

# Space News **ROUNDUP!**

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## Season's Greetings

This has been another good year for the space program and for the Johnson Space Center. As the holiday season approaches, we can all take pride in the Center's significant progress this year, setting the stage for what promises to be an even more productive and challenging year in 1998.

Christmas day will mark the 643rd consecutive day we have had an American crew member in space. This remarkable achievement, as you all know, has not come without difficulties. But between our efforts and those of our Russian partners, we have not only overcome those difficulties but also learned much from them. This knowledge is being put to good use now as Andy Thomas prepares for his mission. The knowledge we have gained will also serve us well as we continue toward launch, assembly and operation of the International Space Station.

Much of what we have accomplished in our partnership with the Russians can be attributed to the excellent performance of the Shuttle. The transition in that program continues, and we are making steady progress toward reducing the government's involvement in day-to-day operations. In the meantime, eight successful launches, five consecutive on-time, are testimony to the hard work and dedication of the Team NASA.

And, we continue to forge ahead with our partners in the International Space Station program. As you know, this partnership expanded recently with the addition of Brazil as a member. With their contributions, and those of all our partners, we will continue to make excellent progress on this critical program. After many years of hard work on the part of the Station team, it is gratifying to see hardware coming off the production line—but it is also sobering to know that we are only 7 months from first element launch. Much remains to be done, but I am confident that we are up to the challenge.

We should be proud also of the critically important efforts going into our advanced technologies efforts here at JSC. If we are to set the stage for an eventual return to the moon and for the human exploration of Mars, these efforts must continue. As we complete Phase III of the chamber tests in building 7, we can take pride in knowing that we are collecting the data and testing the systems that will enable us one day to sustain life on long-duration space missions. And our efforts in other areas, such as Transhab, X-38, and the development of advanced operations concepts are equally impressive. Just as important, we are not only developing the new technologies, but we are also proving that we can apply them to multiple programs as we continue the human exploration of space.

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*George W. S. Abbey*



# Endeavour to deliver final American to live on Mir

Launch moves to Jan. 20 to support activities aboard Russian space station

By Kyle Herring

Endeavour's return to space following a year and a half of maintenance, modifications and upgrades is set to begin on the night of Jan. 20 when it is launched to the Mir Space Station.

Though the flight readiness review is not scheduled until early in January, the launch date was moved about five days later to accommodate some additional operational activities on Mir, that included several space walks and the arrival and unpacking of a Progress resupply vehicle.

Endeavour's flight will mark the eighth time a shuttle has rendezvoused and docked with Mir as part of the Phase 1 Pro-

gram. Astronaut Dave Wolf will return home after four months aboard the station and Andy Thomas will take his place as the final American to stay on Mir. He is scheduled to return home on Discovery's next space mission—STS-91—scheduled for May.

The launch vehicle was scheduled to be positioned on the pad by this past Wednesday for initial validation testing leading into the holidays. Plans call for only minimal work to be done during the holidays.

The delay in rolling Endeavour from its processing hangar was due to an accidental



ding to the upper surface of the left hand payload bay door. The indentation was caused when a weld broke on a part of one of the "strongbacks" that support the doors during opening and closing. The small ding was repaired before the transfer to the Vertical Assembly Bldg.

In parallel, an investigation team continues to seek the cause of an unusually large amount of thermal protection tile "hits" seen on Columbia following its return from STS-87. Though the roughly 300 damaged tiles posed no threat to the crew or mission, the program is inter-

ested in determining the cause and any correlation to future flights. The culprit is likely some thermal insulation coming off of the external tank at solid rocket booster jettison, so workers at Kennedy Space Center were to thin out the insulation on either side of the tank near the solid rocket boosters and take samples to ensure proper bonding.

The final launch dress rehearsal is scheduled for the first week of January. Commander Terry Wilcutt, Pilot Joe Edwards Jr., and Mission Specialists Mike Anderson, Bonnie Dunbar, Jim Reilly, Cosmonaut Salizhan Sharipov and Thomas will travel to Florida Jan. 4 for the Terminal Countdown Demonstration Test.

## First space station pieces ready soon

By Kari Kelley

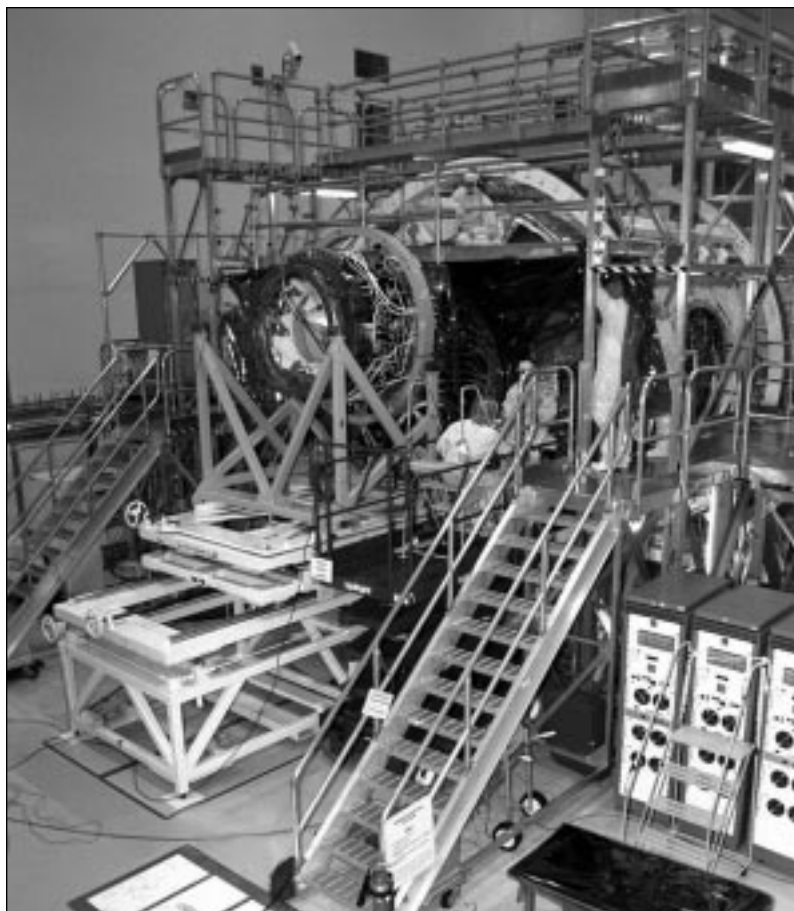
As the clock continues ticking toward the first launch of the International Space Station next June, more than a quarter million pounds of flight hardware have now been produced, and the first elements will soon be readied for launch.

The first element of the Space Station, the FGB, is on schedule for a launch targeted for late June 1998. It is undergoing final test integration in Moscow before being shipped to the Baikonur Cosmodrome in Kazakhstan, the Proton launch site, in early 1998. Built by the Khrunichev Space and Rocket Center, Moscow, under contract to Boeing, the 20-ton pressurized spacecraft will provide the initial propulsion and power for the International Space Station and become the first orbiting element. It will make the trip from Moscow to Baikonur on a special railroad car.

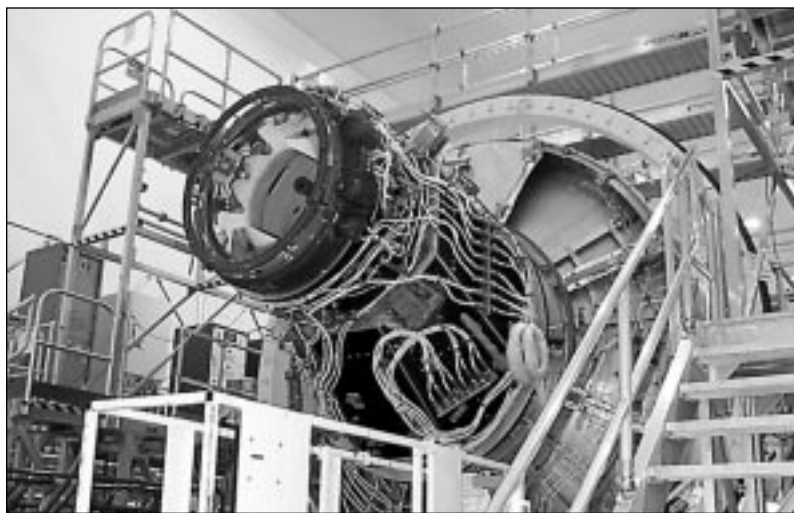
The second element, a connecting module called Node 1, and two pressurized mating adapters are at the Kennedy Space Center's Space Station Processing Facility undergoing final preparations for a July 1998 launch aboard Endeavour on STS-88. Late last month, the first mating adapter, designated PMA-1, was permanently attached to the node. The second adapter, PMA-2, will be attached in January, putting the station elements to be launched on STS-88 in the form they will be in when they are placed in Endeavour's cargo bay early next summer. The node was delivered to KSC from the Boeing space station manufacturing facility at the Marshall Space Flight Center in Huntsville, Ala., this past June.

