

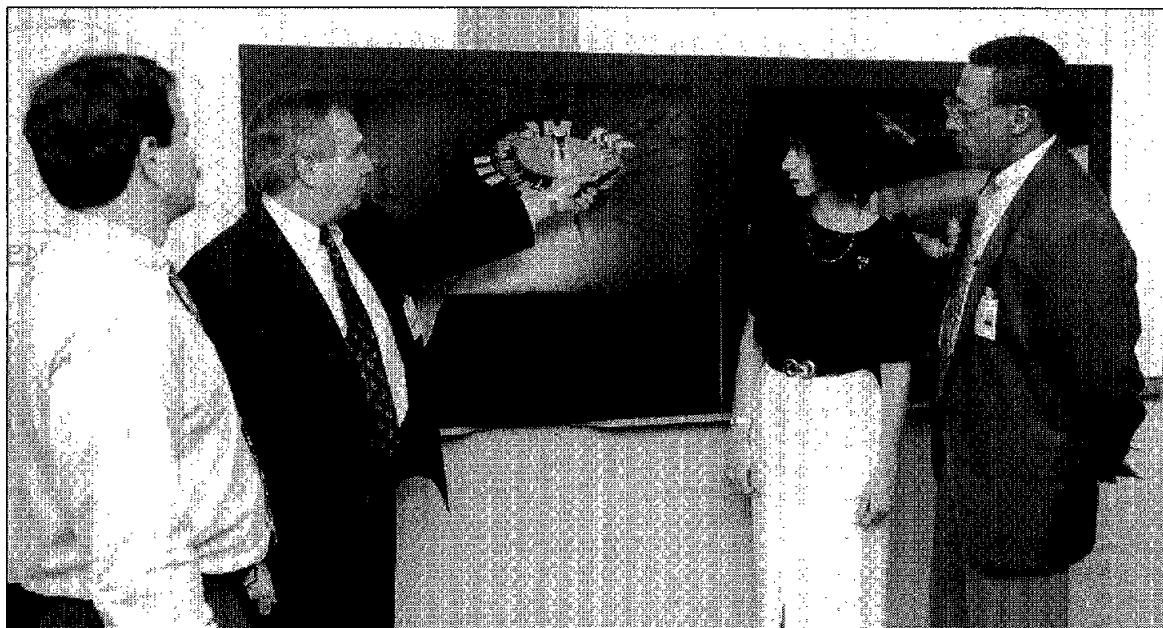


Space News Roundup

Vol. 33

June 3, 1994

No. 22



JSC Photo by Bill Blunck

John Frassanito of John Frassanito & Associates shows off part of a Houston exhibit being sent to Sister City Stavanger, Norway. Frassanito briefed JSC's Kyle Fairchild, left, Jill Fabricant, director of the NASA Technology Commercialization Center, and Hank Davis, director of JSC's Technology Transfer and Commercialization Office, on the exhibit last week. The image showing DeepStar 12, a project by a consortium of energy companies developing technology for commercial production of deep water tracts using subsea technology, is one of 23 in the exhibit.

JSC sends strategic vision to Norway

An exhibit of advanced projects in work at JSC is on its way to Norway for the six-day "Texas Days in Stavanger" festival.

The display will be part of an exhibition at the Houston-Galveston/Stavanger Sister City program taking place from June 12-18 in Stavanger, Norway.

The Sister City group is sending shuttle astronaut John Casper, who will be one of the speakers at the event designed to establish

and increase cultural understanding and friendship between the cities and countries. Casper will discuss the synergy between the exploration of space and the deep ocean during a seminar at Roagalund University.

An exhibition of space program artwork created by NASA contractor John Frassanito & Associates will complement the presentations. Frassanito's exhibit is entitled "Strategic Vision: Its Evolution in Design, Imaging and Planning for NASA."

Before its shipment to Norway, the artwork was displayed at JSC.

More than 100 local high school students, as well as artists and business, medical and space program leaders are to attend the festival. Events include a showing of Texas films, a fun run, dancing, sailing and a barbecue.

Houston and Stavanger formed their Sister City relationship in 1980, with Galveston joining in 1988.

Columbia rolls over for booster hookups today

By James Hartsfield

The finishing touches will be put on *Columbia* next week to ready it for the first step on the journey that eventually will place it in orbit with the International Microgravity Laboratory-2 in early July.

Now in the Bay 2 shuttle processing hangar at KSC, the oldest shuttle orbiter is being closed out in preparation for rolling it from the hangar Friday to the Vehicle Assembly Bldg., where the STS-65 solid rockets and fuel tank await. After being hoisted vertically and attached to the other components, *Columbia* is planned to move to Launch Pad 39A by mid-month.

The STS-65 crew — Commander Bob Cabana, Pilot Jim Halsell, Payload

Commander Rick Hieb, Mission Specialists Leroy Chiao, Don Thomas and Carl Walz, and Japanese Payload Specialist Chiaki Mukai — is in the final stages of its training for the flight.

Work on *Columbia* this week included preparations to close the payload bay doors; final horizontal experiment stowage in IML-2; functional checks of the landing gear; testing of the brake anti-skid device; and installation of the main engine heat shields.

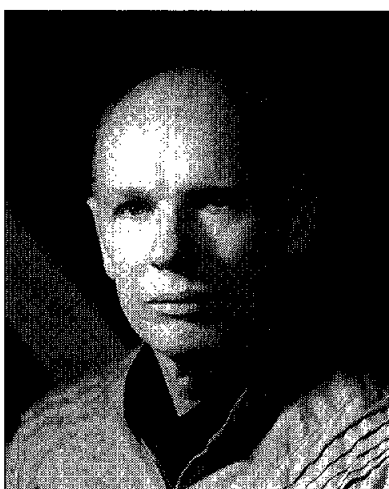
Another long journey was completed this week by *Atlantis* as it arrived at KSC Sunday following more than a year and half of modifications, inspections and upgrades at Rockwell's Palmdale, Calif., shuttle factory. *Atlantis* left Palmdale Friday morning atop the 747 Shuttle Carrier Aircraft and stopped in El Paso overnight. From El Paso, it traveled to Robins Air Force Base, Ga., Saturday, where it remained Saturday night.

The ferry duo departed Robins early Sunday and arrived at KSC's Shuttle Landing Facility runway at 6:35 a.m. CDT. By early Monday, *Atlantis* was inside the Bay 3 processing hangar.

Atlantis' next mission will be on STS-66 carrying the third Atmospheric Laboratory for Applications and Sciences in late October.

Meanwhile, next in line following *Columbia's* July flight, *Endeavour* is being prepared for a second mission carrying the Space Radar Laboratory planned for a mid-August launch. Work to prepare the newest orbiter for STS-68 this week included installation and testing of the drag chute, tests of the orbital maneuvering system, and preparations to install the three main engines.

