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SPACE TECHNOLOGY

Mars comes into focus with Hubble Space Telescope



The red planet...
The planet Mars was photographed on December 13, 1990, with the Hubble Space Telescope. At the time, Mars was 53 million miles from Earth.

by Joshua S. Mussaf
Space Technology Editor

NASA's Hubble Space Telescope (HST) has begun a long-term program to monitor seasonal and interannual changes that occur on the surface and in the atmosphere of the planet Mars. This program will allow for a better understanding of the martian climate and processes involved in surface changes, and may eventually allow scientists to characterize global weather patterns on Mars, which will be an important prerequisite for a manned expedition to the red planet.

Preliminary observations, made with the HST's Planetary Camera, yield the sharpest images of Mars ever taken from Earth. They show clearly martian atmospheric features, as well as surface and topographic details ranging from large impact basins down to surface markings as small as 50 kilometers (31 miles) across. The HST data also provides new information about the abundance of ozone in the martian atmosphere.

Although Mars has been studied in detail by several past missions, including the *Viking* landers which made observations from the martian surface for several years, there is still much scientific mystery in the red planet.

To understand Mars' complex meteorology and climate, the planet must be continually monitored over many of its annual cycles, much as the monitoring of Earth by terrestrial weather satellites has improved our ability to understand and forecast

weather on our planet. HST observations allow monitoring of the martian surface and atmosphere, revealing the global distributions of clouds (both water and dust) in the atmosphere versus latitude, longitude, time of day, season and year.

This is an impossible job for ground based telescopes because atmospheric motions blur the telescopic image of a planet. Even under optimum observing conditions, the smallest details which ground based telescopes can see on Mars are about

150 kilometers across. What is more, this resolution is only possible during a short period of time approximately every 780 days when Mars is closest to the Earth. Most of the time ground based telescopes are unable to resolve features smaller than 600-1000 kilometers so that even major events occurring on the planet are unrecognizable.

Since HST is located in space it can observe Mars in ultraviolet light, which is normally absorbed by ozone in the Earth's atmosphere. By comparing these images at different wavelengths, researchers can measure absorption of ozone in the martian atmosphere, especially over the dry polar regions.

Martian atmospheric ozone was identified by ultraviolet observations made by the *Mariner 9*

spacecraft in 1971, but HST observations provide both global and temporal ozone monitoring. Apparently, water vapor initiates chemical reactions which remove ozone from the martian atmosphere, and scientists hope to use the ultraviolet data to monitor the amount of water, as well as ozone, in the martian atmosphere.

The images in this color composite were acquired on December 13, 1990, when Mars was 85 million kilometers (53 million miles) from Earth.

In the Mars image, a thick canopy of bluish clouds cover the icy north polar regions, where it was martian "winter" at the time of the observations. Extensive thin clouds in the southern hemisphere are perhaps harbingers of a south polar hood which may form there as the season slowly changes to fall (one martian year is 1.8 Earth years).

Raw images obtained with HST suffer from the blurring caused by spherical aberration in the primary mirror. Because the blurring effects resulting from spherical aberrations are deposited across the raw images in a mathematically precise manner, image reconstruction or "deconvolution" techniques can be used to analytically reconstruct the actual, undegraded image.

Preliminary observations, made with the HST's Planetary Camera, yield the sharpest images of Mars ever taken from Earth.

Galileo moves closer to asteroid encounter

by Brian D. Marchesseault
Space Technology Writer

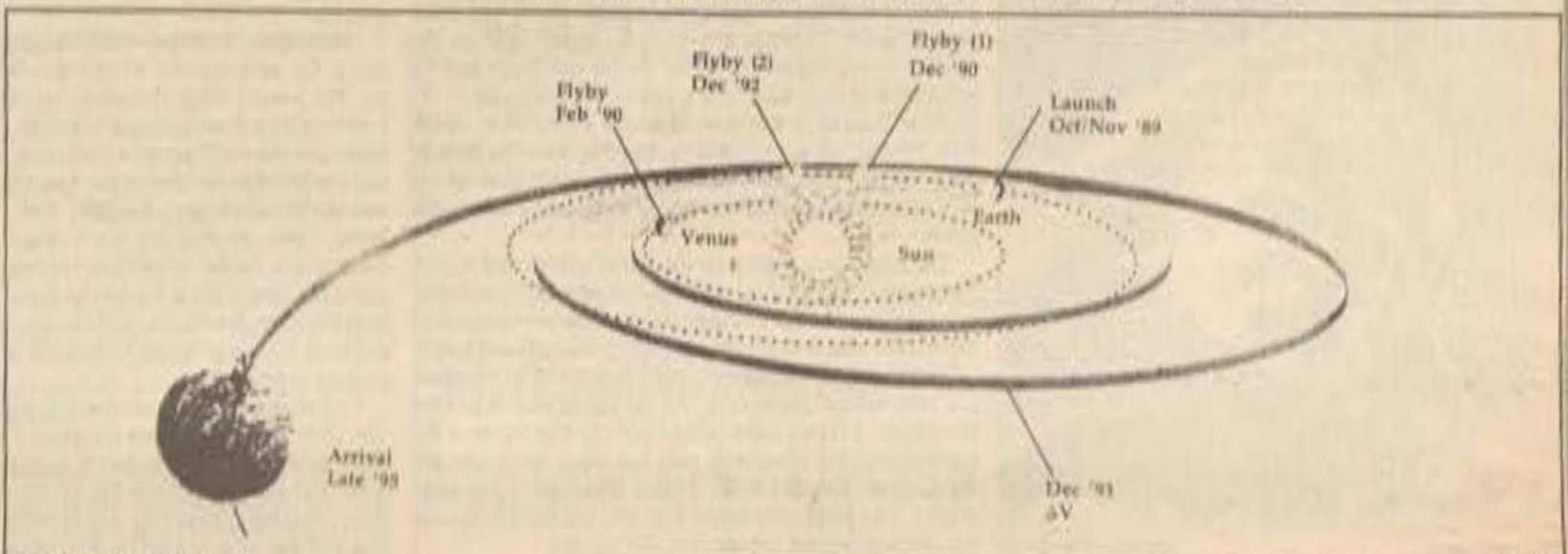
In order to rendezvous with the asteroid Gaspra next October, NASA's spacefaring probe *Galileo* made a trajectory correction maneuver on Wednesday, March 20. *Galileo's* visit to Gaspra will mark the first ever flyby of an asteroid.

Galileo was scheduled to fire its small thrusters from 1 p.m. EST to 4:30 p.m. EST, which resulted in a change of velocity of approximately five miles per hour. Three more such maneuvers are planned for July. These adjustments will put the spacecraft on its path to fly by Gaspra on October 29 in the main asteroid belt.

When *Galileo* reaches the asteroid, it will make an approach at a 1,000 mile distance. Gaspra's irregularly shaped surface, which is about 15

miles in diameter, will be photographed and examined by the probe. A wide range of unusual data is expected to be collected. More such data will be made available with *Galileo's* scheduled visit of another asteroid, Ida, in 1993.

The craft was sent off to its cruise of the solar system aboard the Space Shuttle *Atlantis* in October 1989. After a successful launch, *Galileo* careened toward Venus for its first gravity assist on February 9, 1990. While moving past Venus, the probe made its first demonstrations of its abilities to observe another planet. *Galileo* then made a return trip to Earth on December 5, 1990, for an energy boost from its home planet. At that time, the probe's instruments got another work out while collecting unique data on Earth and its natural satellite, the Moon.



