineering Aptitude Search (NEAS) test November 17 from 9 a.m. until noon. The NEAS, sponsored by the Junior Engineering Technical Society (JETS) is a guidance-oriented examination available to help pre-college students determine their aptitudes for engineering, math, science, or technology studies.
 Components of this three-hour exam include tests in mathematical understanding, scientific reading and comprehension, and problem solving, as well as an interest biography questionnaire.
 Following the exam, students will receive guidance materials and a one-year subscription to the JETS Report newsletter. Comprehension score reports and interpretive guides will be mailed directly to students' homes to assist parents, teachers, counselors and students in evaluating aptitudes for careers in engineering, mathematics, science, or technology.
 Students interested in taking the NEAS should see their guidance counselors to register. The deadlines for registration are Oct. 12 for the November test and Dec. 14 for another test scheduled for Jan. 19, 1991. For more information contact Dean William Grams, College of Engineering and Aviation Science, at Embry-Riddle, 239-6634.

Safety Department to host seminar

The Safety Department is sponsoring a personal safety seminar entitled "Prevention Is The Key" on Oct. 25, 1990, at 1:30 pm, in A-109. The seminar will be presented by Crime Services, an Atlanta based organization specializing in home security and personal safety. Everyone is invited to attend.

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 at 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 be a hold placed on release of your cap and gown for graduation until you have fulfilled your exit interview requirements.

Senior Class Council holds first meeting

Elections for Senior Class President and Vice President were held on October 9. Congratulations to Pat Cassidy and James Dianto.
 The Senior Class Council held its first meeting on October 16. At the meeting, several topics concerning the December graduates were discussed. After the location for the Class Party was debated, Waves at the Marriott was selected as the best location for our party. The Class Council will have a booth at cap and gown pickup to sell tickets for the Class Party. Tickets will be \$10 per person.
 Elections for other class officers were held at the first Council meeting. Congratulations to Robert McCabe for being selected as Class Treasurer and to Rick Knowlton for being chosen as Class Secretary.
 The Council also formed Committees and elected Chairpersons. If you are not on a Council Committee, and would like to be, please see Pat or James for information.
 Fundraising and the Party Committees could use some more volunteers. Contact Michael Stelzig or Dominic Crain respectively.
 To all Committee Chairs, be prepared to update the Council on your progress at each meeting.
 Any December graduates wanting to join the Council should come to our meetings, every Tuesday at 5:30 pm in room B503.

HORSE-BACK RIDING

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Hayrides

Trailrides
Bon fires

All Day Trips!

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Ocean View Dance Floor

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Sandwiches

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MONDAY NIGHTS 7 - 12 P.M. \$1.00 BUD NITE	TUESDAY NIGHTS 7 - 12 P.M. 2 for 1 MIXED DRINKS	WEDNESDAY NIGHTS T-SHIRT NIGHT WEAR YOUR OCEAN DECK T-SHIRTS \$1.00 MIXED DRINKS	THURSDAY NIGHTS \$1.00 IMPORT BEER
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"WE FEED YOU NOT FOOL YOU"

Stromboli,
Calzones,
Eggplant,
Stuffed Shells,
Manicotti

Daily Specials:
Monday - Baked Ziti
Tuesday - Pizza
Wednesday - Baked Lasagna
Thursday - Spaghetti
Friday - Cheese Ravioli
Saturday - Meat Ravioli



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ERAU
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→ Autos for sale

SALE OF THE CENTURY: 1981 Pontiac Firebird, black, 6 cyl., runs great! Pioneer Super Tuner III, removable, good speakers (Infinity), Keystone rims, needs some body work, \$800.00, Call gate 756-3316 or Box #5234.

1979 GMC VAN, 3/4 ton, Black, strong 350, Auto, A/C, am/fm cassette, booster, carpet-panel interior, 36000 miles on engine and trans. Needs nothing, \$2800.00 O.B.O. Rob 3257 761-1139.

FOR SALE: 1976 PONTIAC Sunbird, no rust, runs good, must sale: \$500.00 O.B.O. Call Steve 274-3353 or Box #6366.

78 CAMARO MUSCLE CAR: Hot looking, 42,000 Actual Miles \$2995.00. Call CF's Auto Sales at 254-2886.

82 MUSTANG: 4 SPEED, A/C, sporty economy, \$2495.000. Call CF's Auto Sales at 254-2886.

1984 FORD RANGER PICK UP: 5 speed, sharp new paint, \$2695.00. Call CF's Auto Sales at 254-2886.

1986 CHIVETTIE: Automatic, A/C, \$2695.00, great gas saver. Call CF's Auto Sales at 254-2886.

1986 FORD TEMPO: 5 speed, ice cold air, am/fm stereo, 35,000 actual miles, super nice, \$3995.00. Call CF's Auto Sales at 254-2886.

