

NEWS RELEASE LOG

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76-05	Aeronutronic Ford Contract at JSC Extended 6 Months	1/21/76
76-06	Technicolor Contract Awarded	1/21/76
76-07	Shuttle Mission Simulator Contract Awarded to Singer Co.	1/27/76
76-08	Astronaut Roosa to Retire	1/29/76
76-09	Dr. Robert S. Clark Member of Shuttle Team	1/30/76
76-10	Dr. Charles F. Sawin Member of Shuttle Team	1/30/76
76-11	JSC Hosts Three-Day Black History Program	1/30/76
76-12	Northrop Contract Extension	2/10/76
76-13	Apollo 14 ALSEP Fails	2/10/76
76-14	Draper Laboratories Contract Extension	2/12/76
76-15	7th Lunar Science Conference to Include Planets	2/22/76
76-16	JSC Holds SSA Career Day Conference	2/17/76
76-17	Space Shuttle Approach and Landing Test Crews Named	2/24/76
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76-19	Two Firms Will Study Space Station Systems	3/5/76
76-20	Astronaut Cernan to Retire July 1	3/15/76
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76-22	Shuttle Contract Amendment - Rockwell International	3/31/76
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76-27	Astronaut Ron Evans Retires From U.S. Navy, Stays with NASA	4/30/76
76-28	Junior High School Students to Benefit from Unusual Educational Program	5/14/76
76-29	Metro Awarded Logistics Contract	5/7/76
76-30	NASA Selects Two Companies for Simulator Contract Negotiations	5/10/76
76-31	Serv-Air Contract Extended	5/10/76
76-32	JSC Engineer named to Indian Engineering Society Board	5/19/76
76-33	Astronaut Paul Weitz to Retire from U.S. Navy, Remain with NASA	5/17/76
76-34	JSC Selects Pan Am for Support Contract Negotiations	5/14/76
76-35	Successful Orbiter Heat Shield Test	5/21/76
76-36	Space Shuttle Landing System Components Delivered to NASA	5/18/76
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76-38	Shuttle Training Aircraft Delivery to JSC	6/8/76
76-39	BUSS Test Flight Successful	6/9/76
76-40	JSC to Convert to Surface Water	6/11/76
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76-42	JSC Vacuum Chamber to Restore Flood-damaged Records	6/18/76

NEWS RELEASE LOG

NUMBER	TITLE	RELEASE DATE
76-43	Vacuum Chamber Drying Technique Successful for Flood-Damaged Records	6/30/76
76-44	NASA to Recruit Space Shuttle Astronauts	7/8/76 AM
76-45	Holt Custodial Services Contract	7/8/76
76-46	Hamilton Standard Selected for Negotiations on EMU Contract	2:00 pm CDT 7/16/76
76-47	Shuttle Mission Simulator Computer Complex Accepted at JSC	7/26/76
76-48	Simulation Complex Support Contract Awarded	7/27/76
76-49	Supplemental Agreement Signed with Lockheed	8/4/76
76-50	Space Technology Applied to Fisheries Research	8/9/76
76-51	Space Shuttle Roll-Out set for September 17	8/12/76
76-52	Mason-Reguard picked for protective services contract negotiations	8/31/76 2 pm CDT
76-53	Aerospace Education Specialist Donaldson	8/31/76
76-54	***** Johnson	"
76-55	***** Kubesch	"
76-56	Hill	"
76-57	JSC Awards Shop Support Contract to Di-Jay, Inc.	9/10/76 2 pm CDT
76-58	Second of Two Shuttle Training Aircraft Delivered to JSC	
76-59	NASA JSC Modifies Contract with IBM	9/21/76 2 pm CDT
76-60	MCC Support Contract signed with Aeronutronic Ford	9/22/76
76-61	NASA Negotiates with Hamilton-Standard for Shuttle Oxygen system Contract	9/24/76 2 pm CDT
76-62	Space Construction Methods Study	10/8/76
76-63	NASA/JSC Picks Alpha for construction Contract Negotiations	10/12/76

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76-64	Scouts Hold Space-Arama Campout at JSC	October 19, 1976
76-65	NASA Gathers Data for Setting Female Astronaut Criteria	October 19, 1976
76-66	Manipulator Facility	October 22, 1976
76-67	Tests seek Cause of Motion Sickness	October 21, 1976
76-68	Virginian Dr. Christopher C. Kraft receives Legion of Honor Award	October 22, 1976
76-69	Boeing Selected for Solar Power Study	November 4, 1976
76-70	NASA Scientists Rely on Balloons	November 6, 1976
76-71	LUNNEY NAMED OFFICE OF SPACE FLIGHT DEPUTY	November 10, 1976
76-72	Alternate Martian Channel Theory Proposed	November 22, 1976
76-73	Spacelab Simulation "Crew" Undergoes Medical Tests	December 1, 1976
76-74	ALT 747 Maiden Flight	December 3, 1976
76-75	U.S. to Study New Soviet Moon Sample	Upon Receipt 12/17/76
76-76	NASA Exceptional Service Medal Awarded Robert C. Hood	12/17/76
76-77	Philip H. Whitbeck Receives NASA Equal Employment Opportunity Award	12/17/76
76-78	NASA Exceptional Medal Awarded James L. Neal	12/17/76
76-79	JSC Extends Lockheed Computing Support Contract	12/22/76 2 pm CST
76-80	JSC Extends Boeing Safety, Reliability Contract	12/30/76 12:15 p.m. CST

# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Charles Redmond

For Release:  
**IMMEDIATE**

RELEASE NO: 76-01

ALSO RELEASED AT NASA HEADQUARTERS

COMPUTER AND SATELLITE CUT TIME AND COST OF WATER MAPPING

Countries that have no inventory of their water resources can obtain accurate maps of their lakes and reservoirs from satellite data at relatively small cost by using a new NASA computer program.

