

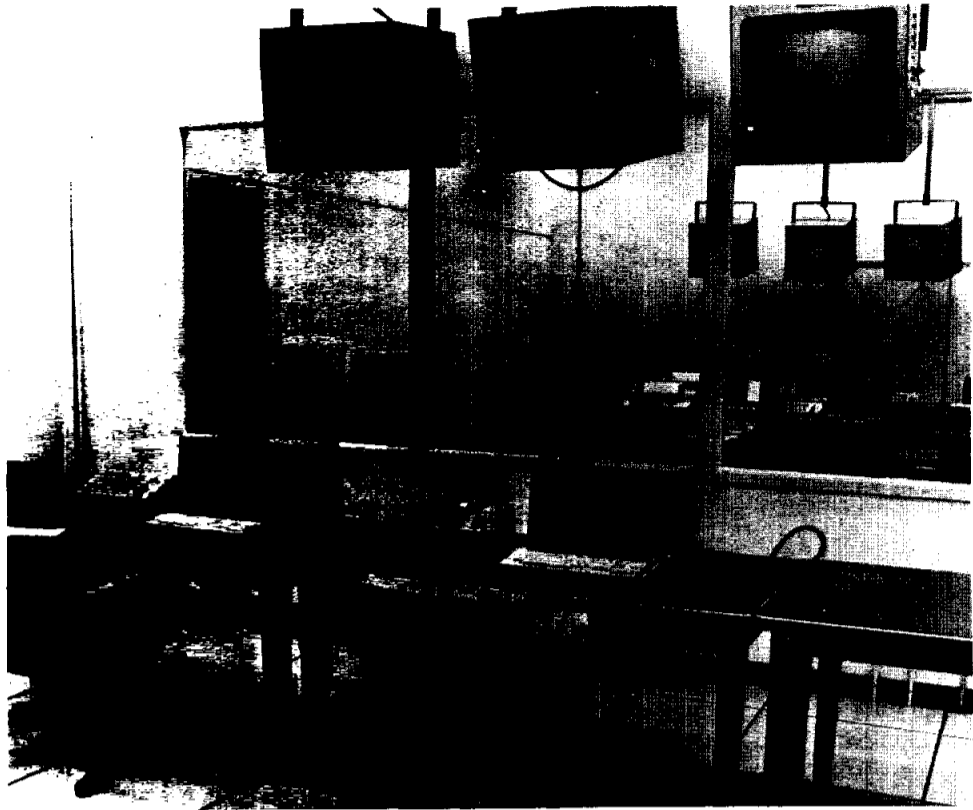
ROUNDUP

Lyndon B. Johnson
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VIEWING ROOM AT MCC — Flight control managers monitor from the consoles (foreground) the activities and commands being given inside by the Flight Controllers. The TV screen in the middle is the one upon which identical data is shown.

Skylab is reactivated by flight controllers

Early on the morning of April 24 the Skylab Activation Team at the JSC Mission Control Center (MCC) began Phase 2 of a long sequence of ground commands to reorient the Skylab.

Bill Peters, Team Leader of JSC's Flight Control Division, says that he will voice commands to the remote sites in Madrid and Bermuda, where individuals there, in turn, will send digital commands to the Skylab.

Harry Black, JSC Instrumentation and Communications Officer, will monitor the site-received signal strength and determine if the commands were received. Commands will be received only when the solar panels are powered by sunlight.

Steve McLendon, Electrical General Instrumentation and Life Support, determined that the vehicle was rolling around its X-axis every five and one-half minutes in a clockwise direction by observing solar panel voltages during Phase 1 of the Skylab activation at Bermuda in March. The flight controllers expect that Skylab is still rolling and that all ground commands will only have a 50 percent chance of being received until the batteries are charged to carry the electrical loads while in darkness.

Four of the Airlock Module (AM) batteries will be charged for a day before live telemetry will be turned on and transmitted to Houston. Once telemetry is established, the long command sequences for 15 Apollo Telescope Mount (ATM) batteries will commence. Peters pointed out that because the ATM batteries will turn themselves off if they are undervoltage, a repeating series of commands must be sent to each battery until it achieves a minimum voltage.

