

3-21-1990

## Avion 1990-03-21 (B)

Embry-Riddle Aeronautical University

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## Space Technology

B

Volume 64, Issue 9

March 21, 1990

### Hubble Space Telescope will provide impressive galactic view



**One step closer...**

Discovery was rolled out launch pad 39-B last Thursday night in preparation for its next flight scheduled for April 12. A concern over a nose wheel bolt may delay the mission if determined to pose a problem.

by Marianne Michaels  
Space Technology Writer

The Hubble Space Telescope (HST) is scheduled to fly next month aboard the space shuttle Discovery.

Discovery will release the space telescope into orbit approximately 300 miles above the Earth's surface. On future shuttle missions, astronauts will revisit the space telescope and repair or replace malfunctioning parts as needed.

During the 20th century, astronomers have been using the most sophisticated and very high powered telescopes located on the top of high mountain peaks. The space telescope, high enough to avoid most of the screening and distorting effects of the Earth's turbulent atmosphere, will complement these observations during its expected lifetime of 15 years.

The Hubble Space Telescope will encounter solar radiation and atmospheric drag due solar activity. The Sun's solar flare heat causes the expansion of the Earth's atmosphere and results in the air becoming more dense at higher altitudes.

HST's speed increases as it loses altitude and its orbit decreases. Scientists will try to predict when this will occur and when it does, a Space Shuttle mission will be flown to boost it to a higher altitude.

The space telescope will relay its observations to one of the three TDRSS (Tracking and Data Relay Satellite System) satellites which will then beam the data down to its receiving station located in White Sands, New Mexico.

The object of the space telescope is to take high resolution pictures of very faint objects. The space telescope has the visual capacity to clearly read the license plate of a car in Boston, from Washington D.C. or it can clearly distinguish between the left and right headlights of a car in Los Angeles from New York.

The Hubble Space Telescope has a viewing distance that is remarkable. The human eye can see approximately 600,000 light years (1 light year is nearly 6 trillion miles), ordinary ground based tele-

scopes can see almost 2 billion light years and the Hubble Space Telescope will see approximately 14 billion light years.

The Hubble Space Telescope is a 94.5 inch reflecting telescope, and will be shielded from the Earth, moon, and the Sun. It cannot view the Earth, moon or Sun because they are too bright.

Hubble consists of several scientific instruments

**Wide Field and Planetary Camera**  
The Wide Field and Planetary Camera is a camera with distinct settings, one for photographing large sections of the sky and the other for taking detailed images of nearby objects like planets which are unobtainable from the ground.

**Faint Object Camera**  
The Faint Object Camera is designed to take pictures of very dim objects in the universe. The camera is able to detect stars 20 times fainter than ground-based observatories.

**Faint Object Spectrograph**  
The Faint Object Spectrograph is designed to detect very dim objects in the ultraviolet and visible wavebands. The main use of this piece of equipment is to obtain information about the physical properties of quasars.

**High Resolution Spectrograph**  
The High Resolution Spectrograph is designed similar to the Faint Object Spectrograph, but will analyze objects in much greater detail. This includes a planet's atmosphere, moons and comets.

**High Speed Photometer**  
The High Speed Photometer is designed to measure changes in light received and to determine the distance between stars and their position from the Earth. It will also study 4 stars interaction with black holes.

**Fine Guidance Sensors**  
The Fine Guidance Sensors are designed to locate stars accurately and lock onto them. The HST

carries three Fine Guidance Sensors. Two are used for pointing the telescope and the third is used to study a stars position.

In addition to the scientific instruments, HST includes the Optical Telescope Assembly made up of the primary and secondary mirrors, light baffles, and the graphite epoxy support structure.

One of the planets the HST will photograph is Mercury.

Much about the planet remains unknown even though Mariner 10 sent back some great photographs in 1974.

The problem is not just that it is the innermost planet and closest to the Sun, but it is almost as bright as the brightest of the stars, Sirius.

Mariner 10 did not succeed in photographing the dark side of the planet, but after a few years, the HST will attempt a tricky maneuver which may get some great pictures.

The HST will compile a detailed record of the Martian climate, take pictures of the Red Spot on Jupiter and the rings of Saturn.

The space telescope will also take pictures of Uranus, Neptune, and Pluto, although the pictures will not be as good as those obtained by the Voyager spacecrafts. The space telescope will not only observe the planets and their moons, but also comets and asteroids. The Hubble Space Telescope will not observe the Planet Venus because of its thick and heavy cloud cover.

The world will be awaiting the launch of the Hubble Space Telescope to see what it will reveal about the origins of the universe.



**Impressive eye...**

The HST will provide an excellent view of the heavens after being deployed from the shuttle next month.



**Pillar of power...**

Martin Marietta's second commercial Titan rocket climbed into the early morning skies last Wednesday. The nearly flawless lift off was later darkened when a problem with payload separation occurred and may result in the loss of the Intelsat communication satellite.

### Intelsat satellite in useless orbit

by Chip Zodrow  
Space Technology Writer

After a flawless launch aboard a commercial Titan 3 rocket from Cape Canaveral last week, an uninsured \$150 million satellite is floating in an useless orbit high above the Earth.

