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DR. COOPER RECEIVES DOD CIVILIAN SERVICE AWARD

Center Deputy Director, Dr. Robert S. Cooper, has been selected to receive the Department of Defense's coveted Secretary of Defense Meritorious Civilian Service Award. The award is one of the highest honors bestowed by the DOD and only those individuals cited for "exceptionally meritorious and outstanding service" nominated to receive it. Dr. Cooper's case, the nomination was made by the man best qualified to assess his distinguished contributions as Assistant Director (Space and Advanced Systems) DDR&E, his immediate boss, Deputy Director, John B. Walsh.

Dr. Malcolm R. Currie, Director, Defense Research and Engineering, made the formal presentation in his Pentagon office on December 11. The citation reads:

"Dr. Robert S. Cooper is hereby awarded the Secretary of Defense Meritorious Civilian Service Award for exceptionally meritorious service as Assistant Director (Space and Advanced Systems), Office of the Director of Defense Research and Engineering from August 1972 to September 1975.

"Dr. Cooper's dedication, initiative, professional expertise and leadership have contributed significantly to the research and development program of the Department of Defense. He has managed major space and high energy laser programs with consummate skill and vigor. He has been a prime mover in the exploitation of space applications and laser technology for the satisfaction of military requirements.

"Dr. Cooper has earned wide respect for his personal qualities, perserverence and professional qualifications. His dedicated service and outstanding contributions in furthering research and development objectives to improve the defenses of the national reflect great credit upon himself, the Department of Defense and the Federal Service."

Dr. Cooper

AWARD EMPHASIZES ATS'S EDUCATIONAL ROLE

In recognition of the pioneering educational television work of the Applications Technology Satellite-6 (ATS-6), an award was presented to NASA at the recent conference in Chicago of the National Association for Public Continuing and Adult Education.

Mrs. Ruth Bates Harris, NASA Deputy Assistant Administrator for Community and Human Relations in the Office of Public Affairs, accepted the award from the group's Committee on Social Justice.

Awards were also presented to members of the team that developed the ATS-6 satellite, including the chief project officer, Dr. Richard B. Marsten, Dean of the School of Engineering, City College, City University of New York, formerly of NASA.

After a year of operation over the North American continent, the satellite was moved last summer to a new position over Africa, where it is now beaming educational programs to remote areas of India.

GREENBELT SOLAR ENERGY RESEARCH HOME NEARS COMPLETION

A fuel oil savings of as much as fifty percent is expected to be demonstrated during this winter by a solar energy research home soon to be completed in the 1600-home cooperative community of Greenbelt, Md. It is located on the southwest corner of Southway and Crescent Roads.

Modification of the four-unit building to utilize solar energy is part of a joint energy research project between Greenbelt Homes Inc., a large housing cooperative within the community, and GSFC. The project was undertaken as part of the Federal Government's efforts to research and demonstrate ways to conserve energy.

"We suggested the use of this cooperative community as a solar energy research project by Goddard on a mutually beneficial basis," said GHI President, Dr. James W. Smith.

"The rising cost of heating fuel which must be passed on to our residents poses hardships for many of them who live on fixed incomes," he added.

As a major NASA research center, Goddard has developed an expertise in the design of thermal control systems for satellites which must maintain stable temperatures for successful operation in space.

"By putting this expertise to work, we can help show a community the way to conserve heating fuel and to cut down on costs. At the same time, we will gain further, vital experience and data on thermal control," said Emil Hymowitz, (WDE 702) Goddard's manager for the project.

Greenbelt is considered ideal for this project because it uses hot water heat and so many of its buildings are identical. These factors have simplified the development of the solar heating system which is designed to work in conjunction with the existing variable temperature hot water heating system.

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GEORGE KRAFT, Chief Engineer for Greenbelt Homes Inc., discusses the adaptation of a solar energy collection system to a Greenbelt multi-unit home with two of the residents. On the right, they are Mr. and Mrs. Joseph Karitas, who have lived in the same home for 35 years. Mr. Karitas is retired as Chief Painter for the U.S. President's White House staff.

