ROUNDUP

Lyndon B. Johnson Space Center

NASA

May 16, 1980 Houston, Texas

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RMS in SAIL

Crane test one of most complex sims at JSC

Parts of the remote manipulator system, the first space robot-like crane which will handle inflight transfer of Space Shuttle cargo, are currently undergoing testing in one of the most complex simulations conducted at Johnson Space Center.

The test involves four separate flight-type parts of the system. These are coupled with the orbiter flight computer and corresponding flight software in the Shuttle Avionics Integration Laboratory (Building 16).

The parts being tested, which recently arrived from Canada, are the display and control panel, rotational and translational hand controllers, and the manipulator controller interface unit. The interface unit is part of the electrical subsystem which operates the manipulator. Lab computers simulate the arm and its movement.

Jon H. Brown, special assistant in the SAIL, said these RMS preacceptance tests (R-pat for short) are designed to complement the Canadian acceptance tests of the remote manipulator system scheduled for use on the second Shuttle flight.

In addition, the tests provide an opportunity to check systems in advance of the formal verification tests scheduled later in the year.

Astronauts, engineers, technicians, and representatives of contractors Spar and the Canadian Research Council are attempting to duplicate events and circumstances astronauts might face operating the space crane in orbit. These computer simulations can both predict and mimic the realities of spaceflight.

Astronauts Sally Ride, Judy Resnick, Story Musgrave, and Norm Thagard are controlling the arm's movement by using the rotational or translational hand controllers in a mockup of the orbiter aft station.

Operators of the system manipulate the controls while looking at a computer-generated television scene which duplicates the view the crew would have out the aft window of the cockpit.

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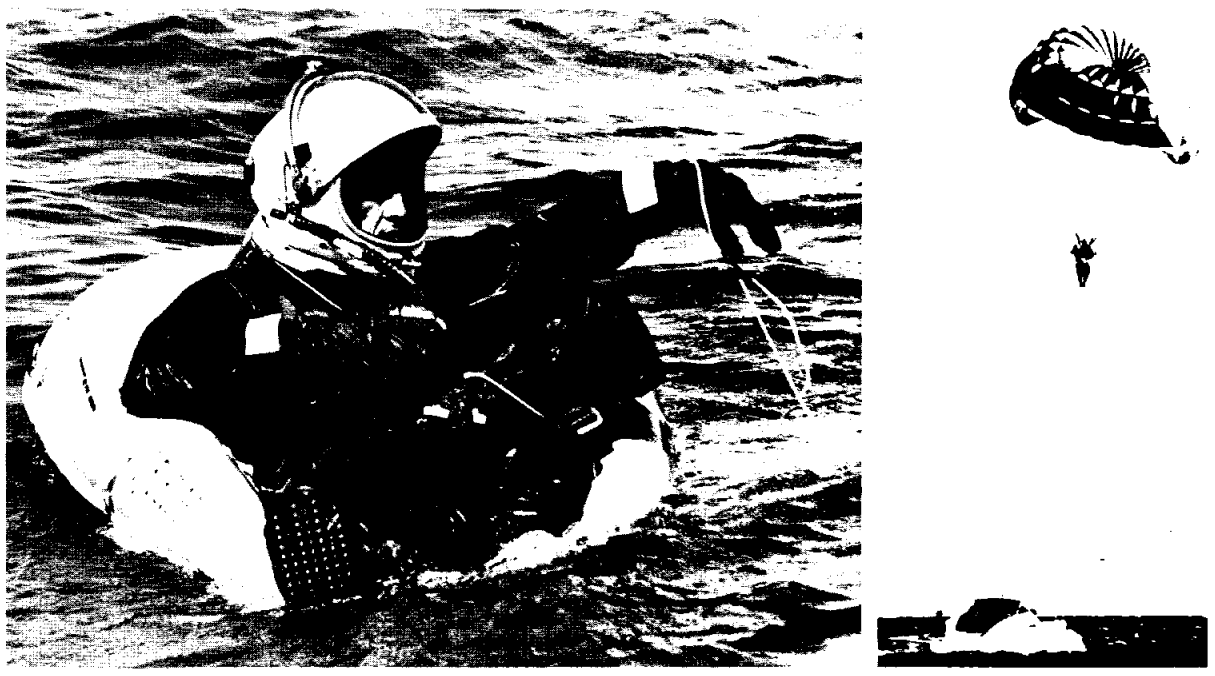
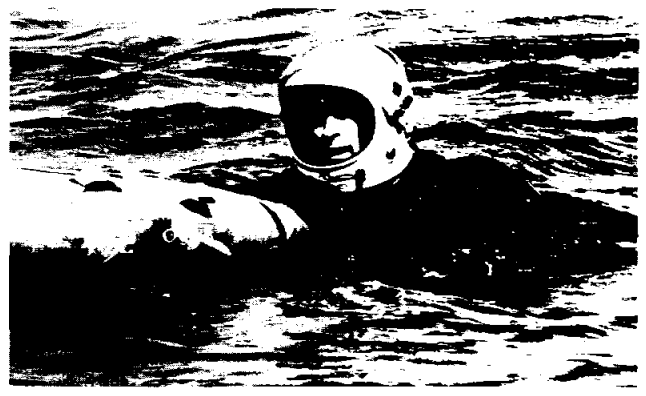




Water Survival

First Shuttle flight crews ran through emergency water landing techniques last month at Homestead Air Force Base. At top left, Bob Crippen, and at bottom right, John Young, inflate and board liferafts after a parachute landing. Far left, Joe Schmitt and Al Rochford prepare equipment

Goals set for small business

The nation's small businesses constitute the single most important segment of our free enterprise system, President Carter stressed in his recent proclamation of the week of May 11-17 as Small Business Week in the United States.