The Titan 3 rocket is Martin Marietta's commercial version of its space launch vehicles. It was the second commercial launch of a rocket by the Denver based company and the fourth by any U.S. company. The first launch of Martin's Titan 3 was on New Year's Eve and was successful, but only after several long delays due to weather.

The launch last week occurred at 6:49 a.m. on Weds. and went without any problems until the rocket and satellite reached their first 100 mile high orbit. At this point the satellite and its own booster are supposed to separate from the main rocket. After the main rocket floats clearly away from the satellite, the booster on the satellite, the Perigee Kick Motor (PKM), is supposed to fire and carry the satellite into its planned 22,300 mile geosynchronous orbit.

When the satellite and booster were supposed to separate from the rocket, the PKM stayed attached to the rocket and the satellite drifted away

without its booster. It appears that technicians at Martin Marietta incorrectly wired the PKM latching mechanism, causing the premature separation.

Technicians at Intelsat, the international communications consortium that owns the satellite, rushed to try to save the satellite from crashing back to Earth, which would have occurred next Sunday due to the atmospheric drag at its low orbit. They used the little amount of on board fuel usually used for small attitude corrections to boost the satellite into a safer 100 mile orbit. It is not known yet how long the satellite can remain in this orbit until it does come crashing down.

**...the PKM stayed attached to the rocket and the satellite drifted away without its booster.**

Presently Intelsat is weighing several options to save the satellite. The optimum mission would be to use a space shuttle to retrieve or

repair the satellite. NASA stated that they were informally contacted and are requesting a formal proposal by all interested parties. At that time the parties will meet to discuss the feasibility of such a mission. NASA will then begin to train the crew and reconfigure the orbiter.

Orbital Sciences Corp., a small aerospace company, sent a message to see Intelsat, page B6

### STS-31 Patch recognizes Edwin Hubble



by Joshua S. Mussat  
Space Technology Writer

The mission patch for STS-31 mission features the Hubble Space Telescope (HST) in its observing configuration against a background of the universe it will study. The cosmos includes a stylistic depiction of galaxies in recognition of the contribution made by Sir Edwin Hubble to our understanding of the nature of galaxies and the expanding universe. The STS-31 crew points out that it is in honor of Hubble's work "that this great observatory in space bears his name." The depicted space shuttle Discovery trails a spectrum symbolic of both the red shift observations that were so important to Hubble's work and new information which will be obtained with the HST.

Encircling the art work, designed by the crew, are the names of its 5 member crew. Mission commander, Loren J. Shriver, pilot Charles F. Bolden, and Steve A. Hawley, Bruce McCandless II and Kathryn D. Sullivan, mission specialists. Currently the mission is scheduled for lift-off on April 12, 1990.



**Caught up...**

This graphic depicts the payload deployment process from a Titan rocket. At point 1, the satellite and transfer rocket are to be separated from the Titan vehicle. The kick motor failed to detach from the rocket leaving the Intelsat stranded with no transfer stage.

### Lockheed speaker explains shuttle processing roll

by Derrick Seys  
Space Technology Editor

Last Wednesday, Robert Granath of Lockheed Space Operations Company (LSOC) spoke to the Embry-Riddle Aerospace Society about their involvement in shuttle processing.

LSOC holds a contract that entails processing all of the orbiters from landing through launch. The contract is the third such awarded to Lockheed. The agreement, called the Shuttle Processing Contract (SPC), consists of other sub contractors which aid Lockheed in the task of preparing America's space truck for launch.

Grumman, Morton Thiokol, and Pan Am assist Lockheed. Combined, they employ over 7000 people in all disciplines.

The contract consolidates over 20 tasks into a single agreement managed by an efficient team. With three orbiters to maintain, LSOC is constantly looking for more efficient ways to do their job according to Mr. Granath.

One such improvement is a laser device that measures the imperfections and tolerances of the numerous shuttle tiles. This cut the time drastically, and did not deter from the quality or safety of the work.

"We began instituting all of this stuff [improvements] on the last flow" said Mr. Granath. These combined for a reduction in the processing time of Atlantis on its last mission by twenty days.

However, he feels the quickest turn-around of an orbiter will be only 65 days.

This amount of time is required to do the job effectively. When asked if he thought of the job as routine he quickly commented, "no!" and added "we want to provide routine access to space."

"Operating and processing a natural resource

should never be looked at as routine" he continued in regard to the attitude LSOC employees have. He doesn't feel it will ever be routine.

Future operations will include continued shuttle processing as well as the space station. The launch of the Hubble Space Telescope will also include involvement of LSOC. The HST, built by Lockheed, will be tested by LSOC once it is received at launch pad 39-B.

Bob Granath is the Public Affairs Coordinator for LSOC. His duties include editing the company newsletter and directing government, employee, media, and community relations.



Bob Granath



# SR-71 sets new speed records

The Smithsonian's National Air and Space Museum recently received one of the U.S. Air Force's newly retired SR-71 supersonic reconnaissance aircraft during a ceremony at Washington Dulles International Airport.

Because of the high altitude at which the aircraft flies, the crew members wear full pressure suits and are connected to life support systems during missions.

