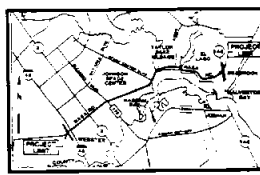




The second Tracking and Data Relay Satellite will give 85 percent coverage of each Shuttle orbit. Story on Page 3.



A public hearing to discuss proposed NASA Road 1 changes has been scheduled. Story on Page 4.

Space News Roundup

Vol. 27

June 10, 1988

No. 13

New look for weekly Roundup

Today, the venerable Space News Roundup becomes weekly.

Several changes in content, typography and layout will help signal conversion of the official JSC newspaper, which now will be published every Friday.

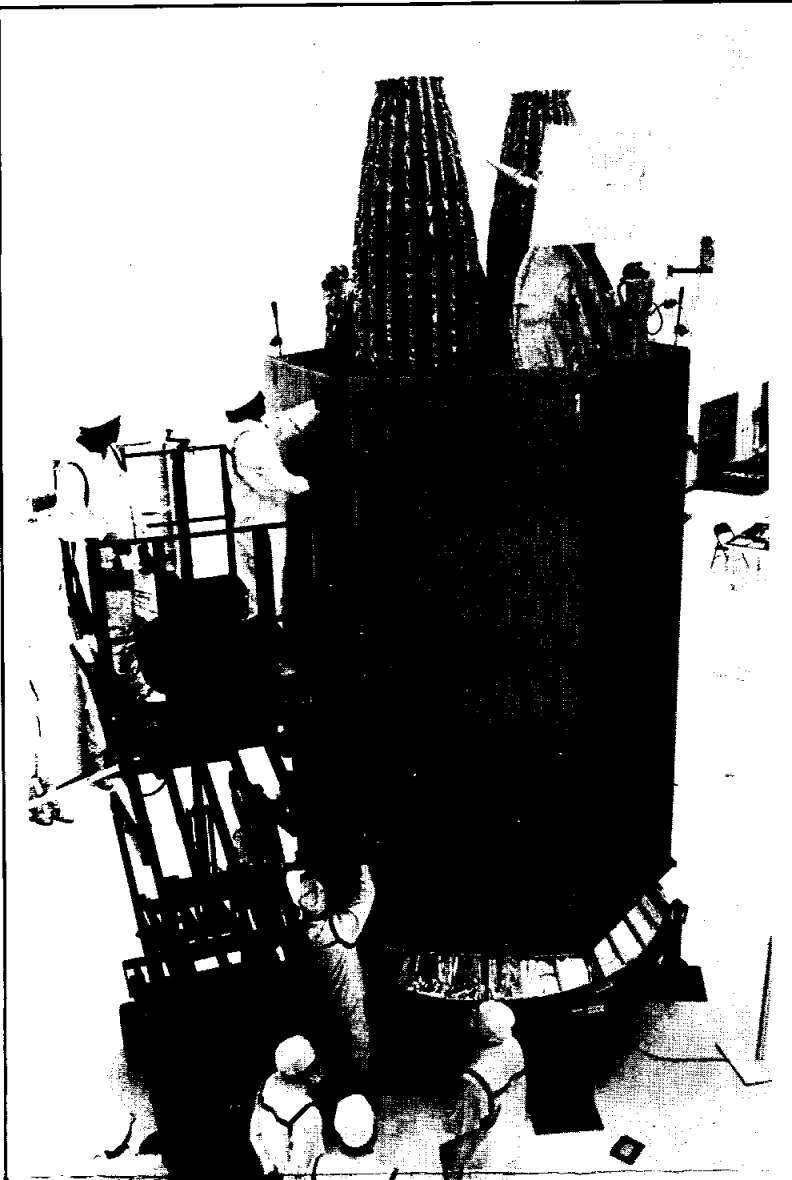
Increasing the frequency of publication is one of several actions the Public Affairs Office is taking under the auspices of JSC's Strategic Game Plan to expand and improve internal communication throughout the center, said Public Affairs Director Harold S. Stall.

"Well informed people make better decisions and are more effective in their jobs," Stall said. "We're trying to make the Roundup a more timely vehicle for getting important information to all JSC employees. There's so much going on at this center and throughout NASA that we can no longer keep people up-to-date by publishing four pages every other week."

Timeliness is expected to be improved by a new production and distribution system that delivers Roundups to the JSC Mail Center every Friday. All on-site employees should receive their newspapers the day it's published. Employees who don't receive their Roundup should check first with the person who distributes the mail in their organization.

