

12-5-1990

## Avion 1990-12-05 (B)

Embry-Riddle Aeronautical University

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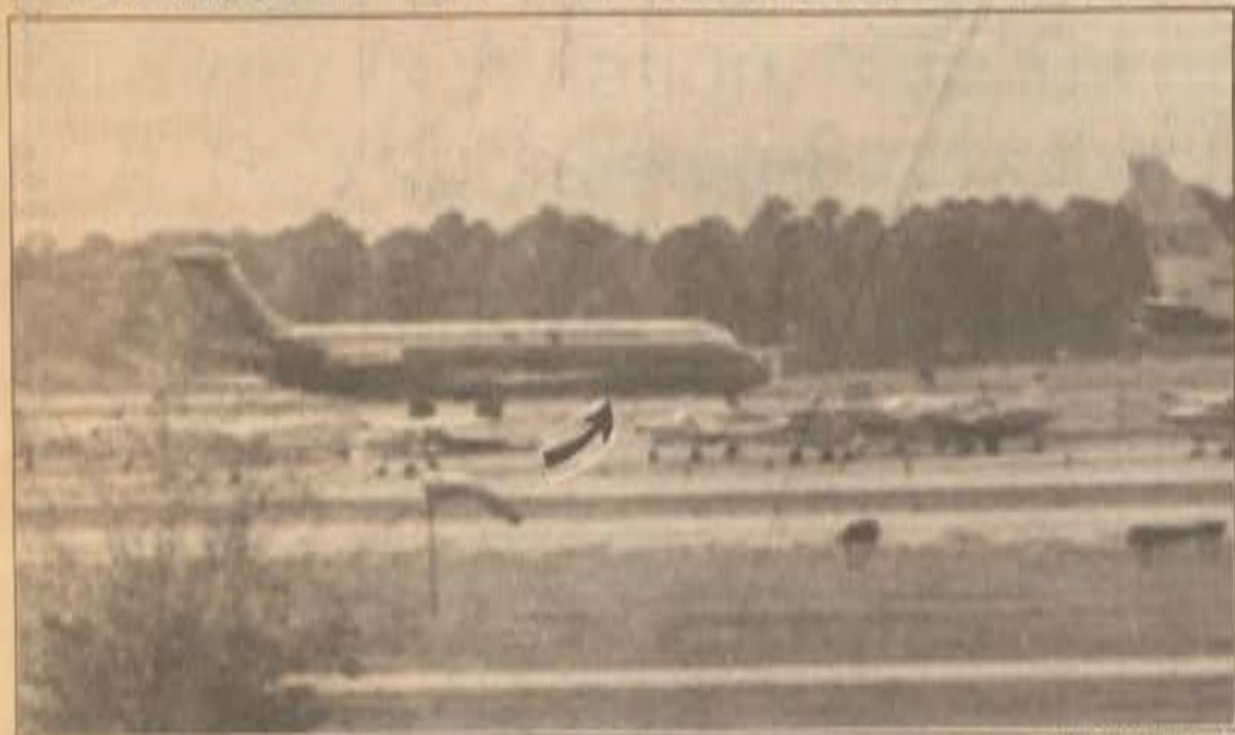
## Aeronautica

## B

Volume 67, Issue 12

December 5, 1990

### Eastern DC-9 takes off from Daytona with door open



**Whoops...**  
 The Avion caught on film this Eastern Airlines DC-9 returning to the ramp after taking off with its forward cargo door open.

by Christopher Schindler  
 Aeronautica Writer

Living in the dorms provides a student with spare time. So, when anything happens that seems out of the ordinary, your total attention can be focused on the situation. A particular situation happened to me around 12:30 P.M. Monday afternoon. I was sitting in my room waiting to go to lunch when I noticed an Eastern DC-9 in what appeared to be a go-around pattern. With my curiosity peaked I grabbed my camera, attached my zoom lens and walked to the other side of Dorm II. I watched the DC-9 come around and line up for final on 7 left when my roommate walked up and said that he had seen the aircraft just take-off. With curiosity really peaked, I watched closely as the DC-9 touched down, slow and taxi off the runway near the E-RAU ramp. As the DC-9 circled around to taxi back to the carrier ramp, I noticed that the forward right cargo door was wide open. They taxied to the carrier ramp and without pulling into the gate a groundcrew worker came out to the plane and shut the door. The Eastern jet rapidly taxied away and headed down November taxiway for another takeoff.

**The pilot would have realized something was wrong when pressurization was not attainable**

Wanting to investigate this further, I visited the control tower at the Daytona Beach Airport. I was able to talk with the Tower Manager Steve Pulak, and the Air Traffic Manager Burt Willis. They said that an off duty tower worker, Bill Norton, saw the DC-9 takeoff with the cargo door open. Mr. Norton said, "It appeared that it was open before rotation," and that he called up to the tower, where upon notification, the workers in the tower informed the pilot that the door was seen open and he immediately began procedures to return for landing at Daytona. Mr. Willis said part of their procedure in an event like this is to inform Flight Standards. Mr. Willis then added that Flight Standards would investigate.

Craig Jackson, the Manager of Airport Sales and Services for Eastern at the Daytona Beach terminal, said that Flight 794, a DC-9-51 bound for Atlanta, returned for landing after the pilot noticed a door light come on. He did not specify whether the pilot noticed the light before or after takeoff. He also said that this incident was "unnewsworthy."

Denis McGee, Airport Director at the Daytona Beach Airport, had "no comment."

According to sources, the warning light for the ajar door should have been on when the electrical system was turned on, unless it was burned out. If it was burned out, the pilot would have realized something was wrong when pressurization was not attainable and would have returned for a landing anyway.

### Aer Lingus becomes first operator of advanced 737's

by Todd Hughes  
 Opinions Editor

Aer Lingus, the national airline of Ireland, recently took delivery of its first Boeing 737-500, thereby becoming the first airline to own and operate the new generation 737 family of airplanes: the 737-300, 400, 500, Aer Lingus presently operates two 737-300s and four 737-400s.

The carrier is scheduled to receive one more 737-400, with four 737-500s remaining on order following the latest delivery.

The 737-500 delivered is the newest and smallest member of the 737 family. The 737-500 seats 137 passengers and first entered service in February of 1990. There are now 33

737-500s and a total of 1873 737s in service.

The 737 family of short-to-medium range twinjets provides a common airplane model to serve airline markets with requirements from 108 to 170 seats. The 737 family is noted for its degree of commonality in spares, maintenance, flight decks, type ratings and power plants.

On delivery of its first 737-500, Aer Lingus Group Chief Executive Cathal Mullan said the new airliner "enables us to give our passengers the benefit of the most successful aircraft in commercial aviation history." The airplane, named St. Columba, has entered service between Ireland and Europe.



**Irish eyes...**  
 Aer Lingus recently took delivery of its first 737-500. The airline is the first to operate the new generation of 737's.

### Boeing's order books are bursting

by John McDermott  
 Staff Writer

Boeing has recently received several large orders for aircraft and made deliveries to several airlines. United Parcel Service has ordered 25 757 package freighters valued at approximately \$1.7 billion including spares. With this order, the UPS fleet of delivered or on order 757PPFs, has grown to 55 airplanes. UPS also holds options on 41 additional 757PPFs scheduled for delivery through 2001.

Boeing's 757PPF is a windowless, dedicated freighter that can accommodate standard cargo containers or pallets. Including this order, 34 customers have ordered a total of 713 757s.

**Total 1990 world orders is 485 aircraft.**

Boeing's 767-300ERs have a range of 6,210 miles. To date 44 customers worldwide have ordered 516 Boeing 767s.

Japan Airlines recently took delivery of a new 747-400, the carrier's 100th Boeing airliner. JAL is one of only five airlines that has received 100 or more Boeing jets, and is the world's largest operator of the 747, with eight of the latest version, the 747-400. The deliveries of 100 Boeing jets is made up of 72 747s, 16 767s, and 12 727s.

In the Middle East, the carrier Gulf Air has ordered 12 Boeing 767-300

Garuda Indonesia has orders for nine 747-400s and sixteen 737-400s and eight 737-300s were signed, with a value of \$700 million. Combined with 1989 orders for six 747-400s and eight 737-300s the airline's total orders with Boeing stand at \$1.8 billion. Boeing has now received orders for 394 of the 747-400s. Total 1990 world orders for Boeing jetliners is 485 aircraft, with an approximate value of \$42.9 billion.

### Two Northwest airplanes collide in Detroit

Romulus, MI (AP) - Investigators working in a light snow on a windy runway today surveyed the burned-out shell of a jet liner that turned into the path of another, causing a collision that killed eight people.

The investigators' spokesman refused to respond to speculation that fog disoriented the pilot of the DC-9, which collided Monday with a Boeing 727 racing down a runway toward takeoff at Detroit Metropolitan Airport.

At least 20 people were treated for burns, broken bones, smoke inhalation and other injuries, and seven remained in hospitals today. Some had leapt to the slushy runway as an explosion of flames burned the roof of their plane.

The National Transportation Safety Board set up teams to look into such factors as human perfor-

mance, engines and survivors' recollections. Before daybreak, investigators used stadium-style lights to inspect the wreckage in 32-degree cold, with a wind chill of four degrees.

"It's not particularly a benign environment out there right now," John Lauber, a NTSB member, said at a morning briefing.

Lauber said investigators were warned to be cautious in picking through the unstable wreckage under time pressure caused by the weather. Airport officials wanted the two planes, both operated by Northwest Airlines, moved to reopen the only runway not affected by crosswind, Lauber said.

Officials said the jets both left their gates at 1:31 p.m. and ended up 2,500 feet apart on the same runway after the collision.

The 727 was racing down a runway toward

takeoff when its wing was sheared off by the DC-9, which had turned in front of it. Fuel poured from the planes and the DC-9 burst into flames, killing seven men and one woman, a flight attendant, among the 43 people aboard.

The victims apparently died from noxious fumes before their bodies were burned beyond recognition, Dr. Bader Cassin, chief medical examiner for Wayne County, said Tuesday.

Romulus, ten miles from Detroit, was the site of the second worst air crash in U.S. history, the August 16, 1987, crash of a Northwest MD-80 on takeoff. That one killed 156.