X-RAY ASTRONOMERS GATHER AT GODDARD

About 100 astronomers from throughout the United States and several foreign countries gathered here October 20-22 to participate in a symposium/workshop on X-ray astronomy.

Discussions centered on the exchange of information on a number of particularly interesting compact double-star systems that emit X-rays and for which there are observations in many other bands of the spectrum—radio, optical, ultraviolet.

Five different satellites now orbit Earth and observe celestial X-rays. Goddard has project management responsibility for three of the spacecraft—Copernicus, Orbiting Solar Observatory-8 (OSO-8) and the Small Astronomy Satellite-3 (SAS-3), as well as coordination responsibility for the European spacecraft ANS-1 (Netherlands) and Ariel-5 (United Kingdom).

There are perhaps 100 binary (double-star) X-ray objects in our galaxy alone. Discovery of these X-ray sources is a product of the space age, with spacecraft observing their emissions beyond the radiation-absorbing blanket of our atmosphere.

The compact stars in the binary systems under observations are the most exciting objects of astronomical research today. They have masses which are close to that of our Sun, but their diameters are only about ten kilometers. For example, neutron stars are so dense that a teaspoonful would weigh a billion tons. Black holes are even more dense; once matter is drawn into the black hole, giving off X-rays as it is squeezed down, nothing can escape—not even light.

Six new and extremely powerful X-ray sources—the brightest in the sky—have been discovered by spacecraft in the past year. Known as X-ray novas, they are noted for suddenly brightening and then completely fading away after a few months. The latest, discovered in August, is as bright as the Sun and more than ten times brighter than the easily seen Crab Nebula, the most famous super-nova (exploding star).

Some of the X-ray binary systems discussed were:

HER X-1—An X-ray pulsar that is probably a neutron star.

Cen X-3—Another X-ray pulsar also likely to be a neutron star, but with a binary system differing considerably from Her X-1.

Cyg X-1—Possibly a black hole.

Cyg X-3—An object that is a major puzzle, with highly variable X-ray spectra, strong radio and infrared emissions, but not visible optically.

A0620-00—A new X-ray nova now being tracked in the optical as well as in the X-ray bands.

3U0900-40 (Vela X-1)—New measurements of this binary system now make it possible to determine the masses of both stars.

KSC JOB TOTAL REACHES BOTTOM

Kennedy Space Center employment has reached bottom and soon will show slight increases as shuttle construction work progresses.

Currently at a level of 9,200 people—at KSC proper—construction projects now underway or planned should bring about a slow increase in total employment to about 10,500 persons when the shuttle begins flying in early 1979.

One reason the employment will be smaller than during previous manned missions is the automated preflight checkout system being developed for the shuttle launch. The firing room in KSC's Vehicle Assembly Building required about 500 people for an Apollo launch whereas the automated checkout system for shuttle will permit a reduction from that 500 to 50 persons in the firing room.

KSC employed more than 26,000 persons at the peak of the space race in 1964, while neighboring Patrick Air Force Base employed another 27,741 at its Eastern Test Range facility. Today Patrick employs about 13,000.

One major construction project almost completed is the 15,000 foot-long runway on which shuttle will land. Fifth-longest in the world, the runway is grooved so that the surface will prevent hydroplaning, a water buildup condition in which aircraft landing gear wheels literally "floats" making control difficult and runout distances lengthy.

Other construction at KSC involves proposed bicentennial displays planned for the spaceport. Fifteen geodesic domes—with 120 foot diameters and 8,800 square feet of display area—will be erected near the VAB which has been tabbed "the world's largest billboard" because of planned bicentennial designs to be painted on its sides.

KSC expects to attract about 30,000 persons a day during the June-October display next year. Previously, the center has averaged about 6,000 people a day during the same period.