In an effort to better inform off-site contractor employees, more papers will be distributed to each contractor.

Please see **ROUNDUP**, Page 4



SATELLITE INSPECTION—Kennedy Space Center technicians inspect the Tracking and Data Relay Satellite (TDRS-C) in the clean room of the Vertical Processing Facility. TDRS-C is the primary payload for STS-26.

NASA Photo

Super sim puts launch decision process to work

An extensive simulated Space Shuttle launch and return to launch site (RTL) abort drill received high marks Tuesday, coupling STS-26 launch and flight teams and priming a new launch decision process overseen by Robert Crippen, deputy director of Shuttle operations.

The "supersim" involved workers at JSC, Kennedy, Marshall, Goddard and Dryden centers plus Rockwell and other contractors. More than 150 participated at JSC.

"All in all, it was an excellent exercise," Crippen said. The integrated launch simulation demonstrated good communications and data flow between the parties involved, he added.

The simulation began three hours before launch and concluded one hour after the successful RTL. A variety of problems and system failures were created during the early morning drill for the Kennedy launch team, the JSC flight control team and the mission management team (MMT), chaired by Crippen, to resolve.

The major difference between this simulation and others was the participation of upper management, specifically Crippen's MMT, an organization that must give a unanimous "go" nine minutes prior to launch to allow the count to proceed. During a built-in

hold at T-9 minutes Tuesday, the MMT discussed a wide range of problems before smoothly undertaking its "go-no go" poll. The MMT poll included parties responsible for the Orbiter, Space Shuttle main engines, solid rocket motors, payload integration and Safety, Reliability and Quality Assurance (SRQA). Also polled were officials from JSC Mission Operations, Marshall, STS program management, Morton Thiokol, Lockheed and other contractors.

Prior to launch, about 17 interim problem reports were handled at JSC and Kennedy, including a liquid hydrogen leak, icing of a liquid oxygen line, Orbiter electrical problems, a faulty gyroscope and a small freon leak. The performance of controllers during the exercise should build their confidence, said Gary Coen, STS-26 ascent and reentry flight director.

"I think the sim people gave us a real good mix of problems to work on," Coen said. "We got a lot of good training. There's a fairly large number of people involved in the decision-making and trouble-shooting loop, and we have to make sure everybody understands the issues we work."

Launch simulations between JSC and Kennedy are commonplace. Please see **SUPER**, Page 4



STS-26

The Return to Flight

New office helps focus Space Station operations work

About 24 employees have been reassigned to a new Space Station Mission Operations Office (SSMOO) created to focus the increasing efforts toward Space Station.

The formation of the office, in planning since last fall, signals a firm step for the Space Station, said Chuck Lewis, newly assigned SSMOO manager. "We did it because we felt like the start of Space Station Phase C/D is a commitment that we're going to have the program. It's moved beyond the study phase and into the design and implementation phase."

Lewis' second in command is Ted Guillory, SSMOO deputy manager, former deputy Operations Division

chief of the Operations Division in the Mission Operations Directorate (MOD). Before he was named SSMOO manager, Lewis was the assistant for Space Station to MOD chief Eugene Kranz.

A top priority of the office is to define the flight operations concept of Space Station, Lewis said. "After we've done that, we'll develop high level requirements for our new facilities — the Space Station

Control Center and the Space Station Training Facility."

The structural design for the Space Station Control Center, planned adjacent to the Mission Control Center, has been completed, as has the training facility design, he said. Construction is awaiting funding and is expected to begin in the next fiscal year.

Concepts for flight operations must be determined for both the assembly phase and permanent manning. "We're going to start trying to lay out how we're going to do the job when we finally get to flying," Lewis said. "And frankly, it's a lot of fun. You're in on the groundwork: What should we be doing in the Space

Station flight OPS compared to STS?"

A flight director for nine months on Skylab, Lewis has a lot of ideas on what the differences will be. "It (Skylab) was a very grueling experience — working seven days a week, 24 hours a day all the way through the program," he said. "And we did that knowing, well, it's going to end. Now look at Space Station: They're talking about flying 25-30 years."

Space Station flight operations will have to be designed to challenge controllers, possibly by merging pre-mission planning work and real-time flight control into duties of the same employees, he said. "But to achieve that, I think we need better tools, like more automation in our monitoring of data, and we're going to be looking at those things," he explained. "We're going to try to bring part of an office environment into at least a part of the control center, so it's not eyes on the console, 24 hours a day."