*Editors note: Embry-Riddle alumni Darren Owen, Aeronautica Science '81, was the second officer on the Northwest Boeing 727 that was involved in the above story.*

### Continental Airlines files for Chapter 11 bankruptcy

by Joe Cambron  
 Managing Editor

Monday, Continental Airlines, which has been facing extreme financial pressure from a large debt load and soaring fuel prices, filed for Chapter 11 bankruptcy in its home state of Delaware.

A spokesman for Continental stated in a Monday press conference that the price it pays for fuel on average has risen from near fifty cents before the crisis in the gulf to nearly \$1.10 per gallon presently.

Continental Airlines reports that its operations will continue as usual, with all of its flights running as scheduled. Continental will also be accepting all tickets that were purchased prior to the filing.

On the employment front, Continental claims that not a single employee will be laid off as a result of the filing.

Continental President Hollis Harris expressed

his plans for bankruptcy court Tuesday, saying that Continental's Seattle-Tokyo would be sold to American for \$150 million. It is also rumored that Delta will purchase Continental's stake in Air Micronesia, a Pacific based-island hopping carrier with routes to Japan.

Continental's Harris denies that this action is being considered, and instead insists that expansion is the Pacific is one solution to Continental's problems.

Continental's problems are not new. The carrier has consistently lost money since the early 1970s. It was then that the maverick head of Texas International, Frank Lorenzo, purchased the company and merged it with his Texas International. Continental continued to lose money as deregulation drug the unwieldy carrier into its first bankruptcy.

From the ashes of bankruptcy, Continental rebuilt itself into a formidable carrier with service

to Europe, Japan, Australia, and Mexico. Building hubs in Cleveland and Newark (after purchasing People Express), Continental expanded from its twin hubs of Houston and Denver.

Continental has faced financial losses since this rapid expansion robbed it of business customers. Continental's attempts to control Eastern Airlines (also currently bankrupt) forced even more losses upon the company.

Eastern, which is now operated independently of Continental, left Continental with over a billion dollars of its pension obligations.

Continental, now burdened with monthly payments on these pension debts, interest on its \$1.7 billion in debt, and rising fuel costs, was unable to avoid bankruptcy.

Frank Lorenzo bailed out of his investment in Continental before the stock collapsed this week. SAS purchased his stake for over \$20 million.

### Beech wins national award for excellence

by Tami Strout  
 Staff writer

The U.S. Defense Logistics Agency (DLA) has presented Beech Aircraft Corporation with the national 1990 Award for Excellence in Assisting Small Disadvantaged Business.

As the national award winner, Beech was chosen from more than 1,100 DLA defense contractors across the nation. U.S. Army Commander - Defense Contract Management District North Central Col. Francis B. Holland presented the award to Beech President and CEO

max E. Block during a ceremony at Beech headquarters.

The Award for Excellence cites Beech's success in recruiting minority owned businesses to provide subcontracted goods and services for Beech government contracts. The Small and Small Disadvantaged Business Subcontracting Plan is designed to ensure that all segments of the economy get a fair share of government business, and that

minority-owned businesses have an equal opportunity in the marketplace.

During 1989, small businesses received 36.7 percent of Beech's subcontracting business. Government goals call for contractors to place only

**During 1989, small businesses received 36.7 percent of Beech's subcontracting business.**

five percent of their subcontracted work with small and small disadvantaged businesses. Small disadvantaged businesses (minority-owned) were awarded 14.3 percent from Beech.

National averages for the two

categories are 25 percent for small businesses and 2.2 percent for small disadvantaged businesses.

When the Avion asked Beech representative Mike Potts, he stated "Approximately one-third of our airplanes are made from vendors selling parts ranging from engines to electrical switches."

Beech Aircraft builds, markets and services a broad range of turboprop, piston, light jet and regional carrier aircraft. Beech has 10,500 employees throughout the world with major company facilities and operations in 24 U.S. cities in 14 states.

### Poberezny receives award

EAA Aviation Center, Oshkosh, Wis. - Experimental Aircraft Association (EAA) Founder and Chairman Paul H. Poberezny recently received the 1990 Lloyd P. Nolen Lifetime Achievement in Aviation Award. The award was presented during the sixth annual Wings Over Houston Airshow, which was held at Houston's Ellington Field on Oct. 20-21.

Poberezny was recognized for a lifetime of achievement that has had a significant impact on aviation and served to promote aviation to the citizens of the world, according to W.S.B. Poss, Chairman of the Nolen Award Selection Committee.

"The contributions to aviation that Paul has made over the course of his lifetime are more than significant,

they are historic," Poss said.

"No one has contributed more to the promotion of all aspects of aviation. The Experimental Aircraft Association, which Paul founded in 1953, is a monument to his vision."

Poberezny is only the second person to receive the prestigious award. Lloyd P. Nolen, after whom the award was named, received the first award last year in recognition of his life long efforts to preserve Warbird aircraft and for founding the Confederate Air Force (CAF).

The award was created by the Executive Committee of the Wings Over Houston Airshow to honor individual or organizations who have devoted a large portion of their lives or existence to the betterment of aviation.

### Aero identification

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Return this form to the Avion. All entries must be verified by an Avion staff member. The first correct entry will win a free submarine sandwich from Sorrento's Deli. Staff members are not eligible contestants.



# OL400 laser printer under \$1,000

by Joe Cambron  
Managing Editor  
A truly personal laser printer is now available with a list price of less than \$1,000. The crisp 300 dot per inch printing capability that was once relegated only to Apple's \$5,000 Laserwriter line is now available from Okidata, a leader in printer technology.

Okidata's recently released OL400 printer uses a new LED technology that actually uses no lasers or mirrors, unlike Hewlett Packard's line of printers. Okidata also manufactures its own printer engine which lowers cost.

**The real price**  
The \$999 list price is not even what most consumers will have to pay. Mail order vendors have been advertising this printer for as low as \$679, or only \$400 more than even the cheapest dot matrix printers.

**Compatibility**  
The Hewlett Packard (HP) Laserjet series of printers is now the de facto low-price standard in laser printer technology. This would seemingly leave any new product out in the cold, but Okidata has overcome even this problem by making its

printer 100% compatible with the HP-PCL language that runs HP's printers.

What this means is that the Okidata 400 can perform like an HP Series II printer, while incorporating more fonts at a lower price. With this compatibility, the OL400 is usable with virtually every modern software package.

**Cartridge fonts**  
Cartridges that may be purchased with an HP printer add fonts to the printer's capabilities for about \$50 each. Okidata makes cartridges for its printer as well, but it includes HP's A, B, C, F, L, and Y cartridges built in. In all, seventeen fonts in four typefaces and two orientations are included with all OL400s.

**Soft fonts**  
The OL400 is able to use what are called soft fonts as well. These fonts are created by a software package (see related story below) and are stored on your hard drive until they are sent to your printer. These soft fonts add limitless typefaces to your printer for usually little cost.

**Performance**  
The OL400 is one of the fastest printers on the market with the ability to reproduce built-in fonts

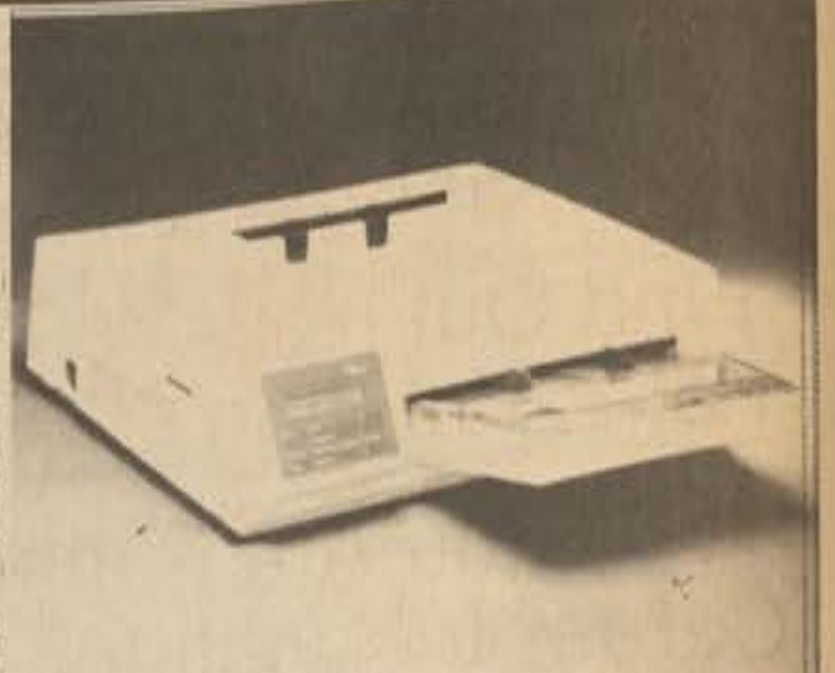
on paper at a rate of four pages per minute. Downloadable fonts are relatively speedy (one to three pages per minute) depending upon how many downloadable fonts are used on a given page.

**Industry praises**  
The OL400 has been rated the "Editor's Choice" by *PC Magazine* for the "best graphics and text quality" for printers in the four to six page per minute categories.

**Dependability**  
Toner cartridges are rated for 2,500 copies and the image drum should last for 15,000 pages. In addition, Okidata is so sure that its LED print technology will not malfunction, that it guarantees it for five years. Other printer parts have a one year warranty.

**Memory**  
The OL400 comes with 512K of RAM standard, although the one tested was equipped with an extra megabyte of memory (it may be expanded to 2.5 megabytes of RAM).

The standard OL400 works with IBMs and Macintoshes. It is available from Micro National Express for \$649 plus shipping (1-800-879-4001), or from a dealer near you.



**Laser light show....**  
The OL400 is small, compact and uses a revolutionary process to bring low-cost, high quality printing home.



**Market madness...**  
Hundreds of laser printers now glut the market, driving prices down. Just Okidata's line of laser printers includes four new models.

by Joe Cambron  
Managing Editor  
Fonts and typefaces are cryptic words to many computer users, but they should be very important to anyone buying a printer these days.

**Typefaces**  
A typeface is a printing style or family such as Helvetica, Times-Roman, or Avant-Garde. These typefaces are often subtly different, but they can appear totally different.  
There are at least two kinds of typefaces, serif and

will yield many difference in the letters.  
A popular typeface is sans-serif Courier. Most typewriters use it, all daisy wheel printers come with it, and all printers support it. Courier is the most basic typeface, but it is also one of the least visually appealing.

