Rockwell secures contract to build replacement Orbiter

The National Aeronautics and Space Administration has completed negotiations with Rockwell International, Downey, Calif., to build the replacement Space Shuttle Orbiter (OV-105). Scheduled delivery date is April 30, 1991. The completion of these negotiations and the commencement of full production of this new orbiter mark a major milestone in our return to safe, reliable and effective space flight," said Rear Adm. Richard J. Kane, Associate Administrator for Space Flight. "Those government funds will be acquired through separate programs, Assembly and the Orbiter Project at JSC, ex- planations and the commencement of Space Shuttle main engines, crew equipment and support services. These items were included as a part of the replacement funding provided by Congress at President Reagan's request in 1987, and will be acquired through separate procurement actions. Under terms of the contract, Rockwell will fabricate, assemble, test, check out and deliver the Orbiter within 46 months. Using existing structural spares, the new vehicle will feature the latest up- grades and modifications and will incorporate all new technology evolving from the current return-to-flight activities. Management and some fabrica- tion will take place at the contrac- tor's plant in Downey. Addi- tionally, it is anticipated that a significant percentage of the work will be performed by more than 100 subcontractors for components and support services. Assembly and checkout of the orbiter will take place at the Rockwell facility in Palmdale, Calif.

Shuttle recovery rounding corner on green light

Workers cheered when the words "VEHICLE POWERED" flashed on a sign outside Discovery, and optimistic NASA officials said that and other signs of recovery pro- gress indicate the agency has rounded the corner as it prepares for the return to flight. Kennedy Space Center officials said the Aug. 3 power-up beginning the first work to prepare an Orbiter for flight since the Challenger accident was a boost to employee mo- rale and proved that NASA can set ambitious target dates and meet them. "That may be the most signifi- cant point about this (power-up)," said KSC Launch Director Robert Sieck. "I think it indicates the ca- pability of the program to meet the milestones we have established. We set this opti- mistic but makeable target date to power up the Orbiter and every- body worked hard and here we are."

"At the same time, the JSC work- force saw encouraging signs of progress last week as a final go-ahead was given to Rockwell Inter- national for construction of a re-placement orbiter (see related story), and the crew patch for STS- 26 was unveiled, recoveryeffort, he said. "The biggest driver" that remains, he said, is completion of the review of shuttle documentation and processes requir- ed. After flights resume, he added, complete docu- mentation detailing the rationale for hardware changes will be finished. Ration- ale documentation is not required for first flight, but is necessary to pro- vide a historical rec- ord of the changes that were made, he said. Sixty-four man- datory modifica- tions required be- fore STS-26 were identified in an extensive review of the entire Orbiter system that began soon after the Challenger accident, he said. An additional 114 modifications were baselined, but were not considered mandatory. Colonna said, however, that most of the modifications would be made on Discovery before its scheduled June launch date. JSC involvement in the orbiter recovery effort, he said is extensive. About half of the JSC workforce is "working in some capacity or another on the return to flight," he said. Much of the workforce at JSC is (Continued on page 2)

NASA funds advanced solid rocket motor studies

Marshall Space Flight Center recently awarded contracts to five aerospace firms for design and definition studies for an advanced solid rocket motor for the Space Shuttle. The 9-month contracts, not to exceed $3.3 million each, were awarded to Aerojet Solid Propulsion Co., Sacramento, Calif.; Atlantic Research Corp. of Alexandria, Va.; Hercules Aerospace Co.'s Aero- space Division of Salt Lake City, Utah; and United Technol- ogies Chemical System Division of San Jose, Calif.

These same firms performed conceptual studies of alternative solid rocket motor designs from September to December 1986. Under the contracts, issued Aug. 7, the five companies will develop preliminary advanced solid rocket motor designs with supporting design analyses, conduct detailed design assessments to increase solid rocket motor reliability and performance and evaluate incre- mental advanced motor changes that would permit Space Shuttle performance increases up to 12,000 pounds of payload. The preliminary designs will include both a segmented motor design, like the current Shuttle motors, and a monolithic motor design, wherein the full-length motor case is assembled and the propel- lant is cast without joints. Based on the results of these studies, a decision will be made whether to pursue the design, development, test and production for an advanced motor beginning in fiscal year 1989. A decision to proceed would allow the advanced motor to be available for Shuttle flights in late 1993.

Quick action confines problems, speeds computer complex rebound

A water leak in Bldg. 30 forced an emergency power-down of the Data Computation Complex (DCC) on Aug. 6, but the facility began returning to normal just 24 hours later.

Mission Control Center personnel reported little damage to the first-floor computer equipment that supports Space Shuttle missions and simulations. Quick response by DCC workers who covered the computers with plastic sheeting was credited with keeping damage at a minimum.