In the near future, the SSMOO will be housed in temporary quarters in Bldg. 13. A permanent location has yet to be decided, Lewis said.



Lewis



Guillory



NASA File Photo

Clifford Charlesworth sits at his Apollo 8 flight director's console in 1966.

Clifford Charlesworth

Lead flight director for historic Apollo 11 retires after 26 years at JSC

JSC Special Assistant to the Director Clifford E. Charlesworth retired Friday, ending a 26-year career at JSC that included jobs as a flight controller for the Mercury Program and a flight director for the Gemini and Apollo programs.

Although he was the lead flight director for the Apollo 11 lunar landing mission, Charlesworth said the most memorable and challenging mission of his career was Apollo 8.

"To me, that was the most significant mission we ever flew. We didn't land on the Moon, but we left Earth orbit for the first time, heading out to a 60-mile-high orbit around the Moon," he said. "You know, we'd done all the mathematical calculations and everything. But that's a pretty small target when you look at it. I still wasn't all that sure."

Charlesworth came to JSC and NASA in 1962 as a flight dynamics officer.

"If I go back over my career, I don't see

how I could have been more fortunate. It was pure luck; I started right after John Glenn's flight. I've worked with some of the most tremendous people in the world, and I think all of my experiences have been rewarding."

From 1970 to 1972, he served as deputy manager of the Skylab Program, and from 1972 to 1976, he assumed duties as manager of the Earth Resources Program, overseeing all Earth resources functions assigned to JSC.

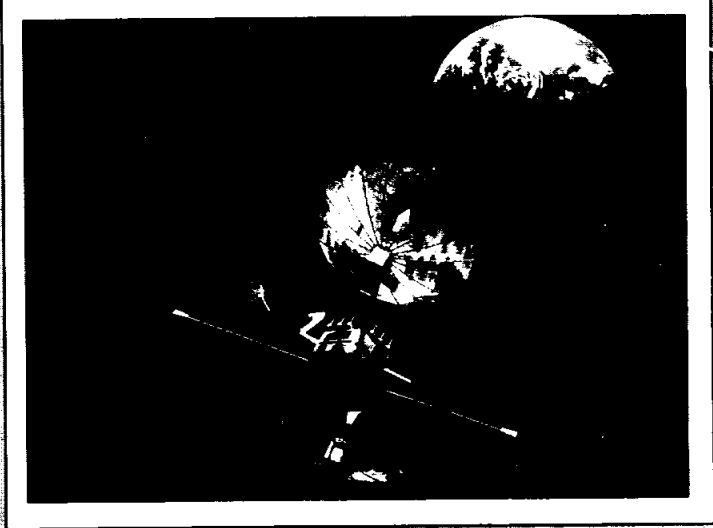
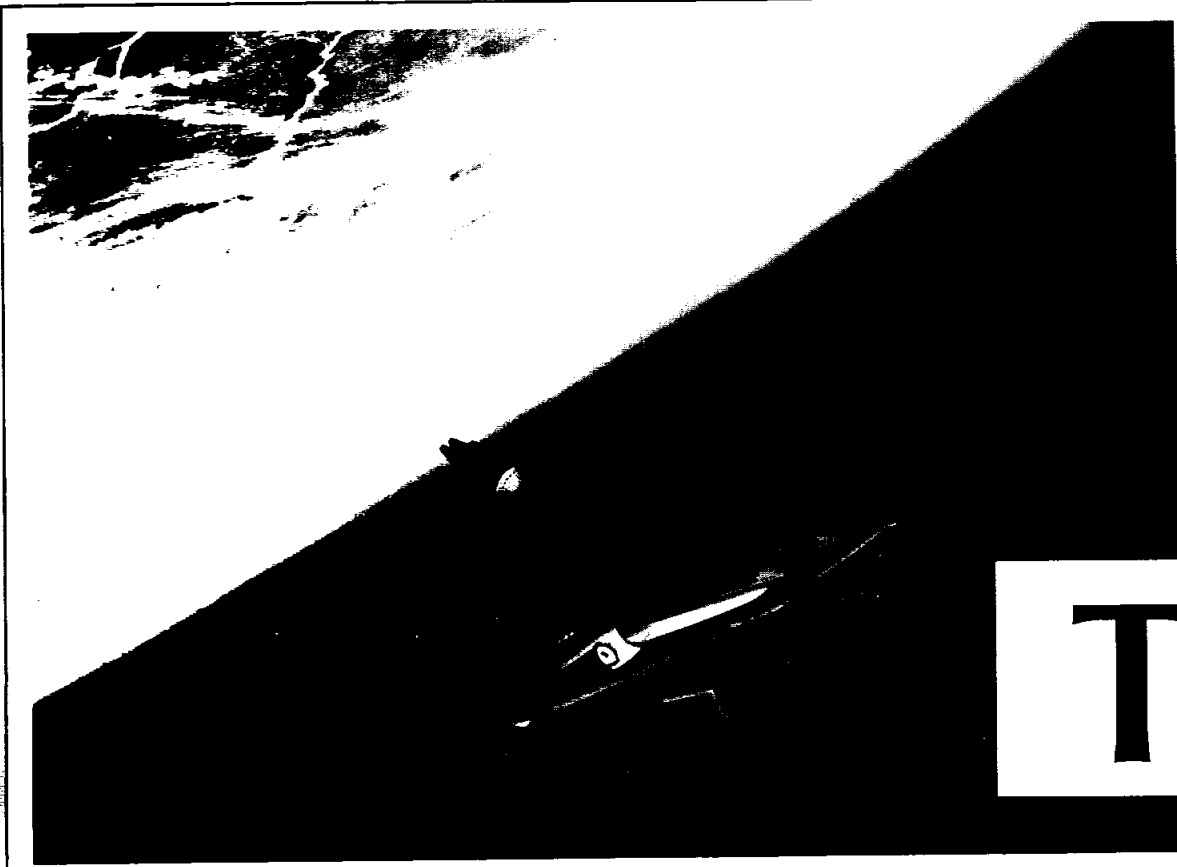
In 1977, Charlesworth became manager of the Shuttle Payload Integration and Development Office. In 1979, he was assigned acting deputy director of JSC and was assigned as deputy director from 1980 to 1983. He served as director of space operations from 1983 to 1986, and he has served in his current post since 1986.