Taking off from Palmdale, California, at 4:30 a.m. PST on March 6, the aircraft set a world speed record flying from Los Angeles to Washington, D.C., on its final flight.

The first flight of the SR-71 was on Dec. 22, 1964, and entered service with the U.S. Air Force Strategic Air Command in 1966. The "Blackbirds" have flown nearly 65 million miles during their years of service.

**The SR-71 remains a technological marvel. Built to withstand temperature of more than 800 degrees Fahrenheit, its skin is a titanium alloy instead of the usual aluminum.**

The SR-71 will become part of the proposed National Air and Space Museum extension at Dulles, scheduled to open in the 1990s. The Lockheed SR-71, known as the "Blackbird," is the world's fastest aircraft, able to cruise above Mach 3. Pilots flying SR-71s hold the world's absolute records for speed (2,193 mph) and altitude (85,069 ft). The U.S. Air Force retired its fleets of SR-71s in January, after more than 25 years of service.

The aircraft received by the National Air and Space Museum, Number 972, holds speed records for flights from New York to London and from London to Los Angeles.

The SR-71 was designed in the early 60s to supplement the U.S. Air Force's Lockheed U-2 subsonic, high altitude reconnaissance aircraft, which had become vulnerable to Soviet radar tracking.

Of the SR-71s decommissioned by the U.S. Air Force, three were transferred to the National Aeronautical and Space Administration, where they will be kept in storage at sonic research, and three more will be kept in storage at Lockheed facilities at Palmdale, California. Other SR-71s will be placed on display at the U.S. Air Force Museum at Wright-Patterson Air Force Base, Ohio, and at several other bases.

Like the U-2, the SR-71 was created by Lockheed Corporation's Advanced Development Projects, the legendary "Skunk Works" led by aeronautical engineer Clarence "Kelly" Johnson.

The SR-71 remains a technological marvel. Built to withstand temperature of more than 800 degrees Fahrenheit its skin is a titanium alloy instead of the usual aluminum. The two Pratt & Whitney J58 turbojet engines with afterburners supply more than 35,000 pounds of thrust each; virtually every part of these complex powerplants had to be fabricated from special materials. Even the fuel and lubricating fluids were concocted specially for the aircraft.

Other aircraft have flown faster than the SR-71; the experimental North American X-15 achieved speeds up to Mach 6, and the U.S. space shuttle travels at 25,000 mph. Unlike these rocket aircraft, however, the SR-71 takes off and reaches altitude under its own power.

The SR-71 flies with a crew of two: a pilot and a recon-



**Flawless...** During recent testing of the MD-11, the plane performed over the expectations of designers and showed lots of promise.

## MD-11 nearly flawless during testing

by Joseph A. Salerno  
Aeronautica Editor

Since its initial rollout, the first McDonnell Douglas MD-11 has, to date, logged more than 100 hours of flight test time, and the company's second new tri-jet has begun testing after its flawless maiden flight to Yuma, Arizona.

The two test craft are the first of a five-aircraft fleet undergoing rigorous tests and Federal Aviation Administration certification procedures.

The first MD-11, while at Yuma and Edwards Air Force Base, California, accumulated 115 hours of flight time in just two months, a McDonnell Douglas record.

Project pilot John Miller and his crew tested the MD-11's flight characteristics while cruising, climbing, descending, and at extreme center of gravity conditions. They flew the aircraft up to 421 knots, at Mach 0.945 and an altitude of 39,000 feet and qualified eight Douglas Aircraft

test pilots on the MD-11. Having already completed low airspeed calibrations and flutter vane testing to check the MD-11's structural stability, the first ship team is conducting autopilot approaches and landings daily. The second MD-11 was piloted to Yuma on March 1 by Tom Melody, an avionics expert, and he and his crew are testing the aircraft's flight management, autopilot, and systems controllers.

The aircraft has flown more than 31 hours to date and holds the MD-11 record for the longest single flight: eight and one half hours. The shortest time spent on the ramp for any McDonnell Douglas-produced tri-jet was accomplished by the second MD-11 which spent just 13

days on the company's west ramp while all the required ramp functions and tests were completed.

"The performance by the ramp team demonstrates their commitment to quality and timely action," said Ed Schaniel, production business unit manager, ramp and delivery operations for the MD-11. "The short time span on the west ramp, coupled with no squawks and a flawless first flight, show the

**The two test craft are the first of a five-aircraft fleet undergoing rigorous tests and Federal Aviation Administration certification procedures.**

dedication of all involved." Schaniel said the third ship, powered by Pratt and Whitney engines, would be undergoing ground vibration testing later this month.

The aircraft is expected to enter the project's flight test program in April with high hopes.

### SR-71 Speed Records

- West Coast to East Coast:  
68 min. 17 sec., 2,112.252mph
- Los Angeles to Washington:  
2,153.24 mph
- St. Louis to Cincinnati:  
2,242.48 mph
- Kansas City to Washington:  
2,200.94 mph



**Faster than a speeding bullet...** The SR-71 Blackbird set four new speed records before entering retirement. The plane will now be employed in research projects and displayed at museums.