SPACE-BORNE SIGHTINGS OF ASTROBLEMES

Well-formed craters on earth caused by meteorite impact may be easy enough to identify. Far more of a challenge is the detection of astroblemes, scars in solid surface rock caused by meteorite impact in the earth's ancient past. A number of astroblemes are known, and some of them are huge.

Imagery from the LANDSAT satellite offers a new look at craters and astroblemes. John F. McHone Jr. of the University of Illinois and Robert S. Dietz of the National Oceanic and Atmospheric Administration have compiled an atlas of known impact sites from such images and, by comparison, selected other geologic features of possible extraterrestrial origin.

U-2 aircraft and NASA's LANDSAT spacecraft are aiding in a space assisted program to identify the onset of "Red Tide," an oceanborne organism that leaves tons of dead fish rotting on beaches in coastal estuarine waters.

They report that the satellite imagery has detected at least two previously unknown astroblemes. One, in the Arabian Peninsula, has been named the Oman Ring. This ghost-ring structure is six kilometers in diameter with a two-kilometer-wide central dome. Another probable site is in northeastern Siberia, called Ozero El'gygytgyn. The location, a crater lake 14 km across, resembles New Quebec crater in Canada but is much larger and more maturely eroded. Imagery shows the roughly circular shore line to be enclosed by highly circular geomorphology. McHone and Dietz say the feature was probably caused by impact of a meteorite in the early Quaternary or late Pliocene.

SHARK REPELLANT NEVER WORKED

The "shark chaser" chemical repellant that thousands of downed pilots have used since World War II appears to be virtually worthless in warding off sharks, a Navy scientist says.

The chemical packets that have been standard issue on all armed services life jackets for more than 25 years have served mainly as a "psychological crutch," Dr. C. Scott Johnson of San Diego's Naval Undersea Center told a conference of shark experts in Orlando, Fla.

"It was never really effective, but it helped psychologically because the people who used it didn't know it wasn't effective," Johnson said. He said the Navy soon will stop using the mixture of black dye and the Air Force already has stopped buying it.

ANNIVERSARY YEAR BRINGS LARGE BENEFITS INVENTORY

October '75 marks the 17th anniversary of the creation of NASA and more than 6,000 technical innovations from the space program are now available for use by American industry. Some people do not recognize this as a fair return on our space investment—many others do.

Here are a few things:

A blind girl from Sao Paulo, Brazil, may now watch TV with her brothers and sisters thanks to a U.S. space program developed process NASA uses to enhance photo images produced by radio signals from space. The "enhancer" can multiply images 1,000 times; the optometrists' lens application of the same process multiplies by a factor of five. One New York optometrist has provided lenses for 1,000 patients while colleagues have used his method for another 1,000 patients.

Freeze-dried coffee, Tang, hand calculators, opthalmic lasers and a variety of water purification devices are but a few of the better-known "fall-outs." There are many other benefits not so well known.

The automatic picture-taking systems on U.S. weather satellites are shared with 50 countries. TIROS-3 gave advanced warning on Hurricane Carla, enabling 350,000 persons near the Gulf Coast to move from the path of the storm.

The ATS-6 Communications Satellite, called America's "teacher-in-the-sky" has been used to transmit television classroom instructions to teachers, students and medical personnel in remote areas. The satellite, currently over India, is being used for transmitting special agriculture, family planning and other necessary programs into several thousand remote Indian villages.

Star systems called quasars are being used in an effort to detect earthquakes from 1 to 10 years in advance.

Scan, an alarm system for teachers that can be triggered from any location in the classroom, provides instant assistance in case of an emergency.

A research effort to develop technology for space mission hardware items is being conducted by NASA's Langley Research Center in Virginia. This diffusion system for reclamation of water is one type of still that may be capable of reclaiming reusable water from urine or wash water on space missions or here on Earth.

The Lewis Research Center in Ohio is experimenting with windmills to generate electricity from wind power.