"Cliff's career has been exemplary of the kind of dedication and motivation needed to advance man's exploration of space," JSC

Director Aaron Cohen said. "During his years here, manned space flight became a reality. He has been an integral part of the achievements of NASA and JSC since the beginning, and I've worked closely with him on many projects. He will be missed."

Charlesworth, 56, is a resident of Friendswood. He plans to continue living in the area, but hopes to travel extensively and visit many relatives and old friends, he said.

But he will miss his work at NASA, and he sees a bright future for the space program. "I've really been impressed over the last few years with the young people coming in. What makes it all work, what makes JSC work are the people. It's like a large family; we pull together as a team," he said. "There are plenty of exciting things to come. Once we fly again, the rest of the things will fall into place. And once we get the Space Station up there, it will be tremendous."



TDRS-C

Second satellite expands communications web

By James Hartsfield

When TDRS-C unfolds two giant golden spider webs 22,250 miles above the Pacific this year, it will open the eyes and ears of NASA to almost the entire sky.

And those will be no small eyes and ears, since a fully operational TDRS (Tracking and Data Relay Satellite) can relay an amount of information roughly equivalent to 100 encyclopedias each second. TDRS is the largest communications satellite ever launched, with an unfolded solar array measuring from tip to tip longer than a seven-lane freeway is wide. The two web-like dish antennas are each more than five yards across and are set in an array that spans 42 feet. The complete TDRS system, consisting of three satellites, will forever change the way NASA has communicated with spacecraft since its first manned space flight.

TDRS-C, second in the series of three, will be the primary payload aboard *Discovery* on STS-26 in August. Its deployment will give flight controllers at JSC direct communication with the Shuttle for about 85 percent of each orbit, meaning the ground will be out of contact for only about 13 minutes of each revolution. At present TDRS-C's predecessor in space, TDRS-1, launched in 1983 and now stationary above the Atlantic Ocean, allows controllers to be in contact with the Shuttle for about 50 minutes of each 90-minute orbit. Prior to TDRS-1, the Mission Control Center (MCC) relied solely on the ground tracking network, a plethora of stations around the globe that together allow less than 20 minutes of contact during each orbit.

The complete TDRS system includes a third satellite, TDRS-D, scheduled for launch aboard STS-29 in early 1989. The third

satellite originally was intended as a spare to be positioned in geosynchronous orbit above the continental United States. But, because of problems with TDRS-1, TDRS-D will replace that satellite above the Atlantic while TDRS-1 assumes spare duties above the U.S.

TDRS-C's deployment will make the complete satellite system functional for the first time. "Everyone's excited about the capabilities it's going to give us," Chuck Shaw, a Shuttle flight director, said. "Used to, we'd just get periodic glimpses, like a look through a keyhole, but now the door will be wide open."