Small businesses account for 48% of our GNP; they also provide employment for over 50% of American workers while providing many inventions and new jobs.

During FY79, JSC's total contract awards to business firms was $1.154 billion with $28 million (2.4%) of this amount being awarded to small business concerns. Minority-owned businesses received contract awards worth $7.112 million, which surpassed the Center's goal of $6.650 million.

For the entire Agency, contract awards of $3.416 billion were made to business firms. Of this amount, $325.4 million (9.5%) was awarded to small business concerns, and minority-owned businesses garnered $61.5 million of the small business total.

NASA Headquarters has set JSC's FY80 small business goal at $33.6 million (up 20%), and a $7.6 million (up 7%) goal for awards to small disadvantaged business concerns. JSC's Director of Procurement, James L. Neal, points out that the FY80 goals represent difficult challenges, but that they can be achieved through the continued efforts of JSC technical and procurement personnel.

Questions regarding the Small and Small Disadvantaged Business Utilization Program and the type of projects needed for small firms at JSC should be directed to Tom Krenek at X5473.

Spacelab

NASA and the European Space Agency have selected 37 scientific experiments to be conducted on the first flight of Spacelab.

Two JSC scientists, Carolyn S. Leach-Huntoon and Millard F. Reschke have been officially named Principal Investigators for experiments that will fly in the flexible orbiting laboratory.

The selection was made from a list of experiments identified several years ago for definition and development.

Space Solar Cells

Lower production costs NASA's goal for power extension package contract

NASA has selected two California-based aerospace firms for negotiations leading toward contracts on production of low cost, large area solar cells planned for use aboard the power extension package, a supplemental power source for Space Shuttle orbiters.

NASA's goal in this contract effort is to reduce production cost of space solar cells to $30 per watt. Current space solar cells cost $80-$120. Solar cell requirements for power extension represent a significant percentage of the total power extension program cost which means that a low cost, mass produced solar cell is required.

The power extension program is designed as a 2000-pound package that can be folded into the Shuttle orbiter's cargo bay. When in orbit an astronaut would use the orbiter's 50-foot-long remote mechanical arm to move the power package and place it in space in front of the orbiter.

Then, by command, the packages' two 177-foot-long wings unfold. The wings are about 12 feet wide and will be covered with the new low solar cells which convert the sun's energy into electrical power.

The power package will be able to furnish 26 kw of electrical power for Shuttle use. The orbiter's main source of electrical power comes from three onboard fuel cells which produce up to 21 kw.

The added power of the extension package will augment experiments and other activities which require more power than can be produced by the orbiter fuel cells.

At the end of a mission the extension package would be retrieved and loaded in the cargo bay for use on subsequent flights.

The contracts comprise the first of two phases, the second being the actual production effort of 12,000 cells per month over a years period.

The two firms, Applied Solar Energy Corp., City of Industry, Calif., and Spectrolab, Sylmar, Calif., will receive a $300,000 contract to develop the solar cell. The contract also calls for the contractors to develop the production, testing, and qualification capabilities and or potential necessary to meet production requirements of about 144,000 space qualified solar cells during a 12-month period.

Engines to be retested at NSTL before flight

The three Space Shuttle main engines designated for the first flight of the orbiter Columbia will be tested again to assure operational readiness for the flight.

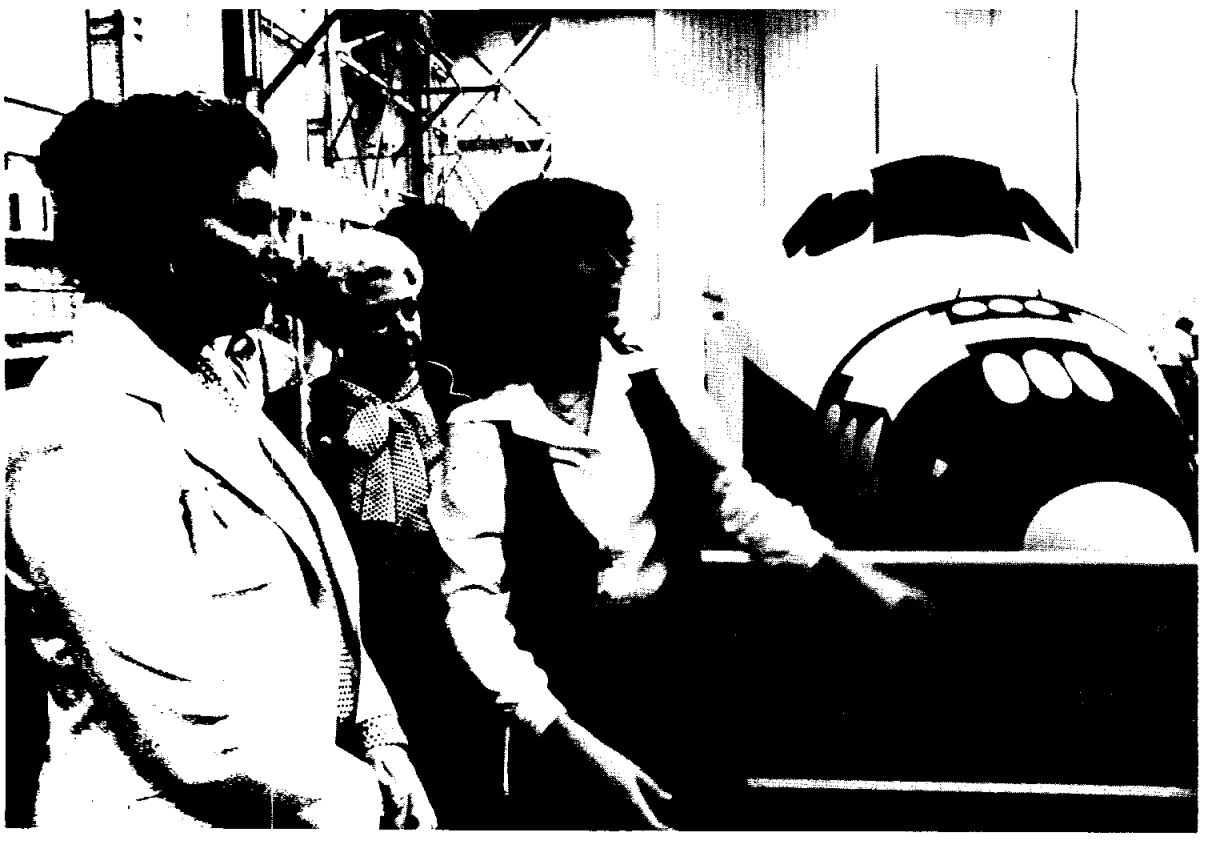
The engines, acceptance tested between April and July 1979, will be shipped from Kennedy Space Center, to the NASA testing facility in Mississippi for reacceptance firings.