The solar cruiser...

The *Galileo* spacecraft is now on route to Jupiter. *Galileo* is traveling at a speed of 68,700 miles per hour and is now more than 36 million miles from Earth.

After reaching Gaspra, *Galileo* will then make a final return to mother Earth on December 5, 1992, passing within a mere 300 miles of the planet. This return to Earth will be the final gravity assist before the spacecraft

loops directly toward Jupiter. The "solar cruiser" will finally come to an end of its grand tour of the solar system in December 1995, for its 22 month mission at Jupiter.

Currently, *Galileo* is conducting routine onboard activities and keeping in contact with the Jet Propulsion Laboratory (JPL) in Pasadena, California. Round-trip time for radio communications is about six and a half minutes. JPL reports the craft's



The crew...
The crew of STS-37 poses for the traditional crew portrait. Astronauts Apt and Ross are pictured with their EVA suits.



The patch...
The official crew patch of STS-37 and the orbiter *Atlantis*.

STS-37 astronauts prepare for first mission of 1991

by Michael D. Fried
Space Technology Writer

The principle theme of the STS-37 patch, designed by astronaut crewmembers, is the primary payload. Gamma Ray Observatory (GRO) and its relationship to the Space Shuttle. The shuttle and the GRO are both depicted on the patch and are connected by a large gamma.

The gamma symbolizes both the quest for gamma rays by GRO, as well as the importance of the relationship between the manned and unmanned elements of the United States space program.

The Earth background shows the southern portion of the United States under a partial cloud cover while the two fields of three and seven stars, respectively, refer to the STS-37 mission designation.

The five astronauts that have been assigned to fly aboard *Atlantis* for NASA's STS-37 mission are commander Steven R. Nagel, pilot Kenneth D. Cameron, and mission specialists Linda M. Godwin, Jay Apt and Jerry L. Ross.

Astronauts Apt and Ross will perform the first extravehicular activity (EVA) since the return to flight in 1988.

Explorer satellite retired after decade of service

NASA News (Goddard Space Flight Center, Md.) The Dynamics Explorer (DE)-1 satellite, which acquired the first global images of the Aurora, was officially retired by NASA on February 28, 1991, after nine years of collecting scientific data. Designed to operate for three years, DE-1 performed for nearly a decade in space.

The decision to stop gathering additional data from the DE-1 was based on an evaluation of the costs for the spacecraft's operations compared to the expected value of the science gained. Also, influencing the decision was the fact that the spacecraft has refused to accept commands at various times since November 17, 1990.

The spacecraft's cameras, in a single view from high altitudes, could see an entire Auroral zone, a ring of light encircling each polar region. These images, taken 12 minutes apart, have proven invaluable in studies of "Auroral substorms," when the Aurora suddenly brightens and expands and when electric currents

flowing between the magnetosphere and ionosphere increase in intensity.

The Dynamics Explorers Program, which consisted of two spacecraft, was designed to study the coupling or interchange of energy, electric currents and mass between the upper atmosphere, ionosphere and the magnetosphere. The quality and quantity of data returned from the two spacecrafts far exceeded the expectations before launch.

The DE-1 spacecraft and its companion spacecraft, DE-2, were launched together on August 3, 1981, from Vandenberg Air Force Base, on a Delta rocket and placed into polar elliptical orbits. DE-2 ceased operations on February 19, 1983 and reentered the Earth's atmosphere the next day.

The DE-1 satellite is among the more successful Explorers, the oldest U.S. satellite series. The first U.S. satellite was Explorer 1, launched in February 1958, which discovered the Earth's trapped radiation, or the Van Allen belts. Since then, 71 other Explorers have been launched to conduct various scientific studies.

Space Week '91 to be held next week in UC

by Roland Houle
Space Technology Writer

During the first week in April, the Embry-Riddle Aerospace Society (ERAS) will be holding Space Week '91. The annual event is held to promote aerospace education. This year it will be held from 9 am to 4 pm in Morrison's catering room.

In this room, the Aerospace Society, who's purpose is to promote the peaceful exploration of space, will have posters, photos, pamphlets, models and more space memorabilia to further aerospace education. Also, they will be showing videos of various space topics to include the Space Station *Freedom*.

The tenth anniversary of STS-1, the maiden voyage of the Space Shuttle *Columbia*, will additionally be celebrated. The first shuttle was launched on April 12, 1981, with astronauts Bob Crippen and Scott Young aboard.

In addition to the Space Week room, there will be other Space Week activities held. On Tuesday, April 2,

Dr. Charles Vuille of the Math and Physical Science Department, will be speaking on future space initiatives.

A highlight of Space Week will be on Wednesday night, April 3 at 7 p.m. in room W-306 on the campus. Mr. J. Gary Powers will speak on the space station project.

Mr. Powers is the Ground Operations Manager for NASA's Space Station Support Office. He is responsible for planning prelaunch and postlanding operations for all space station flight hardware.

Prior to assuming these duties in January 1986, Mr. Powers was responsible for prelaunch and post mission processing of *Spacelab* hardware and related experiments.

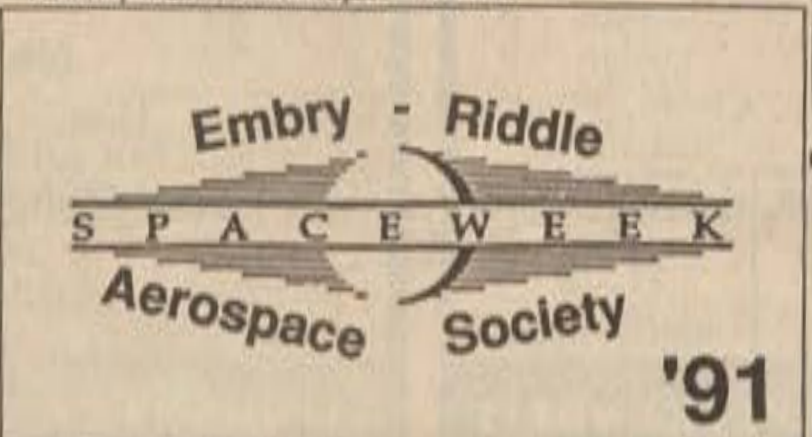
Prior to joining NASA in January 1967, Mr. Powers served as a jet and rocket engine test engineer with Pratt & Whitney Corporation, West Palm Beach, FL.

Space Week will be capped off by a tour of the Kennedy Space Center on Saturday, April 6. The Society will be

going on NASA's Red tour and watching an IMAX film. Any student wishing to attend the tour with ERAS, can contact the Society through Student Activities. The cost for non-members will be \$4.50 and will cover transportation, the tour and the IMAX film.

As a chapter of the National Space

Society, the Embry-Riddle Aerospace Society annually participates in Space Week to encourage the education of the public to aerospace related events and topics. The Aerospace Society encourages any interested persons attend all Space Week activities. Popcorn will be handed out throughout the week.



The final frontier...
The Embry-Riddle Aerospace Society will be hosting Space Week '91 in the Morrison's catering room, April 1-5.

Orbiter Update

ATLANTIS...The Space Shuttle *Atlantis* is currently preparing for launch next week. Although the launch date will not be set until tomorrow, the launch should occur Friday, April 5, in the morning. Work in progress on pad 39-B includes: main propulsion system flight readiness test, liquid hydrogen tank pressurization test and Gamma Ray Observatory battery conditioning. On Thursday, the extravehicular mobility units will be installed in the airlock of the orbiter.