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Bill Thornton

Shuttle astronaut Bill Thornton retires from NASA

By Kyle Herring

Shuttle astronaut Bill Thornton retired from NASA Tuesday, ending a 27-year career that focused on learning how the human body adapts to space flight.

Thornton, a member of the astronaut class of 1967, flew twice aboard the shuttle — on STS-8 in August/September 1983 and STS 51-B in April/May 1985.

On STS-8, Thornton made near continuous measurements and investigations of adaptation of the human body to weightlessness which included a number of first-

time measurements on the human nervous system in space using equipment he designed.

During his second mission, Thornton was responsible for the first animal payload aboard a shuttle. He also conducted space medicine studies in the pressurized Spacelab module in the orbiter's payload bay.

"Bill has contributed greatly to operational studies in space throughout his career," said Dave Leestma, director of Flight Crew Operations. "His expertise will be greatly missed."

Thornton's immediate plans include writing about his work over the last 30 years in the space program.

"Due to my work, I haven't really had the opportunity, or the time to do any writing about my technical work other than a few reports, and none at all about other matters," Thornton said.

Prior to the shuttle program, Thornton was the principal investigator for a Skylab medical experiment and documented a number of basic responses of the human body to weightlessness, including

alterations in body posture and shape, and rapid loss of muscle strength and mass along with preventive methods.

He devised the first mass measuring devices used in space on Skylab, which are still in use. Thornton has recently designed and tested smaller, improved units to allow routine mass measurement in space. Thornton received his doctorate in medicine from the University of North Carolina in 1963 after obtaining a bachelor of science degree in physics from UNC in 1952.

Hubble observations finally confirm black hole's existence

Astronomers using the Hubble Space Telescope have confirmed the existence of a massive black hole in the center of an elliptical galaxy located 50 million light years from Earth.

The galaxy, known as M87, was long assumed to be the site of a black hole, but previous evidence was not decisive. The observation provides strong support for the existence of gravitationally collapsed objects, which were predicted 80 years ago by Albert Einstein's general theory of relativity.

"If it isn't a black hole, then I don't know what it is," said Holland Ford of the Space Telescope Science Institute and The Johns Hopkins University.

"A massive black hole is actually the conservative explanation for what we see in M87," said fellow investigator Richard Harms of Applied Research Corp. "If it's not a black hole, it must be something even harder to

understand with our present theories of astrophysics."

The astronomers used the telescope's Faint Object Spectrograph to measure the speeds of orbiting gas on either side of a dark gaseous disk in the center of M87. They calculated that the disk of hot, ionized gas is rotating at tremendous speeds around a central object that is extremely massive but extraordinarily compact — a black hole.

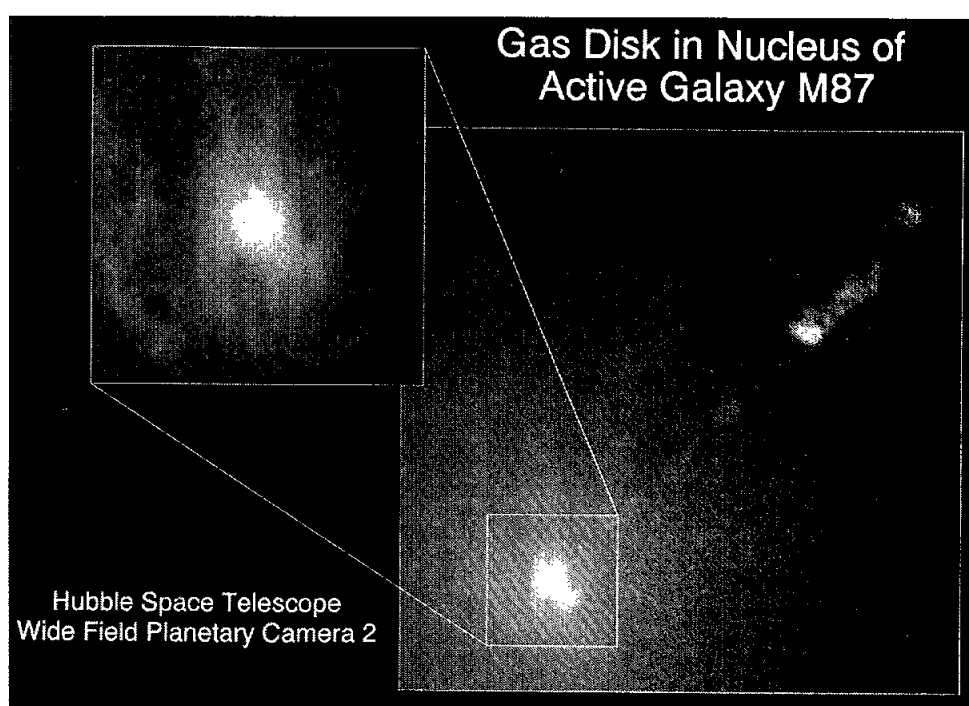
A black hole is an object that is so massive yet so compact that nothing can escape its gravitational pull, not even light. The object at the center of M87 fits that description. It weighs as much as three billion suns, but is concentrated into a space no larger than our solar system.

Earlier observations using the telescope provided strong circumstantial evidence for the presence of a massive black hole in the core of M87, as well as other galaxies — both

Please see **HUBBLE**, Page 4



HUBBLE SPACE TELESCOPE



Gas Disk in Nucleus of Active Galaxy M87

Hubble Space Telescope Wide Field Planetary Camera 2

NASA Photo

This image of a spinning disk of hot gas in galaxy M87 shows a brilliant jet of high-speed electrons, seen as a diagonal line, believed to be produced by the black hole "engine."

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday. For more information, call x35350 or x30990.

Astros Games: Tickets available for the Astros vs. Cubs game at 1:35 p.m. July 3. Cost is \$14 for field level seating. Tickets are on sale until June 17.

Country Western Dance: Tickets available for dinner dance from 7:30 p.m.-midnight June 25. Cost is \$15 person and includes barbecue dinner and entertainment. Tickets are on sale until June 22.

Splash Town: Tickets available for Employee Activity Association Day at Splashtown from 10 a.m.-8 p.m. June 11 or 12. Cost is \$9.

Six Flags: Tickets available for one-day weekend and weekday admission. Cost is \$20.95 for weekend and \$16.75 for weekday. Two-day admission, either weekend or weekday, is \$27.25.

Seaworld of Texas: Discount tickets: adult \$20.95; child (3-11), \$14.25.

Fiesta Texas: Discount tickets: adult \$18.95; child (4-11) and seniors (55+), \$14.25.

Splash Town: Discount tickets, \$11.05.