**Fonts**  
Fonts are sizes of typefaces as well as their style. The text you are now reading is Times-Roman landscape normal 10 point. 10 point is the size of the letters. Four point text is barely discernable to the human eye whereas 144

## What every printer should have

sans-serif (or with-out serifs). Serifs are little tails and artful squiggles that are added to letters to make them look more curvilinear and readable.

Sans-serif typefaces are often used for bold impact like in the headlines in this newspaper. In the *Avion*, a serif typeface is used for text, in this case Times-Roman, and a sans-serif font is used for headlines, Helvetica. A close inspection

point would work well on a poster. Normal is the antithesis of bold, italics, or bold-italics. Landscape style is the printing of letters on their side upon a piece of paper in order to fit longer sentences on a single 11 by 8.5 sheet. Portrait style is normal 8.5 by 11 printing upright on a normal piece of paper.

**Downloadable fonts**  
If not confused already, these fonts are constructed specifically for your printer by a software package such as Bitstream Fonts. Hewlett Packard (HP) printers use HP's Printer Control Language (HP-PCL) to build these fonts.

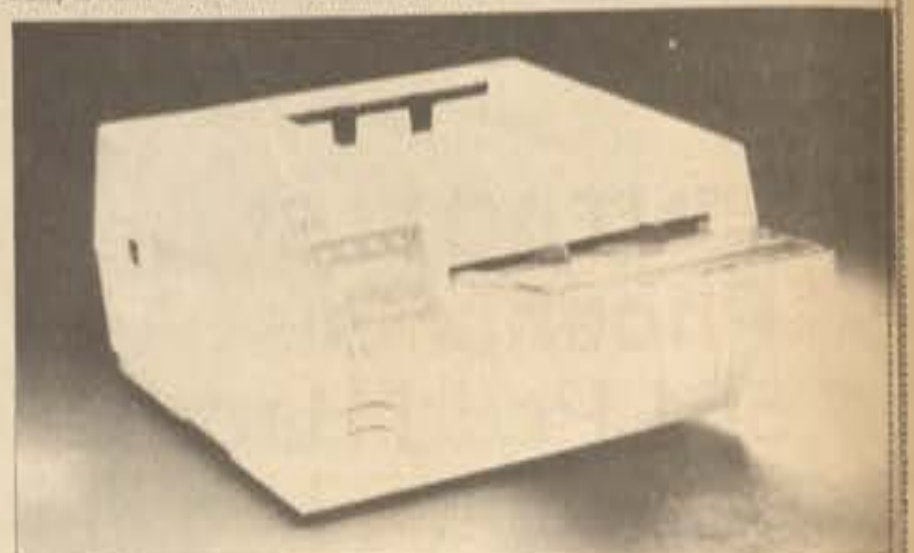
These fonts are in addition to those stored in your printer's ROM. These fonts are stored on your hard drive where they take a lot of space. One way to reduce the amount of space they take up is to reduce the character set used. ASCII character set, for instance, uses 96 characters. Hewlett Packard's character set has 224 characters. Postscript has 220 characters in its set. By limiting the number of characters that your printer can print, your hard drive may be saved megabytes of space. The down side, of course, is that printing the Greek symbol for turkey wishbone is no longer possible.

**Hey bud, come here**  
The Postscript character set

mentioned earlier is the property of the maker of Postscript, Adobe Systems. This company sells letters much like the secret agent on *Sesame Street*. They charge more than a cookie, however.

Postscript places hundreds of fonts in the printers that use it. They are not stored on the hard drive and are therefore faster, but at least two megabytes of memory are needed. Worst of all, Postscript printers can cost as much as \$6,000.

So, if buying printers this Christmas look for the words font and typefaces.



**Postscript power...**  
Okidata, among others, manufactures Postscript printers. They provide hundreds of fonts and quick production of them.

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11:15 am	1:00 pm	2:00 pm 2:15 pm	4:00 pm
1:00 pm	2:45 pm	3:45 pm 4:00 pm	5:45 pm
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# 'Tis the season to fly your computer to new heights Flightstick gives control

by Joe Cambron  
Managing Editor

For the PC flyer in your household this Christmas, CH Products offers a full line of joysticks that are intended to bring the realism of flight into your living room.

**The basics**

The Flightstick is CH's most realistic joystick. It comes with two fire controls as well as centering controls for both vertical and

horizontal. A rapid fire mode is sadly not available and it does not use spring release buttons which are common on other joysticks, but which ultimately lead to centering troubles.

**Centering**

The best part of the Flightstick is its tendency to automatically center, and then STAY centered. The ergonomic design and snap-back centering eliminate the centering worries incumbent in other joysticks. The mechanical nature of the joystick's movement denote both quality and ease of use.

**Throttle**

The joystick also comes with an on board throttle control for games such as *Flight Simulator* and *Flight of the Intruder*. This function should be tested as soon as the product arrives using the basic program described in the manual. Some cheaper game cards appear not to support the additional function.

**Overall**

Its control precision is untouched by Kraft or Analog products. It sells for less than \$50, and may be purchased by calling CH Products directly at 1-800-624-5804.



**Full power...**  
CH Products will put each buyer of its flightstick behind the controls of *Falcon AT*, at no cost.



**Starship Microsoft...**  
*Flight Simulator Scenery and Aircraft Designer* includes both a 747-400 and a Beechcraft Starship.

## Microsoft Designer lets users pilot 747

by Joe Cambron  
Managing Editor

Software companies, like motion picture companies, have recently taken to distributing the products of other companies under their name. Microsoft, the world's largest software maker, is the latest use this tactic.

Microsoft's familiar blue and white packaging now serve as the backdrop for Bruce Artwick Organizations' *Flight Simulator Aircraft and Scenery Designer*. This program expands upon the aircraft design capabilities of version 4.0 of the popular flight simulator. In addition, it gives the creative side of everyone a chance to design their own airports, cities, communities, and lakes.

The aircraft designer comes with a pre-built 747-400, Beechcraft Starship, and Piper Aztec. The simulator also adds sea-plane capabilities to modified Cessnas.

The aircraft designer is even more complex than before, particularly for those who have taken no aerodynamics classes. The new, and numerous, options in the design process are often not real measures of aircraft design. Rather, they are invented short-cuts intended to allow massive changes in your creation with less knowledge about aircraft design. They fail in this objective miserably.

If the manual is carefully studied, however,

aircraft can be created though not from scratch. (Something about flying a Cessna with 400,000 lbs of thrust is enjoyable for masochistic. It sat of fuel rather quickly, though.) Their capabilities of the program are

awe-inspiring and addictive, particularly if you have taken any airport planning classes. Static scenery is stationary, and may take them of parked cars, one of several eral kinds eds, building, bridges, rivers, mountains, is, runways, navigational aids, or or simple igons which may be used to create create even livense landscapes.

Dynamic scenery, as you might guess, uses patterns you record to move aircraft, boats, or cars along a predetermined route.

The only real limitation to the program, in this respect, is memory. A large town, airport, and two-dozen moving objects can be easily stored in one geographic part of the country.

The scenery design part of the program does have its problems, though. It is what programmers call "buggy." These glitches are probably a result of a third party creating the software for Microsoft. Su'sequent versions are sure to

correct these problems, but for now certain things can crash your computer. Using your mouse to move scenery can be dangerous. Often inputs from the mouse will "lock-up" your computer.

Even more strangely, quitting the program after almost any scenery editing session will result in strange happenings. Only sometimes does the computer prompt for a log entry. Often the whole computer will reboot on its own after quitting. Sometimes the terminate-but-stay-resident (TSR) program that overlays flight simulator (that being the scenery designer) will stay in memory after the game is ended, leaving memory tied up.

Even tested on an 80386 with 640K base RAM and 4,096K total RAM, frequent insufficient memory warnings will appear on the screen, but usually performance is seemingly unhindered.

These "bugs" do not seem to affect the game even when using created scenery, though. This at least makes the problems minor at

worst.

These are problems are considerable, but since it is the only program of its kind, there really is no other way to accomplish what this program does. The program sells for about \$40 and is an absolute MUST BUY for anyone with *Flight Simulator v4.0*.

*The aircraft designer is even more complex than before...*

*Dynamic scenery, as you might guess, uses patterns you record to move aircraft, boats, or cars...*

### Glossary of terms used in this section

Font-A size and style of typeface.  
I.E. Times - Roman 10 point italics.

HP-PCL-Hewlett Packard Printer Control Language controls the printers processor. Designed to work with ink-jet and laser printers.

Laser Printer- A printer that uses diode lasers, like those in compact disk players, to burn an image onto a page of normal paper.

L.E.D.-Light Emitting Diode technology eliminates many of the moving parts in normal laser printers. Does not use a laser.

Printer Engine-A device that feeds paper through the printer. Most printers use Canon engines.

ROM-Not a band, a type of memory storage that is permanent and does not require electrical current.

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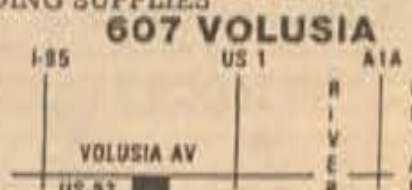
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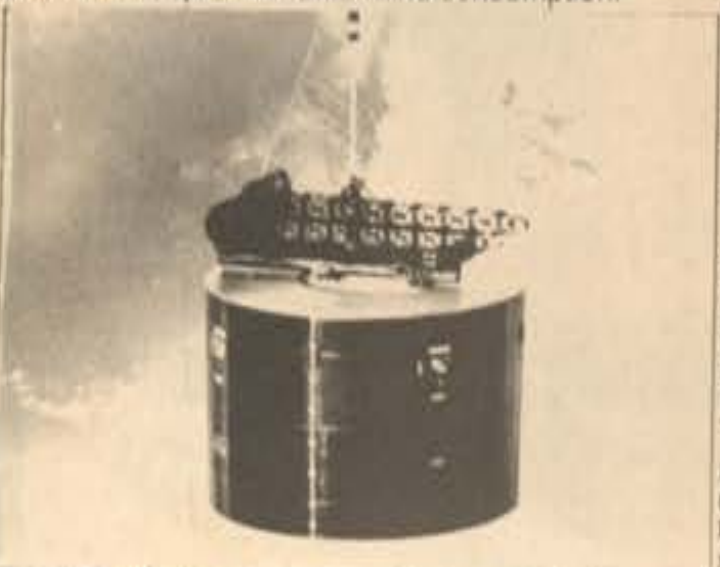


# Space 1990 the beginning of a new decade

## NASA continues shuttle program with success



**Recovery mission...**  
Columbia, STS-32, blasted off into space commencing the year with a salvage mission of LDEF. The satellite had been stranded in space since 1985. Tomato seeds aboard the satellite were distributed to many schools for experimentation and consumption.