### AERO IDENTIFICATION

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# Artwork and sound make *The Jetsons* outstanding



Jetson, you're fired...

The use of special effects makes this game interesting.

by Jason Simon  
Data-Tech Editor

Created back in the 1960's, The Jetsons have survived the test of time. They have lived in a long running television series and have finally made it to the big time, a full blown computer game.

After loading The Jetsons into the Amiga computer, the game displays a filler screen of the Jetsons until the entire program loads. After loading is completed the introduction begins. A quick introduction was expected, but

what actually took place was far more advance than what was expected. The screen divides into several parts. One section contains the text line display, essential to this interactive game. Other sections include commands and what George Jetson currently has in his possession. But, the section of the screen that had the most impact initially was the interactive art screen, where the user gets a view of what goes on out of George Jetson's "eyes."

The game began just like the series, with an introduction and background

music. The writer was amazed at how well the program simulated the introduction of the series. The on screen artwork, while not animated, was stunning while the background music, when played using the stereo sound capabilities of the Amiga, was flawless. The music literally vibrated the room when certain chords were struck. The introduction closed the same as the series, with a "wipe" to black from the sides of the screen on the last two notes of the music. The writer was already impressed.

The actual game starts out with a black screen and a brief description of where George is, in bed with his eyes closed. A strange "boing" sound permeates the room. After George is instructed to open his eyes, by the user, the user sees what the sound is, Orbit, elroy's outer space pet.

After George gets out of bed and gets dressed, the user can choose where he or she wants to go in the Skypad Apartment complex. However, George must find his briefcase and keys for his space car before he can leave for work.

After accomplishing this task, George can go down his space tube to the parking garage and into his spacemobile. One nice touch that the programmer included was the digitized sounds of the space tube "sucking" and the whirring sound of

the space car's engine. It really adds to the realism of this interactive game. After reaching work, George gets chewed out by Mr. Spacely and is forced to beg for his job. If the user "begs" correctly, then George gets to keep his job, on one condition. George has to go to the planet Robotopia to find out why the inhabitants of the planets, self evolving robots, are fighting over this wall that they are building. Spacely and his associates had built a resort on the planet and are losing money due to the feud. George must find out what is going wrong and fix it immediately or lose his job again.

The Jetsons game deserves much accolade. The programmers were not concerned with only producing a good interactive game, but also with the entertainment value derived from such text based games. Older text based games, such as the Hitchhikers Guide to the Galaxy, were based on strict text only, no art or pictures or sounds at all, and these type of games got boring really quick to most people.

The text game has evolved from this to games such as Ar ga's Deja Vu" with text, pictures and some

sounds to the best game so far, The Jetsons. The addition of animated artwork and interesting sound track has brought the text adventure forward into the nineties. Many laughs will be derived from certain parts of this game, like when the rocket that carries George to Robotopia ignites and when Spacely's telecam appears to insult George.

**The game began just like the series, with an introduction and background music.**

A nice addition to this game is the easy to use command line. Instead of typing the instructions out on the keyboard the user can just point the mouse and click the mouse button to activate certain commands. The user can also use the mouse to "reach" into the picture on the screen to remove objects that he needs to complete the game, which is much easier than typing out "use hand to take briefcase."

One nice artistic technique used is the art of fading and "wiping." Fading, as the name implies, is a fade to black or to another screen. The programmers were able to fade the screens expertly, as though it were coming straight off of a television set or movie. "Wiping" is also a way of clearing the screen where the original screen is pushed or pulled out of the

way as another screen takes its place right away. The wipes used are professional, with no gaps or waiting to slow the game down. Once again hats are off to the programmers.

There is one feature which could be considered a pain, that is the type of write protection that is used in the game.

Every once in a while the outline of a screen spirals out from the center of the game screen and then turns into a requester screen. The user is then instructed to enter a word of text from the comic book that is included with the game.

Finding and counting which word is requested is time consuming and boring. After the user enters the right word the screen then spirals into the center of the screen and disappears. Even though this is tedious and timeworn the wiping of the screen deserves some technical merit.

Overall The Jetsons is an excellent game which shows that text interactive adventures do not have to be based solely on text. It is not only technically good, but also has the ability to tickle funny bones everywhere.

The Jetsons was reviewed on an Amiga 500 with one megabyte of ram and stereo sound. The Jetsons is available for the Amiga and for other systems as well.

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## Electronic Arts releases *Indy 500*

by Joe Cambron  
Managing Editor

*Indianapolis 500* is another in a long line of games by Electronic Arts. Electronic Arts games are generally not known for their complexity, but rather for their enjoyability. *Indianapolis 500* may be a possible exception.

*1-500* came highly recommended, but it obviously takes more than skill to play well, good equipment is also required.

An 80386 is not required, but a good joystick is needed to compensate for the program's lack of software based joystick adjustment. The cars are nearly uncontrollable using the keyboard.

At the onset of the game, the player must select one of three teams to play for. The March Cosworth, Lola Buick, or the Penske Chevrolet may be driven with each car successively harder to drive and less controllable.

Other changes may be made in the car after one acquires the experience necessary to make those decision. Stagger, wing position, and tire type are all variable.