Peters says that in mid-May updated programs for telemetry processing and commands will be available for updating the ATM digital computer. The computer must be updated in order for the Control Moment Gyros (CMG's) to operate under new control laws. With CMG control, the Skylab will be oriented to give minimum drag in the Earth's upper atmosphere, which will give it a longer orbital lifetime.

George Guthrie, ATM Software Control Officer, will closely supervise the computer update and will verify proper receipt by reviewing memory dump data. In early June, Harry Clancy, Guidance Navigation Systems (GNS), will monitor the CMG spinup and verify proper operation of the GNS.

After these initial steps have been completed, the Flight Control Team will begin a series of attitude maneuvers to reorient the Skylab. First the vehicle will be stopped in position as it whirls past

the Sun in the rolling motion. Then, using the Sun sensors, the vehicle will be aligned precisely to face the Sun with its solar panels. Once the vehicle is properly aligned, it will be commanded to begin an Earth-orbit rate.

After this critical series of commands and sequences have been completed, the mission will settle down to a periodic monitoring and maintenance of navigation times and spacecraft systems until the Shuttle Teleoperator Retrieval System (TRS) is able to dock with the Skylab.

If Skylab is left in its present uncontrolled attitude, it would probably reenter the atmosphere by the summer of 1979. If attitude control can be regained by the flight controllers, the Skylab orbital lifetime could be extended until the summer of 1980 with plenty of time for the Shuttle and its TRS cargo to reach the Skylab.

Federal Women's Program at JSC attracts unprecedented crowds

The week-long women's program last week attracted not only unprecedented numbers of JSC personnel, male and female, but also crowds of contractor personnel, visitors, and community residents. Five hundred printed programs were gone by the second day of the event, and phones were ringing off the wall, says FWP Coordinator Virginia Hughes.

One portion of the program drew particular notice from the audience: the film "What You Are Is Where You Were When," narrated by the very dynamic Dr. Morris Massey from the University of Colorado. Whether it was the rather unique title of the film which attracted so many people in the first place, or whether Dr. Massey's excellent reputation preceded him is not known. What is known is that countless people telephoned to say how much they enjoyed the film or otherwise voiced their positive feelings about it to committee members. Therefore, plans are being made to reshow the film at a later date.

By Thursday of last week, auditorium locations had to be reshuffled to accommodate the large volume of attendance. Dr. Dale Hill attracted a large crowd with her topic of "Stress: Mental/Physical." Apparently, this is a topic of great concern to both men and women today, which probably accounts for the large turnout from both sexes.

Hill pointed out that factors leading to stress include trying to do more than one can handle and the failure to make choices concerning just how much one can handle effectively. Response to stress of this type, says Hill, can be psychosomatic, showing itself in the form of various continuous aches and pains, spastic colon, or other discomforts and illnesses. The best method, she states, to combat this outcome is to stay physically fit and exercise because these types of discomforts tend to pick just the portions of our bodies where we are most weak.

Other ways some people handle the stress is to use some form of ego defense, such as denial or ignoring of realities, or "atonement;" that is, working super-hard on some project or other to prove to oneself that he or she is really being good. None of these responses to stress

contribute much to the well-being of the individual, she pointed out, and that a better response is a positive practice of problem-oriented decision-making.

New legislation that effects women directly and indirectly at both the state and Federal levels was well covered by Ellen Mendoza, State Representative Bill Caraway, and Sally Griffiss from Senator Tower's office. Most of this legislation, it was stressed, was initiated not to take rights away from one group of citizens to give them to another, but to establish some sort of equitable policies as regards economic, social, and employment concerns.

Moreover, the entire women's program was marked by professionalism in the presentation of facts, studies, and statistics and not by the kind of emotionalism that some people have come to associate with topics of a controversial nature.



Apr. 20 crowd in Bldg. 2



Tues., Apr. 18 panel discussion at the Gilruth Center



STUDYING ENTRY DISPLAYS — Astronauts Bob Crippen and Dick Truly, prime and backup pilots for the first Orbital Flight Test (OFT-1), recently had their first opportunity to see displays of the OFT-1 entry software. The IBM-developed computer program will be used to guide the Shuttle vehicle from orbit to landing. The photo above shows IBM programmer Gail Johnson with Crippen and Truly as they discuss the entry display. The displays were activated for the crew in IBM's Software Development Laboratory (SDL) in Building 30. The SDL provides IBM programmers with multiple diagnostic capabilities to develop, test and debug the onboard programming in a simulated flight environment prior to its delivery to NASA and Rockwell facilities, and the spacecraft.