Since the start of the space program, work in the MCC has revolved around a staccato rhythm of AOS (Acquisition of Signal) and LOS (Loss of Signal). But with the full TDRS system, LOS may become a far less familiar acronym. And the almost constant communications will allow far more flexibility in operations.

"Flexibility is the big thing — we don't have to wait until all the stars line up, so to speak, to talk to the crew," Shaw said. At times, certain events had to be geared to coincide with the AOS from ground stations, he explained.

"For instance, we had to schedule payload tests while we were over one. To me, that's the biggest single impact — to not have to do things at specific times just because of network coverage," Shaw said.

The TDRS system may shorten the communications blackout experienced during the Orbiter's heated reentry into the atmosphere, Gary Coen, an ascent and reentry flight director, added. "We'll be able to talk to the crew much earlier before the deorbit burn with the second TDRS up. And we should have some extra signal strength

during reentry. But it remains to be seen how much," Coen said.

The MCC has been running simulations working with a two-TDRS system for the past six to eight months, Shaw said, and the switch to such operations should go smoothly. Still, the rhythm of work will be different. If breaks are taken by MCC workers, they are taken during periods of LOS. But there will be only one period of LOS with the TDRS system, and it will be brief.

"We may have to get a bigger bathroom, if everyone's going to be going to it at the same time," Shaw joked.

Although it will not yet be in its permanent position, TDRS-C is scheduled to be used during STS-27, giving controllers their first taste of the full communications offered by the system.

For Jim Brandenburg, Mission Control Center network operations support manager, the deployment of the second TDRS will be icing on the cake. "The big change to me was when we got the first one in 1983. This will just develop it further," Brandenburg said.

With the full TDRS system, flight controllers will be able to monitor live data almost constantly, and they will see a problem the minute it happens. Traditionally, data from LOS periods has been "dumped" at high speeds from the Orbiter at AOS. To study any problem with an onboard system, controllers had to replay the data, a process that could mean the information wasn't actually reviewed until, sometimes, 30 to 40 minutes after the trouble occurred.

"You can react a lot quicker to any situation that comes up, because you're in almost constant communication ... and you have more time and more breathing room to work out problems," Brandenburg said.

NASA's ground tracking network, established during Project Mercury, will eventually be phased out, but some stations will remain to support expendable launch vehicles and to support Orbiter landings.

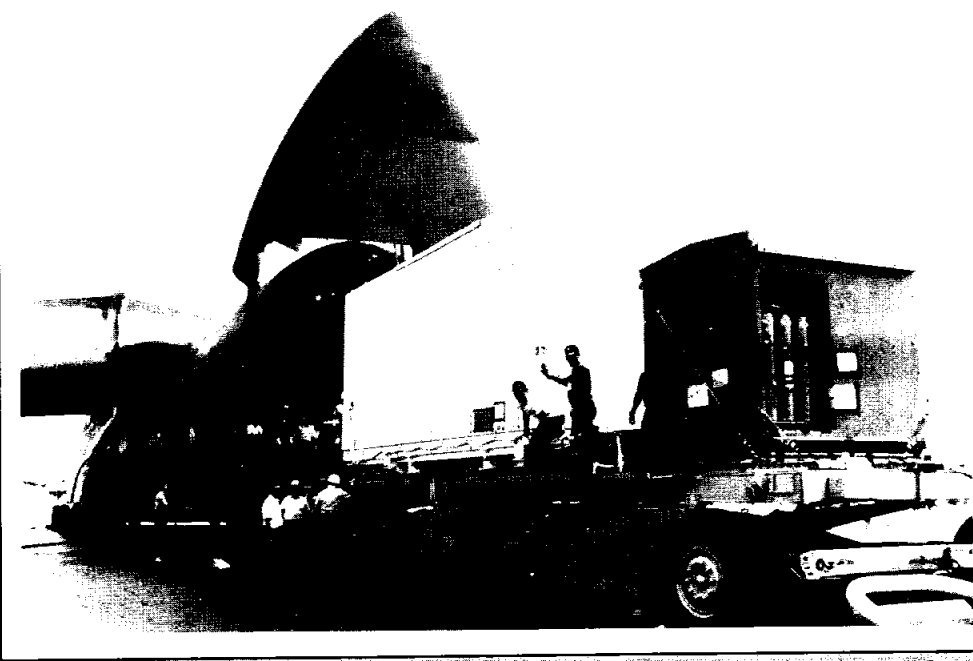
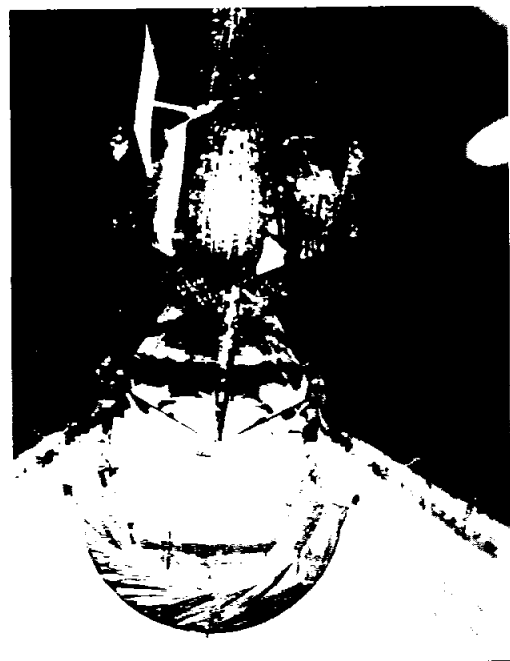
"It's a much more efficient use of on-orbit resources," Shaw said. "As an overall system, it'll be a whole lot cheaper than operating ground sites. It should save taxpayers a lot of money."