The testing will take two to three months and is expected to have no effect on the timing of the Space Shuttle's first flight, now anticipated between November 1980 and March 1981.

The decision to retest the engines was based on the number of modifications that have been made during the past year. These modifications concerned high pressure turbopumps, valves, and nozzles.

Each engine will be operated on the test stands at the National Space Technology Laboratories, Bay St. Louis, Miss. After the tests, the engines will be returned to Kennedy for installation in the Columbia.

About six weeks before the first flight, the engines will be fired once again, for 20 seconds, on the launch pad.



SPECIAL ASSISTANT to the President Sarah Weddington receives briefing on the RMS from Astronaut Sally Ride. Ms. Weddington took a message about the teamwork, complexity, and timing involved in Shuttle training back to the White House after a tour last month.

Play it all out at the Rec Center

Beginning Tennis Lessons: 6:30-7:30 p.m. Tuesday and Thursday's beginning June 17; $20 for eight weeks. Registration is being accepted now.

JSC vs UH/CLC: Johnson Space Center emerged victorious in its first of seven sports competitions with the U of H at Clear Lake. The Shady Oak Bombers ably coached by Tom Jenkins, were victorious over U of H's Fabulous Five, 49-46, in the final game.

JSC retains the perpetual trophy until the next competition—*Tennis*—which occurs in June.

HGAIRC/BARC Fun Run Tomorrow: May 17 at 8 a.m. runs will be over the five-km and the one-mile distances. Cost: 50¢/person.

As an added incentive, we need JSCers to turn out so that we may capture the participation trophy from the Houston Council. The trophy is given to the organization with the most runners.

9th NASA Intercenter Running Competition: 509 runners represented JSC in the April run. Best time in both races was turned in by Herb Cottle of McDonnell-Douglas, running the two-mile race in 10:32 and the 10 km at 36:03.

MPAD won the team participation trophy for NASA; contractor winner was Martin-Marrietta. This showing should improve JSC's posture in the NASA-wide standings.

Softball Tourney: The first of our full summer schedule of Softball Tourneys—a men's double elimination open/restricted tourney—will be June 6-8. Cost: $55/team; limit: 24 entrants. Register now.

New Tennis Court Fees: In addition to the 75¢/person per 1-1/2 hours fee previously announced, the Rec Center now offers an alternative fee structure for regular users to be paid on a yearly, semi-annual, or quarterly basis. Contact x3594 for further information.

Cookin'

Week of May 19 - 23

Monday: Chicken & Rice Soup; Texas Hots & Beans; BBQ Ham Steak; Steak Parmesan; Beef & Macaroni (Special); Green Beans; Carrots; Au Gratin Potatoes. Standard Daily Items: Roast Beef; Baked Ham; Fried Fish; Chopped Sirloin. Selection of Salads Sandwiches & Pies.

Tuesday: Tomato Soup; Potato Baked Chicken; BBQ Spare Ribs; Mexican Dinner (Special); Squash; Ranch Beans; Spanish Rice; Broccoli.

Wednesday: Clam Chowder; Baked Turbot; Liver & Onions; BBQ Ham Steak; Baked Meatloaf w/Creole sauce (Special); Beets; Brussel Sprouts; Green Beans; Whipped Potatoes.

Thursday: Beef & Barley Soup; Chicken & Dumplings; Corned Beef w/Cabbage; Smothered Steak w/Cornbread Dressing (Special); Spinach; Cabbage; Cauliflower au gratin; Parsley potato.

Friday: Seafood Gumbo; Pork chop w/Yam Rosette; Creole Baked Cod; Tuna & Salmon Croquette (Special); Brussel Sprouts; Green Beans; Buttered Corn; Whipped Potatoes.

Week of May 26 - 30

Monday: HOLIDAY

Tuesday: Beef & Barley Soup; Turkey & Dressing; Country Style Steak; Beef Ravioli; Stuffed Cabbage (Special); Corn Cobette; Okra & Tomatoes; French Beans.

Wednesday: Clam Chowder; Catfish W/Hush Puppies; Roast Pork w/Dressing; Chinese Pepper Steak (Special); Broccoli; Macaroni w/Cheese; Stewed Tomatoes.

Thursday: Cream of Tomato Soup; Beef Tacos; BBQ Ham Slice; Hungarian Goulash; Chicken Fried Steak (Special); Spinach; Pinto Beans; Beets.