Atlantis is scheduled to be launched during the first week in April with the Gamma Ray Observatory and the first extra-vehicular activity since the return to flight in 1988.

DISCOVERY...The Space Shuttle *Discovery* is back in the Vehicle Assembly Building and is being prepared to be mated back to the STS-39 launch stack. The orbiter rollover occurred Monday evening. *Discovery* is set to rollout to pad 39-A on Monday at 4:00 a.m.

Discovery is now scheduled to be launched in late April or early May on an unclassified Department of Defense mission.

COLUMBIA...The *Spacelab* Life Sciences payload was installed in the cargo bay of *Columbia* over the weekend. Payload interface verification tests are scheduled to begin today.

Stacking operation continue in the Vertical Assembly Building with the left aft center solid rocket booster stacking to begin on Friday.

Columbia is scheduled to be launched in May with the *Spacelab* life Science 1 payload.

Fly into the future with Spotlight's *Air Strike USA*

by Jason Simon
Diversions Editor

For those who enjoy a heavy duty shoot them up game, Spotlight software, a division of Cinemaware Corporation, has developed *Air Strike USA*.

Air Strike USA is an action strategy game. The player is flying an "Advanced Tactical Fighter" or ATF. This fighter looks something like a cross between a Stealth Fighter and an F-14 Tomcat.

The game loaded surprisingly fast. The program quickly moved through its title screens and introduction. Soon after the Amiga stereo sound kicked in. The musical score was excellent. I was pleasantly surprised with the quality of the music. The score had a powerful beat, but it did not overpower my speakers.

The game then loads into the main screen. The screen features five sub-screens shaped like separate monitors. The screens are full of static and the security guards at the bottom

of the screen ask the player for security clearance, the game's form of write protection. Once the clearance is typed in the monitor screens clear up and the player can continue along with the game.

The player can select options from the main screen, including sound and controls, hi-score tables, demonstration games and other options.

The musical score was excellent, I was pleasantly surprised with the quality...

In addition, the user can select a skill level from this screen. This is done in a rather unique way. When the player wants to change levels a group of people appear on the screen. These people, which include seven men and one rather top heavy female, determine what level the player plays at. The player selects a skill level by selecting one of the people in the game.

The final thing that the player can do is select the take off option from the main menu. A new screen loads up that features two "metallic" doors that slide open to reveal the balance of power screen. This screen shows your

teams firepower and installations as compared to the enemy. Before the beginning of the mission there is a zero balance, which means that neither side has an advantage. Your mission is to upset that balance in your favor.

The next screen is the mission briefing. This screen displays where your base is located on the Earth, the current target selection and the location of the nearest two enemy bases.

After leaving the mission briefing, the weapons screen loads. This screen displays an impressive head on view of the aircraft. The player then selects which weapons he wants to load. The player has a choice of standard guns, ammram air to air missiles and maverick air to ground missiles. In addition, the player also decides here how much fuel will be taken aboard. The amount of weapons and fuel loaded relates directly to the free weight available on the craft. There are upper loading limits to each weapon. The animation in this scene is good, since the weapons are loaded on board the aircraft right before the players eyes.

After passing all of these screens, the game finally begins. What the player sees on the screen is a Head Up Display (HUD). In the middle of the HUD is the actual craft the player is flying. This view allows the player to see the aircraft behind his plane without switching views. The screen also displays a border that is supposed to represent the inside of the cockpit. The cockpit has three video screens in it. Each of these screens has the potential to display vital game information such as the aircraft's location, which weapons are being used and flight statistics, such as how much fuel is left and which target the player is currently homing in on. The player can rotate which screen shows what data by using the function keys, however no two screens can show the same data at one time.

The player can control how high he wishes to travel above the terrain or he can use a terrain following mode which allows the aircraft to skim a few feet above the surface of the Earth. This system is like the one aboard the B1 Bomber, except it works.

In addition to these controls the

player can roll the aircraft out of a dangerous situation by pressing the shift keys. It can jam incoming missiles with the J key and the aircraft even has vectored thrust, which allows the player to slow down when the player comes near the intended target.

Overall, *Air Strike USA* proved to be a good game for those who enjoy the "shoot em' up games" without the encumbrance of screen switching or large amounts of keys to remember while playing. The loading was fast and the sounds were fantastic.



Top gun... Fly a futuristic fighter in *Air Strike USA*.

Dungeons and Dragons revisited in *The Immortal* by Electronic Arts



by Jason Simon
Diversions Editor

There have been many different *Dungeons and Dragons* type video games that have come down the pike, from the original Atari 2600 all the way to laser disc based arcade games. There have also been some good home computer versions including the *Ultima* series and *Dungeon Master*. There is a new video game now on the market which hopes to live up to the standards that its predecessors have met. This game is *The Immortal*.

After loading in a system disk and a play disk, which took forever, the game finally popped up onto the screen. There was no elaborate introduction, just the title screen and some credits. I was hoping for more and I finally did get it.

The game then loaded up the initial screen and music. The game is set in a third dimensional pit with the user observing from above. The user controls the movements of the wizard who is easily recognized by his staff and beard.

The first thing the player is confronted with in the game is a table with a candle on it. As the player moves toward the candle, a figure materializes from it. The figure is the ancient sorcerer Mordamir who has gone down into the dungeon to try and kill the dragon that lives in the inner depths. The phantasm thinks that you are Dunric, one of the sorcerer's good friends, but you are not.

Once you get the entire message from the ghost, you can leave the room you are in. The room leads into a larger room, which has some rather bad nasties inside. Your first

encounter is with a mace wielding monster. The fight scene is in the third dimension as well; your player can end up fighting facing towards you or away from you or in many other positions depending on how the player first met the beast. The fight scenes are graphic, with blood spurting from wounds in the player's body every time he gets hit.

In addition, there are many traps and puzzles in this game. On occasion the wizard may end up falling into a pit. The wizard deftly throws up his staff horizontally and is able to keep from falling into the pit. However, the staff is starting to break, and the player must swing the wizard out of the hole before the staff does break. Some puzzles are interesting; for example, on the second level of the game the player must figure out how to place three jewels into a carving on the floor before he or she is able to proceed to the next level. It can be challenging at times.

Unfortunately, there are many drawbacks to this game. The first example is when the game loads. There are two disks provided in the package, a system disk and a play disk. The user first loads the system disk into the main drive, next the player may want to prepare a snack so that this disk has time to load its information. One of the most distressing things that occurs during loading is the program's incessant belief that there is something in my second external disk drive. As the system disk loads its in-

formation the computer constantly accesses my second drive, which wastes a lot of valuable time. I figured at first that it might be seeking information from the play disk, but I was very wrong. In every attempt to try to use the second drive to load data; the computer seemed to not recognize the drive at all.

Another problem was with the actual fight scenes. In a third dimensional playfield, some of the inner portions of the playfield are obscured by the walls in the rooms. I found it very hard to fight on occasion when I could not see part of the monster I was fighting.

Another problem with fighting was the fact that the player cannot invoke a spell while in the middle of combat. This might have saved my rear in a couple of situations since all fights are to the death.

On the bright side, the game is very challenging and requires the player to use his ingenuity more than his fire button. The graphics are excellent, right down to the flexing muscles in the monster's shoulders. The best part, though is when your character dies. Upon losing your last power point the Wizard dissolves into a pool of blood. Excellent touch Electronic Arts.