"Space Station hardware is being manufactured around the country, and, in fact, around the world," said Doug Stone, Boeing ISS program

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Top: Technicians at Kennedy Space Center's Space Station Processing Facility finish mating two pressurized mating adapters to an International Space Station connecting module called Node 1. Bottom: Support hardware is removed, clearly showing one of the PMAs mated to Node 1.



KSC Photo KSC-97PC-1717

## Managers review Mir space walk, docking flight plans

Phase 1 Program managers are set to begin a series of reviews that will lead to final approval for the launch of Endeavour in January and the start of the final increment of a U.S. astronaut on the Russian Space Station Mir.

NASA officials will take a close look at preparations for three space walks planned aboard the Mir in late December and early January as well as the STS-89 launch of Andy Thomas to Mir as the eighth and final U.S. crew member. Thomas will replace Dave Wolf, who has completed three months of a planned four-month research mission aboard the Mir. Thomas has been medically certified by Russian flight surgeons for his stay on Mir and has returned to the U.S. for final training.

"This type of mission is an endurance run instead of a sprint race like a shuttle mission," American Dave Wolf said this past Friday during a new conference from on board Mir. "I would say after about a month I was feeling extremely good, and after two months, I realize just how good you could feel in space. And I'm feeling better and better every day, enjoying working in space more and more, learning to handle the difficulties of working in space better and better. So it's getting better and better, although I miss home more and more."

On Wednesday, Mir 24 Commander Anatoly Solovyev and Flight Engineer Pavel Vinogradov planned to jettison a Progress resupply ship that's been attached to the Mir since October. After it is undocked, the Progress will automatically deploy a small German-built experimental satellite called "Inspekter" which will

circle the Mir at a distance of approximately 100 meters to conduct a television survey of the station before separating for good.

On Dec. 30, Solovyev and Vinogradov plan to conduct another space walk, this time to repair a leaking outer airlock hatch on the Kvant-2 module. The hatch is used by space walkers exiting or reentering Mir. A new seal is being delivered to Mir along with supplies and food for the crew on the next Progress vehicle.

That Progress, scheduled for launch on Dec. 20, should dock with Mir on Dec. 22.

Another space walk is planned for Jan. 5 by the two Russians to affix handrails to the depressurized Spektr module for additional refurbishment work that may be added to the schedule. A final space walk is planned for Jan. 12 to retrieve scientific gear left outside the Mir by Astronaut Jerry Linenger in April. If he receives final approval from Phase 1 officials, Wolf may join Solovyev for that space walk. Wolf has received approval from NASA managers to conduct on-orbit training for the space walk, but the final go-ahead is not expected until the new year.

"You know that since I was nine years old and Ed White did the first space walk from a Gemini capsule, I've wanted to do a space walk. And I've a healthy respect for the issue," Wolf said. "We trained intensely before the mission. I continue to train on board. And I'll be going outside if all goes well, as planned, with the most experienced space walker in the universe, certainly on Earth or in space around Earth, Anatoly (Solovyev)."



## Test chamber team breaks seal, completes 91 day stay

A team of four JSC workers is scheduled to emerge from a sealed chamber in Bldg. 7 today, completing the longest such test of closed-loop environmental recycling systems so far.

Lunar Mars Life Support Test Project Phase III test subjects, Commander Nigel Packham, a Lockheed-Martin life support system engineer; Vickie Kloeris, a JSC shuttle food system manager; John Lewis, a Lockheed-Martin life support system engineer; and Laura Supra, an AlliedSignal life support system engineer, reported much success in a final report from "inside the tank."

"By the time you read this, the human portion of the Phase III Lunar Mars Life Support Test will have ended," the team wrote. "The door to the chamber opened at 9:04 this morning and we emerged to a whole different world than we left 91 days ago. Summer is gone and winter is here. The test has been a great success and the air and water recycling systems have performed above and beyond expectations with a great deal of scientific data having been collected.

"We have been completely sealed off from

the outside world and have been continuously converting the carbon dioxide that we produce back into oxygen for us to breathe. The same air that was sealed in the chamber 91 days ago will be vented out at the end of the test. We began the test in September with seven days of water in the system, and during the mission the waste water system has processed nearly 10 tons (2,400 gallons) of water for our re-use.

"In addition," the team continued, "data has been collected for 13 different collaborative science studies during the 91 days, with analysis continuing well into 1998 and maybe beyond. Although we will be glad to spend Christmas with family and friends, we have made friendships during this test both in the chamber and on the outside which will last a lifetime. We thank everyone who has supported us during these 91 days. Whether the support was physical or emotional, it was all greatly appreciated. We hope to see the successes of this test translated into a human mission to Mars in the not too distant future. Happy holidays and all the best in 1998!"



JSC Photo 97-17585 by Robert Markowitz

HOME FOR HOLIDAYS—STS-87 Pilot Steve Lindsey is greeted by friends, family and well-wishers at Ellington Field's Hangar 990 following a flight back to Houston from Florida. Lindsey and the rest of the crew—Commander Kevin Kregel, Mission Specialists Winston Scott, Kalpana Chawla and Takao Doi, and Payload Specialist Leonid Kadenyuk—made it home Dec. 5 after the 16-day flight microgravity research flight.

## Community News

### Scouts use JSC club's radio gear to contact Mir during jamboree

By Lane McFarlane

What do scouting, JSC, and amateur radio have in common? Jamboree On The Air or JOTA!

The JSC Amateur Radio Club participated in the International Scout Bureau Jamboree On The Air this year from the JSCARC station near the Gilruth Center.

JOTA is organized by the World Scout Bureau to expose boys and girls in the scouting movement to the magic of technology and radio communications. It also allows scouts from all over to talk to each other in a virtual jamboree.

The radio side is handled by amateur radio operators (or "ham" operators as they are sometimes called), usually those who also are involved in scouting. OTA has been sponsored by the World Scout Bureau since 1957, and is promoted by the Boy Scouts of America and the Girl Scouts of America in this country. It has traditionally taken place on the third weekend of October. Large groups in California and New York, as well as smaller groups get on the air each year to get the scouts talking.

This year, a JOTA participation was hosted by the JSC Amateur Radio Club and the Bayshore District of the Sam Houston Area Council, Boy Scouts of America. The station was staffed by Lane MacFarlane and Matt Bordelon, with scout leader assistance from Mike Veres.

The team had the JSC club's radio station up and running promptly at 9 a.m. for the beginning of the event. The scouts started the day with a tour

around the station's radios and antenna farm, and then got to work on the air.

The scouts spent the morning talking to stations in Mississippi, Louisiana, Florida, Michigan, Maryland, and even Canada, on the JSCARC's radio equipment.

The Scouts also got to see the JSCARC's extensive collection of "QSL" cards, postcards that ham operators send to each other to confirm that they have made contact by radio. The club has cards from all over the United States and the world. The scouts got a bang out of the more humorously decorated cards.

The high point of the day came in the afternoon. At 1:20 p.m., the Russian Space Station Mir flew right over Houston with American astronaut David Wolf aboard. Ham operators regularly talk to Mir, including a group from the JSC club. This Saturday happened to be one of their scheduled communication passes, and the scouts were in for a treat.

JSCARC members Karl Silverman and Kent Castle were on hand to make contact. The group watched as the computer-controlled satellite antennas started tracking Mir as it passed overhead. After the preliminary radio contact was established, two Scouts were able to make contact and talk with Wolf.

All in all, the scouts reported having a good time, and are expected to remember it for years to come.

For details on the JSC Amateur Radio Club, contact the president, Karl Silverman, Code ZS8, at x31047.



Photo courtesy Boeing

Steve Berry, far left, presents a \$10,000 Boeing donation to Carol and Hurt Porter, founders of Kid-Care, the nation's first meals-on-wheels program geared specifically for children. Kid-Care currently prepares and delivers more than 21,000 meals each month to the doorsteps of Houston's hungry children.

### Boeing employees donate \$10,000 to Kid-Care meals on wheels program

By Kari Kelley

Founders of the nation's first meals-on-wheels program geared specifically for children recently received a \$10,000 donation from the Boeing Employee Community Fund.

Kid-Care, founded in 1984 by Carol and Hurt Porter, currently prepares and delivers more than 21,000 meals each month to the doorsteps of Houston's hungry children. The mission of the not-for-profit agency is to end hunger among children in America, beginning with the greater Houston area; to address the holistic needs of the child (food, clothing, education, health and cultural) to end the cycle of poverty enabling them to be productive members of the community; and to empower other people throughout the world to implement Kid-Care programs in their communities.