State agencies can use the program to make better choices between recreational and industrial use of available water supplies.

The computer program, developed at the Johnson Space Center (JSC), Houston, uses digital data from LANDSAT Earth resources survey satellites to compile maps at any desired scale showing surface water areas in excess of six acres.

Specialists in the Earth Observations Division at JSC say the new system, called the Detection and Mapping (DAM) Package, is so simple that only \$300 worth of computer time is needed to map more than 33,800 square kilometers (13,000 square miles).

Paraguay, as an example, could obtain high quality surface water maps of the entire country 408,200 sq km (157,000 sq. mi.) for less than \$10,000, including all computer and labor costs.

Since NASA's two LANDSATs cover about 95 per cent of Earth's land mass, surface water maps can be produced by this system for virtually all populated regions.

- more -



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Accuracy of the program is almost 100 per cent for areas of water 4 hectares (10 acres) and larger. Position accuracy, the degree to which the computer-produced water maps match the terrain in question, is within 90 meters (300 feet) of dead center.

The JSC scientists who developed the system explain that user training is very brief, typically as short as one day, and no computer or remote sensing experts are needed to implement the water mapping program.

The U.S. Army Corps of Engineers used the DAM Package to map water resources in Washington and Tennessee. The Texas Water Development Board has used the program for regional water mapping in Texas and regional agencies in Oklahoma have also used the program.

- end -

EDITOR'S NOTE: Additional technical information and availability of the program for potential users can be obtained from:

Chief, Earth Observations Division  
Code: TF  
Johnson Space Center  
Houston, TX 77058.

January 7, 1976

# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Terry White

For Release:  
January 18, 1976

RELEASE NO: 76-02

ALSO RELEASED AT NASA HEADQUARTERS

ASTRONAUT FOOD TECHNOLOGY APPLIED TO MEALS FOR ELDERLY

While three square meals a day are taken for granted by most Americans, getting even one balanced meal each day is a problem for some of the nation's elderly.

Food technology and packaging techniques developed by the NASA Johnson Space Center, Houston, to feed Apollo and Skylab crews during space flight are being applied in a pilot program to help provide balanced meals to elderly who live alone. Physicians, nutritionists and biomedical engineers at the Center are working together to design and develop a meal system to supplement the existing National Nutrition Programs for the Elderly.

The effort is part of the agency's Technology Utilization program in which space-developed technology is applied in the solution of earth-bound problems.

Project Engineer Gary R. Primeaux reported that surveys have shown that many elderly Americans do not receive adequate nutrition. He cites as contributing factors lack of single-serving products, limited mobility, loss of skills needed to prepare balanced meals, limited finances and often a sense of loneliness or rejection that reduces the incentive to cook and eat nutritious meals alone.

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Called Meal Systems for the Elderly, Primeaux says: "Its goal is to develop nutritious, shelf-stable, convenient and easily deliverable meals for the elderly."

While several programs for home-delivered hot lunches for the elderly are being tried in some cities, there is usually no weekend service and spoilage risk is high. The NASA team developing the meal system is striving to come up with a shelf-stable, multi-meal package that can be distributed by several methods--even parcel post--to senior citizens who live beyond the range of hot-meal delivery or to those people in cities where weekend meals are not provided.

The team is working toward a meal system that can be opened, cooked, eaten and cleaned up by elderly people living alone. A field demonstration, starting early this year, in which selected elderly Texans will prepare and eat developmental meals will give the team an evaluation of meal design and delivery methods.

The basic meal will consist of an entree, two side dishes, desert and beverage, with a 21-day menu cycle to provide variety from a list of 10 entrees, 20 side dishes, 10 desserts and five beverages. Each meal will provide at least one-third of the daily dietary allowance for elderly persons.

The design, development, field demonstration and evaluation phases of the program are expected to be completed by late 1976, according to Primeaux.

In addition to the JSC team developing the meal system technology, the University of Texas Lyndon B. Johnson School of Public Affairs, Austin, will assist in demonstrations and distribute meals. The Texas Research Institute of Mental Sciences, Houston, has surveyed attitudes, food preferences and has run taste tests among potential users.



RELEASE NO: 76-02

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The program is expected to cost \$240,000, of which NASA will fund \$125,000; Johnson School of Public Affairs, \$90,000; Texas Research Institute of Mental Sciences, \$8,000; and United Action for the Elderly, Inc. \$17,000.

Technology, Inc. and Martin Marietta Corp. are contractors in the development program.

Photographs to illustrate this news release will be distributed without charge only to media representatives in the United States. They may be obtained by writing or phoning:

The Public Affairs Audio-Visual Office  
Code FP/NASA Headquarters  
Washington, DC 20546

Telephone No. 202/755-8366

Photo No: 76-H-2  
76-H-3

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058

AC 713 483-5111

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Jack Riley

For Release:

RELEASE NO: 76-03

January 8, 1976

## JSC MANAGEMENT CHANGES

Increasing demands of the Space Shuttle Program have resulted in three management changes at the Johnson Space Center, Dr. Christopher C. Kraft, Jr., Director, announced today.

Kenneth S. Kleinknecht has been named Assistant Manager of the Orbiter Project, part of the Space Shuttle Program; George W. S. Abbey has been appointed Acting Director of Flight Operations, replacing Kleinknecht; and Henry E. Clements has been assigned as Acting Technical Assistant to Kraft, replacing Abbey.