Shuttle main engines test fired April 21

NASA successfully accomplished an ignition test of three main engines of the Space Shuttle Orbiter Apr. 21 at the National Space and Technology Laboratory at Bay St. Louis, Mississippi. Although the test firing was not as long as planned NASA officials report that most of the test objectives were met during the brief one-second engine firing.

The firing was to have been two and a half seconds duration; however, a low temperature reading in the fuel pressure pumps of three engines caused a premature cutoff. NASA and Rockwell International engineers will review the test data to determine if this test should be repeated before moving on to the next phase of the test program.

The Orbiter *Enterprise* was placed in the test stand for the start of the ground vibration tests of the Space Shuttle vehicle configuration at the Marshall Space Flight Center.

Taylor's dual secretarial role earns her April award for \$100

Geraldine Taylor has served as secretary to Clinton L. Taylor, Deputy Director of the Administration and Program Support Directorate, since Sept. 1975. In this capacity, she also provides backup support to the Director's secretary. She assumed the further responsibility of providing secretarial support to R. Wayne Young several months ago when he was appointed Assistant Director and the decision was made not to move his secretary with him because of limited secretarial resources.

This dual role has been a tremendous undertaking since both men are heavily involved in the myriad of activities associated with providing business management support to JSC managers and in overseeing programmatic support provided the Space Shuttle Program. In addition, they both have heavy travel schedules and extensive personal and telephone contacts with NASA Headquarters, other Centers, industry representatives, and JSC personnel so that a considerable portion of the secretary's time is spent in scheduling and rescheduling meetings to take care of the many conflicts that occur in their daily schedules and in handling the heavy telephone traffic.

Supervisors Taylor and Young both agree that their secretary is so proficient in her secretarial skills and so adept at arranging her schedule to provide the required support to each of them that she finds herself in the awkward position, for example, of having one manager wait for an important piece of correspondence while she prepares travel orders for an unexpected trip for the other.

Aside from her private secretarial role, Taylor has the responsibility of reviewing correspondence/documents, emanating within the Directorate, which are prepared for the signature of the managers in the Directorate office of the JSC Director. She ensures proper format, correct numbers of copies to a package, and grammatical correctness. The volume is high and her supervisors say she does a thorough review job without unduly delaying forwarding packages for signature.

"Taylor is an extremely dedicated and competent secretary," says her supervisor. "She enjoys her work and takes pride in being a good secretary, and this is reflected in the professional manner in which she handles all aspects of her job."



Geraldine Taylor

Magnuson is April Co-op student

Timothy J. Magnuson is currently working in his fourth Co-op period in the Institutional Data Systems Division (IDSD), Institutional Support Development Branch. He is a computer science major in his junior year at Lamar University in Beaumont, Texas.

Magnuson's duties are centered around software development in the field of interactive computer graphics. He has developed several highly sophisticated software packages for the ADAGE GS340 interactive graphics system. This graphics system is a state-of-the-art mini-computer system, with a graphics micro-processor, disk subsystem, refresh CRT (Cathode Ray Tube), and several interactive devices such as a light pen, data tablet, track ball, and control dials. Although the ADAGE system is not an easy one to master, Magnuson has acquired a high level of expertise in developing efficient and effective ADAGE graphics software.

One outstanding accomplishment in this area is a generalized two-dimensional drawing package developed by Magnuson. This software program allows a user to create any desired 2-dimensional drawing on the CRT using several interactive devices, and store the coordinate data representing this drawing on the ADAGE disk mass storage. The drawing can then be retrieved from disk storage at any time, displayed on the CRT, and modified if desired. This application was used to support the Shuttle Documentation Aids (SDA) project at JSC by providing interactive generation of figures required for the Shuttle procedure planning documentation. Magnuson also gave several demonstrations and class-type lectures of this program to the JSC personnel associated with SDA.

"This software development effort was not a trivial task, and could not have been completed in the required timeframe without the initiative and technical expertise displayed by Mr. Magnuson,"

declares James L. Raney, Magnuson's supervisor.