Overall, despite several drawbacks, *The Immortal* left me with a good feeling due to its excellent graphics & ingenuity. *The Immortal* was reviewed on an Amiga with 1 megabyte of ram. *The Immortal* is currently available at local computer stores.

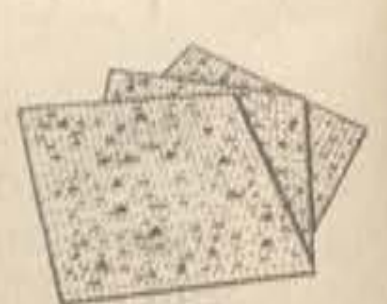
The flight scenes are graphic, with blood spurting from wounds in the player's body...

Rescue me... Rescue Mordamir and slay the dragon in Electronic Art's *The Immortal*.

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HAPPY EASTER

From The Avion & Phoenix



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Excel 3.0 puts 123 to shame

by Joe Cambron
Data Tech Editor

Excel 3.0 for Windows is the latest iteration of Microsoft's graphical spreadsheet program.

Getting Started

Excel 3.0 is one of very few available spreadsheet programs designed to work with Windows 3.0, as a result the program is easy to learn and shares the common interface style of other Windows programs. Another plus for the program is its manufacturer. Microsoft is also the maker of Windows 3.0, thus guaranteeing full compatibility with all of Windows most exciting features.

For the converted Lotus user, the program offers help in a number of ways. First, the program can import graphics and even whole spreadsheets that are saved in Lotus 1-2-3 format. It can even write its own files to disk in Lotus format for ease and compatibility.

Second, the program includes an extensive on-line Lotus help system that converts Lotus commands to Excel commands. This can either be in a tutor mode which shows the user the proper way to do the same task using Excel's windows and menus or in automatic mode which actually carries out the conversion of commands for you.

Multi-tasking

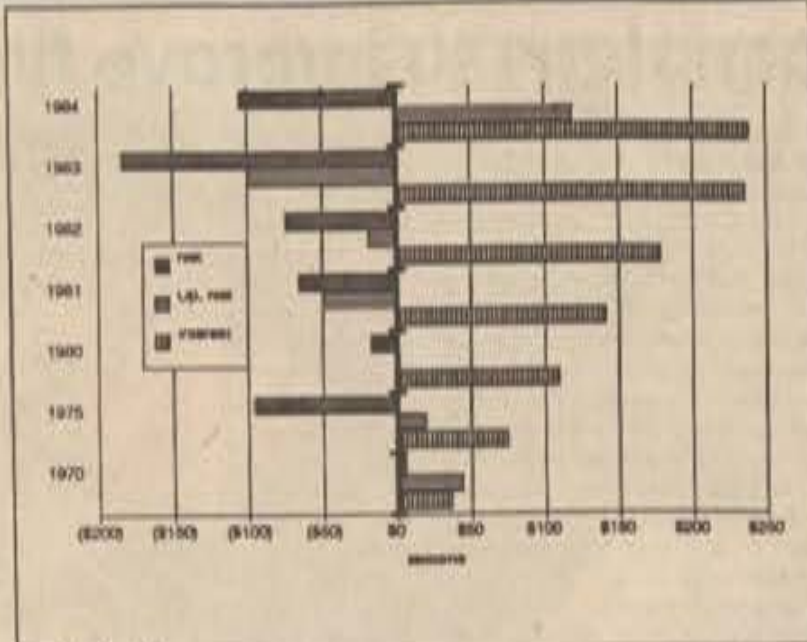
The ability to have Excel and another program open at the same time are great time savers. A report may be typed in Word for Windows and imported automatically into Ventura Publisher for Windows, while a spreadsheet in Excel recalculates a graph and imports it automatically onto my page in Ventura. Graphs are another of Excel's selling points.

Graphs

Excel's graphs leave Lotus 1-2-3's far behind with three-dimensional color graphs that show shadow and depth. A non-color laser printer just does not do the graphs justice. A color Deskjet printer would suffice quite nicely, however.

Speaking of 3-D graphs, the perspective on them may even be changed. What would have been a simple bar graph can have the perspective panned downward so it looks as if the bars are skyscrapers viewed by the pedestrian below. Pieces of pie on the pie graph are no longer planar objects, they now look as if they could fill a whole bakery.

Graphs may be manipulated with extraordinary ease. There is no more maze of menus like in Lotus. The user simply highlights the graph and the menu bar options are immediately changed to reflect only the graph. Titles and legends are treated like fields in a database. They simply



Add depth...
Excel 3.0 uses 3-D graphs to improve reports.

need to be highlighted with the mouse for text in them to be edited.

Speed

Windows built-in co-processor emulation apparently goes a long way toward speeding recalculation. Excel's WYSIWYG (What You See Is What You Get) graphics mode is much faster than the one that comes with Lotus, both in terms of screen draw and recalculation.

Resolution

One of the nagging problems with Lotus 1-2-3 3.1 is immediately overcome by Excel for Windows. 1-2-3 3.1 does not allow resolutions over standard VGA, while Excel supports whatever screen driver Windows is using. This allows many more columns and rows to be on-screen at any given time.

Fonts

Excel allows full use of all your Windows fonts and any downloadable fonts that Windows is configured to use. Lotus comes with a pre-selected group of fonts that are slow and unalterable.

Installation

Installation is simple with only two high-density disks required. Installing Lotus requires nearly ten three and a half inch disks. Both programs still take about five megabytes of disk space.

Requirements

Besides the hard drive space mentioned earlier, two megabytes or more of RAM is important for good performance, an 80286 or 80386 processor will work nicely, a mouse is essentially required, and the user must already have a copy of Windows 3.0.

Value

The program is expensive, but some things are worth the money in their usability. Excel and all spreadsheets fall into this category. Excel, a nice computer, and a color ink jet printer are all that is really needed to put out reports worthy of corporate America.

Digital Research releases DOS 5.0

by Joe Cambron
Data Tech Editor

Even though Microsoft has yet to release the long-awaited follow up to DOS 4.01, computer users can now purchase DOS 5.0 from Digital Research. This new product offers what Digital Research says are all the known features that will be available in Microsoft's DOS 5.0. Not only that, but Digital Research (DR) says that its DOS will actually be better than Microsoft's version. DR DOS 5.0 offers extended and expanded memory management capabilities, integrated disk caching, a graphical user interface, and BatteryMax—a new battery extender for users of laptop computers.

DOS History (Yawn)

For the uninitiated, DOS stands for Disk Operating System. An operating system consists of the core instructions that allow your computer to interface with software. The operating system for IBM computers is called simply DOS, and "in the beginning" there was DOS 1.0.

In the 1990s, however, no one uses DOS 1.0 anymore, and few software publishers even check to see if their software will work with it. Most IBM computers use DOS 3.2, 3.3, or 4.01. These are the latest three successful releases.

DR DOS 5.0

As you might expect, it is a very difficult task to make a piece of software (1440 pages of computer code in this case) work exactly the same as someone else's version, be different enough to avoid copyright infringement, and at the same time improve upon the original. As a result of this, DR DOS 5.0 sells for about \$150 retail, more than Microsoft's older 4.01. Two things are important to consider when switching to a new DOS. What will it do for me that I cannot do now? and Will it really work with all my current software or do they just think it will?

Are we compatible?

Addressing the compatibility issue first, DR DOS seems relatively bug (computerese for a problem) free. Relatively is the key word, however.