Waterworld: Discount tickets, \$10.50.

Astroworld Early Bird: Tickets available for one-day admission for 1994 season. Cost is \$16.75 per person. Tickets must be purchased by May 31.

Moody Gardens: Discount tickets for two of three different attractions: \$9.50

Space Center Houston: Discount tickets: adult, \$7.95; child (3-11), \$4.75; commemorative, \$9.55.

Metro tickets: Passes, books and single tickets available.

Movie discounts: General Cinema, \$4.75; AMC Theater, \$4; Loew's Theater, \$4.50.

Stamps: Book of 20, \$5.80

JSC history: Suddenly, Tomorrow Came: A History of the Johnson Space Center, \$11.

Upcoming events: Sleeping Beauty by Friendswood Ballet June 24 at the Grand Opera House in Galveston. Cost is \$21 for special seating and \$8.40 for general seating.

JSC

Gilruth Center News

EAA badges: Dependents and spouses may apply for photo identification badges from 7a.m.-9 p.m. Monday-Friday; and 8 a.m.-4 p.m. Saturdays. Dependents must be between 16 and 23 years old.

Weight safety: Required course for employees wishing to use the weight room is offered from 8-9:30 p.m. June 28. Pre-registration is required. Cost is \$5.

Defensive driving: Course is offered from 8:15 a.m.-3 p.m. Saturday. Next class is June 11. Cost is \$19.

Aerobics: High/low-impact class meets from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks.

Exercise: Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24 for eight weeks.

Aikido: Martial arts class meets from 5-7:30 p.m. Tuesdays and 6:15-8:15 p.m. Wednesdays. Black Belt class from 6-8 p.m. Fridays, requires instructor permission. Cost is \$25 per month. New classes begin the first of each month.

Country Dancing: Lessons begin June 6. Beginners class meets from 7-9 p.m.; advanced class meets from 8:30-10 p.m. Partners are required. For additional information, contact the Gilruth Center at x33345.

Sailing Club: Sailing lessons are planned for May and June. For information, contact Richard Hoover at x31360 or 996-7716.

Golf lessons: Lessons for all levels. Cost is \$90 for six weeks. For additional information, contact x33345.

Fitness program: Health Related Fitness Program includes a medical examination screening and a 12-week individually prescribed exercise program. For more information, call Larry Wier at x30301.

JSC

Swap Shop

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Ads may be run only once. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2. No phone or fax ads accepted.

Property

Sale: Nacogdoches, Tx brick 3-2-5-2, 3013 sq ft, .75 acre, CH/A, FPL, screened patio, outdoor patio, 20' x 30' workshop w/garage and storage shelter, \$110k. 486-9206 or (409) 560-6537.

Sale: 2.5 acres, 4 mi south of Livingston, near Hwy 146 and FM 1988, \$13k; 16'x20' bldg, tractor, w/implements and acreage, \$16k, terms avail. x30021 or 479-7947.

Rent: Heritage Park, 3-2-2, 1700 sq ft, \$790/mo + dep. Sonny, x38533 or 474-4198.

Lease: CLC/Ellington, lg 2 BR condo, new carpet, paint and fans, W/D conn, pool, \$470/mo + dep. 326-1761.

Sale: Galveston beach house, 3-2, CA/H, furnished, new carpet, 300 ft from beach. Ed Shumliak, x37686 or 326-4795.

Rent: Galveston condo, furnished, sleeps 6, Seawall Blvd & 61st St, wknd/wkly/dly rates. Magdi Yassa. 333-4760 or 486-0788.

Sale: 10 acres scenic Hill Country land. (409) 925-8770 for recorded message.

Sale: Baywind I condo, 2-1-5-2, W/D, new dishwasher, ex cond, immed occupancy, \$35k. Tom, 333-3992.

Rent: Arkansas cottage overlooking Blue Mountain lake, furnished, wooded, 4 acres, screened porch, antiques, \$250/wk or \$50/day. x33005 or 334-7531.

Lease/Sale: University Trace condo, 2-1-study, covered parking, \$450/mo or \$35k. James, 286-1934.

Lease: 1 BR condo, W/D, FPL, sec alarm, appliances, cov parking, new carpet, upstairs. Jim Briley, 244-4632 or 488-7901.

Lease: Heritage Park 3-2-2A, split BR plan, FPL, fans, appliances, garage dr opener, new paint, avail 7/1, \$850/mo. x46315 or 280-0031.

Lease: Clear Lake condo, 2-1-CP, gym, pool, sec, tennis, \$650/mo incl utilities. 480-5583 or 482-7156.

Rent: Time share condo, \$500/wk for location of your choice at any time upon availability. Katie, x33185.

Rent: Colorado condo, fully furnished, sleeps 6, low rates. 488-4453.

Sale: Lake Livingston lot, 30'x70', .5 mi from water, paved roads, util avail, \$3k nego. Walt (713) 422-6369 Baytown.

Sale: Friendswood, 4-2-5-2+, 2137 sq ft, lg living area, FPL, jacuzzi, formal DR, fans, sec sys, cul-de-sac, \$105.9k. 992-1466.

Sale: Baywind II condo, 1-1, new carpet, W/D, refrigerator, dishwasher, FPL, \$27k. Steve, x49625 or 486-8047.

Sale: Meadow Green, 3-2-2, 10' ceilings, Italian tile, wet bar, crown molding, both formals, jacuzzi, cul-de-sac, garden bath, no approval, \$112.9k. x35296 or 992-3004.

Lease: Webster condo, lg clean 2-1, FPL, patio, W/D conn, storage area, pools, \$495/mo. x31275 or 486-0315.

Sale: CLC Bay Glen, 4-2-5-2, 2 story, approx 2100 sq ft, 3.5 yrs old, \$119k. 286-5248.

Sale: Friendswood, 4-2-2, 1/2 acre treed lot, fully

landscaped, new roof, carpet and sheet vinyl, \$123.5k. Mark, x38013 or 992-4132.

Cars & Trucks

'78 Chevy Blazer, brown/white, 350 V8, new battery, tires, AM/FM/cass, garaged, well maintained, A/C, ex cond, \$2.3k. Ed, 481-4889.

'82 Mustang 5.0L, one owner, 8k mi on rebuilt engine, T-tops, \$2.5k OBO. Chris, 337-5410.

'91 Toyota Corolla DX, 4 dr, 40k mi, 4 new tires, auto, A/C, AM/FM stereo, ex cond, \$7.5k. 333-7167.

'88 T-bird Turbo coupe, 34k mi, red w/red int, 5 spd, all options, one owner. x30705 or 486-1430.

'87 Mazda RX7, sunroof, tint, alarm, ex cond, 89k mi, \$5.2k OBO. Mike, x31953.