Magnuson is currently in the final stages of software development of another graphics related project. This project, being developed on the UNIVAC 1110 computer system, involves software techniques to interpret graphics commands for images generated on the ADAGE graphics system and to generate corresponding microfilm plotting control commands on magnetic tape. This tape, when processed by a microfilm system, the FR80, will yield 16-mm or 35-mm microfilm plots of the same images originally produced on the ADAGE CRT. This effort is to support a requirement of the Integrated Structural Analysis System project to produce moving picture presentations of the body bendings of space vehicles during modal deformations.

"This task has also not been trivial in nature, since most of the work had to be done at the lowest logical level," says Raney. "In addition, technical knowledge of the FR80 low-level plot commands was almost non-existent at JSC. This required extensive research and self-tutoring by Magnuson. In addition, he has worked closely with his technical advisor on this project, Bernard Stuckey, to maximize his cost-effectiveness in this critical learning period."

EAA Attractions

EAA PICNIC

The EAA Picnic, Close Encounters of the Fun Kind, is just one week from tomorrow! Ticket sales end Thurs., May 4 at 4:30.

If you want to enter a division softball team in the First Annual Picnic Tournament, call L. J. Corcoran, X-6323. Let's make them fun mixed teams and avoid getting all the athletes on one team!

Tennis buffs call Jim Walker, X-2611 for the tennis tournament, and those interested in



Birds under canopy

♪♪ "HELP! I NEED SOMEBODY!" ♪♪

Here's one for the (mocking) birds

The trees were thick and overgrown outside the window of the Flight Simulations Office in Bldg. 4. Dutifully, the gardeners came to shear the trees to less gangly proportions, when suddenly they noticed a nest of newly hatched mockingbirds nestled in the foliage of one of the trees. Carefully, they replaced the whole nest — birds and all — between two sturdy branches of the now rather naked tree and hoped for the best.

But the birds were presently pretty much unprotected from the elements, and the entire Flight Simulations Office took notice of the situation and swiftly came to the aid of Mother Nature.

Arthur J. Thiberville was first to answer the little cries for help. He rushed out to cover the nest with his loosely constructed plastic canopy and hoped that Mama Bird would not abandon her nest.

Indeed, the mother appeared quite satisfied with the arrangement and, rain

or shine, continued to feed and watch her brood.

C. H. Woodling, Division Chief, cast a baleful glance in the direction of uninformed gardeners, who might inadvertently spray the little hatchlings; at well-meaning tots, who would enthusiastically dispense unwanted goodies into the little mouths and thus scare off the birds' mother; and toward curious passersby, who were all too anxious to stick camera lenses smack in the faces of the unsuspecting little creatures.

Meanwhile, the office secretaries have kept tabs on the welfare of the unconcerned birdies and their mother and hope to see them safely off when it comes time for them to leave the nest.

Of the whole affair Thiberville sighs, "It's a wonder we get any work done around here," and he pulls another stack of papers onto his desk from his in-basket.

What's cookin' in the JSC cafeteria

WEEK OF MAY 1 - 5

MONDAY: Cream of Potato Soup; Weiners & Sauerkraut; Stuffed Pork Chops; Baked Chicken; Meat Sauce & Spaghetti (Special); French Beans, Squash, Buttered Beans. Standard Daily Items: Roast Beef; Baked Ham; Fried Chicken; Fried Fish; Chopped Sirloin; Selection of Salads, Sandwiches, and Pies.

TUESDAY: Navy Bean Soup; Beef Stew; Liver w/Onions; Shrimp Creole; Smothered Steak (Special); Cabbage, Corn, Peas.

WEDNESDAY: Seafood Gumbo; Roast Beef; Baked Perch; Chicken Pan Pie; Salmon Croquette (Special); Mustard Greens, Italian Beans, Sliced Beets.

THURSDAY: Beef & Barley Soup; Beef Tacos; Diced Ham w/Lima Beans; Stuffed Cabbage (Special); Ranch Beans, Brussels Sprouts, Lima Beans.

FRIDAY: Seafood Gumbo; Fried Shrimp; Deviled Crabs; Ham Steak; Salisbury Steak (Special); Carrots, Green Beans, June Peas.

WEEK OF MAY 8 - 12

MONDAY: Cream of Chicken; Beef Burgundy over Noodles; Fried Chicken; BBQ Sausage Link; Hamburger Steak (Special); Buttered Corn, Carrots, Green Beans. Standard Daily Items: Roast Beef; Baked Ham; Fried Chicken; Fried Fish; Chopped Sirloin; Selection of Salads, Sandwiches, and Pies.