Friday: Seafood Gumbo; Liver w/Onions; Deviled Crabs; Roast Beef w/Dressing; Seafood Platter; Tuna & Noodle Casserole (Special); Whipped Potatoes; Peas; Cauliflower

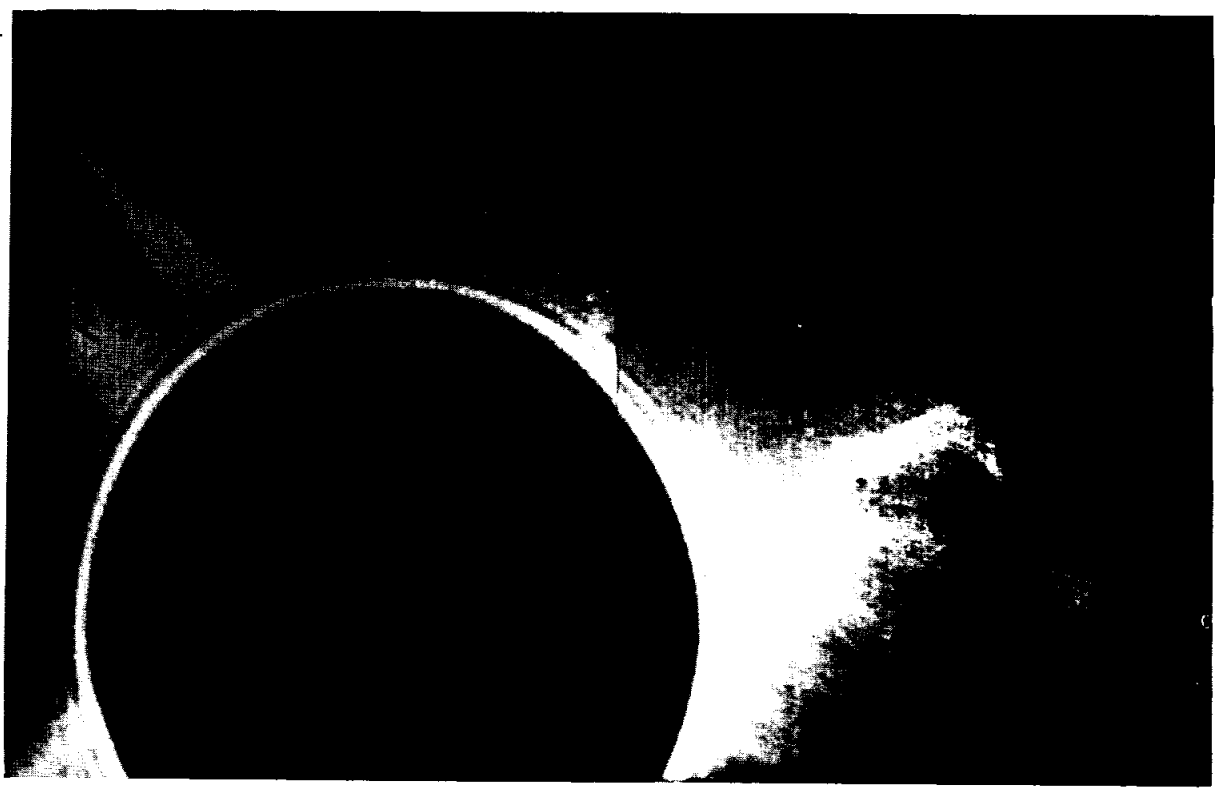
JSC golfers doing great

Third time's a charm.

Having been frozen out the first time and rained out the second, the championship and first flights of the JSC Golf Association finally found a beautiful day on May 5 for their tournament played at Goose Creek in Baytown. The second flight, which played Goose Creek several weeks ago, played the same day at Wortham.

Winners for the day with their net scores are: Championship flight: **Dwight Baker** (69), **Jerry Pels** (70), and **Ralph Najera** (71). First flight: **Joe Deatkine** (70), **Larry Hall** (71), and **Kevin Hickey** (72). Second flight: **Jim Greenlee** (60), **James Kell** (66), and **Craig Thompson** (68).

A "transient event," the first to be observed from the Solar Max spacecraft, is shown here in the bright region of the photo at right. Immense disruptions on the Sun cause ejections of matter—as much as 1 billion tons, to be thrown out at speeds several million miles per hour. The whispy arch in this photo reaches half a million miles above the surface of the Sun. Total energy released in the flare can be as much as the equivalent of a billion megaton bombs. Study of such transient events in solar flares is part of the Solar Max Mission, launched February 14, 1980, to study the Sun during this solar maximum year.



Bulletin Board

The Houston 99's Is Looking for New Members

Prospective members in the Houston 99's are invited to a party at the home of Elsie Collie (497-5745). The 99's is an organization of women pilots formed in 1929 by Amelia Earhart. They attend fly-ins, attend air shows, schedule projects such as airmarking airfields, take part in spot-landing contests, and of course hold meetings with guest speakers. Contact Ms. Collie for further information.

The Space Program & Farmers Topic of Tonight's L-5 Meeting

"Use of Aerospace Remote Sensing in Resource Inventories for Agriculture," is the topic of a speech by Jim Vacarro of Lockheed Earth Observations at the May 16 meeting of the Houston L-5 Society. Dr. Vacarro's speech will illustrate yet another benefit provided by the space program. Time: 7:30 p.m.; Place: University of Houston Central Campus, Science & Research Bldg. #1, Room 117 (Take UH Entrance 6 from Cullen). The L-5 Society is a non-profit educational organization which concentrates on space benefits and potential.

Membership in the Tennis Club Keeps You Playing

The JSC Tennis Club held its second tournament of the 1980 season on April 25, 26, and 27 at the Bay Area Racket Club. Membership in the JSC Tennis Club is open to all JSC employees, contractors, and their families. If you are interested in joining in the fun, contact Lyle White at x2686. The next tournament will be an Open Singles, June 7, 8, and 9.