'91 Toyota 4-Runner, 38k mi, 4WD, 5 spd, load-er, \$20.5k OBO. Mike, x31953.

'88 Chevy Suburban Silverado, ex cond, one owner, \$9.5k. 482-7546.

'88 Ford Tempo, new engine, \$3k. 481-0695.

'88 Hyundai Excel, 2 dr, white, auto, A/C, dependable. x31575 or (409) 762-1799.

'91 1/2-ton Ford extended body van camper, 22k mi, off white, 110V-12V refrigerator, 110V microwave and A/C, fully self contained for RV parking facilities. Calvin or Louise, 339-2181.

'81 Olds Cutlass 4 dr, \$1.5k nego. Patty or Gene, 488-2354.

'91 Ford Explorer XLT, two tone gray & black, 31k mi, ext warranty, ex cond. \$12.4k. x47762.

'89 Jeep Wrangler, 4 cyl, PS, PB, new soft top, 1.5" lift, 31x10.50 tires, AR wheels, ex cond, 46k mi. \$8k OBO. Phil, 333-6372.

'90 Plymouth Laser RS Turbo, 5 spd, all pwr, 45k mi, transferrable warranty, \$10.2k OBO. Phil, 333-6372.

'89 Chevy Cheyenne, extended cab, auto, V8, pwr steering/brakes, tilt, cruise, ABS, long bed, 81k mi, \$7650. x39247 or 332-9720.

Boats & Planes

8' sailing dingy, sails and oars, ex cond, \$650. Robinson, x30454 or 532-3013.

Chaparral 187, 140hp Mercuriser I/O, SS prop, electronics, ex cond, \$5.7k. x37954 or 481-1605.

Galaxy 19' fiberglass fishing boat, white. (409) 762-1799.

'90 Hunter 30' aux sloop, A/C, roller furling, full batten main, digital knot/depthwind, auto pilot, bimini, ex cond, \$49.5k. 980-4781.

Kayak, fiberglass w/skirt, \$150. Robert, x39217 or 532-1825.

Windsurfing equipment, 8'9" Tropix all-around slalom board, new, unused, \$300; masts. Fiberspar 2-piece, 1-piece. David Leboe, 486-8487.

'91 Cajun 18.5' center console bay boat, '93 135hp Mercury P/T/T, Motorguide trolling motor, \$10.5k. Gary, x37069 or 534-3080.

'88 Sportcraft Pesca, 36'x13', quality components, drydocked, \$90.5k. 360-1978.

SeaRay 225 cuddly cruiser, 228hp Mercuriser, Alpha One I/O, VHF, 6" color Furuno, \$6.5k. Mark, x38013 or 992-4132.

Cycles

'90 Yamaha Virago 750, ex cond, 7.5k mi, \$3k. Joe, x41018 or 992-1859.

Audiovisual & Computers

Pyle 12" woofers for car stereo system, mounted in 40"x18.25"x8" box, includes Shenwood 180W amp, all wires and crossovers, loud bass and clear treble, \$250 for all. x30021 or 479-7947.

Trade new \$1295 fax modem, 19,200 bps V.32

JSC

Dates & Data

Today

Cafeteria menu — Special: meat sauce and spaghetti. Total Health: spaghetti noodles with turkey meat sauce. Entrees: rainbow trout, liver and onions, beef cannelloni, pork and shrimp egg roll, Reuben sandwich. Soup: seafood gumbo. Vegetables: steamed broccoli, breaded okra, cut corn, black-eyed peas.

Monday

Cafeteria menu — Special: turkey and dressing. Total Health: herb flavored steamed pollock. Entrees: breaded veal cutlet, beef chop suey, steamed pollock, beef cannelloni, French dip sandwich. Soup: beef and barley. Vegetables: Brussels sprouts, mixed vegetables, egg plant casserole, winter blend vegetables.

Tuesday

Blood drive — Loral will host a blood drive from 8-11 a.m. June 7 in front of Loral Bldg. 3, 3700 Bay Area Blvd. and from 1:30-3:30 p.m. at Loral/Marina Plaza in South Shore Harbour. For an appointment, call 335-5090.

Cafeteria menu — Special: pepper steak. Total Health: barbecue chicken. Entrees: baked lasagna, pork chop and fried rice, turkey a la king, baked chicken, French dip sandwich. Soup: black bean and rice. Vegetables: breaded squash, steamed spinach, baby carrots, navy beans.

Wednesday

PSI meets — The Clear Lake/NASA Area chapter of Professional Secretaries International meets at 5:30 p.m. June 8 at the Holiday Inn on NASA Road 1. For additional information, contact Elaine Kemp,

x30556 or Diana Peterson, x30390.

Cafeteria menu — Special: Mexican dinner. Total Health: steamed pollock. Entrees: broccoli cheese quiche, catfish and hush puppies, spare ribs and sauerkraut, steamed fish, Reuben sandwich. Soup: sea-food gumbo. Vegetables: Spanish rice, pinto beans, peas, broccoli.

Thursday

Cafeteria menu — Special: hamburger steak with onion gravy. Total Health: spicy new potatoes. Entrees: corned beef, cabbage and new potatoes, chicken and dumplings, meat ravioli, French dip sandwich. Soup: broccoli cheese and rice. Vegetables: navy beans, cabbage, cauliflower, green beans.

Friday

Cafeteria menu — Special: tuna noodle casserole. Total Health: broiled chicken breast. Entrees: deviled crabs, broiled pollock, liver and onions, broiled chicken with peach half, Reuben sandwich. Soup: sea-food gumbo. Vegetables: Italian green beans, cauliflower au gratin, steamed rice, vegetable sticks.

June 21

Blood drive — Barrios Technology will host a blood drive from 8-11:30 a.m. at 1331 Gemini. For an appointment, call Tom Hanson, 244-7473.

June 25

Western dance — The EAA Country Western Dance will be held from 7:30 p.m.-midnight in the Gilruth Center. Cost is \$15 per person and includes entertainment and barbecue dinner. Last day to purchase tickets is June 22.

July 4

Independence Day — Most JSC offices will be closed in observance of the Independence Day Holiday.

July 13

PSI meets — The Clear Lake/NASA Area chapter of Professional Secretaries International meets at 5:30 p.m. July 13 at the Holiday Inn on NASA Road 1. For additional information, contact Elaine Kemp, x30556 or Diana Peterson, x30390.

July 21

Apollo anniversary — A 25th anniversary splashdown party is planned from 4:30-7:30 p.m. July 21 at the Gilruth Center. Cost is \$3 per person. Last day to purchase tickets is July 15. For additional information, contact the Gilruth Center at x33345.

August 10

PSI meets — The Clear Lake/NASA Area chapter of Professional Secretaries International meets at 5:30 p.m. Aug. 10 at the Holiday Inn on NASA Road 1. For additional information, contact Elaine Kemp, x30556 or Diana Peterson, x30390.