For astronauts, full TDRS coverage of missions may actually reduce radio chatter from what it is now, said STS-26 Mission Specialist Mike Lounge, who has the lead on-orbit responsibility for TDRS-C's deployment.

"A lot of the chatter now is from checking in and checking out. The hellos and goodbyes are probably 80 percent of what we say," Lounge explained. "With 85 percent coverage, you'll be surprised at how quiet it is."

TDRS, and 100 percent confidence in live communications, may shorten the flight crew's checklist, he said. "Eventually, it may change a little of the way we do business. The checklist might be less complete. You may not have to cover as many failure levels in the list because you can say, 'Well, we'll call the ground and talk to them if we need advice.'"

Three replacement TDRS satellites will be launched as needed to keep TDRS fully operational, with TDRS-E scheduled for a mid-1990 launch to replace TDRS-1. A second-generation TDRS system is already being studied. The ground station for TDRS communications is at the White Sands Test Facility. A back-up facility is now under construction at White Sands to provide TDRS operations in case of a failure at the main facility.



Top left: An artist's conception depicting deployment of TDRS-C from *Discovery* during STS-26. Top right: TDRS relays information back to Earth from geosynchronous orbit. Far left: TDRS-1 is deployed from *Challenger* on STS-6. Right: TDRS-C arrives at Cape Canaveral Air Force Station via C-5 cargo transporter.

Public hearing set on roadwork

The Texas Department of Highways and Public Transportation will conduct a public hearing June 28 to discuss proposed improvements to NASA Road 1.

The hearing will be in the auditorium of Clear Lake High School, 2929 Bay Area Blvd. A document viewing and informal discussion session will be from 6-7 p.m. A formal presentation and session for public comments that will be included in the hearing's official record will begin at 7 p.m.

John C. Holzwarth, District 12 design engineer, said the hearing will

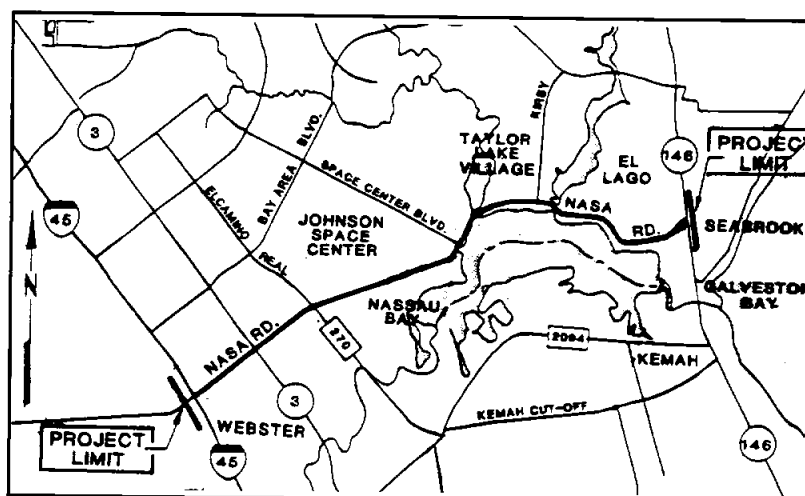
discuss proposed improvements on about 7.5 miles of NASA Road 1 from I-45 to Highway 146 in Seabrook. The proposed project will provide a six- to eight-lane curb and gutter divided highway with grade separations at Highway 3 and El Camino Real, and a new three-level interchange at I-45.