Come Out Dancing At the Spring Ball

Spring is busting out all over! Here's your chance to celebrate. The date is May 31 at Gilruth center. The night's entertainment includes a delicious prime rib dinner, cocktails, and dancing to two bands. In the banquet room, we have "The Jerry Vann Orchestra" for all you ballroom dancers. Jerry has expanded his repertoire to include more of the Latin music that so many of you have requested. On the gym side, we feature "Dialogg" which you will remember from the 1978 Christmas Dance. Their selection of disco music is excellent. Doors open at 7 for cocktails, dinner will be served from 8 to 9 and dancing at 9. Admission is $15 per person. Tickets are on sale May 12 thru 23 in Building 11. Sales are limited to 600. Seating will be on a "first-come basis" in both the banquet room (ballroom music) and gym (disco music).

On Sale at the JSC Exchange Store

(Store Hours 10 a.m. to 2 p.m.)
Dean Goss tickets: $10 single, $20 couple (regular $14.50)
General Cinema tickets: $2.40 each
Astroworld tickets: $8 (regular $9.95)
Six Flags Over Texas tickets
$8 for one day (regular $9.95)
$9.95 for two days (regular $14.95)
Magic Kingdom Cards: free
Sea-Arama Marineworld Fun-Time cards: Free

Interesting Shows Coming On PBS Channel 8

"Cover Story," a magazine format program, debuts Monday May 26, featuring writers and futurists such as Herman Kahn, Stewart Brand, and Hazel Henderson. NOVA covers "Light of the 21st Century," A look at the laser beam, how it is currently used, and its potential future uses May 27 at 8 p.m. (repeated 3 p.m. May 31). And "Power Shift: The Soviet Arms Build-up" is first in a 10-part series, Ben Wattenberg's 1980, which will concentrate on freedom, progress, and traditional American values.

More Seminars Scheduled At Lunar Planetary Institute

LPI continues its seminar series, discussions that take place Friday afternoons at 4 p.m. in the Berkner Room. Scheduled in the near future:

May 16: Bill Leeman of Rice University speaks on Cenozoic volcanic rocks of the Western U.S.

May 29 (Thursday) Anne Lutz Garihan of Furman University speaks on Stratigraphy and brachiopods of Kansas

June 6, Peter Francis of the Open University in England speaks on large volcanic structures in the Central Andes

June 13, Dieter Stoffler, visiting scientist at LPI from the University of Munster in Germany, speaks on European meteorite craters and terrestrial impact formations.

Monetary Woes

How to budget inflexibles from one year to the next

Everyone feels the effects of the inflation/recession that has beset the country since 1972. Financial expert Sylvia Porter has devised a four-step strategy for personal money management that can help you budget through the year.

It essentially entails knowing your income and outgo 12 months in advance and portioning out major bills into monthly expenses.

"Start from the premis that no income you will earn will ever be large enough to cover *all* your wants," she says in *Sylvia Porter's New Money Book for the 80s* (Doubleday). Then she advises that you fill out four "forms to manage your money for the year.

On Form I take your income for the entire year, including dividends, interest, and profits from outside projects (garage sales?) and divide it into 12 equal parts.

"Knowing what you have available to spend each month, you will know how your expenses must be divided to match that real monthly income. You'll be amazed how different your overall income-expense picture will appear," she writes.

On the second form list all major "fixed expenses," such as taxes, insurance premiums, and your nine-year-old's month at summer camp.

"The key to a good system of money management lies in spreading your big expenses and your savings so that each month bears a share of them," Ms. Porter writes. "Take a second sheet of paper. On it list all of your fixed expenses during the coming year and convert each of these to a monthly amount.

"When you put aside $20 every month to meet a $240 yearly insurance premium, for instance, you will not risk spending that insurance money on an unnecessary luxury.

"Without a money-management plan, if you have to pay a life insurance premium of $240, a property tax bill of $96, and a personal loan of $600—all in January—you would have to dig up $936 somewhere. And that might be tough indeed.

"But you probably know

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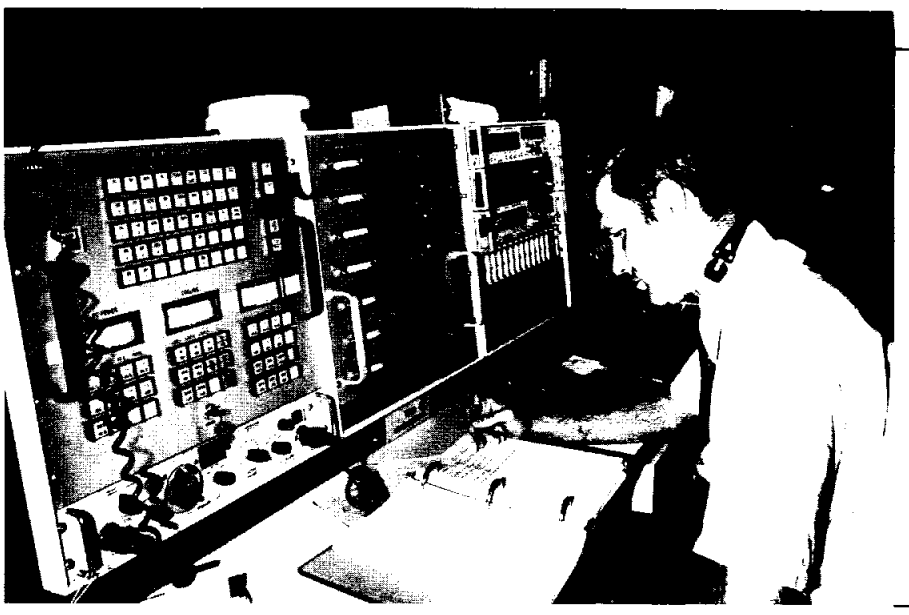


RMS in SAIL

Larry M. Walters studies dynamics of the remote space crane in sims in the SAIL, (See Story Page 1).