Sept. 5

Labor Day — Most JSC offices will be closed in observance of the Labor Day Holiday.

Sept. 14

PSI meets — The Clear Lake/NASA Area chapter of Professional Secretaries International meets at 5:30 p.m. Sept. 14 at the Holiday Inn on NASA Road 1. For additional information, contact Elaine Kemp, x30556 or Diana Peterson, x30390.

Carol, x34734 or 480-9759.

Kg sz bed, 7 yrs old, \$200 OBO. 488-0056.

Brown vinyl sofa and love seat w/oak arms/legs, \$225; oak coffee table, \$20; end table \$5; Magnavox console stereo, \$100. x34354.

Med sz desk, dk wood, ex cond, \$125; 2 oak and brass table lamps, \$30 ea. Sandi, x33854.

19 cu ft almond refrig, ex cond, \$150; exercise bike, \$25; ceiling fan, \$25. Frank, 470-1025.

Dining rm table w/6 chairs, 2 yrs old, was \$700, now \$350 OBO; Panasonic dual cass stereo w/speakers and cabinet, ex cond, \$150 OBO. 992-1466.

Pastel sectional, good cond, \$325; contemporary coffee table and matching end table, ceramic base glass top, \$300. 480-1112.

Three-piece sectional sofa, creme, matching coffee table, \$650; Panasonic microwave, \$90. 334-3998.

Formal DR set, 40" x 60" table, 2 leaves expand to 40"x84", dk oak, 2 arm chairs, 4 side chairs, \$850. Mark, x38013 or 992-4132.

Wanted

Want roommate for new CLC 4-2-5, plenty of room, \$250/mo + utilities. 486-1430.

Want responsible M/F roommate to share 4-2-2, non-smoker, co-op or short term welcome, W/D, cable, full house priv, avail mid June, \$295/mo + 1/3 util. Karen, x37389 or 992-3783.

Want roommate to share Heritage Park 3 BR house, non-smoker, \$250/mo + 1/3 util. Jon, x35182 or 482-3874.

Want NASA publication SP4201 "This New Ocean" or SP publication. Ron, 333-6952 or 482-1385.

Want van riders from Sugar Land, Southwest Houston to JSC area. Alice, x35234.

Want male, non-smoking roommate to share CLC 3-2-2, \$425/mo, all bills paid incl cable, excluding long distance. Jim, 486-2463.

Want 2 used child booster car seats in good cond, prefer Fisher Price of Gerry brand, larger padded types; also want good type boy's potty training set. x49848 or 484-7525.

Want considerate, responsible, non-smoking housemate to share Bay Glen/CLC 3-2-2, \$300/mo + 200 dep + 1/2 utilities. Larry, x33168 or 488-7460.

Want M/F, non-smoking roommate(s) to share spacious South Shore Harbour 4-2-5-2, Tim, x31456 or 334-6118.

Want old vacuum tube radios, tubes, and equipment, also early transistor radios. Robert, x39217 or 532-1825.

Want roommate to share LC house, private bath, \$250-\$325/mo + 1/2 util. Rob, x41027.

Miscellaneous

Tow bar for VW Bug, ex cond, \$45. Robinson, x30454 or 532-3013.

Counter top vending machines, 5-aa sold on location and stocked with snack products, \$4k. Larry, x33168 or 488-7460.

Nissan rebate certificate for new or used Nissan vehicle, \$750 value, \$500. 333-7010 or 482-5393.

Chevy utility bed, fits to '85, \$250; 8' camper shell, \$250; 2 captain's seats, grey, \$200 both; van luggage rack, \$20; Ford PU hvy duty bumper, approx 150 lbs, fits '80 to '94, \$150. 339-1176.

New 10 ft alum ladder that extends to 20'. \$75. x37726.

50-gal aquarium, wood stand, all acces, \$200; Miyata 12-spd men's bike, \$150; light fixtures, alum frame windows, elec weed-eater. 474-7432.

New Ward's vertical blinds, 3.5" fabric w/valences, 78"wx84", peach, teal or white, all HW, were \$125 ea, now \$50 ea. Ed, 481-4889.

Monkey grass in 1 gal containers, \$2.50 ea or 5 for \$10. x30974 or 554-7083.

Wood mouldings, windows, light fixtures cheap; Xerox 3701 copier, works, needs drum, \$75. Don, x38039 or 333-1751.

Four lawn chairs w/cushions, \$25 ea; 2 sets of dishes, \$15 ea set; 2 oil paintings, \$20 & \$10; 2 folding doors, \$8 ea; 1 pr drapes w/HW, \$10. 333-3425.

New Champion stainless steel juicer w/all attachments, \$200 OBO. Rick, x48842 or 538-4278.

McGregor golf clubs, irons 3-PW, ex cond, \$100. 333-3112 or 286-9455.

Sofa/loveseat, drafting table, solar collectors, staples for lg staple air gun, misc nails, Cannondale street racer, Westwind 92" windsurfer. 333-6045 or 992-1338.