TUESDAY: Beef Noodle Soup; Baked Meatloaf; Liver w/Onions; BBQ Spare Ribs; Turkey & Dressing (Special); Spanish Rice, Broccoli, Buttered Squash.

WEDNESDAY: Seafood Gumbo; Fried Perch; Tamales w/Chili; 8-oz. T-Bone Steak; Spanish Macaroni (Special); Ranch Beans, Spinach, Beets.

THURSDAY: Navy Bean Soup; Beef Pot Roast; Shrimp Chop Suey; Pork Chops; Chicken Fried Steak (Special); Carrots, Cabbage, Green Beans.

FRIDAY: Seafood Gumbo; Broiled Flounder; Fried Shrimp; Baked Ham; Tuna & Noodle Casserole (Special); Corn, Turnip Greens, Stewed Tomatoes.

superstar (?) competition call Ann Walker, X-4511.

For those who haven't been to Camp Manison before, it is at the intersection of FM 518 and FM 528 on your left as you head west toward Alvin from Webster or League City.

Special for the kiddies: NO-NO and Fay Wynn, the Clowns.

SOFTBALL TOURNAMENT

The EAA will sponsor a softball tournament May 12 and 13. All NASA teams are eligible to participate. There are men's and women's double elimination brackets. Entry fee: EAA Teams, \$25; non-EAA Teams, \$35. Entry deadline is May 5. Forms are available from the

Gilruth Recreation Center. If the original weekend is rained out, games will be rescheduled for May 19 and 20.

Easter Egg Hunt

The children's Easter Egg Hunt was a grand success, with children galore cavorting across the recreation grounds.

Those who helped to plan and coordinate this well-attended Hunt were Glenda Lancon, Cyndi Martin, Marion Worley, Dede Worley, Frances Barbee, Rowland Cour-Palais, Brian Cour-Palais, Kristel Smith, Darla Cox, Donald Cox, and Boy Scout Troup #445.

TSD maintains diversity, high-quality craftsmanship

The Technical Services Division (TSD) is thought of by many people around the Center as JSC's "workshop." Actually, the TSD function is far more complex and diversified than the term workshop implies.

The TSD provides the manufacturing capability for the Center and, as such, must be staffed and equipped to accommodate virtually any programmatic fabrication requirement. And that's a tall order! The result of this demand has been to collect the most qualified group of craftsmen available representing roughly 27 areas of manufacturing expertise.

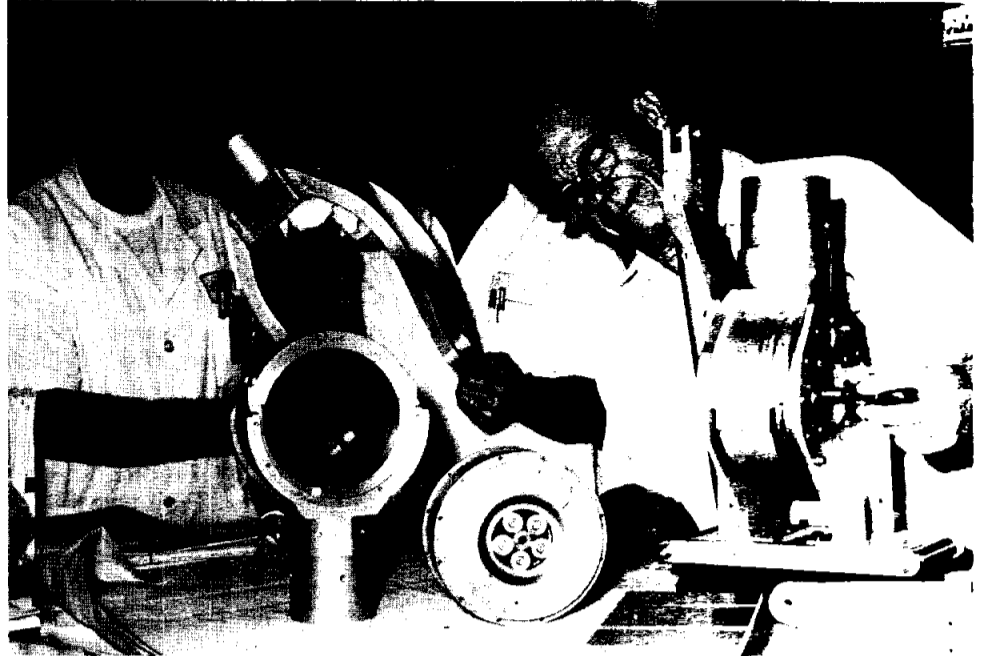
The three main branches of the TSD perform essentially all the work and serve to categorize the varied tasks: the Machine Branch, the Sheetmetal and Model Branch, and the Electromechanical

current with the ongoing programs and activities here at JSC."