A fitting on a chilled water line in the crawlspace in the hallway meant the area affected would expand. Saturday evening workmen used mops to remove water from the cab- inet and 80 critical systems were back on line by 9 a.m. the next day, technicians began powering up the equipment and performing subsystem checks. On Saturday, subsystems were connected and inte- grated tests were performed in both secure and non- secure modes. "By 8 p.m. Saturday evening we were confident everything was back to normal," Kane said. "DCC personnel responded in an exceptional manner," Kane said. "They quickly sized up what had happened and what was going to happen." Water didn't immediately reach the DCC, Kane explained, but the Bendix workers in charge of the complex recognized that the amount of water leaking in the hallway meant the area affected would expand. Within minutes, they started powering down the computers, and covering equipment with plastic stored nearby in case of storm damage. The preliminary calculations were made by floor tiles in the space, said Gary Kane, MC Facility Manager. The water may have been from a leak in the second-floor computer equipment room, Kane said. Precautions were completed by the time water reached the DCC.

"That allowed us to come back up as soon as we could," said Kane. (Continued on page 2)
**Cohen to speak to NMA on Aug. 24**

JSC's2001 NASA Educators Conference is to be held in Houston, and Dr. George Cohen will be one of the plenary speakers for the conference. The event will be held at the George R. Brown Convention Center, and all papers presented at the conference will be available on the Internet, beginning Aug. 15. Cohen is NMA's Outreach Team Leader and Special Advisor on archives and will be speaking on "New Horizons: The End of Uranus to the Discovery of Pluto." The conference is open to all NASA employees and will be held Aug. 21-23.

**Graduate engineering courses expand**

The University of Houston is expanding its ability to deliver graduate engineering courses on CD-ROM. The university's Graduate School has been approved to offer CD-ROM courses, and to offer four courses that will be taught this fall at the Clear Lake campus: EECE 6335 Digital Control Systems, INDE 7397 Multiple Objective Optimization/Goal Programming, INDE 6332 Stochastic Processes, and INDE 6229 Layer Theory. In addition, three courses will be taught in JSC's Bldg. 45 through an interaction with the university, using the First Elements Methods in Engineering Science, EECE 6337 Introduction to Stochastic Processes, and EECE 6342 Digital Signal Processing. Registration is Aug. 13 and 18 from 9 a.m. to 2 p.m. at the University of Houston campus downtown. For more information, contact Diane DeTroye, x3300.

**See solar eclipse in China**

A solar eclipse visit to some of the great places in China is planned Sept. 17 to Oct. 3 by the JSC Astronomical Society. "It is even mostly tax deductible for people who would like to experiment with the eclipse," he said. The eclipse will be conducted during the rare eclipse on Sept. 23," said Paul Maley, organizers. "Visitors are invited to watch the eclipse, Carlsbad, Guan and Hong Kong. For more information, call Maley, x40366.

**Foreign language classes offered**

Foreign language classes will be offered in September by the University of Houston-Clear Lake. French, German and Russian will be taught on a non-credit basis through the Office of Continuing Education, with an emphasis on practical and daily use of the language.

**Monday Night Bowl begins Sept. 1**

The NASA Mixed Bowling League's 1987-88 season begins Sept. 1 with league play. Registration begins Sept. 1 and continues through Sept. 30 for 35 weeks. Cost is $77 per person for the season, plus a small additional fee to cover food costs. For more information, call Leonard Schmit, 160-1692, or Leona Kain, 282-2544.

**Shuttle derived laser eye surgery**

NASA has officially begun studying a technique that could use the engine, solid rocket boosters, external fuel tank and main propulsion system of the shuttle to develop an eye laser instrument. The Shuttle orbiter could be adapted by an unmanned cargo element. The chief purpose of the study is to determine whether a modified shuttle could be used to perform laser eye surgery and operating the Space Station. Results of the Shuttle-C efforts will be integrated with the joint NASA/Air Force modular Advanced Launch System (ALS) studies already under way. The new study will enable a joint NASA/Air Force study on the subject to make the best use of all materials that could result in a successful mission. The project is also funded by the Discovery Project Office, which is undertaking the development of a laser eye laser instrument. The project is also funded by the Discovery Project Office, which is undertaking the development of a laser eye surgery instrument. The project is also funded by the Discovery Project Office, which is undertaking the development of a laser eye surgery instrument.
FOODS for the FUTURE

Food lab’s creations should make Space Station crews ask for seconds

By Billie Deason

The Manned Systems Division has opened a new space food development kitchen in Bldg. 17 for continued development of Space Shuttle and Space Station cuisine.