"The growing demands of the Space Shuttle Program have increased the need for hardware and program management expertise," Kraft said. "Mr. Kleinknecht has had broad experience in program management at JSC in the Mercury, Gemini, Apollo and Skylab Programs and will add significant management expertise to the Orbiter Project."

- more -



Abbey was assigned to the Apollo Program Office prior to becoming Kraft's technical assistant, and Clements recently returned to JSC after several years of management experience at NASA Headquarters, Washington, D.C.

The Space Shuttle is a reusable vehicle that will replace virtually all U.S. space launch vehicles. The Orbiter section will be used to deploy and retrieve satellites and serve as a carrier for Spacelab, a manned laboratory being developed by the European Space Agency.

On its return to Earth, the Orbiter will land on a runway like an airplane and then be prepared for another mission. Operational flights are scheduled to begin in 1980.

- end -

# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Robert Gordon

For Release:

RELEASE NO: 76-04

January 23, 1976

## SPACELAB SIMULATION

A team of space scientists, headed by astronaut-physician Dr. Story Musgrave, on January 26, 1976, will begin a week-long, around-the-clock, test of experiments and procedures in a Space Shuttle Spacelab mockup at the NASA Johnson Space Center.

The three scientists will live and work inside the Spacelab and carry out more than 20 experiments in space medicine and one in space physics. When not working in the 6.8 meter (22 ft.) by 4.06 meter (13 ft.) Spacelab, the three men will eat, sleep and perform other space related duties in a mockup of the Shuttle orbiter crew compartment. The orbiter is the reuseable portion of the Shuttle which is scheduled for launch in 1979.

- more -



Working with Dr. Musgrave will be Dr. Robert C. Clarke, a nuclear-chemist of the Planetary and Earth Sciences Division and Dr. Charles S. Sawin, a cardio-pulmonary physiologist, with the Biomedical Research Division. The test begins at 7:00 a.m. CST on Monday and will last seven days.

This is the second such test in which Dr. Musgrave has taken part. He was team leader for a similar life sciences simulation, along with Dr. Dennis R. Morrison, in October of 1974. The week-long simulation, during which time the scientific team will follow a prescribed flight plan, is designed to evaluate proposed Space Shuttle ground support and flight crew operational procedures, data handling techniques and integration concepts between man and machine, as well as demonstrate the feasibility of a group of 20 biomedical experiments and one space physics experiment.

The Space Physics experiment is a cosmic ray laboratory experiment which has already been flight tested on two previous balloon flights from Palestine, Texas. This particular experiment which Dr. Clarke will be performing is set behind the Spacelab and is representative of pallet mounted experiments planned for Spacelab. It is designed to measure high energy cosmic rays in the upper atmosphere.

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Spacelab is a project of the European Space Agency, a consortium of 11 European countries which is funding and constructing the laboratory for use aboard the Space Shuttle in the early 1980's. The laboratory is designed to carry multi-discipline scientific payloads inside the 60 foot long and 15 foot diameter payload bay of the Shuttle Orbiter.

The three scientists, working inside the Spacelab mockup, will be in communication with flight operation engineers and scientists working at control stations outside the mockup. The mockup, constructed by members of the Bioengineering Systems Division and Technical Services Division at the Johnson Space Center, is outfitted, instrument-wise and experiment-wise, just as the Spacelab of the 1980's will be outfitted.

In addition to the 14 prime and 6 alternate biomedical experiments, the three crew members will perform demonstrations in support of 14 operational test requirements, the results of which will be used by engineers, scientists and flight planners in preparing inflight crew activities, procedures and flight planning and scheduling for the Space Shuttle era. The latter includes such studies as personal hygiene aboard the Orbiter, general housekeeping and special purpose cleaning and maintenance concepts, and functional utility of the Orbiter AFT-deck from which many of the Spacelab experiments will be performed and monitored.

The Spacelab simulation was planned and will be conducted by engineers and scientists of the Life Science Directorate at the Johnson Space Center .

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Milton E. Reim

For Release:

RELEASE NO: 76- 05

January 21, 1976  
Noon

AERONUTRONIC FORD CONTRACT AT JSC EXTENDED SIX MONTHS

The National Aeronautics and Space Administration has signed a Supplemental Agreement Number 201 to Contract NAS 9-1261 with Aeronutronic Ford Corporation, Space Information Systems Operation of Houston for an extension of six months to the current contract.

Direct labor hours and materials for performance of Ground Data Hardware and Software Systems engineering, implementation, maintenance and operations will be performed under the contract.

Work to be performed consists of system engineering and integration, maintenance, operations, and other support functions, such as logistics, reliability and quality assurance for the Mission Control Center (MCC) and various other ground based data systems managed by the Johnson Space Center at Houston.

Contract NAS 9-1261 is a Cost-Plus-Award-Fee contract. The additional effort valued at about \$10,690,633, brings the estimated value of Contract NAS 9-1261 to approximately \$278,400,000.

Aeronutronic Ford will perform the majority of the work at their Houston, Texas, location with support from their facilities at Willow Grove, Pennsylvania.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Robert V. Gordon

For Release:

January 21, 1976

2 p.m.

RELEASE NO: 76-06

TECHNICOLOR CONTRACT AWARDED

Technicolor Graphic Services, Inc., 1001 N. Cahuenga Boulevard, Hollywood, California 90038, has been awarded a contract for Photographic Support Services at the Lyndon B. Johnson Space Center (JSC), Houston, Texas 77058.

Technicolor will be responsible for management and operation of the motion-picture, precision, metric and still laboratories, laboratory analysis and support, and audiovisual support at JSC.