Existing right-of-way width varies along NASA Road 1, and some property owners will be displaced along some portions of the project. Information about right-of-way acquisition procedures, the state's Relocation Assistance Program, and benefits

and services for those displaced will be presented at the hearing. A tentative right-of-way acquisition schedule also will be discussed.

A schematic showing the project location and design, an environmental impact assessment and other project studies are available for viewing at the District Schematic Design Section, 7721 Washington Ave., in Houston.

Written comments may be presented at the hearing or submitted to the District Engineer, P.O. Box 1386, Houston, 77251-1386, before July 8.



Employees receive awards for science

Almost \$20,000 in employee awards were presented by JSC Director Aaron Cohen recently to 30 workers for their various scientific and administrative achievements.

The honors included Space Act Awards for inventive contributions, scientific contributions and NASA Tech Briefs and Employee Suggestion Program awards for ideas that have improved quality and productivity. Space Act Award recipients are selected agencywide by NASA Headquarters. Suggestion awards are a JSC program that processes as many as 300 suggestions each year and has recently presented an average of about \$22,000 in honors per year.

Recent Space Act Award winners and their contributions were:

Inventive Contributions: Dean C. Glenn and LeBarian Stokes, "Smart Electromechanical Attenuator/Actuator for Space Station Docking;" William D. Harwell and Mitchell B. Wu, "Magnetic Attachment Mechanism;" James H. O'Kane and Charles S. Alton, "Pressure Sealing, Low Sweep Volume Hatch;" Thomas Joseph Graves and Robert Alexander Yang, "Two Fault Tolerant Pyro Toggle Release;" and Kevin L. Edenborough and John A. Schliessing, "Smart Tunnel."

Scientific Contributions: John A. Wegener, Cheevon B. Lau, Robert H. Nute, John F. Whitley and Robert Lee Benbow, "Crew Activity Planning

System (CAPS);" Olin L. Graham, "Method and Apparatus for Telemetry Adaptive Bandwidth Compression;" and Clarence J. Wesselski, "Locking Hinge."

NASA Tech Briefs: James H. O'Kane and Charles S. Alton, "Pressure Sealing, Low Sweep Volume Hatch;" Richard L. Sinderson, Jr., "Adaptive Telemetry Multiplexer;" Victor J. Studer, "Shuttle CCTV Color TV Monitor Field Sequential Converter;" Richard D. Juday, "Programmable Remapper for Image Processing;" Shayla E. Davidson, "Distributed Phase Array Radar (DISTAR) Computer Program;" George F. Parma, "Butterfly End Effector;" Leo G. Monford, Jr., "Docking Alignment Mechanism—Two Dimensional;" and Richard L. Sauer, "Shuttle Locker Contained Salad Sprouter."

Employee Suggestion Program award winners were:

Suggestions: Wayne L. Draper and Mark W. Ryan, "Electronic Input of Source Board Cost Data;" Mary C. McLain, "Procedure for Balancing Payroll;" Rebecca L. Squires, "NASA Standard Initiator Holding Fixture;" and Dennis L. Wells, "New Optics Technique, Clearing View Field."

Productivity Improvement/Cost Reduction: F. Doris Wood, "Cost Savings from Computerized Purchase Request Tracking and Management Information Reports."



JSC Photo by Bob Walck

PUTTING ON THE LID--Construction workers install roof insulation on the new Central Computing Facility. The insulation panels was encapsulated in the roof concrete, and weatherproof roofing will be placed on top of the concrete. Tom Conger, JSC's project manager for Bldg. 46, said this will be the first single-ply roof at JSC. General contractor Cahaba Construction is 40 percent finished with the project.

Rockwell workers set extraordinary safety record

Employees of Rockwell's Space Transportation System Operations Co. (STSOC) recently set a safety record by working more than 3.8 million hours without a lost work day accident.

STSOC employees have established safety records since the branch's inception, operating 10 times better than national averages. But the record goes above and beyond others, Safety Manager June Roberts said. "From September

1987 through March 1988, no work day was missed by any STSOC employee due to an industrial-related injury or accident," Roberts explained.

"Any time we can go over a million hours without a lost work day, it's an accomplishment. A 3.8 million hour run is extraordinary."