July 1 marked the grand opening of the new food laboratory that features a test kitchen and dedicated rooms for food processing, freeze drying, food packaging, hardware testing and package fabrication and storage.

The evolution of the food system for Space Station will be the primary task carried out in the updated food lab, the culmination of two years of planning by the Flight Systems Branch. The previous food lab area in Bldg. 37 has been converted to working space for Medical Sciences Division personnel.

The focal point of the new laboratory is an attractive and efficient test kitchen. The kitchen will serve as a crew training facility and a work area for food evaluation and demonstration. After consultation with an architect, who worked out the room arrangement, Space Station food scientist Beverly Thurmond worked with a kitchen designer to develop the layout of cabinets, countertops and counters and cabinet storage, disposal, a 12-ounce film and foil laminate evaluation is used to screen all new containers can be thermo-formed in the lab for evaluation, and Shuttle food system packaging and hardware can be tested. Actual processing and packaging of Shuttle menus is handled by Boeing under the Flight Equipment Processing Contract (FEPC). A recent product of the food development laboratory is a new package for Shuttle food system beverages.

Instead of the molded plastic drink container that could not be compacted for disposal, a 12-ounce film and foil laminate envelope was designed. The envelope folds flat until water is added. After the beverage is consumed, the package can be refolded for disposal. The new packaging uses the same septum adapter and straw as the older version. The new beverage container is planned for evaluation on STS-26.

A primary emphasis for Space Station food is acceptability. Crew mealtimes will probably become an important daily social event, and much consideration is being given to providing a positive effect on crew morale. Ethnic foods for special occasion dinners are another possibility for variety in the Space Station menu.

Also proposed are experiments with new techniques in baking so that breads, cakes, brownies, and other popular desserts could be baked onboard for recreation or special occasions.

"Making the preparation and cleanup of meals as easy and time-saving as possible will encourage crew members to eat nutritious foods, yet have minimal impact on work schedules," Thurmond said.

Space Station crews will use a thermo-formed plastic tray with two elongated slots for individual food containers. The prototype was manufactured by JSC’s Technical Services Division. Individual food serving containers will have varying depths and lengths to accommodate different food sizes and shapes.

Using different sizes of serving containers is a change from the Shuttle food system that uses one common container, requiring all food to be cut or processed to fit the container. Metal utensils with small magnets in the handles will adhere to a metal strip under one edge of the food tray.

A judging process called sensory evaluation is used to screen all new products and ideas for the Space Station food system. Food is graded on appearance, color, odor, flavor and overall product quality.

Since there will be both a freezer and a refrigerator on the Space Station, a greater selection will be available to crew members. New products such as "shelf stable" foods, which require no refrigeration, also will play a role on Space Station menus. Over the next 10 years, Thurmond said she expects advances in technology of food preparation and storage techniques that can be adopted for Space Station.

One such advance is the packaging of fresh fruits and vegetables, which will allow Space Station crews to eat fresh produce for much of their several-month-long missions. By wrapping fruits and vegetables in film wrap and injecting a gas mixture inside the package, shelf life of fresh produce can be greatly extended. There are no plans in early Space Station operations for crews to grow their own food. The food inventory will be managed by the same computer system that monitors all inventoried items on the Station.
**Properties & Rentals**

Sale: Lake Livingston. Fill, 2 weeks free, deposit. Jim, 282-0520. Rowena, x31670 or 996-2949.

Rent: 2 BD apartment, Bannin Lane, Northeast. Nicely furnished, two BR, 2 BA; all utilities included, $550. Joe, x365-1520.

Sale: Leon County 3-2-2, land, garage, pool, tennis, 9 Isad FHa, low equity. David, x346-4424.

Sale: Lake Oneonta 3-BR, 2-1/2 bath, washer, dryer, JetTrac, deck, HP Digital cassette drive for HP-41C JSC, $1,400. Linda, x366-0729 or 488-1574.

Sale: Lake Palestine, 7 BR, 4 bath, 2 acres lake, $125,000. Jed, x382-9703 or 282-7879.

Sale: Pool Home, 3 BR, 2 bath, 2-car garage, pool, all appliances, washer, dryer, open house Sunday, 2 pm. Bo, x346-6524.

Sale: Fogg Lake, 3 BR, 2 bath, pool, garage, large yard, all appliances, x31456 or 346-6524.

Sale: 3 BR, 2 bath, 2-car garage, pool, yard, all appliances, x346-6524.

Sale: Willow Lake, 2-BR, 2-bath, pool, garage, all appliances, x346-6524.

Sale: Lake Palestine, 3 BR, 2 bath, pool, garage, all appliances, x346-6524.

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