Lewis covers everything from electric propulsion for automobiles and collection of solar energy for power and heat to space exploration and from international projects as improved communications to area pollution measurements.

NASA has been surveying pollution produced by the world's aircraft in a program that began at San Francisco International Airport recently. The first such test was conducted on a United Airlines 747 Jumbo Jet. Instruments to measure dust particles and gases in the upper atmosphere were installed in the 747 by NASA technicians.

A light weight breathing system which will help to cut down the casualty rate for firefighters who suffer from asphyxiation or near asphyxiation in burning buildings was developed by engineers at Johnson Space Center, Houston, Texas. They used materials and technology from the space program to design and build air tanks and masks that are lighter, safer and more efficient than systems being used now.

LANDSAT-1 which scans the world for information on wheat yields, forestry conditions, new mineral resources and other environmental concerns was launched into orbit in January. The 1,965 pound space station circles the globe every 103 minutes, looking down from 570 miles in space.

LANDSAT's unique monitoring and mapping capability is suited to the tasks facing undeveloped and often unexplored nations of the world. Niger, at the center of the African drought region, was helped to locate water and forage areas for both people and animals. Bolivia was able to shorten a pipeline route by 10 miles and save $3 million. Both Africa and Bolivia plan to use computer enhanced LANDSAT imagery to pick out small tribal villages to make a fairly accurate census of remote areas.

U.S. Geological Survey coordinates LANDSAT data with foreign nations and assists them in finding areas of resource potential. One of the intangible benefits of the LANDSAT program, say many of these participants, is improving international relations between the U.S. and developing countries.

LANDSAT is planned as a weapon against the global food and energy shortages. One of its main jobs is to estimate how much wheat, barley, corn and rice is growing around the world and to determine the condition of crops at various times during the year.

LANDSAT will also observe forestry patterns and gauge how much timber is taken through clear-cutting and other timber industry techniques. It is to help cartographers draw new maps and assess land use patterns.

Dr. James C. Fletcher, NASA's Administrator, said recently, "If I had to pick one spacecraft, one space age development to save the world, I would pick ERTS (LANDSAT) and the satellites which I believe will be evolved from it later in this decade."

As it passes around the earth, LANDSAT's sensors focus on a trip about 115 miles wide, and at this rate scans the entire globe once every 18 days.

A drug developed from a missile propellant has been used to treat mental disorders and tuberculosis.

Responding to the energy crisis, NASA has established an energy office and is studying ways to convert sunlight into electric energy. It works closely with the newly created Energy Research and Development Agency and other government and private groups.

A new type of artificial limb has been developed to benefit individuals with amputated arms or legs, thus helping to improve their appearance, psychological outlook and employment potential.

Today a woman with polio operates an electric wheelchair and electrically-powered, robot-like arms through a pressure device mounted like a harmonica in front of her mouth. She achieves movement and mobility by touching her tongue to a series of switches that resemble large vitamin tablets. Thanks to the device, she feeds herself, combs her hair, and types letters. She also operates a telephone answering service.

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THE NEW TAX FORM

Although few have begun preparing for their 1975 Federal income tax returns, the Internal Revenue Service has made advance proofs of the new forms available. A look at the form used for most personal returns—Form 1040 and its accompanying schedules—points up the impact of the Tax Reduction Act of 1975.

New lines and computations in the form make provision for the tax credits and larger deductions enacted in the law. The final shape and wording of the form may be changed slightly from those of the proofs being distributed to accountants and others, but the basic outlines of what taxpayers will be struggling with next April can be noted now.

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For example, there is a $30 credit in 1975 for every personal exemption claimed by the taxpayer for himself and his dependents. This credit is not available for the additional exemptions that may be claimed, such as for blindness and age 65 or over.

On the new form, the credit can be listed on line 16b, with lines 6a to 6e revised to clearly separate blindness and age exemptions from personal exemptions. Since the $30 is a credit rather than a deduction, taxes will be reduced $30 for every credit claimed. A deduction from income would not have been worth as much and would have had substantially less effect on people in the lower tax brackets.