Students design space vehicle concept

Twelve students from Houston's High School for the Engineering Professions participated in the final exercise for their 1979/80 Space Science and Engineering Project Tuesday, May 6. In a briefing held in Room 966 of Building 1, each student explained his or her role in developing design concepts for a space vehicle which could operate in conjunction with a future Orbiting Space Operations Center.

Members of the Program Advisory Committee who received the briefing addressed questions to the students on specifics of their design in an informal, lively session at the conclusion of the presentation.

The Program Advisory Committee is chaired by Max Faget with the following serving as members: Frank Curtis, The Boeing Company; Jack Buxton, Grumman Corporation; William Reicks, Lockheed Engineering; Chuck Jacobson, McDonnell-Douglas Astronautics; Harry Clagett, Northrop Corporation; and Vern Widerquist, TRW, Inc.

'I'll give you 2 to 1 odds...'

Addictions come in many forms. Gambling is one of the most difficult to overcome. Betting in games of chance to the extent that such activity has a noticeable impact on family life and job productivity is an addiction.

Employees at NASA who are gambling to the extent that *their* actions are causing interpersonal or financial problems are *invited* to call Connie Alexander, counselor, Employees Assistance Program, x6130. Ms. Alexander is in the process of organizing a local chapter of Gamblers' Anonymous.

If you wish, your identity will be kept strictly confidential.

Roundup Swap Shop

Ads must be under 20 words total per person, double spaced, and typed or printed. Deadline for submitting or cancelling ads is 5 p.m. the first Wednesday after publication. Send ads to AP3 *Roundup*, or deliver them to the Newsroom, Building 2 annex. No phone-in ads will be taken. Swap Shop is open to JSC federal and on-site contractor employees for non-commercial personal ads.

Property & Rentals

Lease: League City, large 4-br home. x6287 or 337-5106 after 6.

Lake Livingston 60 x 120 lot with trees, water, elec, good road, development has pool, tennis, boat ramp, clubhouse, $200 down, $2440. T. Ward 488-5445.

Lot at Waterwood on Lake Livingston, golf, tennis, water sports, etc. Owner will finance. Bill x6136 or 488-1410.

Lease: LaPorte-Bayshore condo, 1 bedroom, utilities paid, $200 deposit/ $255/month. 334-5080 or 334-3202 after 5.

Rent: 3 br beach home on West Galveston, 360 degree porch. Bring linen and food, $200/wk. 481-5943.

Rent/Lease: Friendswood 3-2-1 near schools, fenced yard, clean, $425/month plus deposit. 482-7546

Rent: Lake Livingston, Cape Royale, compl furn home, 3-2-1. Fishing, hunting, tennis, golf, etc. Reserve early. Wk/mo/yr rates. 488-4487.

Galveston, West End. 2 bdrm, By-the-Sea condo. furn. $210/wk off, $300/wk in season. Clements 474-2622.

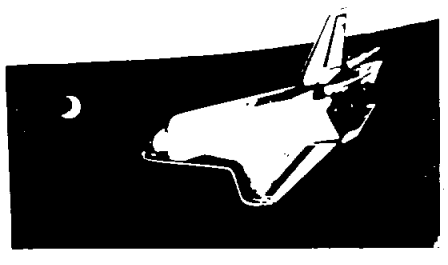
Lease: 3-2-2 house available July 1, 1850 sq ft in Middlebrook, close to swimming pool/tennis courts. $550/mo, 1 yr lease. 488-2913.

Lease: Fairmont Park LaPorte, 4-2-2 fenced, clean, all carpeted, curtains, good neighborhood, available July 1. Gunter x4366 or 471-1914.

Rent: Jamaicia Beach cottage, $210/wk, two bedrooms, one bath. Make reservations now for summer season. 334-1640 after 6.

Lease: Friendswood 3-1-1/2-1, fenced, custom interior. $380/mo on 6 mo lease. Water paid, no pets, available July 1. Tom Morgan x5983 or 482-2356.

Roundup deadline is the first Wednesday after publication.



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

Editor ..... Kay Ebeling

Cars & Trucks

Convertible, 68 Chevy Impala, 327 V-8, a/c, pwr windows, am, new paint, etc. One owner. Bill x6136 or 488-1410.

71 Mercury Marquis, exc cond, full power and loaded, $1500. 675-1097 or 686-9381.

78 T-Bird Diamond Jubilee Edition-Silver Blue, fully equipped, 14,000 miles, $6500. x6287.

72 Oldsmobile 98 4-door hardtop. fully equipped, clean, low mileage. $1095. 334-2765 after 5.

72 Delta 88 convertible 70K mi, negotiable. Joe x5129 or 585-2862 after 6.

77 GMC 1/2 ton pickup, ps, pb, air, exc cond, 497-5378.

78 Thunderbird, ps/pb, air automatic trans, cruise control, low mileage, exc cond, $4900. 488-4915.

78 Camaro Lt. maroon, One owner, pb, ps, a/c, auto, good cond, bargain at $4500. Peacock x2208 or 486-0159.

76 Chevette, blue, new radials, luggage rack, 25+ mpg, AC needs work, $1800/best offer. x5348 T. Brown.

72 Chrysler town and country sta wagon, 440 v-8 rebuilt engine, radial tires, electric windows, $1000. 393-1444.

Carpools

Want to join/form carpool from Texas City area to NASA, hrs 7:30 to 4:30. Rachel x4521.