**One satellite to go...**  
During mission STS-32 at the beginning of the year, a Syncom IV-5 communications satellite was also put into orbit from space shuttle Columbia.

by Joshua S. Mussat  
Space Technology Writer

Since the first space shuttle flight in April, 1981, National Aeronautics and Space Administration (NASA) has maintained a successful fleet of reusable space vehicles, *Columbia*, *Discovery*, and *Atlantis*. The year 1990 brought good and bad news to the space agency, but overall, it was another successful year.

The 1990's were brought in with a roar as the oldest shuttle, *Columbia*, blasted off on a 10 day rescue mission on January 9. The main objective of the mission was the rescue of the falling Long Duration Exposure Facility (LDEF) which had been in orbit for more than five years. Inside this satellite were thousands of tomato seeds that were distributed to science teachers across the nation. Also on the flight, the five member crew deployed the Syncom IV-5 satellite. The mission came to an end on January 20 with a rare night landing, after traveling more than 4.5 million miles.

The second flight of 1990 began in the darkness of night, as the space shuttle *Atlantis* lit up the eastern coast of North America during a spectacular night launch. The five member, all military crew, spent four days in space with a classified Department of Defense (DOD) payload. The launch of *Atlantis* on February 28 was the best viewed, since the orbiter traveled up on a 62 degree inclination, traveling directly up the eastern seaboard, one of the highest inclinations used by a space shuttle.

The most important launch of 1990 was STS-31 with the Hubble Space Telescope. Launched aboard the space shuttle *Discovery* on April 24, the telescope was deployed successfully shortly into the five day mission. The five member crew traveled more than 2 million miles, capturing the earth on film with an IMAX, 70 mm camera. The flight came to an end on April 29, 1990 at Edwards Air Force Base, California.

Starting with the launch attempt of *Columbia* on May 29, the summer of 1990 proved to be a summer to forget. Hydrogen leaks were found in two of the orbiters, grounding the entire fleet for the summer. The stoppage in flight during the summer was the longest break in shuttle operations, since the 32 month grounding after the *Challenger* accident in January 1986. Along with problems in the flawed Hubble Space Telescope, many people had serious concerns with the management at NASA.

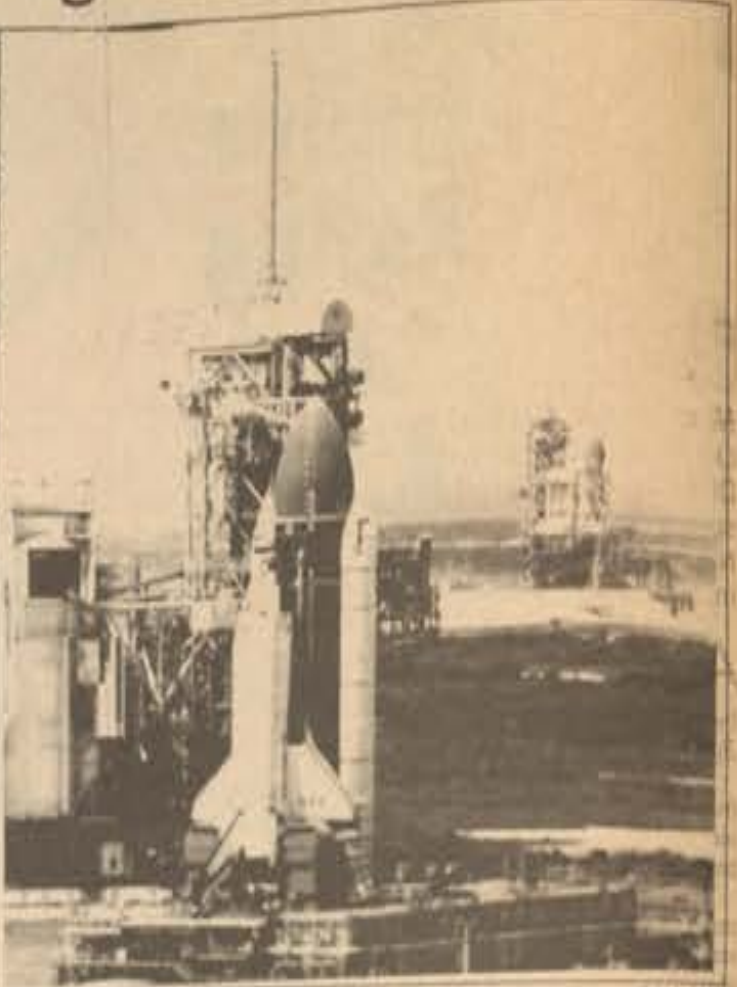
All the problems with the space agency came to an end on October 6, with the successful launch of *Discovery*, and the *Ulysses* solar space probe. After the main mission objective was completed, the five man crew concentrated their efforts on a variety of experiments on the orbiter, one, measuring depleting ozone levels here on Earth. The four day mission ended on October 10 with *Discovery* landing at Edwards Air Force Base in California.

The second flight for *Atlantis* in 1990 was the second night launch of 1990, and the fifth in shuttle history. *Atlantis* rocketed into a secret DOD orbit on November 15 at about 6:30 PM. The payload for the mission was classified, but it has been speculated that due to the situation in the Persian Gulf, a reconnaissance satellite was put into orbit above Iraq. The landing of *Atlantis* on November 20, after a four day mission came with great surprise and excitement to central Florida as for the first time since April 1985, a shuttle returned to the Kennedy Space Center (KSC), only miles from where the mission began.

The landing at the KSC saved NASA approximately one week in travel and another million dollars in expenses. *Atlantis* is now being prepared for its next flight with the Gamma Ray Observatory, to occur in February of next year.

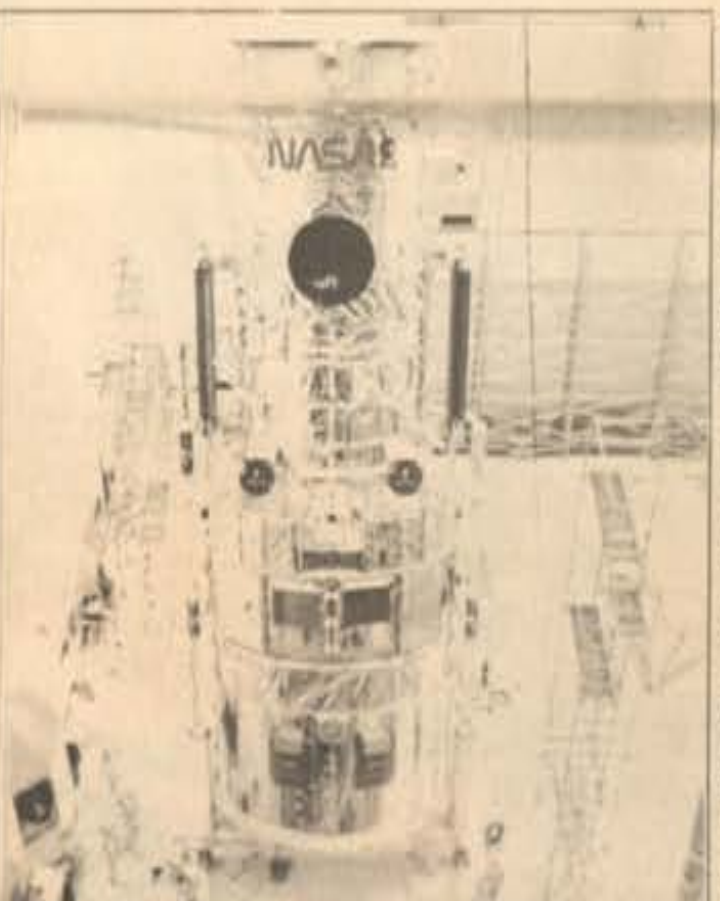
The last flight of the year began with the third night launch of the year and the sixth night launch in shuttle history up to the present. The space shuttle *Columbia* began a nine to ten day scientific mission with a launch on December 2 at 1:49 AM. This mission will be dedicated completely to scientific research. Landing is scheduled to occur at Edwards.

With 1990 coming to an end, NASA closes the book of another successful year, only now waiting for



**Twin shuttles occupy pads...**  
During the month of April, *Columbia* (foreground) and *Discovery* awaited lift-off in the adjacent pads of Launch Complex 39. This was the second time in history that two shuttles were simultaneously at the pad. *Columbia* awaited for mission STS-35, Astro mission, and *Discovery* for mission STS-31.

1991 when the Gamma Ray Observatory, Space Life Science (SLS)-01 laboratory, and the Internal Microgravity Laboratory (IML) with a spacelab long pressurized module are taken into space aboard *Columbia*, *Discovery* and *Atlantis*. 1991 will also mark the return to a full fleet of four orbiters when the space shuttle *Endavour* is brought to its new home in Florida in late April.



**Eye in the sky...**  
The Hubble Space Telescope is lifted into a vertical position at the Vertical Processing Facility at the Kennedy Space Center to process the 94-inch primary mirror. It was this same mirror that ended being defective and blurring the telescopes vision. A repair mission is still being planned, but will not happen for a couple of years still.

## Hubble telescope does not live up to NASA's challenge

By Vilma Enid Molina  
Space Technology Writer

It should have been one of the greatest technological advances in astronomy since the time of Galileo. It should have been the most accurate instrument man has ever made. But it wasn't, not yet.

The troubles with the Hubble Space Telescope began long before it was put into orbit. Princeton University's astronomer Lyman Spitzer was the first one to propose the project in 1946, but it was delayed because of management and cost overruns.

In 1973 NASA selected a group of scientists to consider the basic design and the instruments the telescope would have. Congress finally approved NASA's large space telescope in 1977. Perkin-Elmer and Lockheed Missiles & Space Co. were chosen to build the optical assembly and to build the structures and assemble the complete satellite, respectively.

NASA started testing the instruments in 1983 but completion of the observatory fell beyond schedule. The program was renamed the Hubble Space Telescope after Edwin P. Hubble who discovered the expansion of the universe.

The launch was initially planned for 1986 but technical errors and the *Challenger* accident caused the satellite to wait four years before being launched. On April 24, 1990 the space shuttle *Discovery* finally put Hubble into orbit.