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Another new item is the housing credit of 5 per cent of the purchase price of certain homes, up to $2,000. Newly-built homes used as a principal residence—whether they are single-family houses, condominiums, cooperatives or mobile homes—qualify for this credit if they meet two conditions: They must have been built or under construction before March 26, 1975 and they must have been purchased and occupied after March 12.

This credit can be claimed on line 53 on page 2 of Form 1040. In addition, you should attach Form 5405, on which the credit is figured, and a statement from the seller that the offering price was the lowest after Feb. 28, 1975, and that construction began after March 26.

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For those with an adjustec gross income of $4,000 or less there is also an earned income credit of 10 per cent. And for those with an adjusted gross between $4,000 and $8,000. this credit can be utilized on a phased-down basis. In addition to a space for this credit on lines 15 and 21c, a worksheet has been provided to help eligible filers figure out the applicable percentages and dollar amounts of the credits.

The earned income credit is available only to taxpayers who maintain a household for themselves and at least one dependent child. If the credit works out to be greater than the tax liability—or if there is no tax liability at all—the excess will be refunded by the Government.

Other new features for which the tax form makes provision because of changes in the law include:

Higher standard deduction. The standard deduction for those who do not itemize their deductions has been raised to 16 per cent of adjusted gross income from 15 per cent. The maximum is now $2,600 for married persons filing jointly and $2,300 for single taxpayers.

Larger low-income allowance. This minimum standard deduction has been increased from $1,300 to $1,600 for single persons and $1,900 for married taxpayers who file jointly. For children with part-time jobs or summer work, this allowance can play a major role in eliminating or reducing tax liability.

Charge Accounts. For some years, the I.R.S. has recognized that carrying charges and service charges on credit cards were deductible as interest. Now, for the first time, there is a separate line—line 19 on Schedule A—for charge accounts on which all such charges, including those on oil company and bank credit cards, can be listed. No itemization is necessary.

You will probably receive in the mail your new Form 1040 with an instruction booklet at the end of 1975 or early in 1976. If you have questions about the new lines, look in the booklet for an explanation. If the questions remain, call the nearest office of the I.R.S. or consult an accountant.

"INFORMATION ON THE METRIC SYSTEM AND RELATED FIELDS"

Produced by NASA's Marshall Space Flight Center in cooperation with the Metric Association Information on the Metric System and Related Fields is now available in its sixth edition. References in the publication cover a bibliography of metric books and articles, metric legislation, film, film strips, training courses, posters, tools, etc., plus addresses to which to write for information. $2.25 per copy from Metric Ass'n, Sugarload Star Route, Boulder, CO 80302.

RESEARCHER LINKS ENZYME, ALCOHOLISM

The director of the Center for Alcohol Studies in Chapel Hill says an inherited chemical imbalance in the blood may be a key reason for alcoholism. Dr. John Ewing said Friday that he has identified an enzyme, Diopamine Beta Hydroxylase DBH, which is found in greater quantities in the blood of those who drink the heaviest. Ewing said his research may lead to a means of lowering an alcoholic's level of DBH, thereby lessening his craving for alcohol.

SCHUTT COATING GETS GOLDEN GATE TEST

An improved inorganic paint formulated by GSFC's Dr. John Schutt for space program application is being tested on San Francisco's Golden Gate Bridge. The new coating has been applied to a six-foot steel panel mounted on the underside of the bridge.

Unlike other inorganic paint which is difficult to apply, the NASA potassium silicate zinc-rich coating, having a silicon additive, sprays easily, features long protection and does not require a finish coat. It provides corrosion protection from salt spray, fog, heat and the thermal shock of rapid temperature changes.

The paint was tested last year in the salt spray chamber of the California Department of Transportation's Materials and Testing Laboratory. It showed no sign of deterioration after 5,300 hours of exposure to a continuous three per cent brine spray. The Department of Transportation rates a paint superior if it successfully withstands 3,000 hours of exposure.