The game's graphics are less than staggering, as are its sound effects. The display on a VGA monitor would only

produce low-resolution EGA graphics. Most figures and scenes were clearly blocky.

When one hits the wall, a large black screen comes before the windshield where the collision occurred, its purpose is unknown except to look paltry.

As for the sound, on an IBM speaker the tire screech sounds like a stall warning on any flight simulator and generally implores my trained flying ears to let off the gas. The engine noise is acceptable, but crash effects are also of low quality.

The game's copy-protection scheme is unobtrusive and comes in the form of a quiz. The entire program can be loaded onto a hard drive with no problems, in fact.

The manual warns of problems with Terminate and Stay Resident programs, but the game worked fine with the ones on my computer.

The game sells for about \$40 which is not a bad price for software these days, but Electronic Arts games have a tradition of low price-and this one deserves the low price.

This game should only be recommended for the driving fanatic with an imposing joystick.  
Req.: 384K RAM, Any color graphics monitor.

**Data Technology**

**Writers Needed**

Contact:  
**Jason Simon**  
Data Tech

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Notices

**Counseling Center Programs Spring 1990**

We are looking for "non-traditional" students who are interested in getting together with other such students to join our group called "Experience + here at ERAU. A "non-traditional" student is defined as someone who initially entered college after a break of four years or more from academic studies. The purpose of this group is to form a supportive social network as well as to discuss issues that affect the "non-traditional" student. The group will meet for monthly luncheons.

If you are interested, please contact Lynne Norris or Patty Ruddy in the Counseling Center, 239-6035 for further information

**Free Information**

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

**Parking Policy**

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

**University Bookstore**

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

**Speech Night coming to Student Center**

The Humanities and Social Sciences Departments will present Speech Night Spring 1990, on Wednesday, March 28 at 8:30 p.m. in the S.C. Speech Night is staged each spring and fall to recognize those students of the speech classes who have done outstanding work. Auditions for HU-219 students will be held at 6:30 p.m., Monday, March 19, in W-306.

All members of the student body, faculty, staff, and friends are invited to attend the March 28 performance.

**Graduating Seniors receive a reminder**

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

**Students anticipating summer '90 degree completion**

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

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

**Engineering Student Advisory Council to hold forum**

At 6:30 p.m. on Thursday March 22, an Open Forum for all engineering students will be held. The proceedings from the last meeting will be reviewed and council members will inform students of current objectives being sought by the council. The floor will be left open for new ideas and input from the students.

At 7:00 p.m. Dr. James Ladesic will meet with the engineering students to discuss ongoing objectives currently being carried out by the engineering departments and the administration. Topics of discussion will include: 1) the fundraising goals being set by the university; 2) the renovation of the present engineering building; 3) the plans for the new engineering building; 4) the budget plan for engineering technical fees; 5) the suggestions made by the Industrial Advisory Committee to the AE program. NOTE: Dr. Ladesic is standing in for Dr. Curtis, the AE Dept. Chairman, who is unable to attend this meeting.

**International Student Services to host reception**

The Department of International Student Services cordially invites you to attend the "1990 Spring Reception". The Reception is given for students, faculty, staff, and community members to meet and mingle with our diverse group of International students from 84 countries. Join us on Saturday, March 24 from 2:00 to 4:00 p.m. at the President's Residence, 317 Ocean Shore Blvd., Ormond Beach. Refreshments will be provided.

**Chess Tournament to be held in University Center**

On March 24, 1990, the ERAU Chess Club will sponsor a 4-round Chess Tournament in the Landing Strip Meeting Room from 9 a.m. to 3 p.m. Cash prizes will be awarded for first, second and third places. Pre-registration is \$3 and registration at the door is \$5. For more information about registration or the tournament, please contact the Recreation Department at 239-6530.

**Attention: Cheerleading Tryouts**

Varsity cheerleading team signups start March 12 (Monday). Tryouts are open to male and female students who are interested in showing spirit and pride for their school. The deadline for signup is March 23 (Friday). A mini camp will be given March 31 (Saturday) from 9 a.m. to 1 p.m.. The following week practice will be held every night from 5 to 7 p.m.. Tryouts will be held on April 7 (Saturday) from 9 a.m. to 1 p.m.. Applications can be obtained at the off-campus Housing Office, Dorm II, room 274 from 8 a.m. to 5 p.m.. Any questions call 239-6560 ask for Trudi Peckham.

**Management Club hosts FAA Administrator**

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

**Intelsat**

*(continued from page B1)*  
 NASA and Intelsat offering the use of a newly developed rocket that can be used to save damaged satellites in space.

INTELSAT VI is a satellite capable of carrying 120,000 telephone calls and three TV channels simultaneously for 13 years. It weighs 5 tons and costs \$150 million. The use of the

Titan rocket by Intelsat added another \$120 million.

The reason the \$270 million launch was not insured was due to the fact that premiums now cost more than 30 percent of a satellite's value, and the non-profit consortium has reserves sufficient enough to cover a loss.

Martin Marietta has two more Titan 3 launches under contract, another INTELSAT VI in June and the NASA Mars Observer probe set for 1992.