Unfortunately, Hubble's troubles were

just beginning. The telescope encountered problems with the deployment of its solar panels and antennas the first day in orbit threatening to cause the entire satellite to fail. In July it began to experience problems with vibration. As Hubble whirled around the globe once every one and a half hours there was a warm to cold temperature swing every 90 seconds. That "snap" caused the solar panels to begin to vibrate and eventually, the rest of the telescope as well. This caused a loss of pointing control and rendered the telescope useless.

But it was not until mid June that Hubble's real problem was discovered; Hubble couldn't focus. Jean Oliver, the deputy project manager for Hubble and the mission's chief engineer, said that the primary mirror seemed to have been polished as specifications called for. There were no bumps or pits greater than half of a millionth of an inch. There was instead, an error in the curvature of the primary mirror. The discrepancy was caused by a spacing error of one millimeter in part of the complex optical system used to gauge precisely the curvature of the mirror during its final grinding and polishing.

Several options for correcting Hubble's problems have been discussed and it widely believed that Hubble can be made completely functional. In the words of the late Edwin Hubble, "The search will continue. The urge is older than history. It is not satisfied, and it will not be suppressed."



**Breaking the puzzle...**  
*Atlantis* is hoisted above the external tank and solid rockets at booster configuration after it was rolled back from the pad on August 14 due to the detection of a liquid hydrogen leak. The STS-38 mission was delayed from the summer until November. *Atlantis* flew only twice and both times the missions were dedicated to the DOD. Also, both missions, were launched at night. On its last mission, *Atlantis* landed at the Kennedy Space Center.

## Planetary exploration gains momentum

by Dennis Adams  
Space Technology Writer

In the 16th century Ferdinand Magellan explored unknown lands. Four centuries later, the *Magellan* spacecraft begins its exploration of our sister planet Venus. The *Magellan* project is a geological and geophysical mission designed to investigate the possibility that there may have been water on Venus, and perhaps gain some insights into how the continents formed in the early history of Earth.

Venus has become one of the most visited planets. Twenty spacecraft from the Soviet union and the United States have been sent to try to solve some of our questions about our "twin". Venus' thick sulfur-yellow clouds have been probed and its atmospheric structure and composition have been measured by many investigating spacecraft. Automatic landers have even photographed and chemically analyzed its surface. Despite all this, the knowledge of Venus remains sketchy.

Since Venus is covered with thick clouds, simply photographing its surface is not possible. Radar must be used. *Magellan* will employ an imaging system that will provide resolution 10 times better than that of any previous spacecraft views of the Venusian surface. *Magellan* is expected to unveil the secrets of the Venusian past, just as *Mariner 9* revealed the Martian secrets in 1972.

On August 10, 1990 *Magellan* ignited its solid rocket motor, finally placing it at its destination: in an elliptical

orbit within the gravity well of Venus. *Magellan* is expected to map the topography of the planet with a synthetic aperture radar every 37.2 minutes during its closest approach to the surface and then turn and send the scientific data back to Earth.

A test on August 16 of the imaging system proved very successful. However two anomalies arose which delayed mapping operations. Twice within six days, *Magellan* broke contact with earth. The spacecraft had entered a protective state in response to some sort of perceived threat. The spacecraft has the ability to re-align its solar panels to the sun to ensure ample electrical power (without solar power its batteries would drain in less than 12 hours and the mission would end), to switch off non-essential loads, and to set the telecommunications link with Earth. These functions were built in so that it could protect itself until NASA could correct any problems it may have. Both times communications were reestablished but the anomalies have not yet been explained.

When the *Magellan* mission ends it will have sent back more data than has been acquired in all previous missions combined. Just as Venus' clouds are stripped back, Jupiter will also be forced to reveal some of the secrets it has protected for so long. Project *Galileo* will be our first chance at an in-depth study of the entire Jovian system.

Project *Galileo* is the most complex mission flown by NASA since the *Viking* program 1976. The spacecraft is

more intricate and advanced than any launched and its investigation will prove more enlightening than interplanetary science has witnessed. *Voyager* sent back stunning images of Jupiter, but *Galileo* will be viewing Jupiter from a distance up to 1,000 times closer. *Galileo's* data rates have been greatly increased as has our ability to analyze the information.

The *Galileo* spacecraft is made up of two vehicles. The first is a probe vehicle to penetrate deep into Jupiter's atmosphere. The second is an orbiter vehicle which will traverse the complex magnetosphere of the planet observing changing cloud patterns and atmospheric structure and to keep a close eye on Jupiter's planet-sized satellites.

Due to its size and weight, *Galileo* was put into orbit by



**Home sick...**  
*Magellan*, left, and *Galileo*, right, are very far away from Earth on their planetary explorations of Venus and Jupiter. *Magellan* has already started the mapping of Venus.

a shuttle. The problem was that there were no manufactured rocket motors powerful enough to take *Galileo* directly to Jupiter. The answer was the Venus-Earth-Earth-Assist trajectory in addition to a two-stage solid propellant booster. This trajectory will allow it to observe Venus, the Earth-Moon system, one or two asteroids and other phenomena in interplanetary space.



# NASA plans ambitious schedule for the 90's



**New shuttle coming soon...**  
On August 1, 1987, Rockwell International's Space Systems Division received the go ahead from NASA to construct the new space shuttle *Endeavour*. The new orbiter will be delivered to NASA in 1991 and will fly its first mission in 1992. Among the many modifications are the drag chutes and new carbon brakes.

## Cassini space probe will study Saturn

by Russell E. Darling  
Space Technology Writer

NASA has selected the science teams and the investigators for the *Cassini* Saturn Orbiter Mission, scheduled for launch in 1996. NASA has stated "the Saturn Orbiter will investigate the structure and composition of Saturn's atmosphere, the physical properties of ring particles, a survey of moonlets within the rings and a close look at several moons." The European Space Agency (ESA) is supplying the *Huygens* Probe, which will be deployed by the orbiter on one of Saturn's moons, Titan.

the first spacecraft to visit Saturn since *Voyager 2's* flyby in 1981. During its four year orbit, NASA has stated that the spacecraft will "take detailed pictures of the intensely cratered surfaces of the icy moons, map their topography with high-resolution radar and determine the surface composition."

**The Cassini Orbiter will also complement the studies of two other missions: the Galileo mission to Jupiter and the Comet Rendezvous Asteroid Flyby (CRAF)...**

Just as the *Magellan* probe is mapping Venus, the *Cassini* orbiter will map a large portion of Titan's cloud-shrouded surface. The mission may also provide some light into Earth's beginnings as it examines the unique atmosphere on Titan.

ESA's *Huygens* Probe, named for the another 17th century scientist, Christian Huygens, will examine the atmosphere and clouds of Titan. It will also take pictures of the surfaces as it de-

scends. Once it reaches the surface, and provided it survives the landing, the probe will continue to take measurements and relay data until it loses contact with the orbiter.

The *Cassini* Orbiter will also complement the studies of two other missions: the *Galileo* mission to Jupiter and the Comet Rendezvous Asteroid Flyby (CRAF). This will be accomplished because Cassini's trajectory takes it through the asteroid belt and near Jupiter for a gravity-assist flyby.

This mission, the Cassini mission, is a joint project of NASA and ESA. The development of the spacecraft and operations will be conducted by NASA's Jet Propulsion Laboratory (JPL). Overall, scientists agree that little is known about Saturn and its moons.

The *Cassini* Saturn Orbiter Mission will rewrite the present books and add several more volumes to what is currently known about the Saturnian system.

## Astro-1 observatory searches for invisible universe

by Roland Houle  
Space Technology Writer

Last Sunday, *Columbia* lifted off Pad 39B from the Kennedy Space Center. *Astro-1*, a series of telescopes, was contained in the cargo bay area.

The *Astro-1* consists of four astronomical instruments to study the universe through observations in the ultraviolet and x-ray portions of the electromagnetic spectrum.

Since the earth's atmosphere blocks most of the ultraviolet (UV) radiation, UV observations cannot be made from the earth's surface.

Ultraviolet light is light with a wavelength just shorter than visible light. X-ray light has a wavelength even shorter than UV light.

Observations in these bands of the light spectrum are important to scientists because this light is emitted by highly energetic objects such as supernovas, white dwarf stars, neutron stars, pulsars and by matter being drawn into a black hole.

*Astro-1* continues the work initiated by previous spacecraft. These were the Orbital Astronomical Observatory 3 (1972), International Ultraviolet Explorer (1978), and the High Energy Astronomy Observatory (1979).

Also, *Astro-1* will compliment and extend observations to be made by the Hubble Space Telescope.

The *Astro-1* mission utilizes the European Space Agency's *Spacelab* pallet system in the orbiter cargo bay to support the UV instrument array (three instruments).

The *Spacelab* system for *Astro-1* consists of two pallets to provide the physical and structural support in the cargo bay, the Instrument Pointing System (IPS) to provide alignment and tracking data for the telescopes, and the Command and Data Management System which interfaces with the orbiter controller to control the IPS and the telescopes. The system also provides vital services such as cooling and electrical power and connections.

In order to provide 24 hour operation of the telescopes, the crew will be working in two teams on alternating 12 hour shifts. The control station for the system is in the Air Flight Deck of *Columbia*.

The three ultraviolet instruments include the Hopkins Ultraviolet Telescope (HUT), Ultraviolet Imaging Telescope (UIT) and the Wisconsin Ultraviolet Photo-polarimetry Experiment (WUPPE). These instruments are managed by the Marshall Space Flight Center.

The fourth instrument, the Broad Band X-ray Telescope (BBXRT), was developed by the Goddard Space Flight Center (GSFC).

This telescope was added to the mission after the appearance of a supernova (dubbed

SN 1987 A) in February 1987 to obtain data on the supernova.

The BBXRT will be mounted on the Two-Axis Pointing System (TAPS) developed by GSFC. This system will in turn will be mounted on one of the *Spacelab* pallets in the cargo bay.

The BBXRT will not be controlled by the crew, but by GSFC.

The three ultraviolet instruments will be co-aligned to study each object in unison. This will provide a great amount of data on each object in a variety of scientific areas.

The UV instrument portion of *Astro-1* will be directed from a Payload Operations Control Center at Marshall Space Flight Center.

The *Astro-1* mission on STS-35 represents NASA's trend to its original purpose - to study the universe. *Atlantis*' DOD mission last month marked an end to the DOD's secret missions aboard the shuttle.