Steve Berry, of the Boeing

Planning & Scheduling Technology team, presented the check on behalf of the Boeing Houston employees. He has been involved personally with Kid-Care since 1994. "I not only believe in what Kid-Care is doing to feed hungry kids, but I wholeheartedly support the way that they do it



by tapping into the city's spirit of compassion, generosity, and volunteerism," Berry said. "In addition, they do all this good work without any government or United Way funding. I am grateful to be part of a company whose employees care and support programs like Kid-Care."

While meals-on-wheels is the main focus, Kid-Care also administers other programs relating to chil-

children's well-being.

"We believe strongly that our children must experience field trips, summer camps, and cultural outings to see what the future may hold," said Carol Porter. "These outings foster a deep desire and drive within the heart of children as they see how others live. They will also know that someone helped them in their journey and the spirit of giving back to the community will stay with them forever."

Boeing has been supporting Clear Lake and the greater Houston area for 30 years through corporate contributions, employee donations and volunteerism. This year, the employees "good neighbor fund" already has donated \$150,000 to the local community. For more information on Kid-Care contact Rudy LaBombarda at (713) 695-5437 or (800) 566-0084.

### USA employees share spirit of giving with St. Nicholas program

Each year children are filled with the joy and happiness that comes with annual Christmas-time activities. But thousands who are less fortunate depend on the giving spirit of those who help to make the Houston St. Nicholas program successful.

United Space Alliance celebrated its St. Nicholas Day this month, coming together to provide gifts for children who often are missing something in their lives.

For many of the children, it was a day of gifts and surprises that they will not have again throughout the

rest of the year.

USA employees helped by providing time and effort. About 100 volunteers helped assemble gift bags for this event during a packing party in the USA cafeteria on Nov. 12. About 20 employees delivered the gifts and toys to South Houston Elementary School and helped in decorating the school classrooms on Dec. 4. The morning of Dec. 5, the volunteers had an opportunity to visit the school and help as the students experienced the joy of receiving and learn a little more about the important lesson of giving.

## JSC Safety Alert

### Use, Modification of Commercial-Off-the-Shelf Equipment

#### What Happened

Use and modification of commercial-off-the-shelf equipment in a manner not intended by the manufacturer was identified as the cause of a potential mishap by the Bldg. 7 Uninterruptible Power System Rigging Mishap Investigation Board.

A commercial data scanner, using a bank of reed relays, failed during thermal vacuum testing of the SEASAT-A Synthetic Aperture Radar Transmitter subassembly. The nature of the problem could have caused the failure to occur any time the sensor was operated with the ground support equipment as it was configured. The problem was caused by using a commercial piece of equipment without looking into its internal nature and considering the consequences to the flight equipment should an internal part fail.

The Drop Dynamics Module is a Class C experiment flown on the shuttle. On its first flight, one of the set of seven commercial power supplies failed when an internal short caused the main control breaker to trip.

#### Safety Implications

All COTS equipment used at JSC must be considered for its intended application, potential hazards and benefits.

#### What You Can Do

All JSC organizations, including contractors, when using or modifying COTS equipment, hardware, materials, or software in a manner not intended by the manufacturer must:

- Consult the manufacturer and identify hazards associated with the intended use.
- Perform the appropriate hazard and fault analyses related to the intended use.
- Mitigate all known or discovered hazards and document the acceptance of any residual risks.
- Conduct reviews to assure problem failure accountability, parts selection, materials and processes, environmental testing, quality assurance, and commercial equipment qualification.

### JSC employee, family adopt three youngsters

By Kazuko Hall-Farley

The spirit of Christmas resides in the hearts of some families year-round. That's the case with JSC employee Ernie Romero and his family who recently welcomed four children into their home.

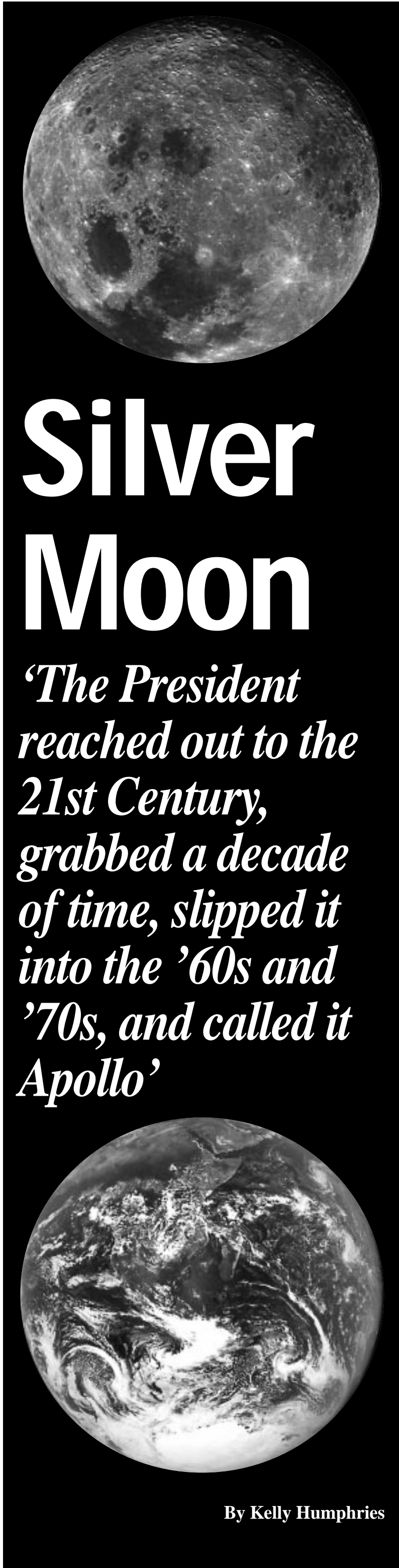
Romero, his wife Cheryl, daughter Sarita, 11, and son, Ernie Jr., 8, now share their meals and rooms with Teresa, 7, Vickie, 6, Sandor, 4, and Carlos, 3.

Romero, who works for Engineering's Manufacturing, Materials and Process Technology Division in Bldg. 9, recalls that they first decided to adopt more than two years ago. They had recently moved to a neighborhood with no other children on the block and were far from their family in California. They asked the kids if they wanted a boy or a girl with whom to play. Sarita immediately settled on a sister and Ernie Jr. a brother. Stumped at first, they soon decided to adopt one of each, hopefully a brother and sister pair. Romero and his wife wanted to help keep a family together if possible.

Soon, they were talking with social workers and looking for the appropriate match. Although many children need homes, the process was rigorous and difficult. Years passed.

Then, he read a newspaper article by Teresa. She shared that her biggest wish was to have parents to call mom and dad and her biggest fear was having her brothers and sister separated. Unfortunately, this fear was their certain fate since social workers couldn't find anyone to take the children. The plan was to separate the boys through different aunts and uncles and separate the girls by having them adopted by different families.

The couple felt something click inside and decided to go for it. It wasn't an easy process, but on Oct. 29, they brought Teresa, Vickie, Sandor and Carlos to their new home, their fourth and final placement. Things have certainly changed for the Romero family, definitely for the bigger and hopefully for the better.



# Silver Moon

*'The President reached out to the 21st Century, grabbed a decade of time, slipped it into the '60s and '70s, and called it Apollo'*

By Kelly Humphries

**T**WENTY-FIVE YEARS AGO TODAY, humans returned from another planet for the last time in this millennium. They brought with them 110 kilograms of lunar material, 2,100 photographs and 22.1 hours of experience scouring the Taurus-Littrow basin for answers to questions almost as old as the human race.

And yet, what the men and women of the Apollo Program set out to learn about the Moon may not have been as important as what they ended up learning about themselves. Or maybe, it's what the world has forgotten about what they learned.

"We were exploring, going to the moon. No one guaranteed what I'd find. No one guaranteed that it would be worthwhile. No one guaranteed that I'd get home," says Gene Cernan, Apollo 17 commander and the last human to leave a footprint on the lunar surface. "But we examined the rewards, the worth of our risks, managed our risks, got as smart as we possibly could, and worked hard to get smarter, and committed ourselves to doing something we believed in and everything it took to support that commitment.

"We had a few tragedies. We killed a few people along the way," Cernan admits. "But look at the reward to mankind. We probably never will—none of us alive today—will fully appreciate the significance of what we've done in the 20th Century in terms of space exploration. Did mankind fully appreciate the significance of what Columbus did when he sailed across the Atlantic within the first 25 years after he did it? Hell no. Was it a hundred years or 200 years? I believe it is going to take that hundred years before we realize and appreciate the significance of those first steps we took out of the cradle and truly ventured into outer space, truly went beyond the gravitational pull of this place we call home, planet Earth, and were literally detached from one planet and captured by another. That's almost science fiction, but we did it, it happened. We didn't just live through it, we worked through it. How important is that? Give me a call in a hundred years and we'll probably have a better idea."