The contract will be a cost-plus-award-fee type contract and is awarded for a 1-year period beginning January 1, 1976, and ending December 31, 1976. The contractor will employ approximately 112 persons and the estimated amount of the contract is \$2,242,000.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Milton E. Reim

For Release:

January 27, 1976

Noon

RELEASE NO: 76-07

SHUTTLE MISSION SIMULATOR CONTRACT AWARDED TO SINGER COMPANY

The National Aeronautics and Space Administration has awarded a letter contract to the Singer Company, Simulation Products Division, Binghamton, New York, for development of a Shuttle Mission Simulator (SMS) for use as a trainer for the Space Shuttle Orbiter Vehicle crew and flight controllers.

The SMS, to be used for training for Shuttle Orbital Flight Tests one and two, will be delivered by March 31, 1978. The modifications to the SMS required to train crews for Orbital Flight Tests three and subsequent will be delivered and installed by March 31, 1979.

Singer will design, develop, fabricate, install, and test a simulator consisting principally of a Motion Base Crew Station and a Fixed Base Crew Station, with integration of associated visual systems and computer systems.

The SMS will be used to train crews and flight controllers in all Orbiter mission phases (launch, orbital insertion, orbital operations, re-entry, and landing).

SMS work will be performed primarily in Binghamton, New York; Sunnyvale, California; and Houston, Texas. Estimated value of the program is \$28,600,900.

The work will be managed by the NASA Lyndon B. Johnson Space Center, Houston, Texas.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Jack Riley

For Release:

January 29, 1976  
9 a.m.

RELEASE NO: 76-08

## ASTRONAUT ROOSA TO RETIRE

Astronaut Stuart A. Roosa will retire from the Air Force and leave NASA on February 1.

Roosa, 42, is a colonel with 22 years service. He has not yet announced his plans for the future.

As command module pilot on Apollo 14 in 1971, Roosa conducted the first extensive lunar orbital science activities during the 33 hours his fellow crewmen, Alan B. Shepard, Jr., and Edgar D. Mitchell, were on the moon's surface. He logged 216 hours and 32 minutes of space flight.

Roosa served as backup command module pilot for the Apollo 16 and 17 missions and is now assigned to the Space Shuttle Program. He was selected as a NASA astronaut in 1966, and his retirement reduces the number of astronauts assigned to JSC to 28.

Roosa and his wife, Joan, have four children.

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# NASA News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Robert V. Gordon

For Release:

UPON RECEIPT

RELEASE NO: 76-09

Dr. Robert S. Clark, formerly of Mattoon, Illinois, is one of the three NASA scientists who took part in the recent week-long space simulation at the Johnson Space Center in Houston, Texas, to verify procedures and experiments for the Shuttle era of the 1980's.

Dr. Clark, son of the late Mr. and Mrs. Horace Clark, is a nuclear-chemist at the NASA Johnson Space Center. He and the other two scientists, scientist astronaut Dr. Story Musgrave and Dr. Charles Sawin, a cardio-pulmonary physiologist, spent seven days in a mockup of the Space Shuttle Spacelab (January 26 through February 1, 1976).

The crew of scientists performed more than 20 medical experiments and one space physics experiment during their week-long make believe mission inside the 6.8 meter (22 ft.) by 4.06 meter (13 ft.) mockup. They spent their working hours in the laboratory and their off-duty hours (eating, sleeping and relaxing) inside a mockup of the Orbiter, the reusable portion of the Space Shuttle.

Dr. Clark, 38, is a graduate of Eastern Illinois University, Charleston, Ill (1960 and received his doctorate in nuclear chemistry in 1969, from the University of Arkansas, Fayetteville, Arkansas.



RELEASE NO: 76-09

The week-long simulation, during which time the scientific team followed a prescribed flight plan, was designed to evaluate proposed Space Shuttle ground support and flight crew operational procedures, data handling techniques and integration concepts between man and machine, as well as demonstrate the feasibility of a group of 20 biomedical experiments and one space physics experiment.

The Space Physics experiment was a cosmic ray laboratory experiment which has already been flight tested on two previous balloon flights from Palestine, Texas. This particular experiment which Dr. Clark operated was set behind the Spacelab and is representative of pallet mounted experiments planned for Spacelab. It is designed to measure high energy cosmic rays in the upper atmosphere.

Spacelab is a project of the European Space Agency, a consortium of 10 European countries which is funding and constructing the laboratory for use aboard the Space Shuttle in the early 1980's.

In addition to the 14 prime and 6 alternate biomedical experiments, the three crew members performed demonstrations in support of 14 operational test requirements, the results of which will be used by engineers, scientists and flight planners in preparing inflight crew activities, procedures and flight planning and scheduling for the Space Shuttle era. The latter includes such studies as personal hygiene aboard the Orbiter, general housekeeping and special purpose cleaning and maintenance concepts, and functional utility of the Orbiter AFT-deck from which many of the Spacelab experiments will be performed and monitored.

The Space Shuttle will be a reusable space vehicle operated as a transportation system for a wide variety of space missions in low Earth orbit.

RELEASE NO: 76-09

The Shuttle will deploy and recover scientific and applications satellites of all types. Since it can carry payloads weighing up to 29,500 kilograms (65,000 pounds), it will replace most of the expendable launch vehicles currently used, and be capable of launching deep space missions into their initial low Earth orbit. It also will provide the first system capable of returning payloads from orbit on a routine basis.

The Shuttle will be able to retrieve satellites from Earth orbit; to repair and redeploy them; or bring them back to Earth for refurbishment and reuse. It can also be used to carry out missions in which scientists and technicians conduct experiments in Earth orbit or service automated satellites already orbiting.

The Shuttle will provide an effective and economical means for the United States to utilize and advance its capabilities in space. It will reduce substantially the cost of space operations for civilian and defense needs in the decade of the 1980's and beyond.