**Why are you still paying for your education?**

**FACT: 135 MILLION dollars in aid went unused last year alone!!**

**FACT: Money is available to 95% of all students regardless of scholastic achievement or financial needs, 95 percent !!!!**

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ERAU Box 7110 for further information!



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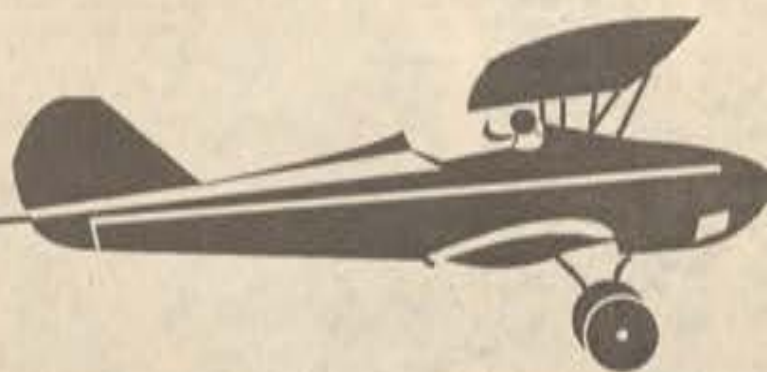
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**David Clark**

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**OUR PRICE \$265.00**

**H10-40 Reg. \$285.00**

**OUR PRICE \$255.95**

**Soft Com**

**C-40 Reg. \$196.00**

**OUR PRICE \$155.00**

**Telex**

**Airman 750 Reg. \$199.95**

**OUR PRICE \$183.00**



## Autos for sale

1980 Dodge Omni-4 dr. hatchback, PS, PB, AC, Automatic. All maintenance records. Must sell graduating. Asking \$850 obo. Call Dee at 756-2377.

1985 Jeep Wrangler Laredo-White and Black Hardtop and grey interior. Every option available (except cruise-control). Has AC and AM/FM/Cassette. 30000 miles. 5 speed. \$11800 obo. Call Greg at 761-6665.

1981 Chevrolet Citation V6 H.O.-X-11 body, black, 4 speed, 2000 mi. since engine rebuilt. Crane Cam, headers, dual exhaust, good interior, sunroof, some body rust. Fun sports car with good handling. \$1000 obo. Call 672-5247 and leave message.

1970 Classic Datsun 240Z-Runs great, excellent interior, mag wheels. Needs welding work. A bargain at \$800. Call Alison at 257-5447.

1981 Chevette-Good, reliable transportation. Economical to run. Great engine. Only \$500. Call Mary at 767-0778 after 6 p.m. or ext. 6229 during the day.

1986 Chevy Sprint-49000 mi. still under warranty, silver color, very economical, like new, 2nd owner. Only \$1950 obo. Call Med at 253-8491 or box 6988.

## Cycles for sale

1981 Suzuki 658S06L-8200 mi., tail trunk, crash guards, cruise control, new battery. \$600. Call Mark at 761-7836 even.

1986 Yamaha SRX 600-1300 mi. Rare, mint cond. \$1800. Call Rob at 252-4355 or box 8321.

1986 Ninja-Lots of extras. Parents won't let me keep it. I must sell, but I don't want to. Helmet, radar detector included. New brakes, tire, and bearings. Make an offer. Call 252-8232 or box 6648.

1985 Honda Elite 250-Looks and runs great, low mileage, red. \$950. Call Jay at (904) 258-0269.

1981 Honda Twinstar CM 200-New chain, sprockets, headlight, tires have 1500 miles on them. Runs excellent, great reliable trans. Asking \$390 obo. Contact Steve in Dorm 2 room 219 or box 4135.

1981 Honda Passport-70 cc's (motor scooper). Great Condition. \$200 firm. Call Tom at 238-1337 or box 8366.

## Miscellaneous

Printer equipped with near letter quality mode for those important documents and a graphics mode. System comes complete, software included. \$300 obo. Call Matt at 254-6854 for more information.

For Sale-City Key Discount Card. Can be used at over 80 locations in Daytona Beach and can be used over and over again. It's good at selected Restaurants, night clubs and Gift Shops. Get one now for \$10. Call 254-2980 or box 6201.

For Sale-RC Glider EZ-2000. New used twice, III start, etc. Bargain \$170. Call Rajiv at 255-6266 or box 6018 or Dorm II Rm 251.

For Sale-Panasonic Electric Typewriter (Thermalwriter). Can also be used for computer printer. \$100 obo. Panasonic Confess Pbeam. Dial buttons on handset and line set, 20 preset memories, speaker phone, intercom. Hardly used. \$100 obo. Call 254-2980 or box 6201.

For Sale-Two Motorcycle Helmets. One black ARAI Half-Head, good cond., size 7.5 to 7.75 Lg. Other white ARAI Full Face, Lg size, good cond. \$30 each. Call Matt at 1-428-8958 leave message, or box 2695.

Need people to visit our place for the summer. No Worry about leases, finding roommates, etc. 3 bedrm, 2 bath furnished townhouse with washer and dryer. Renting. Call 760-7454.