The Golden Gate test is expected to last for about two years. It is being conducted under the auspices of the NASA-sponsored Technology Application Team of the Stanford Research Institute as part of the Agency's Technology Utilization Program. Team officials foresee a wide commercial market for the paint which can be priced competitively with conventional zinc-rich paints.

Patent license rights for production and marketing of the paint are available under the NASA Patent Licensing Program. Further information may be obtained from the office of Assistant General Counsel for Patent Matters, NASA, Washington, D. C. 20546.

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The flat-roofed research structure has been insulated; instrumented for oil consumption, water usage, and temperature data; and equipped with solar energy collectors mounted at pitched angles on the roof. Each collector consists of a glass-covered metal container which houses a network of small water pipes afixed to a metal heat absorber. All of the solar collectors are coupled to an insulated hot water storage tank beneath the building.

In operation, water is pumped to the roof where it is heated when flowing through the solar collectors. From there, the heated water drains into the storage tank and is subsequently pumped into the building's existing hot water heating system when needed, day or night. Consequently, the structure's oil furnace will require fewer "burns" to heat the structure.

For comparison purposes, an uninsulated flat-roofed building without a solar collector but otherwise similar to the research structure has been instrumented to collect oil consumption, water usage, and temperature data during the upcoming winter. Two similar pitched-roof structures, one with insulation and one without, also have been instrumented for the winter test.

Greenbelt is one of three "Green Towns" built by the U.S. Government in the 1930's as an experiment in new towns founded upon sound environmental concepts. The plan for the community provided for a broad girdle of woodland surrounding the town, hence the name Greenbelt. Its design has for years attracted the attention and praise of community planning experts from around the world.

In 1953, the federal government sold the dwellings, facilities and 700 acres of land to GHI, a nonprofit, cooperative corporation. Today, approximately 30 percent of the total number of families live on a retired fixed income.

NATIONAL SCIENCE FOUNDATION RESEARCH INTO SCIENTISTS AND ENGINEERS

In 1972 and 1974 the Bureau of the Census, with support of the National Science Foundation, conducted surveys of a sample of 50,000 scientists and engineers. The sample represents 1.4 million individuals who have been identified as scientists and engineers from the 1970 Census of Population. The major findings of the study were these:

1. About one-half of the scientists and engineers devoted a significant portion of their professional time to problems of critical national interest in 1974. Environment/pollution and energy/fuel were the primary interest of about one-quarter.

2. Federal funding continues to be a major factor in the support of scientists and engineers with over one-third receiving funds for their work. (Almost 50% of the funding was from the Department of Defense, with NASA in second place with about 12%.)

3. The educational attainment of scientists and engineers in the National Sample increased from 1972 to 1974 with the proportion holding advanced degrees gaining 3.5 percentage points. Scientists reported a 6.6 percentage point gain in this proportion while engineers showed a gain of 2.9 percentage points.

4. The proportion with doctorates increased in all fields; the ratio for psychologists and social scientists rose by over 10 percentage points during 1972-74.

5. Almost 40% of the scientists and engineers took part in supplementary training programs during 1972 and 1973. On-the-job training and courses at employer training facilities were the most frequent forms of participation.

RADAR LOOKS AT JUPITER'S MOON, GANYMEDE

Jupiter's largest moon, Ganymede, has been probed by radar for the first time and found to have a rougher surface than the inner planets. Ganymede, 625,000 miles from Jupiter and 380 million miles from Earth, has long been known to have a brightness that might indicate it is composed of ice. The radar astronomers, however, found "a simple sphere of ice does not fit well with the radar data." A hard, rocky surface coated by frost or light ice could be possible but astronomers at the Jet Propulsion Laboratory think that a mixed rock-metal and the ice surface is more likely.