The Sheetmetal and Model Branch supports Centerwide research and development activity with light and structural sheetmetal and welding fabrication. The Branch also provides manufacturing support in wood, plastics, and composite materials and fabricates full and reduced scale models and mockups for training, testing, and mission simulations.

Two examples of recent models and mockups that the TSD has performed fabrication for are the "One-G Mockup Facility" and the "Manipulator Development Facility (MDF)." These are part of the Building 9A Mockup and Integration Laboratory (MAIL), which consists of five separate Shuttle-related facilities, two of which are the Engineering and Development mockup facility commonly identified as the one-G mockup and the MDF.

The one-G is a full scale, high-fidelity Orbiter mockup used for engineering studies, procedure and design reviews,



PRELIMINARY ASSEMBLY OF THE PIDA — Shown left to right are Rudy Marent, Murray Norman, and Louis Normand, who are some of the technicians involved in assembling the rotary actuator and lower actuator clamp assembly.



Sheetmetal and Welding Section



Heavy Machine Shop

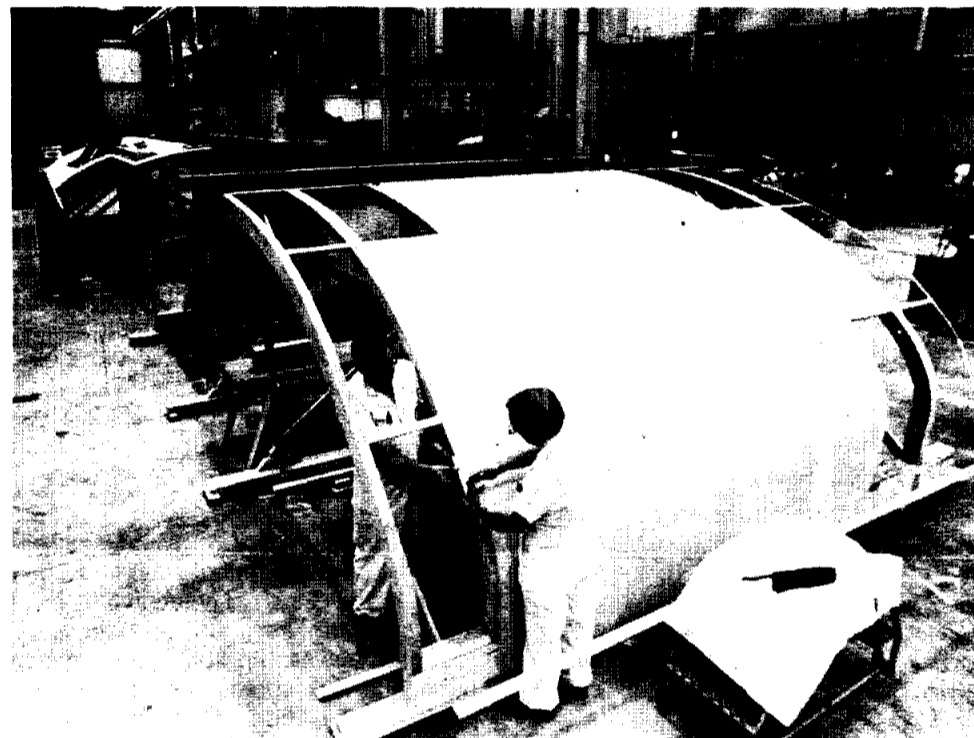


Instrument Machine Shop

Branch. From these three branches, JSC maintains a diversified shop complex having the capacity to fabricate precision components and assemblies ranging from subminiature to large structures necessary in the research and development activities of JSC.