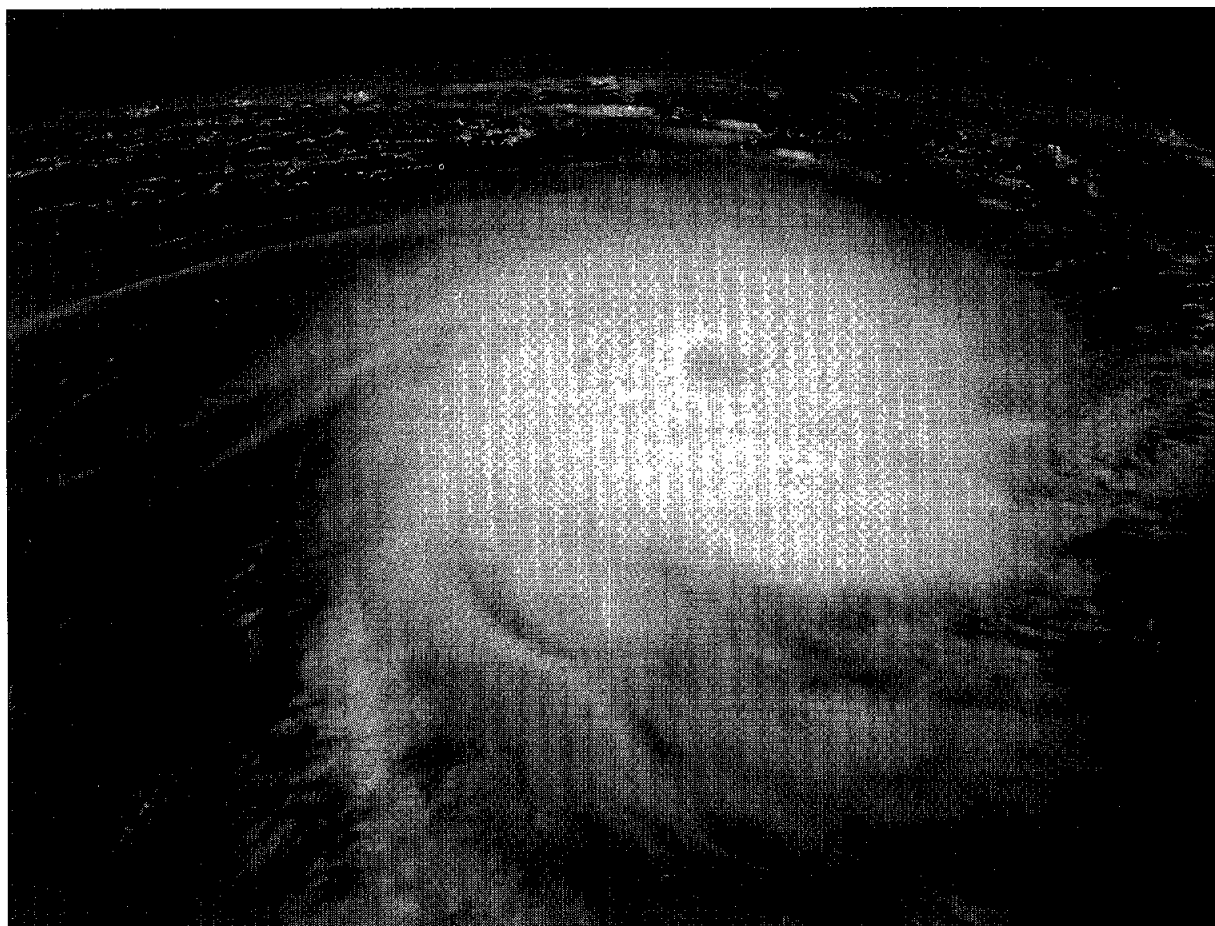
Large gray metal gov't type desk. 333-6456 or 480-8682.

Sesame Street twin comforter, sheets, drapes, border, wall figurines, book/toy chest, chair, light switch and laminated posters, ex cond, \$75 for all. Cathy, x33851.

Fifteen collectable plates, various artists and series, \$15 ea or 2 for \$25, inventory list available. Earl Rubenstein, 480-1998.

Computer table, \$40; Pace 1000B CB radio w/pwr mike, \$40; infant girl clothes, sz 3-18 mos, ex cond; dolls, porcelain and vinyl. 488-6521.

Floor polisher



Bracing for Bad Weather

JSC prepares for worst, hopes for best this week as hurricane season opens

Wednesday was the official start of hurricane season, which means it's time for JSC emergency preparedness officials to brace the center for one of nature's greatest forces — and hope that one doesn't hit here.

"Hurricane season is not the time of year that many people look forward to, but along the Texas Gulf Coast, part of the infamous hurricane alley, you'd better prepare, plan ahead and brace yourself," said Joe Olivarez, JSC's alternate emergency preparedness officer. Bob Gaffney has primary responsibility for emergency preparedness.

As emergency preparedness officers, Olivarez and Gaffney work with JSC Hurricane Plan Manager Keith McQuary to ensure that the comprehensive preparedness plan published every year — and due out soon — is followed. That means coordinating the work of Area Protection Teams and the emergency planning representatives in every organization, and keeping emergency supplies ready through logistics contractor Pioneer Contract Services.

At Action Level I, the center shifts into a state of continual readiness under JSC's Severe Weather Plan. At this level, personnel assigned to implement the hurricane and severe weather plan assess, review and prepare their strategies. Level I ensures that JSC will have a full stock of rations and supplies to support the next level of activity.

Action Level II goes into effect if a hurricane threatens the Clear Lake area. At the discretion of the Center Operations director, an Emergency Action Center is opened in Bldg. 30. Each JSC organization has a designated emergency planning representative and an alternate who stay on top of the status of the action levels during a hurricane alert and distribute information on preparing for a hurricane.

Once the threat of hurricane grows great enough, JSC Director Dr. Carolyn Huntoon will decide whether to close the center and begin evacuation of all non-essential personnel.

Action Level III starts when the decision to evacuate the center is made. Information concerning work assignments and closing JSC will be delivered to employees through their organizations.

"An important part of preparing the center for closing in hurricane conditions is securing offices, a responsibility that falls upon every employee," Olivarez said. "Each employee should secure his or her individual work area, which includes unplugging computer terminals and covering them with plastic garbage bags. Additional office preparations include raising venetian blinds to prevent additional wind damage should windows break, storing classified information and other important materials in safe, dry places and closing all doors.

A group of about 13 area protection teams from Plant Engineering readies JSC's grounds for a storm — checking buildings, picking up loose objects outside and securing

possible hazards.

"The main thrust would have to be on preparation, those things that you can do to mitigate the effects of a storm or minimize the degree of damage that they can do,"

Gaffney said. "Preparation is key to successful recovery; we'll recover regardless, but we can have a better chance of recovering if we prepare adequately in advance."

The first step is awareness, Gaffney said, and toward that end the JSC Television Distribution System will broadcast a 27-minute hurricane preparedness videotape everyday this week Channel 5. The JSC Emergency Preparedness Office will sponsor a hurricane workshop for employees in Teague Auditorium in the coming months. The program will include information on JSC's program to protect employees

and facilities, as well as information on personal disaster survival plans. All employees are invited to attend as their work loads permit, and Olivarez said it would be especially useful to Gulf Coast newcomers.

Although emergency preparedness workers here are responsible for taking care of JSC first, the center can pitch in and help

in the community on a case-by-case basis, and sharing information about the center's plans will help community leaders know what kind of help may be available. With hurricane season upon us, JSC has begun a state of continual preparedness or Action Level I in anticipation of the summer storm season.

Level IV starts when the storm hits. The Hurricane Rideout Team gathers at its posts and waits for the storm to subside. Activities during the storm are limited to only essential emergency repairs that can be performed without endangering the personnel safety.

The team moves back into action once the storm passes, assessing the damage and arranging for necessary repairs. In the event of an evacuation, employees can continue to stay in contact with the center through the use of two recorded phone services.

The Emergency Information Line, x33351, provides potential storm information, plans for safe-guarding work areas and information throughout the year on other area emergencies, and the Employee Information Service, x36765, provides information about closings. Center personnel will be notified when to return to work through the information services and radio and television reports.

Olivarez encouraged employees to form their own plan for personal protection. The first steps should be taken well in advance of the development of any tropical storm.