DR DOS does not work well with programs that "patch" your computer's BIOS. BIOS is the extremely low level hardware control ROMs (Read Only Memory) that are found in every computer. These ROMs control such things as disk size. One should ask one's self, why these need to be "patched" or changed. One program this reviewer uses is called MAXI. This program patches the BIOS to allow floppy disks to be formatted for more data

than intended. 1.4 megabyte disks for instance may hold 1.6 megabytes while MAXI is running. Since relatively few people use these types of programs, it is unlikely that the average user will have any problems, of course.

With the exception of these programs, DR DOS 5.0 is apparently totally compatible with DOS 4.01 and earlier.

It can do that?

For those people who have never used Quarterdeck's QEMM 386 memory manager, the joys of "high-loading" are unknown. "High-loading" allows network drivers, buffers, screen savers, mouse controllers, and other "drivers" to be moved out of what is known as conventional memory, thereby freeing up to 620K of conventional RAM for normal programs. This additional RAM improves the speed of Windows 3.0, allows Ventura Publisher to run with a mouse and a screen driver, allows a network computer to run Microsoft Word, and allows memory hungry games like Red Baron to run using a mouse.

DR DOS 5.0 even works with older 80286 and 8088-based computers, unlike QEMM 386.

Disk Caching

Caching is a hot word in computing these days. It refers to storing data in a more quickly accessed place than it would normally be stored. In the world of disks, this refers to the storing of hard drive or floppy drive data in extended or expanded memory. Using this technique, repeated disk access to the same piece of stored data is only needed the first time. Each subsequent request for the data is rerouted to much faster RAM storage.

Hi-DOS

The most eagerly awaited capability offered by DR DOS 5.0 is the ability to "high-load" the actual operating system. This 40-60K chunk of memory is immediately removed from your 640K on Microsoft DOS equipped computers, but with DR DOS it is shifted to extended memory leaving behind a small 15K "kernel."

In Closing

DR DOS 5.0 does not require reformatting of your hard drive, runs well with Windows and QEMM 386, enhances your current memory options, allows you to modify your cursor, supports hard drives over 32 megabytes without partitions, and contains a powerful file editor.

DR DOS 5.0 is more than just a quick fix for the impatient. DR DOS's simple installation and useful features make it extremely useful for 80386 users and necessary for 80286 users.

Coming soon in Data Tech:

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Education Package C:
AMIGA A2000HD SYSTEM
A2000HD CPU, 1 Mb RAM, Keyboard,
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AT Bridgeboard, A1084S Monitor
List Price: \$3,197 **PRICE: \$2,327**

Education Package D:
AMIGA A2500/30 SYSTEM
A2500/30 CPU (25MHz), 68882 math
co-processor, 5 Mb RAM, Mouse,
50 Mb Hard Drive, AT Bridgeboard,
AmigaVision, A1084S Monitor
List Price: \$4,997 **PRICE: \$3,638**

Education Package E:
AMIGA A2500/30 SYSTEM
A2500/30 CPU (25MHz), 68882 math
co-processor, 5 Mb RAM, Mouse,
100 Mb Hard Drive, AT Bridgeboard,
AmigaVision, A1084S Monitor
List Price: \$5,647 **PRICE: \$4,111**

Education Package F:
AMIGA 3000-25/50 SYSTEM
68030 CPU (25MHz), 68882 math co-processor,
2 Mb RAM, 3.5" Disk Drive, 50 Mb HD, Mouse,
SCSI Interface, 15.75 & 31.5 Khz Video Ports,
Multiscan RGB Analog Monitor and AmigaVision
List Price: \$4,298 **PRICE: \$3,067**

Education Package G:
AMIGA 3000-25/100 SYSTEM
68030 CPU (25MHz), 68882 math co-processor,
5 Mb RAM, 3.5" Disk Drive, 100 Mb HD, Mouse,
SCSI Interface, 15.75 & 31.5 Khz Video Ports,
Multiscan RGB Analog Monitor and AmigaVision
List Price: \$5,498 **PRICE: \$3,941**

Education Package H:
AMIGA 3000UXD SYSTEM
68030 CPU (25MHz), co-processor, 9 Mb RAM,
3.5" Drive, 200 Mb HD, Mouse, Ethernet Board,
Multiscan Monitor, AmigaVision, UNIX System
V R 4, X Windows, Open Look, Network Software
List Price: \$7,798 **PRICE: \$5,615**

See your local Commodore-Amiga dealer for terms and further details.

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NASA F-15 HiDEC uses advanced technology to improve flight safety

by Frances L. Cozza
Aeronautics Writer

The F-15 HiDEC (Highly Integrated Digital Electronic Control) program conducts flight research on integrated digital electronic flight and engine control systems and has demonstrated improved rates of climb, fuel savings, and engine thrust by optimizing systems performance based on mission and real-time needs.

The HiDEC F-15 also tested and evaluated a computerized self-repairing flight control system for the Air Force. The system can detect damaged or failed flight control components, rudders, ailerons, elevators, flaps, and reconfigure unaffected flight surfaces so the pilot can maintain aircraft control to either complete the mission or land safely.

The major elements of HiDEC are a Digital Electronic Engine Control (DEEC), an on-board general purpose computer, and an integrated architecture to allow all components to "talk to each other".

Unlike standard F-15s, which have mechanical and analog electronic flight control systems, the HiDEC F-15 also has a dual-channel, fail-safe digi-

tal flight control system programming in Pascal.

In addition to the HiDEC system, the F-15 has an Advanced Digital Engine Control System (ADECS), which trades excess engine stall margin for improved performance. This is achieved through the integrated and computerized flight and engine control systems. The engine stall margin, the amount that engine operating pressures must be reduced to avoid an engine stall is continually monitored and adjusted by the integrated system,

The HiDEC F-15 also tested and evaluated a computerized self-repairing flight control system

based on the flight profile and real-time performance needs.

Using this information, ADECS frees up engine performance that would otherwise be held in reserve to meet the stall margin requirement. Improved engine performance obtained through ADECS can take the form of increased thrust, reduced fuel flow, or lower engine operating temperatures because peak thrust is not always needed.