Cernan, now chairman of the board for NASA contractor Johnson Engineering, says perspective may have been the most important piece of data with which he returned.

"Orange soil, scientific experiments, walking on the moon, none of them compare," he says. "I'm going to repeat a quote that I won't claim, but that one of us or some of us along the way made: 'We went to explore the moon, but in fact we discovered the Earth.' By far, orange soils, rocks, volcano origin of the moon—they're scientifically and philosophically important as well. But there's nothing that can replace, from a memory point of view, the overwhelming inspiration and feeling one gets, number one when he's standing a quarter of a million miles away and looking back at this Earth, and then place yourself physically on another planet. You're physically in somewhat of a static position on another planet, standing in sunlight looking at the Earth surrounded by the blackest black you can conceive in your mind.

"That is indeed in our Earthly language a paradox, but in space and on the moon it is truth. That blackness goes on forever, I call it the infinity of space and the infinity of time and the Earth is three-dimensionally within that blackness. Other than the color you bring with you to the moon, it's the only color. And it's blackness, not darkness. Darkness is the absence of light. Blackness is something out there, it's the blackness that's the endlessness of space and time and it is something that does exist. I know it exists because I saw it with my own eyes. Our Earth moves with such purpose and such logic and such beauty through that blackness it is incomprehensible. It's just too beautiful to have happened by accident."

For the first scientist to fly in America's space program, it was much the same. Harrison "Jack" Schmitt, Apollo 17 pilot astronaut and geologist, also subjugates his operational and scientific observations and investigations on the Moon to the grander, philosophical stirrings that arose within.

"When you come down that ladder you're facing the lunar module," Schmitt says. "You're facing primarily objects that are extraordinarily familiar to you. Everything you've seen of the moon has been out the window. Even for the next 10, 15 maybe even 30 minutes of work around the lunar module, you haven't had a chance to step away from it all and see it in context. I think the first time there was an emotional high, if you will, or plateau, was when I moved away from the lunar module about 75 meters to take the first panorama that included the lunar module and the total scene of the valley of Taurus-Littrow. It was at that moment I realized what a magnificent setting we had actually landed in. It is being there that makes these experiences for human beings so extraordinarily meaningful.

"We were in a valley deeper than the Grand Canyon. Some mountains on either side were going up 6- to 7,000 feet. They were brilliantly illuminated by a sun as bright as any New Mexico sun I can ever imagine. The shadows were as black as one could ever imagine, both in the craters and behind the rocks. The sky was absolutely black in spite of this brilliant sun. And of course, hanging over the southwestern mountain that we called the South Massif, there was this beautiful planet Earth in about a two-thirds phase. Unless I can take you there and show it to you, there's no way that I can describe it so that you could share in that experience."

Cernan and Schmitt also agree that what humans learned about themselves from the inside was as important as the perspectives we were able to apply to ourselves from that location so removed from human experience. It may have been the end of the Apollo Program, but the dedication of the thousands who made it possible because they didn't know they couldn't never faltered.

"Many of those thousands lost their jobs when we lifted off, for all intents and purposes," Schmitt remembers. "The dedication that made Apollo possible carried right through the last mission. It wasn't \$16 billion in those year dollars that made Apollo possible, \$22 billion if you count up everything. It was these 16-hour days, 8-day weeks that everybody felt they should, but wanted to work, because they believed what they were doing was the most

important thing they would do with their lives."

"These are truly unsung heroes, the men and women of the space program who were just like us," Cernan says. "Look at the guys on the lunar module on Apollo 17 at Grumman. They had their pink slips before we launched. They knew they were working out of a job. By God, those guys said 'This is going to be the best LEM that ever flew,' and it was. I'm convinced they left us a little message that I read almost every time we went in and out of the spacecraft that said 'God speed the crew of Apollo 17.'"

While the glimpse inward—both at humankind's infinitesimal place in the cosmos and the grandeur of its ability to accomplish when determined—lives large for Apollo today, so too lives a sense of sadness and disappointment about what might have been, tempered by a sense of hope for what might yet be.

"We were really focused on the mission and didn't have a great deal of luxury to worry that it was the last one," remembers Schmitt. "The first time I began to think about that in any serious way, other than regret, was after we had rendezvoused with Ron (Evans) and were closing out the lunar module. We were interrupted, if I remember the sequence correctly, at that point with Jim Fletcher reading President Nixon's statement to us, which included words to the effect that we would be the last to visit the moon this century. I remember that upsetting me greatly, one because I thought it was an unnecessary remark even if true, and two, I hoped that we would prove him wrong."

"I would say it's the damndest disappointment I think I've ever had. It was almost with a state of sorrow that we lifted off for that last time with the crew from the surface. When we brought that LEM up it was almost a time of mourning," says Gene Kranz, who along with Gerry Griffin and Neil Hutchinson, was an Apollo 17 flight director.

"I think we had the capability with the Apollo system to establish at a minimum a Little America-type base that we could visit periodically using that same technology," says Schmitt, who went on to become a senator from New Mexico, and now is at the University of Wisconsin-Madison teaching a course called "Resources from Space." "To have shut down that assembly line right when it had proven itself so remarkably successful was a terrible historical error even though at that time we did not know why it was going to be so very important to maintain a lunar base presence. Of course, 10 years later we rediscovered the energy resources that are represented both in the soils of the moon relative to the solar wind Helium 3, and of course the surface of the moon that others have proposed as a location for solar energy collectors. The history of the West, the history of humankind in general should have told us that having opened up a new geographic province such as the moon, it would prove to have value far beyond anything that we could anticipate at that time."

Griffin, who is starting work on his fourth movie as a technical adviser including "Apollo 13" and chairing the board of public company headquartered in California, says NASA needs to be patient and ready for when it is called upon to reach out for interplanetary goals once again.

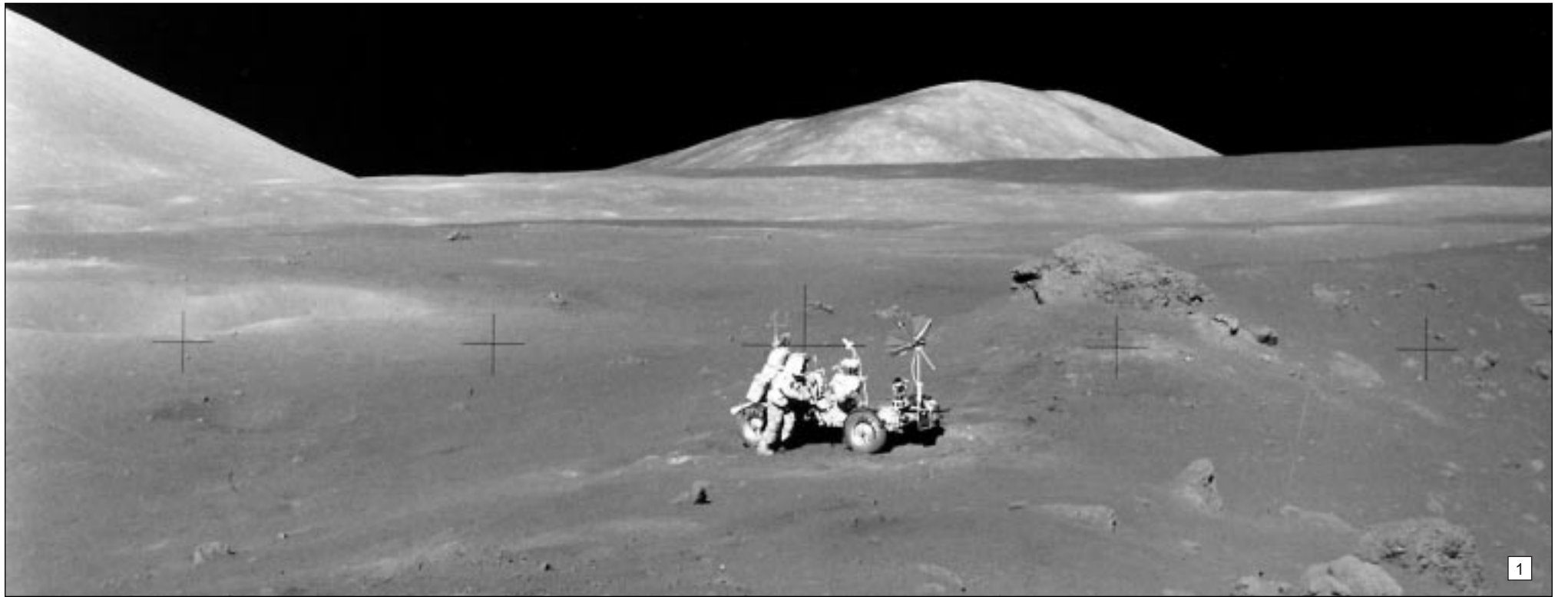
"It was with mixed emotions when we got to the end," Griffin says. "On one hand we had this great team in place and we had done six landings, seven of them if we had made Apollo 13. All the hardware was working great. We were getting great science. On the other hand, it was time to get on with the rest of the American space program. If all we were going to do was explore the moon, I believe we would have run out of gas on the political front pretty fast.