Although DOD shuttle missions are scheduled for the upcoming years, they are not classified missions. Instead, the Department of Defense is depending more upon unmanned rockets, such as the Delta II and Titan family of rockets.

In the upcoming years, though, NASA has several scientific missions on the launch manifest.



### Sightseeing...

Space shuttle *Columbia* leaped into the Florida night sky carrying the *Astro-1* observatory. The observatory will explore the invisible ultraviolet and X-ray universe as it has never been studied before. *Astro-1* consists of the Hopkins Ultraviolet Telescope, the Ultraviolet Imaging Telescope, the Wisconsin Ultraviolet Photo-Polarimeter Experiment and the Broad-Band X-Ray Telescope.



### Up, up and away...

Culminating 14 years of successful Delta rocket launches, history was made on October 30, 1990, when McDonnell Douglas launched their 200th Delta aloft. The launch coincided with the companies celebration of its 30th anniversary. British Aerospace Ltd.'s INMARSAT was the payload on this flight. The satellite was created as a link in the International Maritime Satellite Organization's global communication network. It was delivered successfully and is currently functioning perfectly.



### Burp...

The images of Saturn were taken with the NASA Hubble Space Telescope's Wide Field Planetary Camera. The one on the right was taken on August 26, 1990 when the planet was at a distance of 1.39 billion kilometers (860 million miles) from Earth. The image on the right taken in November after amateur astronomers discovered a new "white spot" near the equator of Saturn. The images were taken in blue and in infrared light. The results were totally unexpected and caused great excitement among both planetary astronomers and atmospheric scientists. Better quality photographs will not be available until Hubble is fixed, this is one of NASA's future projects. Meanwhile Hubble will keep scanning the universe.



## Space Station Freedom: the bird takes flight

by Jose Luis Vazquez-Delgado Jr.  
Space Technology Editor

Space is the only alternative for a progressing age like ours, just like the wheel was in ancient Egyptian times and the train was in the making of this country.

President John F. Kennedy directed the nation towards the Moon, and had he not been killed, he would have been able to sit back and reflect on his accomplishment. On his State of the Union Address on January 25, 1984, President Ronald Reagan directed NASA to a new goal.

"We can follow our dreams to distant stars, living and working in space for peaceful, economic and scientific gain. Tonight, I am directing NASA to develop a permanently manned space station... NASA will invite other countries to participate so we will strengthen peace, build prosperity and expand freedom for all who share our goals." This statement will maybe become as famous as

President Kennedy's if the United States ever deploys its so talked about space station.

*Freedom* has captured the heart of many American dreamers, but it has also captured the attention of those in Congress. The FY 1991 budget for the program was substantially below the budget profile on which the *Freedom* program is presently based. An assessment will be

performed to determine what new compromises will have to be made.

Compromising seems to be a key word in the *Freedom* project. Since its creation, *Freedom* has gone through dozens of compromises. When new compromises need to be made, some ground

rules will be established. Otherwise, the United States might end up having an upgraded version of the Skylab Station of the 70's.

Some of the assessment ground rules are:  
1- develop a phased approach with quasi-independent phases. Phases can and probably will overlap, but must stay within the overall

program budget limits.

2- protect the high priority of life sciences and materials sciences.

3- achieve man-tended capability as early as possible.

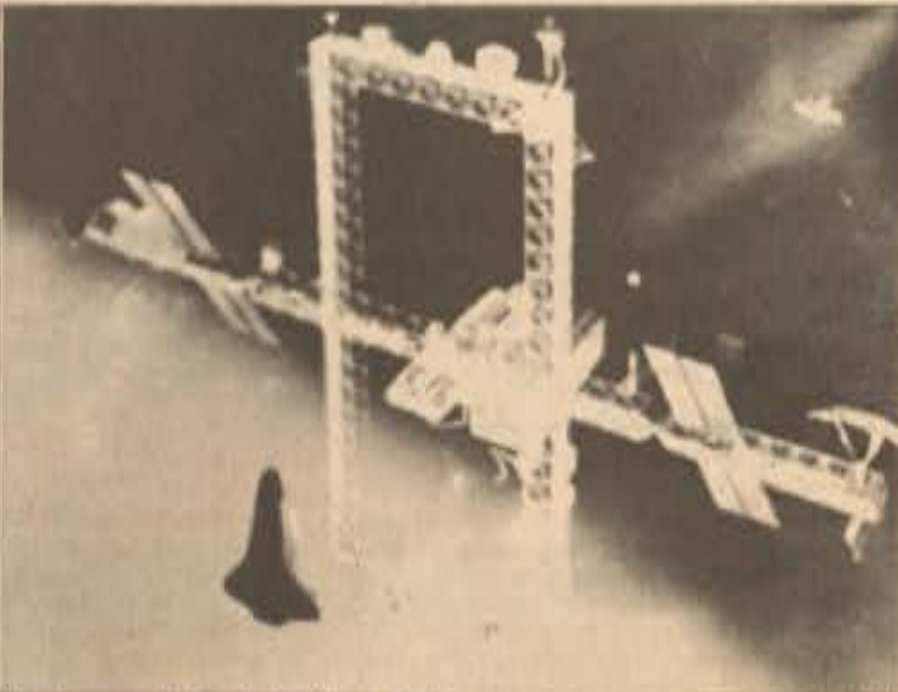
4- permanent manned capability will remain a commitment of the program.

5- limit assembly flights to four per year.

The time has come to analyze the purpose of the space station. Some questions need to be asked, like are the present objectives economically feasible, and are they meeting ends with the lagging projects of the NASA of the 70's? What exactly does the nation want and at what cost?

Answers for this question are still to be found. But, many NASA officials as well as private industry officials are working on possible answers.

In the sixties when President Kennedy initiated the great moon race there was a goal; get to the moon before the Soviets. But, what about now? The goal of having a space station is not to win a race, the Soviets won that race a long time ago. Then what will it take to get some cooperation between Congress and NASA to achieve the so long talked about station?



### The incredible shrinking station...

Space station *Freedom* has been the target of controversy. Many think that it should never fly while others want to reduce its size. Budget cuts have only worsened the stations final designs. With luck, *Freedom* NASA will start construction in the mid-90's.



# 600 North Attitudes

## THE NEW HOME OF ERAU!!!

### Wednesday: Hospitality Night

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

### Thursday: Starving Students Night !

\$1.00 Well And Call Drinks All Night  
\$.20 Chicken Wings All Night

### 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

### Saturday: Progressive Night

### Sunday: Comedy Night

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

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

### Tuesday: Live Progressive Band

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

### Wednesday: Margaritaville

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

### Thursday: Ladies Night:

9-11 Free Drinks Free Admission  
\$100.00 Fooseball Tournament

### Friday: Free Drinks 9-11

World Gym Presents The \$200.00 Strong Man Bench  
Press Contest  
2 Weight Divisions

### 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)

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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

HEY DAD, I'LL GUESS ANY NUMBER YOU'RE THINKING OF! GO AHEAD, PICK A NUMBER!

MM... OK, I'VE GOT IT!

IS IT 92,376,081?

BY GOLLY, IT IS!

WAIT A MINUTE! YOU'RE JUST TRYING TO GET RID OF ME, AREN'T YOU?!

NO, YOU'RE PSYCHIC! GO SHOW MOM.

A LOT OF PEOPLE DON'T HAVE PRINCIPLES, BUT I DO! I'M A HIGHLY PRINCIPLED PERSON!

I LIVE ACCORDING TO ONE PRINCIPLE, AND I NEVER DEVIATE FROM IT.

WHAT'S YOUR PRINCIPLE?

LOOK OUT FOR NUMBER ONE.

MOM, YOU KNOW THE SANDWICH YOU PACKED FOR ME TODAY? WELL, BY LUNCH TIME, THE JELLY HAD SOAKED INTO THE BREAD. THAT GROSSES ME OUT.

SO TOMORROW, I'D LIKE THE JELLY PUT IN A SEPARATE CONTAINER WITH A KNIFE, SO I CAN SPREAD THE JELLY AT THE LAST POSSIBLE MOMENT BEFORE I EAT THE SANDWICH.

ALSO, YOU KEEP USING BREAD FROM THE MIDDLE OF THE LOAF. I ONLY LIKE THOSE PIECES FOR TOMS. FOR SANDWICHES, I WANT ONLY THE END PIECES, BECAUSE THOSE DON'T ABSORB AS MUCH JELLY. GOT IT?

SOOOOOO IT, SHE DID IT AGAIN!

WHY, LOOK? YOU MADE YOUR BED WITHOUT EVEN BEING TOLD TO! THAT'S WONDERFUL, CALVIN!

GEE, YOUR MOM SURE IS NICE WHEN YOU HELP HER.

YEAH, THAT'S THE REASON I USUALLY DON'T.

I LIKE MOM TO BE IMPRESSED WHEN I FULFILL THE LEAST OF MY OBLIGATIONS.

LOOK OUT THE WINDOW! IT'S SNOWING! THERE MUST BE ALMOST HALF AN INCH!

BY MORNING, I'LL BET THERE'S TONS OF SNOW! DO YOU THINK THE SCHOOLS WILL CLOSE?!

WHAT? OH YEAH? WELL, SAME TO YOU!!

I WONDER HOW A CRABBY GUY LIKE HIM GOT TO BE SUPERINTENDENT.

THAT WAS QUITE A RIDE.

I'LL SAY.

I'VE NEVER SEEN A SLED CATCH FIRE BEFORE.

WE'RE LUCKY THE POND HADN'T FROZEN.

**Far Side** by Gary Larson

Man, I hate elevator music.

Excuse me, Zeek, but I have to go over to the neighbor's yard for a few minutes... be right back.

Yo! We got any magazines?

Buffalo, N.Y., Nov. 2-5: The annual convention of the Big Goolet Society of America.

Like most veterinary students, Doreen breezes through Chapter 9.

ACE MARBLES INC.

In the corner, Vance was putting the move on two females — unaware that his fake hood had begun to slip.

Misunderstanding his employees' screams of "Simmons has lost his marbles," Mr. Wagner bursts from his office for the last time.

**Mister Boffo** by Joe Martin

ON THE OTHER HAND, IF THEY ARE ON THE LEVEL, WE'D HAVE A MATCHING SET!

ANOTHER WAY TO TELL WHEN YOUR RELATIONSHIPS IN TROUBLE

BOFFO + M

BECAUSE ME, BUT YOUR NAME WOULDN'T HAPPEN TO BEGIN WITH AN 'M' WOULD IT?