"Now would be a good time," he said.

Employees should assess the vulnerabilities of their home and contents and develop firm plans for transportation and shelter with their families. They should contact their community's emergency management representatives about whether they are low enough to be affected by a storm surge and stock up on emergency supplies, Olivarez said. □

Hurricane Warning Checklist

- ✓ Unplug office machines, and computers
- ✓ Cover computer terminals with plastic bags
- ✓ Raise venetian blinds
- ✓ Store classified information in safe, secure, dry place
- ✓ Store important papers in safe, dry place
- ✓ Close all doors

Emergency Supply Kit

- Flashlight
- Tissues
- Radio
- Pocket knife
- Sanitary Supplies
 - Toothbrush
 - Soap
 - Shampoo
 - Sponge
 - Cleanser
 - Bleach
- Batteries
- Pencils
- Drinks/Juices
- Nuts
- Rice — Pastas
- Soups
- Canned Foods
- Water (1 gal per person per day)



30-gallon trash barrel

- First Aid Kit
- Medicines
- Rubbing Alcohol
- First Aid Handbook
- Towels
- Blankets
- Paper Towels
- Toilet Paper
- Candles
- Matches
- Can Opener
- Peanut Butter
- Crackers
- Dried Beans
- Change of Clothing
- Foul Weather Gear
- Sterno, Stove, Fuel
- Garbage Bags
- Cooking Utensils
 - Cooking Pot
 - Plastic Dishes
 - Silverware
 - Aluminum Foil

Important Numbers

JSC Emergency Information Line	.....x33351
JSC Employee Information Service	.....x36765
JSC Emergency Reporting	.....x33333
Ellington Fire	.....x47231
Ellington Ambulance	.....x 47231
Greater Harris County Emergency Network	.....911
Red Cross Shelter	.....526-8300
Houston Lighting & Power	.....228-7400
Entex gas	.....659-2111
GTE	.....800-843-4345
Southwestern Bell	.....881-8181

Top: Tropical Cyclone Litanne, a cousin to the damaging hurricanes of the Atlantic Ocean and Gulf of Mexico, was photographed by the crew of STS-62 as it traversed the southern Indian Ocean in mid-March.

Left: JSC employees can make a home emergency supply kit by filling a 30-gallon plastic trash barrel with a securable lid. Food supplies should be rotated every six months. The list is not intended to be all-inclusive. Everyone must decide what supplies are best suited for their family's survival.

Clementine produces first digital map of Moon

NASA's Clementine science team has released the first global digital map of the Moon.

The map, which includes information on the topography and composition of major regions of the Moon in detail, and other important science results, was released at the spring meeting of the American Geophysical Union in Baltimore.

The Clementine mission is sponsored by the Department of Defense Ballistic Missile Defense Organization.

The digital data set covers 38 million square kilometers of the Moon mapped in 11 colors in the visible and near-infrared parts of the spectrum during the mission's 71 days in

lunar orbit, providing the first view of the global color of the Moon.

"The scientific significance of the lunar data set from Clementine is immense. For the first time, multi-spectral imaging data of consistent viewing geometry, resolution, and lighting conditions have been obtained for the entire Moon," said Dr. Jurgen Rahe, NASA program scientist. "With Clementine data, we have begun a new era in the exploration of the geology of the planets using global multi-spectral data sets."

The color of the Moon in the visible to near infrared part of the spectrum is sensitive to variations in both the mineral composition of surface

material and the amount of time that material has been exposed to space. Color filters for the ultraviolet-visible camera and the near infrared camera, were used to characterize the surface composition and search for titanium-rich rocks.

The mission also provided tens of thousands of high resolution and mid-infrared thermal images. The topography was mapped using a laser ranger. Knowledge of the surface gravity field of the Moon was improved through analysis of radio tracking data. A Charged Particle Telescope characterized the solar and magnetospheric energetic particle environment.

Scientists measured the topogra-

phy of large, ancient impact features, including the largest (1,600 miles) and deepest (more than seven miles) impact basin known in the solar system. Preliminary analysis has deciphered the gravity structure of a young basin on the limb of the Moon, showing that a huge plug of the lunar mantle has been uplifted from below its surface.

The Science Team completed a mosaic of the South Polar region using more than 1,500 images obtained during the first month of mapping. A striking result from this mosaic, is the discovery of an ancient impact basin about 190 miles in diameter near the South Pole. Large parts of this dark area

may never receive any sunlight because the Moon's rotation axis is nearly perpendicular to the plane of its orbit around the Sun.

If this region receives no sunlight, it possibly will be about minus 230 degrees Celsius. This fact is significant because water molecules from impacting comets may have found their way into such 'cold traps' and accumulated in significant amounts over billions of years. Clementine beamed radio waves into the polar areas to look for echoes that would indicate the presence of water ice deposits. The results of this experiment may not be known for many months as the data will require thorough analysis.

NMA marks first decade with dinner

The NASA-JSC chapter of the National Management Association will mark its 10-year anniversary with a special meeting June 21 at Space Center Houston.

All current and former members are invited to attend the meeting. Social hour begins at 5:15 p.m. followed by dinner at 6 p.m. in the Silver Moon Cafe. The program will highlight the NASA-JSC chapter's accomplishments over its first 10 years and its plans for the future as well as the installation of officers for the 1994-95 chapter year.

During the evening, the chapter also will recognize the achievements of several JSC managers during an awards ceremony. Awards to be presented include Manager of the Year, Certificate of Leadership, and the chapter's highest award, the Silver Knight of Management.

The reunion meeting is free to current and former members but there is a \$10 charge for guests. For reservations or information, contact Allison at x47115, Susan at x35266 or Judy at x36251.



JSC Photo by Benny Benavides

TWO DIRECTORS — Ames Research Director Ken Munechika, left, breaks bread with JSC Director Dr. Carolyn Huntoon at JSC's Asian Pacific American Heritage luncheon last week at the Gilruth Center. Munechika gave the keynote speech at the luncheon, explaining how his Asian heritage has helped him become the first Asian American director of a NASA center and comparing his experiences to those of Ellison Onizuka, who became America's first Asian American astronaut. Munechika said Ames is working to foster diversity, respect and opportunity for all employees through a Multi-Cultural Leadership Council. About 300 JSC civil servants and contractors attended the Thursday luncheon, which wrapped up this year's Asian Pacific American Heritage Month.

Texas university among research grant recipients

NASA has announced the selection of six Hispanic-serving universities, including one in San Antonio, to receive five-year, Institutional Research Award grants for multidisciplinary research in science and engineering.

The universities will receive \$400,000 the first year, \$600,000 the second year, \$800,000 the third year and \$1 million in the fourth and fifth years, totaling \$3.8 million over the five-year period.