The finding is particularly interesting in view of verification by Pioneer 10 and 11 flybys that Jupiter itself is gaseous with no solid surface that could sustain a radar echo. Only one other celestial body, a small asteroid named Toro, has appeared as rough as Ganymede to radar scans.

METRIC CHEF: CHOCOLATE CHIP COOKIES

(HINT: ml = millilitre. 500 ml is about 2 cups, 2 ml is slightly less than one-half teaspoon. 100° C = 212° F. You're on your own from here!)

- 500 ml cake and pastry flour
- 2 ml baking soda
- 2 ml salt
- 225 ml butter or margarine
- 175 ml granulated sugar
- 175 ml brown sugar
- 1 egg (metric or customary)
- 5 ml vanilla
- 250 ml (one 175 gram package) of chocolate chips
- 125 ml chopped nuts

Preheat oven to 190° C. (To make the best use of that energy, put in a few baking potatoes for dinner tonight!)

Sift together flour, baking soda, and salt. Cream butter and sugars together. Add egg and vanilla, beating until light and fluffy. Drop batter from a spoon about 5 cm apart on ungreased baking sheet.

Bake in preheated 190° C oven for 8 to 10 minutes, or until golden brown. Makes about 50 cookies. (While the potatoes finish cooking, put in your dinner casserole.)

(Recipe, paraphrased from The Metric Reporter, Sept. 19, 1975.)

SHORT SHOTS AND SIDE BARS:

In order to move a synchronous satellite to an exact position firing of its orientation thrusters is required. For example, when the ATS-6 spacecraft was moved last May from its position over the Galapagos Islands to its present one over Lake Victoria, Africa, its catalytic-decomposition hydrazine thrusters were fired to energize the move and also to brake the spacecraft for final positioning. Till now, these thrusters could only be started 250 to 300 times before their performance began to fall off. A new hydrazine thruster is now undergoing rigorous acceptance testing; has already been started 800 times without noticeable degradation. Testing has involved over a million pulses and 40,000 seconds of steady-state operations. Propellant throughput was over 800 pounds of hydrazine.

Performance improvement is due to a novel propellant injector design, noble-metal catalyst bed screens, and a specially processed catalyst. Because it does not have a conventional bed heater the new thruster is lighter, consumes less power and is more reliable.

The Great Plains wheat belt is the laboratory for the *L*arge *A*rea *C*rop *I*nventory *E*xperiment by NASA and the Departments of Agriculture and Commerce. The purpose of LACIE is to make accurate crop estimates by interpreting the infrared photos from the NASA Goddard Space Flight Center's two Landsat satellites. These infrared-radiation patterns, taken by multispectral scanners aboard the Landsats, are compared with simultaneous on-the-ground measurements of crop conditions and solar radiation. If the technique can be perfected, monthly crop estimates for the entire world could be made.

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A rechargeable heart pacemaker eliminates the need for periodic surgery to implant new batteries. The new mechanism is smaller than a cigarette package—one-half the size of older models—and operates on nickel-cadmium cells which are used to propel most satellites.

In Houston and several other major cities, ambulances are carrying a compact medical unit called Telecare, a product of NASA-developed equipment and a radio system that transmits cardiac data to the hospital so doctors waiting for the victim can relay advice and be better prepared to handle the case when it arrives.

A Huntsville, Alabama hospital is using space technology to help patients who have lost the use of their arms and legs. Using eye-operated switches, breath-controlled devices and pressurized equipment, patients who were once helpless can now open windows and doors, regulate room temperature, change radio and television channels, dial telephones, adjust bed positions and turn the pages of books.

The National Cancer Institute has adopted a special garment used as a portable sterile environment for astronauts returning from the moon. In its new role, the suit is being used to protect leukemia patients from infection while they are undergoing chemotherapy.

A portable cardiac unit that provides instant monitoring of a heart attack victim's condition to ambulance crews and a physician has been on the market for a year.

A brassiere with sensors is being tested to help women detect breast cancer at an early stage.