I KNOW WE HAVE THE LATEST IN MEDICAL TECHNOLOGY...

BUT I STILL WISH I HADN'T DEAD HIS HORSSCOPE.

**Mother Goose and Grimm** by Mike Peters

I THINK HE'S A LITTLE NERVOUS.

POP CORN

THEY DIDN'T HAVE CHANGE FOR THE TWENTY.

GRIMMY... I'LL GIVE YOU A DOGGIE TREAT IF YOU BARK.

WOW BOW!

THAT'S, BOW WOW.

WHAT EVER.



→ Autos for sale

1979 VW RABBIT Yellow 4 door, 4 speed. Excellent running condition \$500.00. MATTHEW SWANEY 761-7492.

1981 TOYOTA COROLLA SR5 Red 2 door, 5 speed. Excellent running condition \$1200.00. MATTHEW SWANEY 761-7492.

1973 PLYMOUTH FURY 360 engine, air, cruise, power steering. Good condition. Asking \$550.00. O.B.O. 255-7536 Ext. 310 or Box 2153.

1988 LINCOLN MARK VII LSC. Black with tan leather interior, loaded. Mint condition. Must sell, call 257-4321 and ask for Dean.

1980 PLYMOUTH HORIZON automatic, air cond. good cond. white with red interior. \$650.00 call 257-4321 and ask for Dean.

→ Cycles for sale

1975 SUZUKI 185 GT looks and runs like new with only 3,000 original miles. Never been dropped or scratched. Candy apple red, electric start, very dependable. Great for school. Only \$350.00 call Kevin at 252-7962.

1988 HURRICANE 600 Never laid down. Call 676-2909 and ask for Joe

1986 YAMAHA XJ 700 model bought in '88 (back stock). Engine in Ex. cond. 12,000 miles, only driven in summer. \$1,000 O.B.O. Call Chris 258-9098.

→ Miscellaneous

WATERBED FOR SALE: Super twin, full waterbed system including heater, headboard, pads and liner. Originally \$300, will sell for \$175. Contact Joe at 760-0313.

ECONOMICS BOOK FOR SALE \$3220. Author: Roger A. Arnold. Contact John at BOX 5483.

FOR SALE: 60 watt Vector Research AMP/Receiver and 10 band EQ/Spectrum analyzer \$300.00. Rebuilt GM 4 speed overdrive, automatic transmission \$200 O.B.O. GM 350 engine major components, make offer 3 1/2 cu. ft. dorm fridge \$50 O.B.O. Call 255-1128.

3 BICYCLES FOR SALE 10 speed Physio Fit, Free Spirit w/ spring seat, mud guards, rear rack \$50. 12 speed Contender, Open Road \$10. 10 speed Huffy 412 ST. U.S.A. \$40. O.B.O. Call James or Wayne 778-8177.

For Sale-sturdy wood couch, chair, table, 2 lamps, end table, all for \$125.00 New Bin color T.V. \$100.00 call Eric at 756-4350.

FURNITURE SALE Desk nice hardwood \$100. Dresser with huge mirror \$150. Sofa and chair foam type that unfold into beds \$50 sofa, \$25 chair, \$60 both. Call Joe at 756-1680.

TEAC top of the line 4 head Hi-Fi VCR. Next to new \$350.00 Call Dee at 767-2928

WEIGHT BENCH for sale, excellent condition, like new \$40.00 call Tim 274-4447 and leave message.

FOR SALE return airline tickets from Pennsylvania, Maryland and North Carolina to Daytona. Also, Oakley razor blades, iridium lenses \$30. Contact Jesse at 322-2461 or Box 1306.

MOVING SALE Open house: Microwave, stereo, T.V., living room set, dining room set, master bedroom set, and more. Everything must go. call Matthew 761-7492.

NEW GOLD CHAINS Real nice pieces at wholesale prices. Call Tim 258-0782.

FOR SALE: Amiga 500 Computer. 1mb memory, 2 3.5" floppy drives, 10845 RGB monitor, mouse, lots of software. \$900.00 O.B.O. Call Jeff 756-6893.

1 ROUNDTRIP DELTA TICKET departs Daytona Dec. 20 to Louisville Kentucky departs Louisville Dec. 30. \$175.00 O.B.O. Call 673-8937

AIRLINE TICKET male, Dec 21 Daytona round-trip to Itaip, NY returning Dec. 27. \$300 call 676-9561.

TICKET from Chicago to Daytona good for Jan. 4 thru 6. \$30 Contact Brian 253-2717.

FOR SALE: Macintosh SE. 2Mb memory. Superdrive floppy, 40 Mb hard drive, Apple keyboard. 3 months old. Rarely used. Complete user manuals \$1500. Call 788-4154.

DISCOVER DIVING DIVE CENTER 92 Dunlawton Ave. (West end of the New Port Orange Bridge) Phone 760-DIVE. Discover the guaranteed lowest prices and largest inventory in the area. Mon-Sat 10 am to 7 pm, Sun 10 am - 3 pm, closed Tues. Complete rental package \$25.00. We service all major brands.

DORM REFRIGERATOR AND BOOKS FOR SALE: IL 106, CS 109, HU 219, EL 220, PS 101, 110, HU 123. 760-7500 ask for Brian.

PINBALL MACHINES AND VIDEO GAMES bought, sold and repaired. 760-7500 ask for Brian or Dennis.

DAVID CLARK HIQ-40 HEADSET in carry bag used 1 FL course. Like new \$180.00. Also King Video instrument ground school and weather video, ATC comm video, VFR/IFR refresher video. VHS \$80.00 Call Fred before 4pm at 252-6527.

RALPH 12 SPEED BIKIE 24" Hardly used, perfect condition \$110.00. Call Fred before 4pm 252-6527.

ROUNDTRIP TICKET to N.Y. & LaGuardia Airport Dec. 26-Jan. 6. Asking \$200.00 Call Tom 756-5878 or 255-4492 or Box 7453.

A&P MECHANIC LOOKING FOR PARTNER in a light twin venture. CFI preferred. Short term possible. For details contact Box 5330, or call 252-4011.

→ Roommates

ROOMMATES WANTED 2 bedroom, 2 bath town house close to school. \$225 per month plus 1/3 utilities. 760-7500 ask for Brian. Must be non-smoker.

APARTMENT FOR RENT: Available immediately. Second floor end unit in 2 floor bldg. 2 br, 1 bath, balcony, appliances. Very nice! \$445 mo. Call 22257-3958 Tom or Lv. Message.

HOUSE FOR RENT: 2 br, 2 bath. Want to rent 1 bedroom and 1 bath. On river, \$250/mo. plus 1/2 electric, deposit, security negotiable. Contact Jeff at 672-4161, 8 am to 4 pm.

ROOMMATE WANTED to share 3 bedroom, 2 bath house. \$200 a month plus 1/3 utilities. Call 676-2909.

ROOMMATE WANTED To share a 3 bedroom, 2 bath house near school. PVT. room unfurnished. Only 185.00 a month plus 1/4 utilities. For details call 767-5917 ask for Jeff.

ROOMMATE WANTED Starting January 1st. to share a four bedroom house on beachside. Rent is \$162.50 plus \$100.00 deposit. Pay 1/4 of phone, water electric and cable. Contact Lyndon, Chris or Pete at 257-6900.

COUPLE WANTED to share 2 bed, Harbor Winds Apt. on Beach St. The master bed. is very large w/walk in closet and connecting full bath. Rent is \$158 each (\$475 total) plus tel, cable, elec. Interested? Contact Melyssa at 257-52445 or box 2103.

ROOMMATE WANTED Big bedroom with private bath. 172.00 month plus 1/3 utilities. 252-2360 ask for Mike or Frank.

FEMALE ROOMMATE WANTED 2 B.R., & bath at Island Club (1 1/2 mi. from campus). Pool, hot tub, tennis courts. Beautiful Apt. \$270/mo plus 1/2 utilities. 760-0313 Lisa.

FOR RENT: 2nd floor house apartment, modern kitchen, water and cable included, Florida room 2 bedrooms available now for \$375.00/month plus security. Call 255-3447 anytime.

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.
- Only paid 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.

ROOM FOR RENT in new house. Fully furnished except for bedroom. In nice Port Orange neighborhood. \$200.00 per mo. plus \$200.00 security. Call Tony at 760-7078.

→ Personals

SAUNA BUDDY Thank you for all the wonderful walks, they've been great. Just know when your loose ends are tied you'll know when to find me! SR-BUNNY P.S. You are precious, baby ton kitten.

FSW Have a great X-mas. I'll be thinking of you. I wish the future could find us together but, alas, all I can do is dream. FOX

EIC, This semester has been great working with you. I hope next semester will be just as good. Hope your X-mas break is great. GUESS WHO

FLY BUNNY, Rooming with you this semester has been great! Hope next semester can be as much fun. FOX

GREGG S. So tell me loverboy, how are Flagler women?

TO: TRUDY, GUZZI, MY LOVE 6/7/89-12/7/90 What are we NUTS!! Nope, guess it's love!! LOVE, HENRY, NORK FACE, NERD BALL

DUCK, I want you! S.E.B.

T.E.O. I thought this might get your attention. So how about this weekend? Are you still busy or what? YOUR NOT SO SECRET ADMIRER

BERNARD A real friend is someone who takes a winter vacation on a sun-drenched beach and doesn't send a card. Don't worry. Be happy. SMILE

AL, Please stop staring at the ceiling, you are worrying me. J.D.S.

ERIC- Thanks for all your help! Don't take too many pictures, it's bad for your health - you must people like us. LAURA & JACKIE

COREY, When are you gonna release your book? How will you finish it if you won't be here? You will be missed. J.D.S.

I think I'll take the offer. It might turn out to be very interesting. BOOTS

SANDY, Christmas comes and goes, but our friendship continues to blossom. Think of me during the Holidays, as I will be doing of you. Do you believe in the tradition of the mistletoe? HYO

AVION STAFF Seasons Greetings and Have a Great Break. EIC

LAURA, Don't worry about a thing cause every little thing is gonna be alright.

CLUBHOUSE Good luck to all on finals. Are you ready for another wild and crazy Christmas party?? MELE KALKIMAKA HAUOLI MAKAHIKI HOU!! M.E. M.H.L.P.

SPIC: HAPPY BIRTHDAY!! Welcome to the "21" club!! Are you ready to party?? Membership does have its privileges!! M.F. M.H.L.P.