1979 CHEVY CUSTOM VAN: Fully loaded with ice cold air, \$2495.00. Call CF's Auto Sales at 254-2886.

→ Cycles for sale

79 YAMAHA DT 250: Road ready, 75 M.P.G., 1 kick starting, \$400.00 O.B.O., Leave phone # & name in box 5024.

1989 YAMAHA XT 350 ENDURO: Red/white, low mileage. Includes 4 yr. warranty and helmet, \$2800.00 or T.O.P. Must sell 257-1008 Joe.

→ Misc. for sale

NEED AN IBM TYPE COMPUTER
Computer's to fit any need. State-of-the-art computers for as low as \$1250. Will customize, setup, or repair PCs for reasonable prices. Student with extensive IBM experience. Leave message at 238-7355

Frank 80386SX Mini-tower with 4 megabytes of RAM, Windows/386 (unopened), DOS 4.01, Silent quarter height Center 25mb 40Meg drive, two high density floppies, multisync 1024x768 monitor, VGA or better color, Adlib music synthesis. For sale for \$2500. Leave message at 238-7355.

RC AIRCRAFT Engine and radio for sale. A.S. .61 SF long stroke \$110.00, 7 channel radio \$100.00. Call Jim 760-7500.

FOR SALE: Water bed \$100.00, Sofa \$195.00. Call Marcelle at 760-7167.

FOR SALE: COBRA SUPER HETEROZYNE TRAPSHOOTER: Ultra "talking" radar detector, voice, music, or tone warning; separate X-K band indicators; auto, windshield, or dash mount; 3 anti-theft circuits; carrying case. Excellent condition. List \$160.00, asking \$100.00. Steve H. 255-0183.

FOR SALE: WINDSURFER 124" complete great beginner board, \$275.00, also have car rack for sale. Call Brent 274-3220.

486, 25mhz, 8 megs RAM, video-7 VRAM VGA, 110 magabyte quantum harddrive, Princeton super VGA monitor, 3.5 and 5.25 inch high density floppies. Dos 4.01, etc. \$4500.00. 238-0896. list dust ps/2.

FOR SALE: RC Model Airplane - trainer, great for a beginner, excellent condition with brand new 4 - channel radio \$180.00, contact Mark at 760-5406.

FOR SALE: WHISTLER SPECTRUM 2 REMOTE Radar detector, never used, still in box, reg price over \$200.00, asking \$120.00 O.B.O. Call 788-4597 ask for Tom or leave message.

FOR SALE: DISCMAN CD PLAYER, brand new, \$75.00, Ray Banc \$25.00, contact Mike at 238-0061.

FOR SALE: 19" COLOR TV with remote and other misc. items. Call Jenny at 257-6460 for more info.

GO SURFING: FOR SALE: 6'3 1/2" West Wind surfboard, lots of color, excellent condition. \$180.00. Call Chad or leave message 756-9238.

TRUCK TOPPER for full size pick-up. All fiberglass with tempered glass windows. Sliding front window. White, good condition. \$150.00 O.B.O. Rob box 3257 or 761-1139.

FOR SALE: Soft comm headset still in box with all papers, \$120.00, make an offer.

FOR SALE: ALL MUST GO! Desk \$25.00, 4 drawer dresser \$25.00, drawing board \$25.00, Crossman model 1377 pump pellet gun with pellets \$25.00, 3 pincer side rails for queen size water bed \$25.00, swivel rocker \$50.00, Call Scott at 239-0318 before 3:30. After 3:30 leave message.

FOR SALE: TEXAS INSTRUMENTS TI-60, excellent condition! (2yrs. old) Have manual and carrying case to go with it. ERAU 7592 or 238-7958, leave message for Keith M.

WEIGHT SYSTEM: Includes bench weights, and attachments for butterfly, leg lifts, curl rest, pulley attachments. Brand new, paid \$200.00, sell for \$150.00 Pete 761-0917.

RABBIT FOR SALE: Black & white dwarf. Includes cage, water bottle and food. \$35.00 O.B.O. Jeffe at 760-8192.

FULL WETSUIT: HO sports extreme, 1 year old, colors still bright, good condition and top quality. \$75.00 760-8179.

FOR SALE: Super single waterbed, complete with all accessories. \$100.00, Call Scott at 255-7386.

GUNS FOR SALE: S & W 669 with many accessories \$450.00, S & W 4516 .45ACP, like new in box \$525.00, Remington 870 12 ga. ex-police riot gun \$200.00. Call Dave 238-2520.

FIREARMS AND ACCESSORIES: Federally licensed firearms dealer. All weapons and accessories below retail. IMF reloads available. Best prices in town. Call Dave 238-2520.

FOR SALE: WEIGHT BENCH with weights, \$50.00. Bench trainer, \$45.00. Contact Matt at Box 6767 or 253-4086.

→ Miscellaneous

\$99.00 WEEKEND Accelerated ground school - Private Pilot or Instrument. \$49.00 refresher for rated pilots. Aircraft rental \$35/hr. Ceasra 152. Call toll free 1-426-0007 evenings.