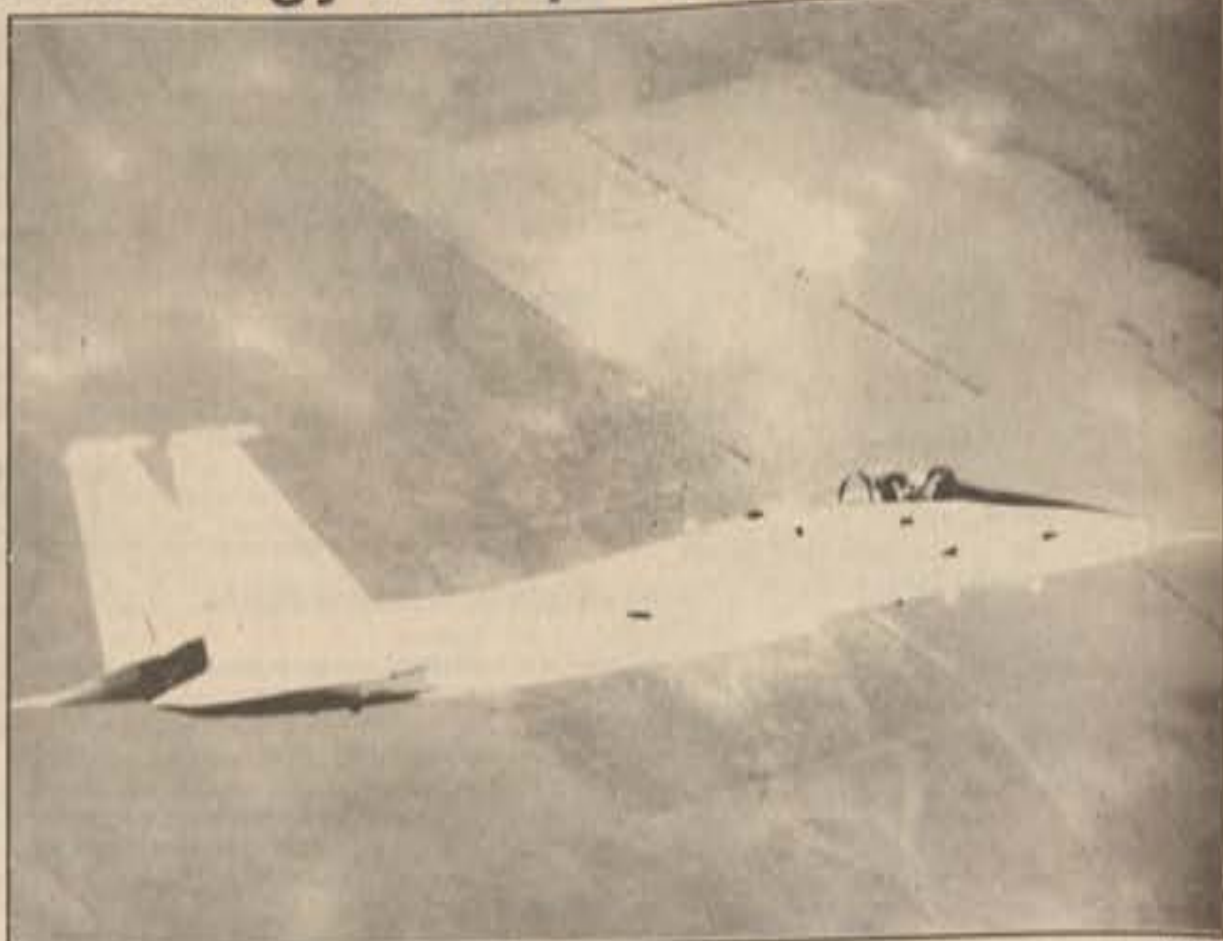
During late 1989 and early 1990 the F-15 research aircraft investigated what could become a major breakthrough in airborne flight control capability. It was the first aircraft

to demonstrate a Self-Repairing Flight Control System (SRFCS).

As an example, if a horizontal stabilizer on an aircraft was damaged or failed in flight, the SRFCS would immediately diagnose the failure and determine how the remaining flight control surfaces could be repositioned to compensate for the damaged or inoperable stabilizer.

A display in the cockpit also informs the pilot of the control surface reconfiguration, and information displayed by the SRFCS shows the pilot what operational limitations he must observe as a result of the damaged or failed component. These limitations could be reduced "G" loading angle of attack maneuvering, or reduced air speed and altitude margins. The SRFCS also has the capability of identifying failures in electrical, hydraulic, and mechanical systems.

The F-15, an "A" model, was obtained by NASA from the U.S. Air Force in 1976 and has been used for more than 25 advanced research projects involving aerodynamics, performance, propulsion control, control integration, instrumentation development, human factors, and flight test techniques. Included in these projects was its role as a testbed to evaluate aerodynamic pressures on Space Shuttle thermal protection tiles at specific altitudes and speeds.



Self-repairing systems...
The F-15 HiDEC is used by NASA to test new computer systems that can detect damaged flight control systems and reconfigure unaffected systems to maintain control.

World Air Power Journal provides in-depth coverage



Real books...
The World Air Power Journal provides insight into military aviation.

by John McDermott
Aeronautics Editor

World Air Power Journal is a publication that is well worth the price. Instead of buying or subscribing to several monthly aviation magazines dealing with current military aviation in different parts of the world you can get in depth information with outstanding photographs in one issue every three months.

World Air Power Journal started publication in the Spring of 1990 and is published quarterly. Each issue carries a volume number and identification by season, is at least 156 pages and is produced in oversized format of twelve inches by nine inches on quality art paper.

The publication is devoted to contemporary military aviation and provides extensive information about the world's air powers and their aircraft. It is heavily illustrated (approximately 500 color photos per issue) with cutaways, fold-out artwork,

and technical drawings.

Every issue provides a wealth of data about specific aircraft and their operators, including markings, and squadron insignia.

World Air Power Journal's team of editors, correspondents, and researchers are based around the world to provide in depth coverage.

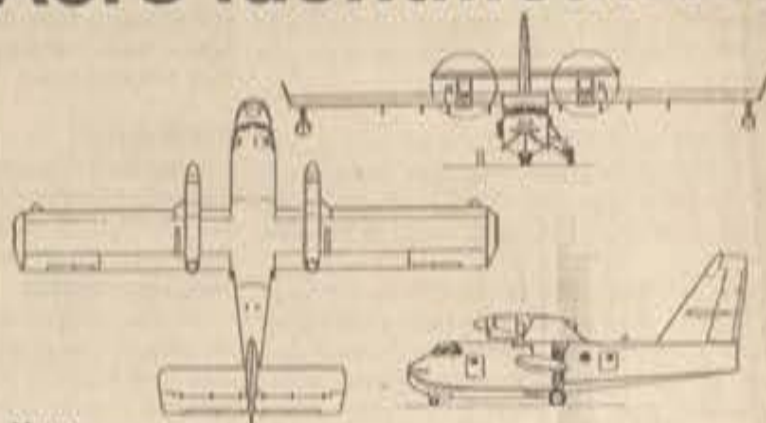
The Journal is published by Aerospace Publishing of the United Kingdom which has published several aviation books and magazines.

Recent issues have provided extensive analysis of the Tupolev Bear, the F-18 Hornet, Panavia Tornado, the bombers of Strategic Air Command, the F-15E Strike Eagle, and the MiG-29 Fulcrum.

The current subscription rate is \$45.50 for one year, and will begin with the current issue or may be requested to be back started with an earlier issue. All back issues are currently available for \$17.00 each.

Subscription information is available by writing to World Air Power Journal, 10 Bay Street, Westport, CT 06880 (phone 203 226-3580).

Aero Identification



Name _____
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Library Hours for Spring Break

The Spring Break Hours for the Library are as follows:
 Thursday, March 28
 Friday, March 29
 Saturday, March 30
 Sunday, March 31 (Easter)

8 am - 5 pm
 8 am - 5 pm
 Closed
 Closed

Attention April Graduates

The final meeting for April Graduates will be held in the Student Center on Tuesday, April 9, at 8:00 p.m. Important graduation information will be reviewed. The graduation announcer will be present to rehearse names that are difficult to pronounce. Voting for Outstanding Faculty and Staff will be held.

Since there is no rehearsal for graduation, it is important that you attend. If you are unable to attend, please stop by the Student Activities office in the Student Center.