"We'll have to wait until we've got more things in line both politically and technologically that we just don't have today," predicts Griffin, who served as JSC director a decade ago. "Let's face it, the lunar program had a certain amount of space race with the Soviets involved with it. We don't have that threat right now. I don't think we can 'generate' the energy we had in the Apollo by just deciding that's what we're going to do—and I'm talking about the space community. When you look at the Apollo program, a number of things got into synch. We had a balanced budget, essentially. We had good political leadership that was bold, ready to react. We had a threat. The technology was in place or at least was on the drawing board. You can't force those things to happen.

"What the space program of today has got to do is try to be ready—and I think the agency is but it is very difficult—I think they've got to be ready so that when the factors get into alignment again where something like Apollo can happen, we've got to be ready to take advantage of it. It is a challenge to keep the team in place to the degree we can with the assets like the Johnson Space Center and others, and keep the facilities right and keep the interest of the young people that we seem to be able to do so far to keep them coming into the agency and then be ready when these things get into alignment so that we can either go back to the moon or on to Mars or wherever. I don't know how long it will be before we leave this planet again, but I think you can measure it in a few decades rather than a few years."

In their silver anniversary analysis of the legacy of the Apollo Program, two men who went to the moon on Apollo 17 and two men who led the flight control teams that helped get them there and back safely agree that it is greater than the sum of its technological, scientific and philosophical parts. It is, at long last, a matter of the human heart.

"The legacy is understanding the commitment that people were able to make," says Cernan. "Understanding their dedication to do something that a lot of people thought couldn't be done. Their willingness to accept a challenge knowing that there was no guarantee of success. Their willingness to accept a challenge that had national pride at stake as well as a timetable. This was not just one jump up the rung of the ladder. Apollo was a monumental discontinuity in history. We went along with Mercury, seeing people could fly in space. Then all of a sudden, to me it's like the President reached out to the 21st Century, grabbed a decade of time, slipped it into the '60s and '70s, and called it Apollo." □



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S97-17473

Top to bottom, left to right:

- 1) A view of the lunar landscape at Station 4 (Shorty Crater) showing Scientist-Astronaut Harrison Schmitt working at the lunar roving vehicle during the second Apollo 17 extravehicular activity.
- 2) Astronaut Ron Evans, who died in 1990, is photographed performing a space walk during the Apollo 17 spacecraft's trans-Earth coast, retrieving film cassettes from the Lunar Sounding Camera and Panoramic Camera.
- 3) Apollo 17 Commander Gene Cernan, today.
- 4) Apollo 17 Flight Directors Neil Hutchinson, Eugene Kranz and Gerald Griffin in the Mission Operations Control Room.
- 5) Cernan stands beside the lunar roving vehicle during the third extravehicular activity.
- 6) The Apollo 17 command module, with astronauts Cernan, Evans and Schmitt aboard, near splashdown in the South Pacific Ocean. The splashdown occurred at 1:24:59 p.m. Dec. 19, 1972.
- 7) Schmitt, with his adjustable sampling scoop, heads for a selected rock on the lunar surface to retrieve the sample for study.
- 8) The plaque left on the moon by the Apollo 17 crew.



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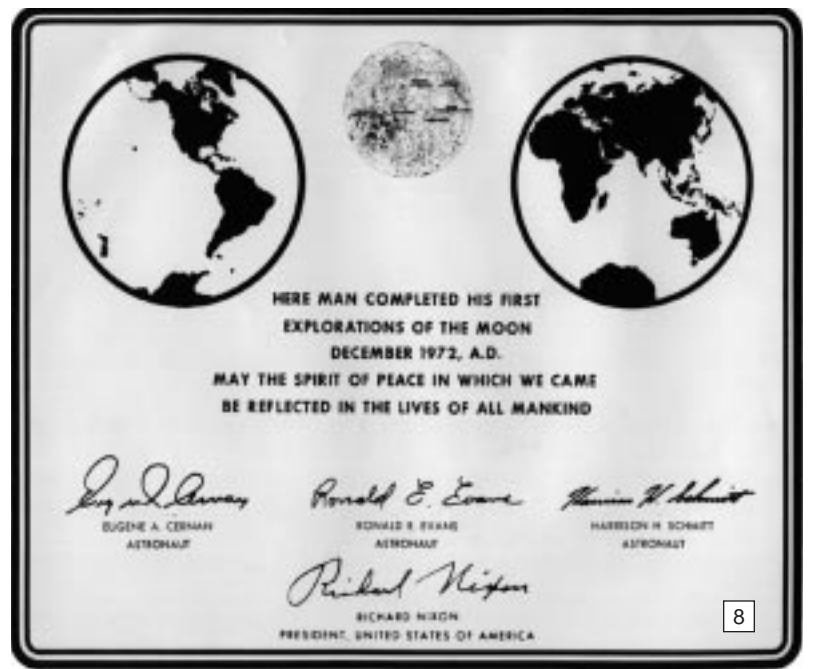
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# 25 Years Ago at MSC

## Newsman, MSC employee say space program is significant

Reprinted from the Dec. 22, 1972, issue of Space News Roundup

At the beginning of the space program, public support and enthusiasm were almost overwhelming.

Then when lunar exploration began, everyone anxiously awaited the moment the first man set foot on the moon.

Since Apollo 11, however, it seems that public support of the space program has decreased somewhat.

Questions often arise concerning the significance of the space program in general and the Apollo program in particular.

Following are excerpts from statements made by two men, one program in particular, a NASA employee—Thomas L. Wilson of MSC's Flight Simulation Branch, and the other a non-NASA employee—Howard K. Smith, well-known news commentator of ABC.

Both men strongly support the space program and attempt to assert significance to its past and future.

The first ideas, those of Howard K. Smith, were reprinted from the American Institute of Aeronautics and Astronautics newsletter:

Every moon trip, enthusiasm is a little less, the cry a lot louder—stop squandering money in the sky when we can't solve problems on earth.

Every moon trip I cannot forebear answering—that money in the sky does solve problems on earth, as nothing else would. Think of its effects so far. It provoked the National Defense Education Act, which has made U.S. higher education in mastery of the earth the best in the world. Youth from poor nations crowd our colleges to learn from it how to meet their problems at home.

The rich spin-offs are in the thousands, like the pacemaker, lengthening life against our most costly disease ... satellite communication which brought us live contact with Peking and is the first condition for one day making the world one ... computer technology which has become our most competitive, indeed world-dominant, export in a time when our older industries lag.

If there is ever a disarmed world, it will be because spy satellites of the space program have opened every nation's secrets to the other's inspection.

And the very system of problem-solving it invented provides team methods we would not otherwise have known to save the cities and clean the environment, whenever

Congress gets around to legislation to apply those remarkable methods.

I mention only in passing the vast expansion of knowledge and resources, bound to eventuate in sudden discoveries to come but which could not have happened without this long investment.

The space program is the one unconditionally good thing we have done lately. Cutting it back after this beginning is one of the silliest.

The next statements were printed with permission from Thomas L. Wilson. Wilson hopes to get his ideas published in Science magazine but first wanted to share some of them with fellow MSC employees:

The finest thing that man can do is what he does for Man. With the End of the Apollo program now at hand in Apollo 17, it is fitting and proper to assess the meaning of Man's first lunar landings not only in terms of human science but human understanding as well. What does it mean for Man?

The answer lies in search for self. In Man's search for himself, the moon has proven to be an immutable gift from time, a rosetta stone for endless years the same.

Living in an age of anxiety and a time of uncertainly, little did we see in nature that was ours. We had forsaken ourselves and the wilderness bestowed upon us by our mother Earth.

The despair of modern man and the insecurity of our time had conspired against him. A whole generation had lost its way in the dark wilderness of our minds, with no clear picture of what we were or what we ought to be.

But Apollo 11 brought about a decided end to that. For a few moments there was peace on Earth while Man looked aloft, taking his thoughts away from himself toward something bigger than his comparison with other men.

For once we could see beyond the miserable duration of human life.