STSOC President Bob Minor praised the employees' commitment to safe work. "Obviously, as employees, we don't want to put our-

selves or our families at risk. As an employer, having a healthy work force is essential to meeting the challenges of a competitive market place. It's a win-win situation," Minor said. "I want to encourage our team to look beyond today's victory. Let's move forward, taking reasonable and responsible actions, to break this new safety record."

The official record now stands at 3,848,449 hours without a lost day accident.

Super sim exercises launch interplay

(Continued from page 1)

Coen said, but the addition of the management team and the expanded participation was new. "The idea was to make sure upper management was informed," he explained. "I think it went quite well."

About two minutes after liftoff, a hydraulic leak developed in an Orbiter system. And 37 seconds later, the left main engine failed, forcing the RTLS abort. A little over two minutes later, an electrical lock-up occurred in the right main engine.

Several more minor problems were simulated in the Orbiter as it flew east

about 250 miles over the Atlantic to burn its fuel, jettisoned the External Tank and maneuvered back to Kennedy for a safe landing.

Lee Briscoe, a flight director who helped plan the simulation, said the objective was to boost communications and drill the entire launch control team. "All of the interplay between the folks of varied disciplines went very well," Briscoe said.

"We checked out all the new communication loops and data processing capability. There were several decisions that went on up the chain to the MMT."

The simulation script was as broad as the number of people participating, he said. "We selected malfunctions that we thought would make all the different entities think. We had several malfunctions that would've been no gos, but once the team talked them through and decided no go, we'd say, 'OK, that's a scrub. Now let's continue for purposes of the sim,'" Briscoe explained.

"It really brings home that there's another group of folks out there working just as hard as you are to make sure all the problems are resolved and to see us go fly."

Roundup publication goes weekly

(Continued from page 1)

Papers formerly were distributed to off-site contractors based on a ratio of one paper for every five off-site employees. That ratio has been improved to one paper for every two off-site employees.

Retirees in the Houston area also should be able to keep better track of JSC activities. Instead of receiving two biweekly Roundups once a month, they'll be receiving a paper every week.

Upgrading the Roundup to a weekly publication means there will be room for more stories about JSC's projects and people, said Editor Kelly Hum-

phries. Anyone with suggestions about stories or events that deserve coverage should call the Roundup office at x38648, or send a short note to the Roundup at mail code AP3.

"We're going to need everyone's help to keep on top of the news at this bustling center," he said. "We won't be able to print every story, but if we know something is happening we'll be able to make an informed decision about whether it's newsworthy."

Assistant Editor James Hartsfield said the new weekly deadline for information about meetings and other upcoming events is 5 p.m. every

Wednesday. All notices must reach the Roundup office, Bldg. 2, Rm. 147, eight working days before the desired date of publication.

All Swap Shop classified ads are now due at 5 p.m. Friday two weeks before the desired date of publication. For example, ads that arrive at the Roundup office by 5 p.m. today will be published in the June 24 issue.

The Space News Roundup was first published Nov. 1, 1961, at the Manned Spacecraft Center, Langley, Va. The Roundup was first published in Houston on April 18, 1962.

Children of JSC employees win exchange scholarships

The children of three JSC employees will receive scholarships from the NASA Exchange-JSC Scholarship Program this year, the program's 21st year.

Darin D. Durand, Christina L. Marent and Lori K. Thompson, all graduating seniors at area high schools, were selected for the \$4,000 scholarships. The three awardees were chosen from 36 applicants based on their overall scholastic achievement, the extent of their financial need and their participation in school and community activities.

Durand, son of NSTS Program Office employee Judy Durand, is graduating from La Porte High School and is ranked seventh in his class. He plans to major in pharmaceutical studies at the University of Houston. Durand has served as president of the National Honor Society (NHS) and played varsity

basketball, baseball and tennis, among other honors and activities.

Marent, daughter of Instrument Machine Section, Technical Services Division worker Rudolf Marent, is graduating from Dobie High School in the top 10 percent of her class. She plans to study music performance and education at Rice University. Marent has been a member of the NHS and involved in activities including band and orchestra.

Thompson, daughter of Solar System Exploration Division employee David Thompson, is graduating from Clear Lake High School in the top five percent of her class. She plans to study accounting or business at Baylor University. Thompson also has been a member of the NHS, and she recently placed first in Sam Houston State University's statewide photography competition.

NASA

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

Space News Roundup

The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every Friday by the Public Affairs Office for all space center employees.

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Assistant Editor James Hartsfield