Want to join/form carpool from Nassau Bay/Clear Lake City to Herman Hospital, 7:30-4 female, non-smoker. 333-2395.

Want two more carpoolers from Fairmont Park/Pasedena area to NASA, 7:30-4 shift. M. Dalton x4226.

Want one or two more carpoolers, Beverly Hills/Sagemont/Almeda Mall area to JSC. Approx 7:30 to 4:15. Ringwood x4389 or Steinthal x2050.

Need another rider from Pearland/ Woodcreek area. non-smoker, hrs 8-5. Stella x4241 or Jan x3628

Personals

Lost, strayed or borrowed book: "Nomographs" by Lipka. Please come home. Trebes x6313.

Cycles

Girl's 10-speed, 27-inch bicycle, Schwinn Varsity, yellow, exc cond, $35. 488-8149 after 5.

Bicycle, Boy's 20" High-rise handlebars, banana seat, $25, Fullerton 488-5782.

Household Articles

1 rug, 9' x 12', brown, $20. 1 hooked rug, 5' x 9' oval, tan with floral design, $25. York x6247 or 488-2188.

2-ton Sears a/c, $190. King-size headboard, $30. Sewing cabinet/table, $15. End table, $10. Coffee table, $30. 482-8827.

Solid pine 32 x 78 hand carved Spanish door, $75. Spanish 58-inch twin headboard, hand carved, $50. John x4393 or 488-0559.

Ceramics, Greenware, Bisque, finished pieces. 451-2112 or 921-2793.

Used carpet and pad, 150 yards, exc shape, beige plush 1 year old, light green sculpture 2 years old. x2786 or 333-3298 after 4:30.

Sears portable washing machine with permanent hook-up kit included, exc cond, $100. Cindy x7236 or 944-4896 after 5.

Ceramic dishes, old mill pattern of Johnson brothers, 51 piece set includes various serving pieces. $30. Rubenstein x3116 or 334-2354.

Garage Sale, May 17 and 18, 9-5, 3912 Dover Street in Park Place, misc household goods, several families.

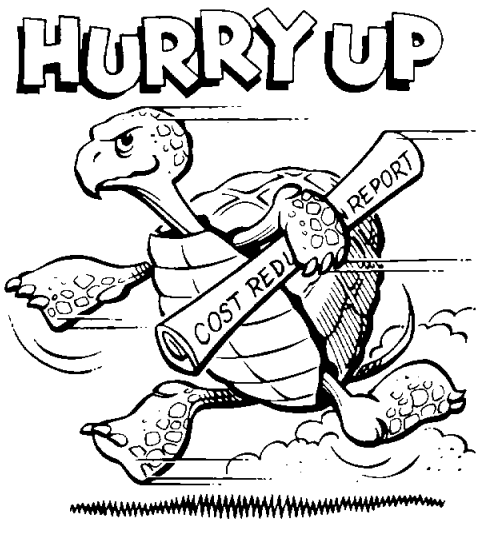
74 Whirlpool Gas Dryer $100 (new home electric). x2660 or 554-7014.

Wanted

Someone to repair a Mickey Mouse watch, needs hairspring. Jim Bates x4601 or 944-4687 after 5:30.

Small trailer to use behind riding lawnmower. Al x2805.

Housing or bedroom accommodations for summer ASEE faculty fellows. Mid-June through August. Call Nancy Robertson x4724



GET JSC FORM 1150
AND SPEED IT TO
BE-3 - COST REDUCTION OFFICE

Cartoon by Russ Byther

Manual or parts list for a porter cable rototiller model 105. x4643 or 921-7212.

Outboard motor, 35 to 50 hp controls and tank. Age not important but must run well. 482-3678 after 5.

Babysitter for 8-year-old boy, 4-5 weeks this summer, days. call 333-3104 after 5.

Boats & Planes

Wellcraft '78 V20, 470 Mercruiser, SS prop, VHF, exc, $6900. 471-5396.

77 Oday 25-foot sailboat and trailer, fully equipped, exc cond, Watergate slip transferrable, $12,800. 334-1892.

Sailboat, 14' Sr Dolphin. Includes trailer and boat cover, exc cond. Earl Rubenstein x3116 or 334-2354.

76 Galaxy 16' 120 OMC, I/O drive, depth finder, radio w/dual speaker, etc, $2995. 451-2112 or 921-2793.

Airplane: PA-22 like new, less than 100 hrs SMOh, $14,000 invested, make offer, leaving area. Barney x2817 or x2168 or 471-7967 after 5.

Outboard motor, 65 hp Mercury short shaft elec start, tank and controls, $200. 482-3678 after 5.

Stereos & Cameras

Magnavox, VTR color camera, w/electronic view finder, 6-1 200-m lens, auto, iris w/leather case $800. 333-2974.

Camera lens, 135mm for Pentex or Yashica, best offer. Joe x2812 or 2168.

Bell & Howell slide projector with remote control. Roberto x5841

Miscellaneous

Lady Shick consolett salon hair dryer, $7. B&W 17 inch Westinghouse TV, $20. AMF professional gynmastic mat, $90. John x4393 or 488-0559.

69 Grand Prix parts, exc cond; A/C system $50, Turbo 400 trans $50, and most other parts all for $150. 488-5546.

77 Rockwood 24 ft. travel trailer, fully equip, air, furnace, shower, etc., mint cond, $5500. x2375 or 488-0658.

Air compressor, air tools, misc tools, 10 1/2" ruger 44 mag pistol, Win. model 70 rifle, 30-06; Van Siats 488-1846 evenings.

Master Conservocation correspondence course materials, includes: Resources and wildlife conservation, $100. Samouce x2568.

Solid bronze custom belt buckles, paperweights and plaques. 488-2913.