Alcorn State University in Mississippi received a NASA grant to perform radio tracking of geostationary satellites. Louisiana's Grambling College, is studying the effects of continuous low-dose rate gamma irradiation on cell population kinetics of lymphoid tissue.

The list continues to grow.

An essential part of exploiting the space-age perspective of "Spaceship Earth" for its human inhabitants remains a function of man's ability and willingness to apply the bounty for the common good.

Dr. Michael B. McElroy, Professor of Atmospheric Sciences, Harvard University, and a coinvestigator on one of the Apollo-Soyuz Test Project experiments, in his "Detente in Space," said, "The prospect calls to mind an early prophecy by Soviet space theorist and philosopher Konstantin Tsiolkovsky: 'Earth is the cradle of mankind, but man cannot stay in the cradle forever'."

ELIZABETH CLARK (Code 249) is not exactly your everyday version of the office "Mother Hen!" . . . more like a lady matador with a procurement "Bull-by-the-tail!"

Through the maze of NASA Procurement, GSA Regulations and a variety of budgetary do's & don'ts, she guides a group of eleven purchasing agents in their daily efforts of providing the Center with everything from tape drives to automobile decals.

"Process my $11.95 rush order yesterday" while 99 others wait, could well be the general order of pressure experienced daily in the Facilities Support Branch, Procurement Management Division, where Elizabeth and her eleven "diplomats" process virtually every Center procurement action under ten thousand dollars. Office machines, lab equipment, flight hardware, even flu serums and trees fall under the purview of this efficient, but little known group of specialists.

With 16,000 procurement actions totaling approximately 20 million dollars a year, you can bet a lot of vendors know they are right there in Building 18 doing business in spite of the Bull!

"THE DIPLOMATS" of Code 294 are pictured with samples of the 16,000 procurement actions handled annually totaling $20 million. Pictured above left to right: (seated): Lydia Fominaya, Peggy Bradley, Virginia Sweeney, and Linda Wetzel; (standing): Joyce Sharpe, Betty White, Ethel Mesler, Michelle Garrett, Linda Phipps, and Vonnie Colombo. Not pictured: Bobbie Metzger.

"SPACE DOCTOR" NOW SERVES IN GAZA STRIP

Once a specialist in space medicine, overseer of the health of astronauts and physician who welcomed the crew of Apollo 12 back from the moon, Clarence A. Jernigan now practices medicine in a 100-year-old medical facility in Gaza.

In 1964, Jernigan's career turned to the Manned Spacecraft Center in Houston, Tex.

Jernigan started out as one of three physicians taking care of the astronauts and their families. The team of physicians also handled the medical monitoring of various phases of astronaut training.

For the first three manned Gemini missions, Jernigan also served as a flight surgeon at various tracking stations.

After two years of NASA-sponsored training, leading to his certification as a specialist in aerospace medicine, Jernigan returned to the Manned Spacecraft Center as chief of the flight medicine branch. Again he cared for the astronauts and their families as flight surgeon and family physician.

Throughout most of the Apollo program, Jernigan shared with two other physicians the responsibility for leading the pre-flight and post-flight medical examining team.

At another time, Jernigan served as crew physician and spent the quarantine period with Charles Conrad Jr., Richard F. Gordon and Alan L. Bean, the Apollo 12 team which was the second crew to set foot on the moon.

"There are few things I would trade for the eight years with NASA," Jernigan declares. But after that period, he says, he felt a "stirring of spirit" that led him to move into Galveston County (Tex.) Health District. There, for two and a half years, he practiced medicine and directed the health care delivery activities of the district.

"It was valuable preparation for service in a place like Gaza," Jernigan explains.

As he completes the shift from serving astronauts to serving refugees, he is seeking to contribute to the hospital's plan of action for the future. "I haven't received any requests for consultation on space medicine problems," he acknowledges, "but that NASA-learned adaptability is proving very useful."

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James Lacy, Editor
Patricia Ratkewicz, Secretary, Phone Extension 4955