Through Apollo we have seen ourselves reaching out, not to exploit but to explore and to understand to understand ourselves and the world about us. We have lit a candle so that man can stop cursing darkness and learn how to conquer himself.

Now we understand better why we went to the moon and why we shall go beyond. We did not just go there just in the name of human science, for science is not enough. Nor did we go there to mend the broken wings of man. We went there to save the Dignity of Man.

It is man's space. It is the Alpha and the Omega, the Beginning and the End of Apollo.



JSC Photo S72-55065

Above: Apollo 17 Scientist-Astronaut Harrison H. Schmitt is seen anchoring the geophone module with a flag in this reproduction taken from a color television transmission made by the camera mounted on the Lunar Roving Vehicle. The geophone module is part of the Lunar Seismic Profiling Experiment, a component of the Apollo Lunar Surface Experiments Package. Other ALSEP components are visible in the picture. Left: The Apollo 17 astronauts bid the Taurus-Littrow landing site farewell as the Lunar Module "Challenger" makes its spectacular liftoff from the lunar surface. The Lunar Roving Vehicle camera, remotely controlled from the Mission Control Center in Houston, made it possible for people on Earth to watch the event.



JSC Photo S72-55421

## Author reviews writings of 25 years ago

Tom Wilson, the Rice graduate student who wrote part of the 1972 perspective piece on Apollo, still works at JSC. Then, he was a guidance and navigation flight instructor for Apollo astronauts; now, he is studying cosmic ray astrophysics in the Earth Science and Solar System Exploration Division. He also has written a book intended to justify a return to the Moon for scientific purposes.

"I cannot help but compare the lasting legacy of Apollo 17 with that of Apollo 11," he said this month after rereading what he wrote in 1972. "The latter was a discovery, an awaken-

ing to something we knew was there and we finally proved we could do it. But Apollo 17 was about exploration, that haunting wanderlust that stirs the human spirit to search through the unknown and do the impossible.

"Some of us saw it as a defeat because it was the last flight of the Apollo program and the end something special. However, the believers have never accepted defeat, and to this day we see Apollo 17 as only a magnificent beginning and not an end, the first step in a long incredible journey called space exploration," Wilson said.

## Gilruth Center News

**Hours:** The Gilruth Center is open from 6:30 a.m.-10 p.m. Monday-Thursday, 6:30 a.m.-9 p.m. Friday, and 9 a.m.-2 p.m. Saturday.

**Sign up policy:** All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a yellow Gilruth or weight room badge. Classes tend to fill up two weeks in advance. Payment must be made in full, in exact change or by check, at the time of registration. No registration will be taken by telephone. For more information, call x30304.

**Gilruth badges:** Required for use of the Gilruth Center. Employees, spouses, eligible dependents, NASA retirees and spouses may apply for photo identification badges from 7:30 a.m.-9 p.m. Monday-Friday; and 9 a.m.-2 p.m. Saturdays. Cost is \$10. Dependents must be between 16 and 23 years old.

**Hatha Yoga:** A stress relieving, stretching and breathing exercise routine to unite body, mind and spirit. Classes meet from 5:30-6:30 p.m. Thursdays. Cost is \$40 for eight weeks.

**Nutrition intervention program:** A six-week program to learn more about the role diet and nutrition play in health, including lectures, private consultations with a dietitian and blood analysis. Program is open to all employees, contractors and spouses. For more information call Tammie Shaw at x32980.

**Defensive driving:** One-day course is offered once a month. Pre-registration required. Cost is \$25. Call for next available class.

**Stamp club:** Meets at 7 p.m. every second and fourth Monday in Rm. 216.

**Weight safety:** Required course for employees wishing to use the weight room will be offered from 8-9:30 p.m. Call for next available class. Pre-registration is required. Cost is \$5. Annual weight room use fee is \$90. Additional family members are \$50.

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

**Aikido:** Introductory martial arts class meets from 5:15-6:15 p.m. Tuesday and Wednesday. Cost is \$35 per month. New classes begin the first of each month.

**Step/Bench aerobics:** Classes meet from 5:15-6:15 p.m. Monday, Tuesdays and Thursdays. Cost is \$32 for eight weeks. Kristen Taragzewski, instructor.

**Ballroom dancing:** Beginner classes meet from 7-8:15 p.m. Thursdays. Intermediate and advanced classes meet from 8:15-9:30 p.m. Cost is \$60 per couple.

**Country and western dancing:** Beginner class meets 7-8:30 p.m. Monday. Advanced class (must know basic steps to all dances) meets 8:30-10 p.m. Monday. Cost is \$20 per couple.

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

**Gilruth Home Page:** Check out all activities at the Gilruth online at: <http://www4.jsc.nasa.gov/ah/exceaa/Gilruth/Gilruth.htm>

## 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 and in the Bldg. 3 Exchange Store from 7 a.m.-4 p.m. Monday - Friday. For more information call x35350 or x30990.

**EAA New Year's Eve Dinner/Dance:** Dec. 31, \$27.50 per person

**Moody Gardens:** Tickets are \$9.50 for two of four events

**Space Center Houston:** Adult \$8.95; children (4-11) \$6.40 JSC civil service employees free.

**Movie discounts:** General Cinema, \$5.25; AMC Theater, \$4.50; Sony Loew's Theater, \$4.75

**Shirts:** JSC logo T-shirt, \$10, polo style, \$23; International Space Station logo golf shirts, \$26 and \$28

**Stamps:** Book of 20, \$6.40

**1998 Franklin Planner** replacement refill orders being taken now.

**Sweetwater Pecans:** Orders are being taken now; cost is \$5.75 per pound.

**Metro passes:** Tokens and value cards available.

**Book available:** *Suddenly Tomorrow Came: A History of Johnson Space Center.*

**Upcoming events:** EAA Spring Break Ireland Trip: March 21-29, \$1,399 per person, double occupancy (\$200 deposit per person, final payment due Jan. 21).

## Roundup Deadlines

The Space News Roundup is published every other Friday. Story ideas should be submitted as far in advance as possible, but no later than two weeks prior to the date of publication.

The deadline for Dates & Data calendar items is three weeks prior to the date of publication.

Stories and ideas should be submitted to Kelly Humphries in Bldg. 2, Rm. 180, or via e-mail to [kelly.o.humphries1@jsc.nasa.gov](mailto:kelly.o.humphries1@jsc.nasa.gov)



JSC Photo 97-17457 by Steve Candler

JSC Director George Abbey welcomes Goddard Space Flight Center Director Joseph Rothenberg to the center for his George M. Low Leadership Series lecture.

## New era in exploration requires vision

Goddard Space Flight Center Director Joseph Rothenberg told JSC managers early this month that the new era of space exploration, where speed, cost and quality are kings, have forced him to "jump-start" change in his organization.

Now, the cost of developing and putting into orbit an unmanned science satellite has dropped from its average cost of \$500 million and taking five years to a point where a new project can be completed in as little as 18 months for a tenth of the cost.

"This is not the exception," Rothenberg said at the December George M. Low Leadership Lecture. "This is not the hero mode. Anybody can do something in a short period of time if you put all the resources, convince everybody it's critical to the nation and work through weekends, nights, round the clock."

Rothenberg, who has been Goddard's director since July 1995, said one of his first efforts as director of the center, at a time when budget and personnel cuts were looming fast, was to identify the center's customers for its concurrent projects.

He said he also was able to spur the Goddard management team into fighting a 35-year-old tradition of being "insular," and competing with industry and academia instead of working with them. The culture worked to eliminate all risk to its projects and was organized along technical lines. On top of that, he was being told to cut 2,600 contractors and 550 civil servants, reduce the center's budget by \$550 million and yet not lose any program content.

"Everybody knows that the Cold War is over. No longer are we racing somebody. No longer are we an enti-

tlement," Rothenberg said. "We needed to be relevant. We needed to not compete with industry and academia. We needed to understand how to complement them, how to take the risks that they weren't willing to take. We needed to bring them in as partners. We needed to look to technology and architecture our spacecraft and how we operated around the technology of the future, not the technology of the past."

Rothenberg said he began by setting a vision that the center would be a national resource in partnership with academia and industry, with civil servants doing hands-on work and taking risks that academia and industry couldn't afford to take.

The George M. Low Leadership Series is intended to stimulate discussion and expand the vision of the center's leaders.

## People on the Move

Human Resources reports the following personnel changes as of December 10:

### Key Management Assignments

Dave Kanipe was selected as deputy chief of Engineering's Aeroscience and Flight Mechanics Division.

Irene Verinder was selected as deputy chief of Engineering's Manufacturing and Process Technology Division

### Additions to the Workforce

Karen Flynn joins the Office of the Chief Information Office as a secretary.

Andy Roberts joins the Flight Operations Branch of the Flight Crew Operations Directorate as a pilot.