I AM LOOKING for a ride to or around ST. LOUIS, MO for the Thanksgiving. If you know anything, please call 238-7960 and ask for Jim, or drop a note in box 6400.

LOOKING TO BUY an expensive IBM PS/2 or a cheap no-name made in Japan clone? - Don't! I'm selling at a low price, a Zenith Data Systems (made in U.S.A.) 248 AT compatible computer with an Intel 286 processor, a 40 megabyte 28 millisecond Seagate hard drive (fastest 40 meg drive in the market today), both 5.25 and 3.5 inch floppy drives, and a high resolution color monitor. Additionally, will give away free secret bonus on purchase of computer, worth many times the price of it. Contact Jose, box 5466 for details or call 255-4941.

ROOMMATE WANTED: From November on to share two bedroom apt. Will get a room with bathroom, located 2 mi. from school at Wood Forest \$183.33 per month plus utilities. Call 238-0120.

ROOMMATE NEEDED! 1 large bedroom apt to share at breakers (behind Volusia Mall) \$220.00 per/mo. + 1/2 utilities. Call Joe 238-7791.

FEMALE ROOMMATE WANTED: HURRY! Pick up the phone and call the totally radical people, who, if you're lucky, could become your roommates. but you'll have to hurry, first come, first serve! Call 253-6941.

→ Personals

SEXY WIKY
Thank you! Thank you! Thank you! You are the ultimate Physics God!! Just think, only two more months.
THE LATE NIGHT PHYSICS CALLERS

TO DYNAMITE
I MISS YOU!!
RAVISHING

Why do people care how much they weigh when it is only a matter of gravity?
THE MENTALLY ILL SNOWBOARDER

TO 108 ROOMIES
When the hell is dinner???
WENCH

HELLS ANGEL
a.k.a. The Fabulous Five, Key West was awesome, but let's not see the lobster twice next time. Anyone wanna race? Where to next, Bahamas? I love you guys!
EASY RIDER

THE FABULOUS FIVE
The keys have been an adventure. Don't forget the Angela and Dunpy have patience. It's been royally fun but too bad our BUTTS hurt.
THREE MAN

WHEN I SAY vertical, I mean vertical!
PHOTO GOON

SNUGGLEBUNNY
Yoda has escaped from the depths of the closet! This means he's roaming the house alone. If you find him, bring him back.
SLEEPY

YO DAVE
What's up?
TS

TO: CONCERNED PILOT;
PILOT ERROR!
FROM: BUDDING ENGINEER

DINNO'S MAN
Are you ever going to speak to me again?
Time is running out. Love,
ME

FRENCHMAN TO THE FRESHMAN
"How about a game of strip poker?"

(3:00AM Wednesday Oct. 17th)
Don't all you Kiddens just love Dorm life?
DESK STAFF!

DANIELLE
You need to ask your friend what he is really doing with my friend. I know I am about tired of the whole thing. When as you aren't sure what you want. Hummmh. Come down and talk to me.

FUZZ
Takhonask!
TALL COOL ONE!

DEAR M:
Last week I saw hundreds of pictures of you on the floor at the mail room. I wanted to pick them all up and bring them home. You give so much and receive so little in return...just wanted you to know it hurt me too. I'll be at every game.
LOVE B.

T.B.P.Y.E.S.
You can be MY wigman. Yeah, right...as if...Love ya,
PISS ANT

WANTED: Attractive, honest, fun-loving female looking for a guy with the same qualities. I am 6ft. tall, have blue eyes, and dirty blond hair. Please respond in Avion next week. Signed,
SEARCHING

COOLBREEZE
I love you very much.
TCK

WORLD TRAVELER
Paid that phone bill yet? Thanks for the wonderful friendship, you're my sanity in an insane world.
THE NEW ENGLANDER

WALLY & HO.
We want Snatchmeister back...NOW!!! If we do not receive him in 24hrs. we'll send the task force over. Of course, Moby will lead it.
SNUG BUNNY & SLEEPY

DANIETTE
AAARRRGGGHHHH!!!
FELLOW SUFFERER

GAL IN WHITE FERO W/Michigan plates, going to Ponce Inlet...want to car pool? Guy w/white mustang in Wilbur by the Sea. BOX 9176

FM STILL WONDERING how many chicks will be in the yearbook this year?!

GODS STAFF:
Rich - Film???
Brad - box closed???
Maliss - Where's the *j#@# camera??
Dean - Where are you???
Rob - You win absolutely nothing!!
Liversonnie - You want it when???
HA!
PHOTO GOD

TANYA TOLLS
Did your gate follow me?
I walked beneath tresses of gold
And gazed through purest sapphires.
We've never talked,
But you've said so much
I was pointed out by,
Another Matronly Youth.
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BABY KANGAROO

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9. Dracula. Helen Chandler (left) and Bela Lugosi (right)

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