Motorcycle trailer fits 3 bikes, $195. Ed Miller x6378 or 554-2702 after 5.

.08 carat diamond ring for sale. Paul Richards x4205

Golf clubs, Wilson staff irons, 1, 2, 4 woods all new grips, bag. Must sell soon $120. x5348 T. Brown.

EAA Picnic 1980

With a pie-eating contest and an obstacle course that was better than ever before,the EAA picnic entertained over 3000 persons May 4. Anything went at anything goes, including balloon poppings by unusual methods and distinguished engineers stumbling across a course with 10 lifesavers over their heads. The Dunk Tank collected a record amount for charity—Jack Lister and Harv Hartman attracted the most ball-throwers (they are from Personnel). Word all over the center the following Monday was that it was the best picnic yet. And the band was great.

Complex RMS sims, cont'd

Mr. Brown explained that one of the difficulties astronauts will face in operating the mechanical arm is the dynamics induced by movement of the arm. In the weightlessness of space once a mass is set in motion (the arm and attached payload), it wi l keep going until it is stopped by an equal and opposite force.

As a result, each time the arm is commanded to move, the control system must eventually deliver a command to counteract this motion. Reactions from the arm movement cause the orbiter to move and vice versa.

Possible interactions of the arm's control system with that of the orbiter is an area which NASA must fully explore prior to flight. The lab simulation required to perform this investigation is among the most sophisticated ever attempted at JSC.

As in all manned space simulations numerous problems are fed into the system. According to Mr. Brown, ample problem situations as well as normal operations are built into the sims.

"It is extremely complex," Mr. Brown said.

The RMS is an intricate machine being developed for NASA by the National Research Council of Canada. It is planned for use aboard the Space Shuttle Orbiter beginning with the second flight.

The manipulator system will be used for a number of tasks including placing or retrieving satellites in space, assembly of structures or components, and, if necessary, the rescue of crews from an inoperative vehicle. The man pulator would transfer the crew from a disabled vehicle to the rescue vehicle.

Spar Aerospace Products, Ltd., is under contract to the Canadian government to design, build, and test the manipulator system. NASA recently signed a $63.6 million contract for the production and delivery of three additional manipulator systems.

The first flight item, scheduled for delivery to Kennedy Space Center later this year, was built by the Canadians at no cost to NASA.

The system consists primarily of a 50-foot long arm with movable joints at the shoulder, elbow, and wrist, plus associated motors, gears, sensors, and an end effector which serves as the arm's ingenious hand.

Also included in the system are cockpit controls and displays and electronics which control the arm and provide an interface with the orbiter flight computers.

Exploration

"We never gain as much from exploration as the wild enthusiasts promise; we invariably gain more than the frightened old men predict. And regardless of predictions, the exploration must go on because it is in man's nature to explore."

—James Michener

Frosch testifies on joint ventures

Recently NASA set up a joint venture policy to stimulate industry investment in commercial space projects. NASA Administrator Robert A. Frosch testified last year before the House Subcommittee on Space Science and Applications regarding joint venture policy. Following are excerpts:

One fact that has become evident, throughout NASA's endeavors, is the necessity for positive innovative action to bring the possibility of utilizing space technology and spaceflight opportunities to the attention of industrial customers.

We have conducted a number of studies and analyses to identify factors that tend to inhibit commercial or corporate participation in these activities. We have solicited advice from leaders in this field.

The results of these studies and conferences indicate to us that many elements of the business community perceive a number of impediments to cooperation with the Government in the development and exploitation of the space environment.

These include a concern that they may lose any patentable rights that result from cooperative programs; that proprietary data may be made available to their competitors; and that association with a governmental or quasi-governmental organization will expose their records to Government auditors.

Also, many business leaders have stated that financial pressures due to inflation have reduced their interest and capacity to undertake long-term, high-cost, high-risk ventures.

For these activities the risk adjusted rate of return on the initial investment must be high in order to compensate for the above factors.

At this time, few space ventures are attractive to industry.

Some industrial organizations state they have adopted a "second to market" strategy. They have concluded that it is more profitable to be second in a market than to bear the high risk and high cost that goes with the initial development.

By monitoring the progress and activities of their competitors, they hope to ascertain which products or processes are furthest along in development. Thus, by starting product development several years later, they hope to achieve acceptable market penetration with minimal risk.

Because of these concerns, and in accordance with its statutory mandate, NASA has for some time been reviewing alternatives and options for a program to encourage the industrialization of space and insure the maximum benefit to both our citizens and the economy in general.

By engaging in joint ventures where each party pays for his own participation, we will have the flexibility to negotiate arrangements under which the legitimate rights and interests of both the Government and the private concerns are protected.

Budgeting through the year, cont'd

beforehand that in January you must meet those payments. When your money-management plan is in full effect, you would set aside $78 out of each month's income and then take the January financial blow in stride."

Remember to include a regular savings deposit as part of those fixed expenses, she advises.

On Form III you can now figure how much you have left each month for day-to-day expenses.

"Take a third sheet of paper," Ms. Porter writes. "From Form I, put down your total income divided into 12 equal parts. From Form II put down your unavoidable expenses and your savings divided into 12 equal parts. The difference is what you have available for day-to-day living expenses.

"This much is easy."

Form IV is where the "juggling" takes place. Day-to-day items such as food, clothes, and recreation cannot be figured accurately a year in advance, but by using this system you can know how much you have available any month of the year for cash flow.

Civil servants can adjust this system by dividing income and expenses by 26 instead of 12 to coincide with federal pay periods.

Using this system will keep you from accidentally spending next quarter's insurance payment on an impromptu trip to South Padre. You can take your trip and make the payments as well.

All it takes is a little planning—and a lot of discipline.