The Shuttle will consist of a reusable orbiter, a large expendable liquid propellant tank and two recoverable and reusable solid propellant rocket boosters. The orbiter will look like a delta-winged airplane, about the size of a DC-9 jet airliner. It will have three liquid fueled rocket engines, a cargo bay 18 meters (60 feet) long and 4.5 meters (15 feet) in diameter, and will be operated by a crew of three. Wingspan will be about 24 meters (78 feet) and it will be about 37 meters (122 feet) long.

Before joining the NASA in 1969, Dr. Clark was an inspector and chemist with the Department of Health, Education and Welfare in Missouri and Texas (1960-1961). He served three years in the US Air Force and worked as a scientific and engineering assistant at Kirtland Air Force Base, Albuquerque, New Mexico.

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RELEASE NO: 76-09

In his position at the NASA Johnson Space Center, Dr. Clark is a staff scientist in the Cosmic Ray Laboratory project and his primary responsibility is in the area of experiment operations.

Dr. Clark is married to the former Christine Maria Quintana, Santa Fe, New Mexico. The Clark's reside in Houston and have three children; David Troy 24, Catherine Ann 21, and Pamela Jean 5.

- end -

January 29, 1976

# NASA News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Robert V. Gordon

For Release:

UPON RECEIPT

RELEASE NO: 76-10

## DR. CHARLES F. SAWIN MEMBER OF SHUTTLE TEAM

Dr. Charles F. Sawin, formerly of San Carlos, CA., is one of the three NASA scientists who took part in the recent week-long space simulation at the Johnson Space Center, Houston, Texas, to verify procedures and experiments for the Shuttle era of the 1980's.

Dr. Sawin, son of Dr. and Mrs. John Sawin of San Carlos, is a cardio-pulmonary physiologist at the NASA Johnson Space Center. He and the other two scientists, scientist astronaut Dr. Story Musgrave and Dr. Robert Clark, a nuclear chemist, spent seven days in a simulator of the Space Shuttle Spacelab (January 26 - February 1, 1976).

The trio of scientists performed more than 20 medical experiments and one space physics experiment during their seven days inside the 6.8 meter (22 ft.) by 4.06 meter (13 feet) Spacelab mockup. They spent their working hours in the laboratory and their off-hours (eating, sleeping, relaxing) inside a mockup of the Orbiter, the reusable portion of the Space Shuttle.

Dr. Sawin, 35, is a graduate of the University of California, Berkeley (1963) where he also received his Doctor of Philosophy degree in Physiology in 1969.

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RELEASE NO: 76-10

The week-long simulation, during which time the scientific team followed a prescribed flight plan, was designed to evaluate proposed Space Shuttle ground support and flight crew operational procedures, data handling techniques and integration concepts between man and machine, as well as demonstrate the feasibility of a group of 20 biomedical experiments and one space physics experiment.

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- more -

RELEASE NO: 76-10

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After graduation, Dr. Sawin was employed with the Boeing Company, Seattle, Washington, as an aerospace physiologist. He joined the National Aeronautics and Space Administration in 1971. He is currently assigned to the Environmental Physiology Branch where he is responsible for the development and testing of physiological hardware and concepts and basic studies in the areas of exercise physiology, pulmonary physiology and life support systems.

RELEASE NO: 76-10

Dr. Sawin is married to the former Bernice Joan Blatt of San Francisco, California. The Sawin's reside in Houston with their three daughters, Jennifer Lee, 7; Laurie Jane, 5; and Elizabeth Joanne, 2.

- end -

January 30, 1976

# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
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Judie Boin

For Release:  
UPON RECEIPT

RELEASE NO: 76-11

JSC HOSTS THREE -DAY BLACK HISTORY PROGRAM

Not many Americans know that the first clock built completely in America was built by scientist-mathematician-astronomer-surveyor-clockmaker Benjamin Banneker (1731-1806). Even fewer know that Banneker was black.

Banneker's contributions to America's culture and history as well as those of other black Americans will be featured February 9-13 at JSC as the Center's participation in National Black History Month. A three-day program of entertainment groups, guest speakers and an exhibit, "Traditions of Our Peoples", will be held in the JSC Auditorium.

Following the theme American for All Americans Festival USA: Let Us Celebrate, the JSC program will begin at 11:30 a.m. with "Soul-Searching Music of the Black Man" - black cultural expressions interpreted by soloists and bands from the Houston-Galveston area.

The award-winning film Legacy of a Dream will be shown in the Auditorium February 12 at 11:30 a.m. and again at 12:30 p.m.

Among guest speakers on the February 13, program starting at 1 p.m. in the Auditorium will be NASA Deputy Assistant Administrator for Community and Human Relations Ruth Bates Harris and Judge Andrew Jefferson of Houston.

- more -



The Festival is open to the general public. A schedule of events follows:

<b>National Black History Week</b> <b>Building 2 Auditorium</b> <b>Festival U.S.A.: Let Us Celebrate</b>	
<b>Wednesday, February 11</b> <b>11:30 a.m.</b>	
Cultural Expressions	
Introduction . . . . .	Baley Davis
Ball High School Variations . . . . .	Ball High School Department Galveston, Texas Directed by: Richard Wallace
Gospel Solo . . . . .	Lynette Randolph
Prose . . . . .	Robbin Mathews LaMarque Jr. High School "Gavel Grease Paint" Club LaMarque, Texas Sponsor: Francis Ashby
Jazz Solo . . . . .	Lynette Randolph
Forest Brook Stage Band . . . . .	Forest Brook High School Houston, Texas Directed by: Ronald Thornton
Gospel Solo . . . . .	Lynette Randolph
Prose . . . . .	Robbin Mathews
Jazz Solo . . . . .	Lynette Randolph
Forest Brook Stage Band . . . . .	Forest Brook High School
Soul Searching Music of the Black Man - A History? . . . . .	"Die Gruppe" M. C. Williams High School Drama Department Houston, Texas Director: Lee Turner
Thursday, February 12	
Film - "Legacy of a Dream"	Introduction: Herman Hines
Times: 11:30 and 12:30	
Friday, February 13	
1:00 p.m.	
Opening Remarks	Joseph D. Atkinson, Jr. Chief, Equal Opportunity Programs Office
Welcome	Christopher C. Kraft, Jr. Director, Johnson Space Center
Introduction of Platform Guests	Julius T. Mayhorn, Jr.
Introduction of Speaker	Howard L. Renfro
Speaker	Ruth Bates Harris Deputy Assistant Administrator for Community and Human Relations NASA Headquarters
Introduction of Speaker	Alotta M. Edison
Speaker	Judge Andrew Jefferson
Closing Remarks	Quarance J. Patin
Refreshments, Art Display.	

# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Terry White

For Release:

RELEASE NO: 76-12

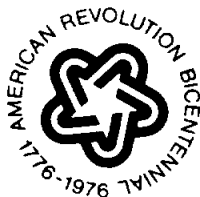
February 6, 1976

## JSC HOSTS BIOPROCESSING IN SPACE COLLOQUIUM

More than 150 industrial and academic researchers will meet March 10-12, at the NASA Johnson Space Center, Houston,, to examine potentials of processing biological materials in space flight.

The Colloquium on Bioprocessing in Space will be held at the JSC Gilruth Recreation Facility to acquaint researchers in the pharmaceutical, biomedical and biological fields with the opportunities to fly bioprocessing experiments aboard Spacelab in the 1980's. Spacelab is a manned space station being built by a consortium of 10 European countries which will be carried into Earth orbit in the cargo bay of the Space Shuttle Orbiter .

Space processing experiments flown in Apollo, Skylab and Apollo-Soyuz--- last summer 's joint manned flight with the Soviet



Union---revealed that many materials exhibit unique characteristics in the weightlessness of space flight.

Electrophoresis experiments on Apollo-Soyuz have shown promise as possible means of separating human kidney cells capable of producing an enzyme, urokinase, for treating blood-clotting disorders and in isolating white blood cells needed for leukemia patient transfusions.

The JSC Colloquium will cover the technical details of biomedical material behavior in weightlessness, a description of Spacelab and Space Shuttle research facilities and flight opportunities, results of biological experiments already conducted, and a survey of potential research and industrial space applications.

The agenda for Monday, March 10, includes presentations on the following topics: Space Shuttle and Life Sciences; Spacelab; NASA's Space Processing Program; Working in Space; Materials Behavior in Space; and Space Processing on Skylab and Apollo-Soyuz.

On the March 11 agenda are: Cell Experiments in Zero-g; Gravity Sensors in Cells; Bioprocessing/Biological Separations; and Biosynthesis Using Tissue Culture and Fermentation Techniques; followed by workshop meetings on Biotechnology, Cell Biology, Biosynthesis, and Pharmaceuticals.

- more -

Researchers wishing to register for the Colloquium or to receive the published proceedings should contact Dr. Dennis R. Morrison/DF2, NASA Johnson Space Center, Houston, TX 77058, telephone 713/483-2031.

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# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Robert Gordon

For Release:

February 12, 1976

RELEASE NO: 76-12

NORTHROP CONTRACT EXTENSION

The National Aeronautics and Space Administration has signed a \$8.8 million, one-year, contract extension with Northrop Services, Inc., Houston, Texas, for operations and maintenance of laboratory and test facilities at the NASA Johnson Space Center.

This extension brings the estimated value of the contract to \$37,146,742. Northrop has been providing operation and maintenance services to the NASA Johnson Space Center for the past three years.

The work to be performed will consist of maintenance and operation of life sciences and engineering laboratories and the lunar curatorial laboratory. A total of 425 people are employed under this contract.

- end -



# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
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Charles Redmond

For Release:

UPON RECEIPT

RELEASE NO: 76-13

APOLLO 14 ALSEP FAILS

After 4 years, 11 months and 13 days of continuous data transmission, the Apollo 14 lunar scientific experiments package, ALSEP, failed. The station was originally set up on February 5, 1971, by Alan B. Shepard and Edgar D. Mitchell, during the third manned exploration of the moon. The transmitter failed on January 18, 1976, ending the Apollo 14 ALSEPs long transmission history.

The Apollo 14 ALSEP, one of five stations on the moon, was essential in providing scientists a lunar seismic network. With the Apollo 12 station and stations at Apollo sites 15 and 16 subsequently installed, the ALSEP 14 station provided geophysicists necessary data to locate moonquakes and begin the study of the moon's interior structure.

Originally designed for a life of one year, the ALSEP 14 has long outlived its specifications. It is the first of the ALSEPs to fail completely although it has had problems before. Almost one year ago, in March 1975, the ability of the station to receive commands from Earth was lost and never regained. However, in the meantime the 14 station continued to transmit data about the moon's seismic activity.

- more -



- 2 -

ALSEP engineers at the Johnson Space Center believe that the most likely cause of the failure is an electronic component which quit functioning. A small chance remains that the failure was due to thermal stress as the instruments underwent dramatic temperature changes. The temperature excursions occur every time the moon undergoes sunrise or sunset. Maximum temperatures reach 227 degrees C and fall to minus 170 degrees C. The ALSEP stations have gone through temperature changes of as much as 400 degrees C in less than two hours.