Citation Jet Time-Becomes Citation Jet qualified. Includes 15 hrs systems ground school, cockpit resource management and actual jet time. When finished you will be signed off and Citation Jet co-pilot qualified. \$790. Call 253-2378.

Please someone buy my HP-41 CV. Great for engineering students. Paid \$160 will negotiate price. Call Matt 274-1937.

House on the Beach-The entire bottom floor of a two story house is now for rent. Located only five houses from Atlantic Ave. Apt. is furnished and has a full kitchen, bath, separate living and dining area, and two big bedrooms. Rent is only \$187.50 mo., plus \$150 refundable deposit that can be paid in installments. Drive by and take a look. 2 blocks south of Texan Hotel located at 600 Ribault Ave. Call Steve at 258-0651.

Apartment for Rent-I would like to sublet my clean, 2 bedroom, 2 bath apt. from May thru July. Security, pool, tennis, air cond., laundry, 1 mile from ERAU, and unfurnished. \$440 mo. plus deposit. Call Alexa at 253-0427 between 6 and 8:30 p.m.

Room for Rent in 3 bedroom, 2 bath new house. You get master bedroom with attached bath. Only two people including you. All appliances, cable TV, washer-dryer. \$320 includes all utilities. Call 756-2377 for Des.

The VIP/Cry Key Card for Spring Break 1990-Seve lots of money on admissions, food, souvenirs, clothing, and drinks. Anything and everything you would need to do for Spring Break. \$10 per card, wallet and map provided. Makes a great souvenir. Call Cindy at 761-6536.

For Sale-David Clark Headset H10-80, like brand new. \$250 each. Call Mark at 761-7836 even.

For Sale-SoloFlex, 1-yr. old. Leg and arm attachments included. Paid \$1295 will sell for \$750. Call 239-0382 after 6 p.m.

For Sale-Drifter 6 string guitar, \$50. 6 string guitar with case, \$45. Both guitars are made in Korea and are in very good condition. Girls 3 speed used bicycle, \$35 obo. Call 788-0751.

For Sale-Sherwood CRD-175 AM/FM. Cassette with auto reverse, auto music search, speakers, 3-way 70 watt. Targa 7-hand Equalizer 50 w. \$290 complete. Call Phil at 767-2928.

For Sale-Realistic TRC-474 C.J. with all accessories. Includes mike and antenna. Easy to install. I have all the booklets. \$100 obo. Call Thomas at 258-5974 or box 7914.

For Sale-Used Huffy 12-speed bike, with lots of extras. \$40 obo. Call Lynn at 760-7205 or box 4472.

For Sale-Apple Macintosh Microsoft Business Pack. Includes Microsoft Word, File, Chart, and Multiplan. Very powerful programs. Never been used. Sells for New for \$400 but will sacrifice for \$100. Call Thomas at 258-5974 or box 7914.

For Sale-13 ft. Bandee Monohull Sailboat. Fits on all cars with our rack that I will throw in. Best Offer. I must sell. Call 760-3053.

For Sale-Apple II Plus Computer and Panasonic Printer. Good system for doing school papers, resumes, and other word processing tasks. Printer less than 3 yrs. old.

For Sale-Brand New in the box Softcom C-40 Headset, only \$140. Jeppesen Sanderson Avstar, new and unopened, \$40. For more information call Jeff at 238-3355.

Guitar playing a plus. Call Mark "Slater" Shilladay at 252-8825, box 4354, or Clive "Abe" Lasing at 257-3353, box 5479.

For Sale-Overstuffed love seat with hand made slipover cover, \$50. 12 speed Zenmax Bike, one year old, \$100. Contact Matt at 6767 or 255-3057, leave message.

For Sale-1 way ticket D.B. to Denver, CO or Eastern Airlines. You pick the date to fly. \$150 obo. Call Mark 258-0572.

For Sale-BC Rich Platinum Series Wartock \$200. Crate practice amp \$100. Tube Screamers Classic Distortion Pedal \$20, sell them all for \$300.

For Sale-6 ft. 3 in. Surfboard. Trifin, West Wind team board. Good condition. Call Ed 761-2508 or box 2256.

For Sale-12 speed Schwinn Sprint, good condition. Comes with rack, tools, and tool bag. \$70 obo. Call Jim at 255-4663 or box 5247, leave message.

For Sale-Plane Ticket. One way from Daytona to Raleigh Durham to Chicago O'Hare. On American Airlines, 1 May '90. Asking \$75 obo. Call Jeff at 756-4246.

For Sale-Amiga 500 System. Two disk drives, one mega byte RAM, keyboard and mouse, 1.3 kickstart and ROM, color monitor. All for just \$500. Call Carl Wilson at ext. 6496.

For Sale-Roll Bar for a small truck. Accept best offer. Call Susan at 788-4874 after 5 p.m. or Matt at 255-3057, leave a message.

German Car Repair-Specialize in VW, Audi, Rabbit, Golf, GTI, Jetta, Scirocco, Beetle and Supre Beets. 10 years experience brakes, struts, C.V. joints, routine maint. overhaul. Factory Trained. Only \$14 per hour labor for ERAU students, faculty. Labor warranty. Call Rob Wartick at 238-0386 or box 2193.