### Promotions

Marge Davis was selected as a facility management specialist in the Center Operations Directorate.

### Reassignments Between Directorates

Duane Hightower moves from the Safety, Reliability, and Quality Assurance Office to the International Space Station Program Office.

Mike Demasie moves from the Space Operations Management Office to the EVA Project Office.

Larry Gana moves from the Space Shuttle Program Office to the EVA Project Office.

### Reassignments to Other Centers

Rob Kolb of the Business Management Directorate moves to Goddard Space Flight Center.

Kellie Murray of the Business Management Directorate moves to Goddard Space Flight Center.

### Retirements

Don Blevins of the Engineering Directorate.

Harry St. John of the Engineering Directorate.

Russ Morton of the Space Shuttle Program Office.

Jimie Maley of the Space Operations Management Office.

### Resignations

Hal Taylor of the Safety, Reliability, and Quality Assurance Office.



JSC Photo 97-16723

JSC Director George Abbey and Space Shuttle Vehicle Engineering Office Manager Ron Dittmore present the Marilyn J. Bocking Award for Secretarial Excellence to Diane Thoren.

## Thoren earns top secretary award

Diane Thoren, secretary to the manager of the Space Shuttle Vehicle Engineering Office, recently received the Marilyn J. Bocking Award for Secretarial Excellence.

Thoren was nominated for her superior secretarial skills and her knowledge of the Space Shuttle Program, as well as her initiative, leadership and dedication.

In particular, Thoren was recognized for support that was "critical to the smooth transition" when her manager moved to the new position and added two deputy managers to the organization.

She also was cited for developing a computer calendar methodology used for shuttle program integration, and for her superior talent in training office education students assigned to the organization.

## NASA honors defense contract auditor

The manager of the Defense Contract Audit Agency in Houston recently received a special award from NASA's Inspector General for his work in exposing fraud, waste and abuse in NASA programs.

Michael McConnell, branch manager of the DCAA in Houston for the past five years, received the NASA Medal for Outstanding Leadership in November. He was primarily responsible for a \$220 million settlement involving a NASA contractor in 1989, and since 1992 has been responsible for \$300 million in savings from various NASA and Department of Defense contractors, including a key role in the largest count indictment and conviction in NASA history.



Michael McConnell of the Defense Contract Audit Agency in Houston received the NASA Medal for Outstanding Leadership for his work detecting and combating fraud, waste and abuse. To his right is Doug Smith, the special agent in charge of JSC's Inspector General Office.

## Dates & Data

### Dec. 25

**Christmas Day:** Most JSC offices will be closed Dec. 25 and 26 in observance of the Christmas holiday.

### Jan. 1

**New Years Day:** Most JSC offices will be closed in observance of the New Years Day holiday.

### Jan. 7

**Astronomy seminar:** The JSC Astronomy Club will meet at noon Jan. 7 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For more information, call Al Jackson at x35037.

**Spaceland Toastmasters meet:** The Spaceland Toastmasters will meet at 7 a.m. Jan. 7 at the House of Prayer Lutheran Church. For more information, call Jeannette Darcy at x45752.

**Communicators meet:** The Clear Lake Communicators will meet at 11:30 a.m. Jan. 7 at Lockheed Martin, 555 Forge River Road. For more information, contact Richard Lehman at 281-333-6004 or Melissa Sommers at 281-332-0698.

**Spaceteam Toastmasters meet:** The Spaceteam Toastmasters will meet at 11:30 a.m. Jan. 7 at United Space Alliance, 600 Gemini. For details, call Patricia Blackwell at 281-282-4302 or Brian Collins at x35190.

### Jan. 8

**MAES meets:** The Society of Mexican American Engineers and Scientists will meet at 5 p.m. Jan. 8 at Mario's Pizza in Webster. For details, call Gerard Valle at x38835.

### Jan. 9

**Astronomers meet:** The JSC Astronomical Society will meet at 7:30 p.m. Jan. 9 at the Center for Advanced Space Studies, 3600 Bay Area Blvd. For more information, call Chuck Shaw at x35416.

### Jan. 13

**Aero club meets:** The Bay Area Aero Club will meet at 7 p.m. Jan. 13 at the Houston Gulf Airport clubhouse at 2750 FM 1266 in League City. For more information call Larry Hendrickson at x32050.

**NPMA meets:** The National Property Management Association

will meet at 5 p.m. Jan. 13 at Robinette and Doyle Caterers, 216 Kirby in Seabrook. Dinner costs \$14. For more information call Sina Hawsey at x36582.

### Jan. 14

**Astronomy seminar:** The JSC Astronomy Club will meet at noon Jan. 14 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For more information, call Al Jackson at x35037.

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4302 or Brian Collins at x35190.

**PSI meets:** The Clear Lake/NASA Chapter of Professional Secretaries International will meet at 5:30 p.m. Jan. 14 at the Holiday Inn, NASA Road 1. Dinner costs \$13. For details, call Elaine Kemp at x30556.

### Jan. 15

**Directors meet:** The Space Family Education board of directors will meet at 11:30 a.m. Jan. 15 in Bldg. 45, Rm. 712D. For more information on this open meeting, call Gretchen Thomas at x37664.

### Jan. 16

**Roundup out:** The first 1998 issue of Space News Roundup will be distributed Jan. 16. For more information, call x38648.

### Jan. 21

**Astronomy seminar:** The JSC Astronomy Club will meet at noon Jan. 21 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For more information, call Al Jackson at x35037.

**Spaceland Toastmasters meet:** The Spaceland Toastmasters will meet at 7 a.m. Jan. 21 at the House

of Prayer Lutheran Church. For more information, call Jeannette Darcy at x45752.

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**Scuba club meets:** The Lunarflins will meet at 7:30 p.m. Jan. 21 at the Redfish Restaurant under the Kemah/Seabrook bridge, Seabrook side. For more information, call Fred Toole at x33201.

### Jan. 28

**Astronomy seminar:** The JSC Astronomy Club will meet at noon Jan. 28 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For more information, call Al Jackson at x35037.

## NASA Briefs

### TRW notifies NASA AXAF will be late

TRW Space and Electronics Group, Redondo Beach, Calif., has notified NASA that it will be unable to deliver the Advanced X-ray Astrophysics Facility to Kennedy Space Center on June 1, 1998, as required by contract, because it has experienced delays in assembly and testing of the facility. TRW is NASA's prime contractor for the observatory. NASA and contractor officials met at NASA Headquarters to discuss the issue. While no new delivery date was agreed upon, the agency has directed TRW to develop a plan of action that would show how the contractor can minimize impact to the June 1 delivery. Although a delivery delay could delay launch, currently scheduled for August 1998 on STS-93, the full impact isn't known.

### NASA sharing efforts for far-future concepts

Many people wonder when we will be able to travel to distant solar systems as easily as envisioned in science fiction. Discover NASA's perspective on the prospects that exist today for achieving such far-future visions via a new World Wide Web site called, "Warp Drive, When?" Explore the site at: <http://www.lerc.nasa.gov/WWW/PAO/warp.htm>. This web site explains the challenges of interstellar travel, the prospects and limitations of existing propulsion ideas, and the prospects emerging from science that may one day provide the breakthroughs needed to enable practical interstellar voyages. For a look at what NASA is doing to achieve such breakthroughs, another web site is available about the new NASA Breakthrough Propulsion Physics program: <http://www.lerc.nasa.gov/WWW/bpp/>

### Onizuka family accepts memorial

NASA representatives presented a memorial plaque to dedicate the world altitude record for a propeller-driven aircraft to the memory of Col. Ellison Onizuka on Dec. 10. The plaque was presented to the Onizuka family and the Hawaiian community in a ceremony at the U.S. Navy's Pacific Missile Range Facility, Barking Sands, Kauai. Another plaque will be provided to the Onizuka Museum on Kona. Onizuka, Hawaii's first astronaut, was killed in the *Challenger* accident in January 1986. The record of 71,530 feet was set by the solar-powered Pathfinder on July 7. The remotely piloted aircraft is part of NASA's Environmental Research Aircraft and Sensor Technology program.

## Abbey wishes employees joyous holiday season

(Continued from Page 1)

Our science efforts have also been impressive this year. Excellent research has been done aboard the Mir and the Shuttle, efforts that are critical to our understanding of how humans are affected by the space environment. And with the establishment of the Space Biomedical Research Institute, we have taken a critical step in demonstrating yet another of the advantages partnering with the outside community can bring to the space program.

We should all take pride in our many other efforts to reach out to the community, understanding that their support is critical to our future. Our agreement with the Clear Creek Independent School District to build a middle school on JSC grounds is a

historic achievement, and a visible indicator of our support of the nation's efforts to improve the education of our young people, particularly in math and science. Despite some weather challenges, the Center's efforts in support of Inspection 97 were excellent, and we also had another outstanding Open House this year. We have made commendable progress, across the board, in our efforts to build mutually beneficial relationships with the outside community, and this progress will pay many dividends in the future.