The four remaining ALSEP stations continue to provide lunar scientists with data concerning the moon's seismic activity, heat flow, interactions with the Earth's magnetic field, the solar wind and cosmic particles which continuously bombard the moon's surface.

The contribution of the ALSEP stations to lunar science is substantial. Larry Haskin, chief of the planetary and earth sciences division at the Johnson Space Center says "most of what we know about the interior of the moon has come from these packages." A partial list of important findings based on ALSEP data includes:

- \* The existence of moonquakes, several thousand a year with most of them about 4 on the Richter scale.
- \* Indications of a lunar core at or near the melting point.
- \* A thick lithosphere that has probably precluded mountain-building on the moon.
- \* A tenuous atmosphere on the moon's surface deriving from solar wind particles.

The ALSEPs are the most sophisticated sensors which will be established on a planet's surface, besides the Earth, for the foreseeable future. The seismic instruments at the ALSEP stations are the most sensitive of any in existence.

- more -

The data returned by the ALSEPs has laid much of the groundwork for the orbital studies of planets.

The Apollo 12, 15, 16 and 17 ALSEPs have an estimated life of three years remaining. Apollo 12 ALSEP was activated in November 1969, and has four of its six original experiments still working. Apollo 15 ALSEP activated in July 1971, has five of its original eight experiments functioning. Apollo 16 ALSEP, activated in April 1972, has three of its original four experiments still active. Apollo 17 ALSEP, the last station established on the moon, was activated in December 1972, and has four of its original five experiments still functioning.

The ALSEP stations, which are powered by small nuclear reactors, were designed and built by the Bendix Corporation, Aerospace Systems Division, Ann Arbor, Michigan.

- end -

February 10, 1976

# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Robert V. Gordon

For Release:

February 12, 1976

RELEASE NO: 76-14

## DRAPER LABORATORIES CONTRACT EXTENSION

The National Aeronautics and Space Administration has awarded a \$6.8 million, two-year contract extension to the Charles Stark Draper Laboratories of Cambridge, Massachusetts, for the technical support of Space Shuttle Orbiter avionics software development.

Under the terms of the contract, the Draper Laboratories will provide the computer programming relative to the integration of the guidance, navigation, and control systems of the Space Shuttle Orbiter, the reusable space system scheduled to be launched in early 1979. This effort, which will employ approximately 55 people at the Draper facilities in Cambridge, Mass., shall include software design, design verification, simulation, requirements formulation, and analysis for the Orbiter avionics as required for the guidance, navigation and control computer programming.

The Draper Labs have been furnishing this support to the Johnson Space Center since 1974.

- end -



# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Charles Redmond

For Release:

February 22, 1976

RELEASE NO: 76-15

ALSO RELEASED AT NASA HEADQUARTERS

## SEVENTH LUNAR SCIENCE CONFERENCE TO INCLUDE PLANETS

Discoveries made about the Moon will be applied to deciphering the origin and early history of the solar system when several hundred scientists gather in Houston next month for the Seventh Lunar Science Conference.

The conference will be at NASA's Johnson Space Center on March 15-19.

A new topic, "Earliest History of the Moon and Solar System" will be introduced, in which scientists will use data obtained from lunar rocks to understand what Earth and the other planets were like between the time that the solar system formed about 4.6 billion years ago and about 3.7 billion years ago, the age of the oldest rocks preserved on Earth.

The fact that moon rocks are beginning to tell us something about other planets is one of the most exciting aspects of current lunar research, according to the conference cochairmen, Dr. Larry A. Haskin, JSC Chief of Planetary and Earth Sciences, and Dr. Robert O. Pepin, Director of the Lunar Sciences Institute. Bodies like the Moon, Mars, and Mercury have apparently formed in much the same way, and their early histories are dominated by the impacts of large bodies and by widespread melting within them.

- more -



The Moon preserves some of the details of these processes, and several scientists at the conference will describe how lunar data can be used to interpret the craters and volcanoes recently photographed by robot spacecraft on the surfaces of Mercury and Mars. Other papers will discuss meteorites, the satellites of Jupiter (which are about the size of our own Moon), and the use of Earth-based telescopes to measure the chemical composition of the asteroids.

Despite the changing emphasis in lunar studies, many features about the Moon itself are still not understood. Controversy persists about why the lunar surface is magnetic, whether the Moon has an iron core, what the inside of the Moon is made of, and what kinds of chemical separations occurred when the Moon was young. If we can answer these questions for the Moon, we may be able to answer them for other planets, including Earth.

This year's emphasis on more general planetary studies is a new trend for the Lunar Science Conferences, which have been held annually since 1970, when the first conference assembled to hear about the scientific results from the Apollo 11 mission, the first manned landing on the Moon. The conference brings together scientists in such diverse fields as geology, chemistry, physics, astronomy, engineering, and biology. More than 700 scientists from as far away as Australia attended last year's conference.

The conference begins on Monday, March 15, with three simultaneous sessions and continues through Friday. Sessions will be held in the JSC Main Auditorium and in the JSC Gilruth Recreation Center. The conference topics are:

Constraints on Structure and Composition of Planetary Interiors;

Characteristics and Movements of Materials on Lunar, Planetary and Asteroidal Surfaces;

Characterization and Evolution of Maria and other Volcanic Landforms;

RELEASE NO: 76-15

- 3 -

Characterization and Evolution of Planetary Crusts;

Nature and Effects of Impact Processes;

Extraterrestrial Materials as Solar/Interplanetary/Interstellar  
Probes; and

Earliest History of the Moon and Solar System.

The Lunar Science Conferences are sponsored jointly by the Johnson Space Center and the Lunar Science Institute, Houston. Proceedings of the first six conferences fill 18 thick volumes and are supplemented by material published in many scientific journals.