Taking applications for Turbine Lab Assistant in AMT 215. Powerplant license necessary. Hours are 12:30 to 3:00 p.m. daily. Apply to Mr. Moore at AMT.

For Sale-Queen Size Mattress, \$50. Two Twin Size Box Springs \$20 each. Call Will at 239-8640.

Roommate wanted in 3 bedroom, 2 bath house. \$200 per month. Call Joe at 676-2909.

Male Roommates Wanted-For sharing 5 bedroom beach front house. Tampa College graduate working in area. Affordable and many benefits. Call 555-1212.

## Roommates

Roommate Wanted-3 bedrm apt. in Wood Forest. Close to school, clean, pond, racquetball. \$225 mo. plus util. Move in at start of Summer A. Call Eric Lewan at 253-8534, or box 7704.

Roommate Wanted-Non-smoker, beginning Summer A. 2 bedrm apt. with washer and dryer, hot tub, pool, tennis courts. In the Island Club 3 mi. from ERAU. Call Jeff at 760-7417.

Roommate Wanted to share 2 BR, 2 BA riverfront apt. at Riverpoint Apartments on Beach St. (only 5 to 8 min. from ERAU). All deposits are paid on utilities and rent. Move in cost is only first month rent of \$210. Must be clean non-smoker. Call Mark at 258-7673.

Roommate Needed-Can move in immediately. Will have own bedroom and bathroom in new apartment. 3.5 miles from ERAU. \$240 mo., non-smoking senior student, male or female. No lease. Call Mark at 788-9776 evenings.

Roommate(s) needed for Summer A and B. Rent \$148 mo. plus one third utilities. Contact Coran at box 6275 or Jenny at box 5907.

Roommates needed for Summer A and B. 3 bedroom, 2 bath, fully furnished house. Rent \$180 plus utilities. 7 miles south of ERAU just off Clyde Morris in Port Orange. Call 756-4246 for more details.

Roommate Wanted-Preferably female, not a must to share 2 bedrm, 1 bath house near beachside for Summer A and possibly after. Only \$117 mo., not including utilities and phone. Own bedrm. For more info. Call Dionne at 788-8177 or 767-5036.

Lost-Short purple stick with Brizels on one end. If seen please note date, time, and location and report it to box 6806.

Wanted-A clock that doesn't move around at night time. Contact Box 6806.

## Personals

KEY, Big deal you won a game. Tell Mike the girls laughed at him at the "post game poncho outing." What a play. LOS LOSER

LOS PONCHOS, Lets pull one out for a change. Uncle and become a true team. Good Luck Thursday. JUST SOMEBODY

BOOMAN, You let me down. I was under the impression that I always had a friend in you...looks like my loss, eh? What went wrong? AN OLD FRIEND

PUMPKIN-KIN, Sun do mix hangin' out with ya, bud. Let's make time and do some of the things we were so accustomed to (i.e. "Power Shopping"). By the way, only six weeks left until we hit the Mexican Caribbean! LOVE YOGI

HAIL LADIES, Glad to hear you enjoyed our wish to all you excellent females. Why don't we get together for an Excellent Adventure? THE REBELS OF ROMANCE BILL AND TED

NICE DIMPLES!!

PANDORA, Beelzebub wants to know, "What's Up Doc?" THE RIDDLER

I NEED A VACATION!!!!

HELLO MY JULIET, What could be more romantic than secretly visiting you at your bedroom window on that moonlit night! Climbing the six-foot fence was a bit tricky but it was worth it! You were sooo beautiful...and still are!! I love you very much, honey!! YOUR ROMBO

YIN, Lights, camera, ACTION thanks for the satisfaction! Want to make a movie? YANG

J, Happy? P.

PUMPKIN SEED, Thank you for putting up with me. I do love you so very much! P-POOH

DARRILL, You should drink your milk so you can become big and strong. RUSS

BURGLE, A word from the wise-staying up late to party may cause your downfall. CONCERNED

THE EXCELLENT FEMALES ON CAMPUS, Who are We? Well... What would you do if you knew? BILL AND TED

SWEETUMS, I love how your cheeks expand when I give you mouth to mouth. SWIETIE

POOKIE, You are truly the greatest...together, we will not only reach for the stars, but shall forever lack in their brilliance. ALWAYS YOUR GREATEST FAN

I'd tell you that I miss you, but I don't know what you'd say, your friend means so much to me although you're far away. We've got much to look forward to and yes, I know you care. I hope you sometimes think of me although I'm not right there. SEE YOU SOON (?)

DEAR AN ADMIRER, Knock it off! I am getting very annoyed. I'm not impressed and neither is my boyfriend. 7108

Hi Mom! FROM YOUR EXPENSIVE PHOTOGRAPHER

QUEEN BUD, We're sending you a keg full of happiness for your birthday. So live it up. VAL AND MIKE

TO MY BUSINESS BUDDY, Glad you're feeling better and good luck with your research paper. THE ONE IN FRONT

TO THE LOVE OF MY HEART Where are you? When I needed you, you were with someone else. Now I'm not lonely and hope you are. YOUR ONE TRUE LOVE

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