**Last Week's
PUZZLE SOLUTION**

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Please send me _____ copy(ies) of *The Authoritative Calvin and Hobbes* at \$12.95 per copy paperback or \$19.95 per copy hardback plus \$1.00 postage and handling for each copy, total: _____ Please allow 4-6 weeks for delivery. Avion

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The Weekly
Crossword
Puzzle

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Citizen 200GX Color Printer
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LIST PRICE \$3500.00 CU'S PRICE 2995.00
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1 - 12**

**CONTEST FOR
1/2 HOUR RIDE IN
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\$1.00 DONATION

Autos for sale

Olds Cutlass, year unknown, capable of sustaining more damage than A-10 and still drive home. Involuntarily to ditch, urine vomit trash, rivet gun, rust, Bendis Bob, and Nikita the driving cat. Voted ugliest car in Volusia. It takes a lickin' and keeps tickin' be the showplace of your neighborhood and call 274-5269 to take advantage of Bando Bots Spring Special. Price can of warm Harley beer, or a bag of kitty litter (firm).

'88 Spectrum, Good condition, Auto-Transmission, A/C Heat, PM Stereo, tint windows, fuel efficient, give away at \$2,995. Make at 760-6615 evenings.

For sale-1981 Honda cm 400 Motorcycle 6666 original miles. Runs great, good condition asking 700.00 Obo. Call 258-1459 After 6 pm. Box 3277.

For sale-1976 Olds Cutlass "The Urban Assault Vehicle" Senior! The ultimate graduation gift. Recently certified for all urban use, no blowtorches too large. Warp engines now added. "I can't wreck this car"-Nikita (Times) The driving Cat. Crazy Bob's March Madness Sale in its final week! Still don't have Scooty's phone number. Call Bob 274-5269

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

1986 CHEVETTE: Automatic, a/c, \$2695.00, great gas saver. Call CJ's Auto Sales at 254-2886.

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

82 MUSTANG: 4 speed a/c, sporty economy, \$2495.00. Call CJ's Auto Sales at 254-2886.

1971 VOLKSWAGON CAMPER: Approx. 3000 miles on rebuilt engine. Excellent interior. \$900.00 O.B.O. Call Ahmed at 238-1066.

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

HONDA CIVIC 1500: 1982, 2 door, 3 speed, a/c, am/fm, asking \$1300.00. Ask for Dick at 761-1738

1979 FORD FAIRMOUNT, good basic transportation, 6cy/v4, good tires, runs good. Call Jeff at 255-6674.

PROJECT CAR: 1968 Volkswagen Dune Buggy. Excellent fiber glass body w/full hard top. Can run w/little work. \$500.00. Call days 6926 or 255-9939 even.

FOR SALE BY ORIGINAL OWNER: 1969 Karmann Ghia, garage kept, clean, no rust, not driven on beach, leather interior, new tires. Well maintained and serviced. Please call after 6 pm 673-4498. \$1200.00 negot.

Cycles for sale

For Sale-1985 Honda Interceptor VFR 500. Excellent Condition. Runs great. Asking \$1500. Call Marty at 252-5529

Yamaha 550-Maxim, 1982. Has luggage Rack and net bungee cords. Oil just changed, runs well. Have owners manual and Clymer repair manual. Will include one piece Raincoat and helmet (s). \$750. Call 756-6789

1987 NINJA 600R: Immaculate, bought in Europe to tour. New tires, brake, 2 helmets included. \$2400 O.B.O. Must sell quickly. Leave name & number in box 3064.

1986-Interceptor 500-Just in time for Spring Break and Summer. Red Never on beach or dropped. Asking 1,950 or best offer. Call Joe at 257-4321

Motorcycle-Yamaha YSR50 New in '89 - New Pistons, Rings, Tune up Garage Kept, Great condition \$850 obo Call 756-3641

Roommates

Be my roommate for Summer A and/or B. I have a pool table, you get your own bedroom with bathroom, king size H/O-Bed. Tennis courts, swimming pool, W/D are 20 yards away. ERAU is 3 min away. All this for only \$230/month+ utilities. Call Ron at 255-6708 and let us make a deal. Just do it.

Roommate needed - May 1st. Non-smoker, 2 bed, 1 bath, pool, tennis, laundry, 3 miles from ERAU, only \$197.50/month + \$100 security. Call now, 248-0044.

Pelican Bay - Clean, secure, spacious. \$375 includes everything. Call 756-1916.

Roommate wanted - 3 bedroom townhouse at the Breakers. Own room + 1/2 utilities. Contact Amy at 252-8587.

LARGE BEDROOM, cable TV, microwave, washer/dryer. Furnished with double bed, desk, dresser, sofa. Large closet. Residential house. 10 minutes from campus. \$200.00 a month, \$150.00 deposit, 1/2 utilities. Bob 761-5828.

SICK OF YOUR CURRENT ROOMMATE?!! No problem! Have your own pad in our humble abode, it's groovy. Reasonable rates and totally happening rooms. No geeks please. We have a reputation to uphold! Don't waste another minute. Pick up that phone & dial 253-6941. Operators are standing by.

ROOMMATE WANTED: for 2 bed/2 bath apt. share bedroom, 1/2 mile to school, \$165.00 a month + 1/3 util., washer/dryer, cable, microwave, pool, etc. 238-6465.

ROOMMATE WANTED: To share 3 bdrm, 2 Bath Apt. \$171 mo. + 1/3 utilities. Barrington Apts. For more info. call Mike or Dave at 252-2360 after 6 pm.

Misc. for sale

FOR SALE: 13: Color TV - \$60.00, Microwave - \$50.00, Space heater - \$10.00. Please leave name and number on answering machine if there is no answer. 274-5372.

FOR SALE: TV/Microwave stand. Baseless condition. \$25.00. Also an excellent full size bed: frame, box springs, and mattress. \$100.00 firm. Call 788-3327 or ERAU ext. 6926.

ROLLER BLADES For Sale! All colors and sizes. Womens' styles too, brand new, still in boxes. Ten pair left, only \$25.00 a pair. Call Tom at 253-7529.

FOR SALE: Colors Superheterodyne Ultra "talking" trapshooter, voice, music or tone warning, separate X-K band indicators, view, windshield, or dash mount, 3 anti-fading circuits, carrying case. Excellent condition. List \$160.00, asking \$100.00. Call Steve B. 255-0183.

WATERBED FOR SALE: brand new paid \$225.00, will take \$170.00 O.B.O. 252-2360 Mike or Dave.

1985 KAWASAKI JET SKI 550, includes trailer, new electrical system, asking \$2000.00 O.B.O. Call Eric (407) 323-9797.

BILL MOTORCYCLE HELMET - \$30.00, one Blaffe helmet - \$30.00, Bikemaster rain suit - \$25.00. All are in good cond. 1 King size waterbed, pulled rails \$100.00 O.B.O. (407) 323-9797

PERSONALIZED SCUBA DIVING Instruction: Student rates and flexible hours, class or private. Call Jan at 761-2021.

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BEST FUNDRAISER ON CAMPUS - Looking for a fraternity, sorority or student organization that would like to earn \$500 - \$1000.00 for a one week in-campus marketing project. Must be organized and hardworking. Call Lisa G. at (800) 592-2121.

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HAS MA111 OR MA112 GOT YOU DOWN? Don't let it wait any longer! Get help now before you have to repeat the class! Call Adam at 761-8301 for tutoring and leave a message.

999 WEEKEND Accelerated Ground school - Private Pilot or Instrument. #49 Refresher for rated pilots. Learn to fly, first lesson free.