The Center is taking on difficult challenges in many other important areas, many of which will have a long-term effect on our future activities. The efforts of our Space Operations Management team to bring a consolidated space operations contract on

line will set the stage for improved services at reduced cost. And our activities in support of ISO 9001 certification have already begun to bear fruit in the form of improved processes and a clearer understanding of quality principles.

The White Sands Test Facility continues to demonstrate world class expertise with an outstanding year of performance. It also continues to strive for efficiencies in operations as it moves forward to consolidate support activities for the test facility and the tracking and data relay ground stations. We will miss Grady McCright, the director, and wish him well in his retirement. Joe Fries, his successor, I'm sure make 1998 and the coming years productive ones for White Sands.

Finally, let me say that we continue to make significant progress in our safety efforts. We recently posted one of the safest quarters on record, demonstrating that our efforts to raise awareness levels and educate our people about this critical subject have had the intended effect. As you celebrate the holiday season, I encourage you to keep safety uppermost in your mind.

This is a great team, with many exciting challenges ahead of us. Our experience this year has proven that we can meet these challenges with creativity, innovation and hard work. I thank you all for your dedication, your can-do spirit, and your many outstanding contributions to our future in space. My heartfelt wishes to you and your families for a joyous holiday season.



JSC Photo 97-17462 by Steve Candler

**GOOD CAUSE**—JSC Director George Abbey drops a toy in to the "Toys for Tots" donation box in the Bldg. 3 cafeteria on Dec. 2. Astronaut candidate and Marine Maj. Charles Hobaugh, behind Abbey, and Sgt. Pat Moser, Houston coordinator for Toys for Tots with Marine Reserve Center in Houston witnessed the start of the drive to collect toys for underprivileged children over the holidays.

## JSC gives half a million

Once again, JSC employees have set a record for generosity to those in need. Almost 2,200 employees have contributed \$502,425 to this year's Combined Federal Campaign—the first time that the half-million dollar mark has been reached.

This is more than \$22,000 above the Center's \$480,000 goal. In addition, the percent of employees participating in this year's campaign increased over last year's and it was the first time in many years that the percentage of givers rose.

"A special thank you goes to all those JSC employees who gave so generously as well as to the organization coordinators/canvassers who helped to make this happen," said Coordinator Teresa Sullivan.

Seven of the largest organizations reached 100 percent participation and 15 organizations exceeded their dollar goal. The Human Resources Office led the way with 248 percent of its goal and the organization with the next highest percentage of its goal was the Equal Opportunity Programs Office with 222 percent.

## Roundup takes holiday break until Jan. 16

Today's Space News Roundup will be the last of 1997, as the next scheduled date of publication would have been Jan. 2.

The first Roundup of 1998 will be published on Jan. 16.

The deadline for community and employee awards stories for the Jan. 16 Roundup will be 5 p.m. Jan. 5. The deadline for Dates and Data calendar submissions will be 5 p.m. Jan. 7.

## JSC Quality System seeking certification again in February

By Leon Blum

A November registration audit of the JSC Quality System found only one major non-conforming element, and a group of top managers is working to correct the problem in time for ISO 9001 certification in February.

The National Quality Assurance registration audit, conducted Nov. 17-21, found one the major non-conformance in section 4.14, "Corrective and Preventive Action." The audit also identified 23 minor non-conforming elements and made nine observations that JSC must address.

A working group of deputy directors from the various JSC organizations has been convened to develop the corrective action plan required to respond to the major non-conformance. A draft corrective action plan was to be reviewed by JSC senior managers on Dec. 18 and forwarded to NQA no later than Dec. 22.

The finding of a major non-conformance will slightly delay JSC's receipt of an ISO 9001 certification. NQA has given JSC a "grace period" until late February 1998, to effectively respond to the specific corrective action issues raised during the November 1997 audit. Once JSC has completed the necessary activities, NQA will re-audit the Corrective Action and Prevention portions of the JSC Quality System.

When NQA is satisfied that the Corrective and Preventive Action

System has been effectively implemented, it will recommend JSC for ISO 9001 Certification. If JSC doesn't pass the audit in February, it will be faced with a full re-audit of the quality system in the summer of 1998.

Corrective action refers to those activities required to be performed when a non-conformance is identified, to prevent its reoccurrence. The NQA view of corrective action's scope is significantly broader than what JSC had been used to previously, which leads us to apply corrective action activities mainly in the context of hardware or software anomalies. The expanded ISO 9001 view of corrective action applies it to all processes for which we have responsibility. This includes such things as internal and external customer issues, supplier and sub-contractor issues, resource issues, quality system issues, and general management operations. This view is consistent with the concept that ISO 9001 is more a "management" system than it is a "quality" system.

JSC civil servants and contractors should expect actions to be initiated after the year end that address improving requirements, training extensively in corrective and preventive action, and re-looking at some of the cultural and management factors that may have been impediments to successful implementation of corrective and preventive action at JSC.

## Embry-Riddle to offer classes at Ellington

JSC's satellite campus for Embry-Riddle Aeronautical University is accepting registration until Jan. 5.

Undergraduate classes at Ellington Field will include: Basic Algebra and Trigonometry, from 5:30-8 p.m. Tuesdays and Thursdays; Social Responsibility and Ethics in Management, from 5:30-10 p.m. Fridays; Public Administration, from 5:30-10 p.m. Mondays; and Flight Physiology, from 8 a.m.-5 p.m. Saturdays.

The U.S. Coast Guard at Ellington

Field also is sponsoring a master of science in aeronautical science operations or management. Classes will include: Human Factors in Aviation, from 5-9:30 p.m. Fridays and 8 a.m.-5 p.m. Saturdays, Air Carrier Operations, from 5:30-10 p.m. Mondays; and MAS 609 Aircraft Maintenance Management, from 5:30-10 p.m. Wednesdays.

For registration information, call Larry Powers, Houston resident director for ERAU, at x49456.

## Station taking shape as technicians ring in new year

(Continued from Page 2)

manager. "By the end of the 1998 fiscal year, we will be more than 80 percent complete with our portion of the program."

Other station hardware that has accomplished recent manufacturing milestones includes a test article called the S0 truss, planned to be the first segment of the 360-foot long truss that will be the backbone of the ISS. The test article was removed from the assembly fixture in a Boeing clean room at Huntington Beach, Calif., to make way for the flight unit. The center truss segment for the ISS is 44 feet long, 15 feet in diameter and will weigh about 33,000 pounds at launch. It will be launched and attached on orbit to the laboratory module in early 2000, the first of nine such

truss segments that will hold the solar arrays and distribute power, data, communications and thermal systems.

The first station solar arrays and equipment for generating electrical power, a photovoltaic module package designated the P6 cargo element, is now at Marshall Space Flight Center for an extensive battery of structural tests. The photovoltaic module will generate, store and distribute electrical power.

The completed station will include four scucy modules, all of which are designed and developed at Boeing's Rocketdyne Propulsion & Power facility in Canoga Park, Calif.

Earlier this fall, the development of the U.S. laboratory module passed a milestone when electrical power was supplied to it for the first

time at Marshall's space station manufacturing building. To conduct the lab "power-on" test, electricity was delivered from a power supply rack outside the module to simulate the solar array power that would be provided on-orbit.

"This power-on test was a huge milestone because it marks the beginning of our ground test activities and it is a good measure of the Lab assembly status," said Steve Goo, Boeing lab manager.

Upcoming milestones for the laboratory module include multi-rack testing, the installation of racks, the beginning of software integration and finally shipment to the Kennedy Space Center in Florida, targeted for August 1998. The lab is scheduled to be launched aboard STS-98 in May 1999.

Meanwhile at JSC, as the first station elements near launch, Boeing is joining with NASA to build an ISS Systems Integration Lab at JSC's Sonny Carter Training Facility. The new lab will allow integrated testing of station hardware and software.

"Without this capability we would rely solely on computer simulations to make sure that the equipment was properly integrated," said Michael Raftery, Boeing ISIL project manager. "Now we will have actual hardware together in one lab to give us an extra level of assurance that the equipment will work properly on-orbit."

"The excitement is definitely building in the hearts and minds of people working on this program," Stone said.



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The Roundup office is in Bldg. 2, Rm. 181. The mail code is AP3. The main Roundup telephone number is x38648, and the fax number is x45165. Electronic mail messages may be directed to [kelly.o.humphries1@jsc.nasa.gov](mailto:kelly.o.humphries1@jsc.nasa.gov).

Editor . . . . . Kelly Humphries