Just a few of the TSD functions are machining, sheetmetal fabrication, model building, electronic/electrical fabrication, precision grinding, patternmaking, sculpturing, optical tooling, plastics fabrication, printed circuit fabrication, numerical control machining, electromechanical assembly including battery servicing, engraving, and marking. A complete description or list of all the TSD capabilities would be exhaustive, and the list of job assignments runs the gamut from fabrication of a rat experiment cage to circuit configuration for a guidance and navigation test station console.

J. D. Williams, Chief of Technical Services Division, says: "It is the vast variety of tasks we are called upon to do on a day-to-day basis that makes our job so interesting. We have a saying, 'If you don't like what you are doing today, just wait until tomorrow.'" It is probably the diversity of our work more than any other factor that keeps our technicians highly motivated. In addition, it is a challenge to stay abreast of state-of-the-art manufacturing techniques, and at the same time we stay



PAYLOAD BAY DOORS MOCKUP FABRICATION — In the foreground are shown (left to right) John Heckler and Jon Fisher constructing a 15-foot high-fidelity section of the payload bay doors, while J. D. Higginbottom (in the background) applies the outer skin to the 30-foot low-fidelity doors.

payload accommodations, and experiment interface studies. Currently, TSD is fabricating payload bay doors for the one-G mockup and for the Manipulator Development Facility. The MDF provides a realistic simulation of the Orbiter remote manipulator system for the development of payload operational procedures and

required on the NASA T-38 aircraft to decrease the lift/drag ratio, permitting the T-38 to be used as a Shuttle chase plane and intermediate trainer. Through an earlier request, TSD has fabricated prototype speed brake assemblies that proved highly successful.

Since the manufacturing of the first



FIT CHECK OF T-38 SPEED BRAKE — A few of the technicians involved in performing a fit check of the first speed brake assembly are (left to right) Leon Atkins, Ron Jackson, and Dick House. They are using an actual portion of the T-38 fuselage.

hardware. This requirement came from the Spacecraft Design Division and completion is scheduled for November 1.

A unique job involving the Heavy Machine Section of the Machine Branch is the fabrication of a number of sets of speed brake assemblies for the Aircraft Operations Division. Speed brakes are re-

prototype assemblies was accomplished on the numerical controlled milling machine and stored on magnetic tape, subsequent assemblies are being manufactured at a significant cost savings.

Another unusual and interesting requirement from the Spacecraft Design

Division has been the fabrication of components by the Instrument Machine Section of the Machine Branch for the Shuttle Payload Installation and Deployment Aid (PIDA). The PIDA consists of the electromechanical actuator assembly, an arm assembly, and a docking mechanism assembly. The PIDA will be used in the MAIL described earlier, and it uses a four-bar linkage mechanism with a single point application of rotary power to move the payload from the bay with a circular arc motion to stay within the specified clearance envelope and displace the payload from the spacecraft to a position that permits deployment or retrieval handling of the payload by the remote manipulator.

Historically, the TSD goes back a long way in the space program — back to 1959 and the "Little Joe" capsule fabrication in the NASA/Langley shops, back to 1960 when it was expanded to include technical support to the Astronaut Corps in training and preparation for manned launches, back to 1962 when the TSD moved to Houston from its Virginia location.

In 1962, The TSD fabricated a working model of an advanced Apollo simulator and provided soft-landing test support; they produced a high-fidelity trainer for flight crews — a full-scale Gemini — and an earlier concept of the lunar excursion module. Then, in just two short years, they found themselves involved in such complex and science-fiction-sounding schemes as a Mars mission module, involving fabrication of various shaped elliptical cones for wind tunnel testing as part of the Advanced Spacecraft Technology Program.

From there they went on to fabricate EVA units for the astronauts, a scale model of chamber "A," and the multitude of lunar hand tools. As the space program advanced the state of the art associated with electronics packaging, the TSD updated its facilities to include the latest in printed circuit manufacture.

Indeed it can be said that the TSD has been an integral part of every mission and even some nonmission-related work, including some of the components used in the mobile biological isolation garment that became little David's suit (see the November 25 *Roundup*).

J. D. Williams became division chief on January 1, taking over from his long-time predecessor, Jack Kinzler. William S. Lee has been deputy division chief about six months.

Who knows what the future will bring for the TSD. Maybe some of the individuals there even now will be able to build structural beams in outer space, and perhaps their children will help construct the first space colony or city.

Science fiction? So were Skylab and Venus probes once!