The grant program targets institutions of higher education, especially Hispanic Serving Institutions that meet the eligibility criteria outlined in Public Law 102-325 in the higher education amendments of 1992, in which Tribal Colleges and other minority universities whose student enrollment of underrepresented minorities exceeds 50 percent.

The grants will provide an increased opportunity for eligible institutions and underrepresented minorities to participate in and benefit from NASA and federal research programs by strengthening their capacity to perform research and by providing a learning and research environment for students. Three of the research projects are in engineering, two in Earth science and one in space.

The universities selected to receive grants are:

- California State University at Los Angeles;
- Florida International University, Miami;
- New Mexico Highlands University, Las Vegas;
- The City College of New York;
- University of Puerto Rico, Rio Piedras; and
- University of Texas at San Antonio

The IRA grant program is sponsored by the NASA Office of Equal Opportunity Programs in collaboration with NASA Headquarters program offices and installations and the Jet Propulsion Laboratory in Pasadena, Calif.

Full fleet in Florida

(Continued from Page 1)

Elsewhere, *Discovery* is in High Bay 2 of VAB, having been moved out of the Bay 3 processing hangar to make room for the arrival of *Atlantis*. *Discovery*, being prepared for an early September flight on STS-64 with the Lidar in Space Technology Experiment, will be moved into the Bay 2 hangar as soon as it is vacated by *Columbia*. While *Discovery* is stored in the VAB, little work is planned on the orbiter.

Summer Fitness Program offers exercise, not heat exhaustion

With the heat of a Houston summer once again upon us, JSC's Total Health Program is offering employees a chance to improve their fitness without suffering through the noon-time temperatures.

"Summer weather can play havoc with your workout schedule," said Greta Ayers, assistant director of health fitness. "Working out in the morning avoids the problem of high afternoon temperatures, and lets you get your exercise in before beginning your daily work routine."

The 12-week Summer Fitness Program will begin June 27 offering JSC employees and contractors the opportunity to work out from 6:30-7:30 a.m.

"We are requiring that all program partici-

pants receive medical screening prior to exercising," Ayers said. JSC civil servants will receive the medical screening free of charge at the JSC clinic. Contractor employees must obtain the evaluation off-site at their own cost. The medical evaluation should include a basic physical, blood screening for cholesterol and glucose levels and written clearance that the individual can participate in vigorous exercise. Participants over 40 years old also must have passed a treadmill stress test within the past three years.

Interested employees should fill out an

application for the Summer Fitness Program and send it to the fitness staff/ AW9. The fitness staff will make medical screening arrangements directly with the clinic for all JSC civil servants.

"What makes our program different is that we prescribe specific exercises for individual participants based on their medical evaluation," Ayers said. "People can walk or jog, use the Stair Master, the tread mill, or weight training equipment."

The Summer Fitness Program emphasizes all aspects of health, including nutrition, exercise, stress reduction and diet. Classes will meet Monday, Wednesday and Friday through Sept. 16 and there is no cost to participate.



Hubble researchers to peer closer to center of black hole

(Continued from Page 1)

active and quiescent. These earlier observations showed a rapid increase in starlight toward the center of a galaxy suggesting that stars are concentrated around the center due to the gravitational pull of a massive black hole.

However, the black hole's mass could not be determined until HST's spectroscopic capabilities were used to measure the actual motion of gas around the black hole. Such high spatial resolution spectroscopic observations were not possible prior to the installation of the Corrective Space Telescope Axial Replacement unit by the STS-61 crew during the December 1993 servicing mission.

"Once you get that measurement, all you need is straightforward Newtonian physics to calculate the mass of the central object that's making the disk spin," Harms said.

The measurement was made by studying how the light from the disk is blue-shifted and red-shifted — as one side of the disk spins toward the

Earth and the other side spins away from it. The gas on one side of the disk is speeding away at a rate of about 1.2 million miles an hour. The gas on the other side of the disk is whipping around at the same speed, but in the opposite direction, as it approaches viewers on Earth.

Now that astronomers have seen the signature of the tremendous gravitational field at the center of M87, it is clear that the region contains only a fraction of the number of stars that would be necessary to create such a powerful attraction.

Ford and Harms were surprised by the M87 images taken with the telescope's Wide Field Planetary Camera-2 in February since they hadn't anticipated seeing such clear evidence of a gaseous disk in the center of M87.

"Now, it all knits together," Ford said. "We see a disk-like structure that appears to have spiral structure, and it's rotating. One side is approaching and the other is receding."

"It's just totally unexpected to see the spiral-like structure in the center

of an elliptical galaxy," Ford said.

The cloud of gas is composed mostly of hydrogen. The hydrogen atoms have been ionized, or stripped of their single electron, possibly by radiation originating near the black hole.

Over the next few months, the researchers will attempt to peer even closer to the center, where the disk should be spinning at even higher speeds, improving the measurement of the black hole's mass.

Astronomers first began to suspect that unusual activity was occurring in the center of M87 as early as 1917 when they discovered a long finger of energy emanating from the nucleus. Investigations using radio telescopes in the 1950s detected large emissions of energy from the galaxy. This made it clear that the bright optical jet and radio source were the result of energy released by something in the center of the galaxy.

In high resolution images, the jet appears as a string of knots, some as small as 10 light-years across,

within a widening cone extending out from M87's core. A massive black hole had been the suspected "engine" for generating the enormous energies that power the jet. The gravitational energy is released by gas falling into the black hole, producing a beam or jet of electrons spiraling outward at nearly the speed of light.

HST's observation confirms more than two centuries of theory and conjecture about the reality of black holes. The term "black hole" was coined in 1967 by American physicist John Wheeler. However, it was French scientist Simone Pierre LaPlace who first speculated that "dark stars," which would have such intense gravitation that light itself could not escape, might exist. This conjecture was put into a theoretical framework with Einstein's general theory of relativity, published in 1915, which postulated that very massive objects actually warp space and time. The theory was supported in 1916 when German physicist Karl Schwarzschild

described the mathematical basis behind black holes.

For decades, however, black holes were regarded not as real astronomical objects, but merely as mathematical curiosities. With the discovery of active galaxies and quasars, black holes have become the favored "engine" for explaining a wide array of powerful and energetic events seen in the universe.

The research team included Ford, Harms and astronomers Zlatan Tsvetanov, Arthur Davidson, and Gerard Kriss of Johns Hopkins; Ralph Bohlin and George Hartig at STScI; Linda Dressel and Ajay Kochhar at Applied Research Corp.; and Bruce Margon from the University of Washington in Seattle.

The STScI is operated by the Association of Universities for Research in Astronomy, Inc. for NASA, under contract with Goddard Space Telescope Center. The Hubble Space Telescope is a project of international cooperation between NASA and the European Space Agency.