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I AM LOOKING for a ride to Washington on Thanksgiving. If you have any information please call 258-1915 or leave a note in Box #5124. Thanks

For Sale-Entire Bedroom furniture, includes: full-size Bed, Wooden desk with rotating chair, dresser, drawer, fan, bedroom lamp, 3 plants, and many other. Must see to appreciate. Furniture clean and in excellent condition. Must sell because of graduation at the price of only 300.00 or Best offer Call: 788-0464 Stelios. Everyday after 14.00 pm.

20" KMC Color TV with remote! Must sell asking \$120 OBO Call Joe at 257-4321

Pre-Law Students for Last Material contact Prof. Rooth Assl 116 239-6864

Desk -Top Publishing for Students and Faculty-Do you need a hard-copy that looks and is professional? Need it done on a real computer? Try an Apple Macintosh with a Laser Printer. Resumes Graphics Reports Call 254-0682 (evenings) Let me help you with what you need done.

For Sale-1 pair Sony Es 80 6x9 Deck Speakers 80 watts max input 1 clarion 700 BQA Active or passive, 25x25 white Active. Must sell Take advantage of me! Contact Douglas at 253-

FREE TO A GOOD HOME: Black cat - has small patch of white on stomach, 7 months old. Call Jen 257-6460.

WANTED: MUSICIANS to form punk/progressive band. From faith no more to N.E. Need voice, drum, guitar #2? Also, Jim, give me a call. Dan 756-3641.

Hail to The PRISCOTT crew!-Hey Miss Garret, The stress is ending; finally it's almost over! The painted Desert Car's wait till summer; we've played this game of Just Imagine long enough...April's (not) over, can you tell me how long before I can be there? Seven and 1/2 days? Thank you. Hope it is as awesome as we want!
P.S. Outta Here.
P.P.S. You need!
BLUE EYES

L/Z
I have my needle and thread. Where's your pin?
YOUR BIG SIS

HEY DELTA CHU
Nice bulletin board.

KEY LIME PIE
P.P.S. You need!
MARS LANDER

THEETA PHI ALPHA PLEDGE-SISTERS
It won't be long. Brace yourself, you never know what could happen.

HAN SOLO
Chewy got lucky but he won't be so lucky next time. Point of story: don't be a wookiee.
LUKE SKYWALKER

PIN CUSHION
Remember: the more (black and blue welts and bloody red puncture wounds), the better.
PENCER #1

TO THE SOPHISTICATED LADY WHO HILD THE DOOR FOR ME IN THE U.C.
Are you married?
SEEKING COMPANIONSHIP

DAVE
You have to be the worst golfer ever.
NORM

AZHAR
Thanks so much for everything. I really appreciate all you did for me.
ASH

SHANU
I'll tell you what: why don't you move to Asha's yourself.

B-B-B-BILLY
Heidi Thomas would be proud of your singing. It's beautiful.
FIREWALKER

Hi Staph! Welcome Back!
Love
TODD

ANGIE
Well here's another one.
Cya
LONDON

Wanted: One studly women with incredible waffle-making skills and body to make waffle while naked. Need not to be sexually activated.
Contact Box 6093

If your shoes were on fire, would you run for help? If you can't talk to someone, would you call them to ask why?
CAPRICE

AUDIE
You really are a hussy.
BOR
Get rid of that hat.
ASH

ALASKAN PIPELINE
Do you still love Helga and I? Why don't you visit? Miss you.
TO MR. THREE YEARS
If you really want your balls back, you can have them. I don't need them anymore but thanks for the offer.
POOL PAL

POOMKINS
You're a SA&R!

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.
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- > 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) 239-8049.

SPRUCH CREEK FLY-IN: Fly without the hassle of the Daytona Beach ARSA. Call Adam now at 761-8301 and leave message.

RENTAL OF PIPER SEMINOLE: Reasonable rates, less than \$100.00. Call Alex at 238-0453.

RACQUIT STRINGING Don't pay \$18 at Champ! \$10 for a satisfaction guaranteed string job, next day service usually available and sometimes same day. Dorn 2, room 202 or 338-4074. Ask for Sonny.

WANTED: Roundtrip Airline ticket (open dates) DAB-BOS. Leave a message 676-9192

Living room chair for sale, \$25 New Soccer Shoes, \$30 call Pat at 788-6568

For Sale-couch, chair, coffee table and two end tables. \$100 will deliver. Call 756-6789

Sales-Item over \$500 per week! Sales Experiences. Prof. but not necessary. Daytime or Eve. Ask for Lou 672-9300

Need Computer?-An IBM PC/XT comp., 640 K RAM, 2 31/2" Drives, both 4.7 MHz and 10 MHz clock speeds, Hercules Graphics Adapter Monitor and card, phone modem, 10 pin card, 101 Keyboards, personal software; Games, Word processing, Spreadsheet, communication, graphics, dBase, and utilities. Give away for \$695. Call Mike at 760-6615 evenings.

Must sell Twin Bed- Dresser, Desk Chair \$125.00

Personals

TO THE HIST
I really had a great time with you last weekend. I just want you to know that I am sure I want to be with you forever. Now, can you trust me?
FROM THE BETTER

DIANA,
My sweet wife! It's been too long. It is over between him and I. We must get together for some carver or a drink. Contact me. Your loving,
SYDNEY

MOVIE DUDE,
You've been a bad boy! Bad little boys must be punished! Hope you enjoy the 26th.
POOL PAL

GREG
Hey Snugglesbunny, How's Calvin? I love you so much and I'll miss you so much this summer. What will I do... will I do with out you?
Love,
KYMME

TO THE LADIES IN LOGISTICS
The men expect to be served after the third inning, fifth inning and seventh inning. Your services will be appreciated.
B-LOVE

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JIFFY.
Thank you for taking me out Friday. I had a really good time. I am glad we had a chance to spend some time together. I am hoping there is more to come!
TT
YOU KNOW WHO
P.S. My sweater is kompon' in your car.
42

In all the complexities of life offers, none is more harsh than the dependency on a wife other for all friendship, love and co-habitation.
CAPRICE
99
RAVI,
Hope you're having fun with your girlfriend! Thanks for the favor... I would call you "longie" but its for Augie. Ha Ha.
ASH
41

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Wy' - Eld Wenz-Dae!

The Drink, The Myth

THE LEGEND

According to legend a witch doctor called Wenz-Dae saved the Wy'-Eld tribe from certain extinction many years ago by concocting a secret potion. It seems the people of the Wy'-Eld tribe were just plain bored, boring and uninteresting... and on top of that they they couldn't dance. This potion, legend states, was so inspiring that soon the better part of the dark continent was dancing to the boogie beat of the Wy'-Eld ones. As a matter of fact, partaking of this potion became part of the Wy'-Eld rite of manhood and was known as the ritual of Wy'-Eld Wenz-Dae. Unfortunately, Wenz-Dae took the recipe with him when he went and it remained locked in his tomb for 6,000 years. Then in 1944, Professor D.S. Tillery uncovered the tomb and immediately set about mixing up a fresh batch of the potion... a pinch of sweet rhino horn, a dash of cola nuts, secret distilled grains and the mystic Wy'-Eld incantation "Git Dow'n Witcho Bad Se'l." Inspired by the mixture, the aged and balding D.S. Tillery immediately spouted a full head of hair and was endowed the stamina and sex appeal of a 20 year old decathlete. He was last seen bounding off into the jungle with a bevy of native maidens in hot pursuit. and to this day in memory of Professor D.S. Tillery, Jungle Jims Still Practices this ancient ritual for their patrons who want to Git Dow'n every Wenz-Dae.

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