DAVE BLACKBURN Legs like those deserve Tennis Shorts!! Shorten them shorts!!! A.E.

JEN D. Happy Anniversary and Love! You know how! L.D.

EDDIE, MA 111 and the dimers were great. Hope you get to go to Copenhagen for Christmas. See ya next semester. TWO IN FRONT

CEASER, See you at the dance club, we'll dance some more. BACK IN BLACK

RINO, At last I'm number two. How long before I'm number one? EIC

MGBO, Ha. EIC

JOE S. Have fun at Southern. You have got a cute butt!!! BACK SCRATCHER

BACK SCRATCHER, That offer for next semester is still open, relaxation is very important. HO

TO ALL OF THE YAHOO'S Twas the night before Christmas, and all through the office. Not a creature was filling space, not even a mouse. All the broadsheets were shipped to the printer with care, in the hopes that there will be time to spare. The reporters were finished and many thoughts remained dancing in their heads, with visions of ideas for the issue to come. Johnny still stuck on Ventura, and I'm thinking what a load of "###&". I fly to the door to see where that babe is at. I open the door and what to my wondering eyes did appear, a babe consisting of much blond hair. To all those in the office, Merry Christmas and I finally got one!!! EIC

I think I'll take the offer. It might turn out to be very interesting. BOOTS

SANDY, Christmas comes and goes, but our friendship continues to blossom. Think of me during the Holidays, as I will be doing of you. Do you believe in the tradition of the mistletoe? HYO

AVION STAFF Seasons Greetings and Have a Great Break. EIC

TO THE RED HAIRED GIRL IN HU 221, Even though we've not had a chance to really talk much lately, I'm glad we did start. Don't freeze over Christmas and you know where I'll be next semester. BLUE EYES

HOT TUB BUDDIES, Thanks for the great turkey meal and the chance to relax with two totally awesome babes around. Have a great Holiday Season!!! CAT SITTER

DANNY, I'd like to too. Maybe next semester. Thanks for the cards. COOKIE MONSTER

COOKIE MONSTER, I promise I won't think too hard. I'll just wonder all during break. CLUELESS

AMY, When the president speaks, we listen. Stop by my place sometime. I have something for you. EIC

DEAR BORG/ENERGIZER RABBIT ALLIANCE No way eh! Radiation has made me an enemy of civilization! Take off you hoer! -DARKMASTER

KARIN, Wanna trash another Pizza Hut? Joy said she'll drive! THE 2 LIVE BACKSEAT CREW

Happy Birthday!

Just For Fun, Balloon Someone!

All Occasions

- Strip O Grams
- Bellygrams
- Funnies
- Party In A Box

Beth's Ballooney

2800 S. Nova Rd. S. Daytona

761-0515

PETE'S PIZZA COMPANY

(From Brooklyn New York)

16" Pizza With 2 Items

2 Liter Coke & Chef's Salad

\$9.45 + Tax

Pick Up Or Delivery Only

Coupon erau

Daily Special

2 Slices Pizza & Free 16 oz Coke

\$2.50 + Tax

(.35 Each Item Per Slice)

(Eat In Only Anytime)

Coupon erau

FREE DELIVERY!

1441 S. Nova Road (Promenade Shopping Center)

253-3707

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Grand Opening Special!

Mon. - Sat. 10:00 am - 9:00 pm

Sun. 12:00-8:00pm

1325 Beville Rd. Daytona Beach 788-7980

Saturday Special!

Rent 5 Movies For Just \$10.00 Dollars (Reg. \$12.50) Saturday Only

Movie Gallery With Coupon Expires 12-31-90

FREE MOVIE RENTAL!

Rent One Movie At Regular Price, Get The Second Movie Rental Free

Movie Gallery With Coupon Expires 12-31-90 ERAU

Rental Rates 2 For \$3.00+ Tax Mon. - Thur. Fri. - 2 For \$4.00 Sat. 2 For \$5.00

Rent On Saturday Return On Monday For \$2.50 Each

AIRPORT STORAGE




Daytona Beach Regional Airport

1575 Aviation Center Parkway

Open 7 Days 252-4000

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The Storage Box	Daytona Storage	Port Orange Storage
274-4003	255-3534	756-4393

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**Embry-Riddle to Administer FAA exams**

Embry-Riddle will administer FAA Pilot exams on Friday December 14 and Saturday December 15. Exams will begin at 9:00 am on both days. Examinations will take place in building G room 105, by the flight line.

Students intending to take an FAA Pilot Written Examination are required to sign up in office H-119 or call extension 6830 prior to examination day.

At the time of the examination, each student must present a receipt for the pilot exam fee, validated at the cashiers office; a written authorization form signed by the appropriate aeronautical science department ground instructor, or the failed results of a previous examination, and present as personal identification an Airman certificate, drivers license or other official document.

Explanation of appropriate forms and procedures will be given. Immediately thereafter, testing will commence and unless prior arrangements have been made no late examinees will be permitted to enter the examining area while testing is in progress.

**Library hours extended for finals**

The Jack R. Hunt Memorial Library will be offering extended hours during final exams. The library will be open on Friday, December 7 from 7:15 am until 1:00 am, Saturday, December 8 from 8:00 am until 10:00 pm, Sunday, December 9 from 1:00 pm until 1:00 am Monday, December 10 through Wednesday December 12 from 7:15 am until 1:00 am and Thursday, December 13 from 7:15 am until 6:00 pm.

**Graduation applications are being accepted**

Applications are being accepted for those who are expecting April 1991 degree completion. Come to the Registration and Records Office and fill out an application to receive a "preliminary evaluation"

If a prospective employer requests a transcript for a job interview, we must have a written request from you before information can be released. Stop into the Registration and Records Office and see us about request forms. After you leave, no request can be done without a written request and a \$2.00 fee, if an official transcript is needed.



**A Happy Hanukkah**

A HAPPY NEW YEAR *שנה טובה תזכה בה*

*Kenan Morris, Ed. M. John Wheeler*  
Office of Campus Ministry

**DI'S MAYTAG LAUNDRY PLACE**

Have you heard? Di's Laundry has beer & wine now besides being a really clean, nice laundromat.

- Wash Dry Fold Service •
- Dry Cleaning • Alterations •
- Drop Off • Beer • Wine

Mon - Sat 7 am - 10 pm  
Sun 9 am - 10 pm  
**258-9686**  
PUBLIC FAX 258-5985  
1565 S. Nova Road  
Promenade Shopping Center  
Daytona Beach



**MAYTAG**  
Computrac Washers & Dryers

**FREE**

Wash one load of laundry at the regular price and get the second load of equal or lesser value

**FREE**

Top Loaders Only  
Di's Laundry Place  
One Load Per Coupon  
Not Valid With Other Offers  
With Coupon - Expires 11-30-90

**1/2 OFF**

Wash one load of laundry at the regular price and get the second load of equal at 1/2 price. Good for 4 visits +

Di's Maytag Laundry  
Top Loaders Only  
Not Valid With Other Offers  
With Coupon - Expires 11-30-90

**50¢ OFF**

Commercial Washer Special!

Our commercial washers are ideal for those heavy loads. Just \$2 with this coupon

Di's Laundry Place  
One Load Per Coupon  
Not Valid With Other Offers  
With Coupon - Expires 11-30-90

**\$2 OFF**

Dry Cleaning Special!

Get \$2 Off any dry cleaning order of \$10 or more.

Must present coupon with incoming order.  
Di's Laundry Place  
Not Valid With Other Offer  
With Coupon - Expires 11-30-90

**The SongKran Restaurant**  
brings the flavors of Thailand to Daytona Beach!!

We specialize in the finest Thai cuisine specially cooked to your taste! Come in and sample some of the best exotic dishes from Thailand!

**LOW SALT!! NO M.S.G!!**

**Reasonable Prices...**

15 Daily Lunch Specials:  
Start at: \$3.50  
Dinners start at: \$3.95  
Lunch specials include soup or salad  
Beer and wine served

**Take Out Available**

Catering for Special Occasions!

Owned and operated by an Embry-Riddle Student!  
**The SongKran Restaurant**  
Open Tuesday through Sunday 11:00 AM till 10:30 PM  
2309 Ridgewood Avenue, South Daytona  
760-0300



**Jungle Jim's Restaurant** now interviewing for full and part time positions. All restaurant job classifications available. Applications may be completed and interviews conducted December 9, 16, 17, and January 6 and 7. From 9 a.m. to noon and 5 to 7 p.m. at the restaurant location in Volusia Plaza, 337 Bill France Blvd., Daytona Beach. Jungle Jim's is an equal opportunity employer

**WARNING!**

If you're not buying your pilot supplies from the new Aerohut Daytona, you're missing out on the best selection and the most competitive prices you can find.

Special Discounts for ERAU Students and local F.B.O. Patrons.




**(904) 238-6081**



1472 Volusia Ave. Daytona Beach

**Unless you really enjoy reading manuals, get a Macintosh.**

Limited Time Special Pricing!



Tim Moses  
Computer Science  
Vanderbilt University

"Macintosh practically eliminates the need to keep manuals next to my computer, because—regardless of which program I'm using—I can open, close, save, and print files in exactly the same way. And you can't say that about any other computer."


"Today lots of other computers are attempting to look and work like a Macintosh, but it's just not possible. They're too fundamentally different to begin with. This may sound a little strange, but comparing a Macintosh to other computers is like comparing apples to oranges. You can squash the orange into shape and paint it to look like an apple, but underneath the makeup, it's still an orange."

"It's funny—I work at the Vanderbilt computer store and I've seen lots of people switch from other computers to Macintosh, but I've never seen anybody with a Macintosh switch to another computer."

**Product Demonstrations & Information**  
Academic Computer Lab (B440)  
**December 6**  
10 am - 4 pm

Why do people love Macintosh?  
Ask them.

**MINI concepts, inc.**





# COLISEUM

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## Our 1st Anniversary!

IMAGINE . . . YOU IN ITALY!

During our first year, the Coliseum has elevated night club entertainment to a new dimension. We attribute our success to you and to show our appreciation, we're throwing an anniversary party Dec. 14th & 15th in your honor. Free food and drinks 8-10 p.m. both nights. Great music, a good time and to top it all off, we're giving away a trip to the other Coliseum. You know . . . the one in Rome, Italy!

*Arrivederci, baby!*



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COLISEUM  
DANCE CLUB