- end -

February 13, 1976



# NASA News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Judie Boin

For Release:

UPON RECEIPT

RELEASE NO: 76-16

## JSC HOLDS SSA CAREER DAY CONFERENCE

Spanish Surnamed Americans (SSA) students will be actively recruited for the Summer Aid, Vocational Office and Industrial Cooperative Training programs of the Johnson Space Center, at a conference February 18, at the Ripley House Community Center in Houston, Texas.

The "NASA Career Day" will feature Apollo 16 command pilot Thomas K. Mattingly as guest speaker, Stan Goldstein, Chief of Employee Development Branch of Personnel and Gloria B. Martinez, SSA Recruiter for Personnel.

JSC's recruiting of Spanish surnamed students is aimed toward proving "in-school" training and transportation to jobs for high school students, while developing personal contacts in the Houston school district and in the community.

The Continental Can Company of Houston donated \$5,000 to the Neighborhood Daycare Center Association Transportation Department for SSA student bus transportation. The students will pay a nominal fee. In the past, the lack of transportation has been a major factor in not having a successful SSA Recruitment Program.

A film clip of SSA students in the VOE, ICT, and Co-op Programs will be shown on February 22 on Channel 11's "Hola Amigos TV Program", featuring VOE student Esther Acosta of Jeff Davis Sr. High School and Jose Andrew Rodriguez, Texas A&I Co-op student. Joe Mendiola, a Co-op Program graduate and new aerospace engineer



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- 2 -

at JSC will appear on "Mexican-American Dialogue" TV program (Channel 13) on March 13. Other students in the film clip are Humberto De Los Santos, ICT student of Dickinson Sr. High School, Richard Gonzales, Co-op student from University of Texas at El Paso and Mary Lou Canales, Co-op student from Texas A&I.

- end -

February 17, 1976

## STUDENTS ON FILM CLIP

### (1) Esther Acosta - Jeff Davis Sr. High School - VOE Student

Esther works in the JSC Space Shuttle Program Office every afternoon. She helps in the assembling of Presentation materials for Center management, filing and typing. After graduation Esther would like to continue working at JSC.

### (2) Humberto De Los Santos - Dickinson Sr. High School - ICT Student

Humberto began in the Summer Aid Program in 1975 and continued in the ICT Program in the Fall of 1975. He works every afternoon in the Sheetmetal Section of the Technical Services Division learning machine shop techniques and safety regulations and also helps in the operation of the various machines. Humberto feels that after his training here at JSC, he will not have any difficulty in obtaining a job in a machine shop.

### (3) Richard Gonzales - University of Texas at El Paso - Co-op Student

Richard started his first work period in January 1976. He is working in the Consumable Analysis Section of the Mission Planning and Analysis Division, being trained to analyze data of the fuel cells of the Orbiter for constraint testing. This data is used to determine the appropriate testing techniques. His plans are to become an aerospace engineer.

### (4) Mary Lou Canales - Texas A&I, Kingsville, Texas - Co-op Student

Mary Lou is in her 3rd work period and is working in the Engineering and Center Management Branch of the Industrial Resources Division. She is majoring in Data Processing and is working towards her degree in Business Administration. She has worked with Historical Manpower Data - cost numbers and projected cost numbers for manpower and is presently working with medical records.

STUDENTS ON FILM CLIP

(5) Jose Andrew Rodriguez - Texas A&I University - Co-op Student

Andy, from Taft, Texas, started his first work period in January 1976. He is working in the Personnel Office, learning all aspects of personnel functions and will work in various branches of the Personnel Office during his work period. He is majoring in Political Science.

(6) Joe Mendiola - Recent graduate of New Mexico Highlands University of Las Vegas, New Mexico - Co-op Program Graduate

Joe was hired permanently at JSC on January 19, 1976 as an aerospace engineer in the Space Software Division. He started in the Co-op program in January 1974, at JSC, working for the Flight Software Division (renamed Space Software Division), in Real Time Computer Systems in support of the Control Center during the latter Skylab missions and the Apollo-Soyuz Test Project.

# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Milton E. Reim

RELEASE NO: 76-17

For Release:

February 24, 1976  
1 p.m.

## SPACE SHUTTLE APPROACH AND LANDING TEST CREWS NAMED

The National Aeronautics and Space Administration today announced crews for the Space Shuttle Approach and Landing Test (ALT), the initial flight test of the Shuttle Program. The ALT tests are scheduled to begin in mid-1977.

Two 2-man crews were named. They are: Fred W. Haise, Jr., commander and Charles G. Fullerton, pilot; Joe H. Engle, commander and Richard H. Truly, pilot. Both crews are scheduled to fly ALT missions with Haise and Fullerton making the first flight.

The ALT flights will be conducted at the NASA Dryden Flight Research Center in California. The Orbiter will be carried aloft to an altitude of about 25,000 feet atop a specially modified 747 aircraft. It will then be released allowing the crew to fly the Orbiter to the ground. Several unmanned and manned non-release flights will precede the initial "free flight" of the Orbiter.

The crews will participate in the various phases of Orbiter test and checkout between now and the first flight. Both crews will train for the flights utilizing the NASA T-38 aircraft with special speed brake; the Shuttle Training Aircraft, a modified twin jet Gulfstream II; Shuttle Procedures Simulator and the Orbiter Aeroflight Simulator.

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- 2 -

Haise, 42 (civilian), commander of the first crew was selected for the astronaut program in April 1966. He was backup lunar module pilot for Apollos 8 and 11, lunar module pilot on Apollo 13 and backup commander on Apollo 16. He is the only crewman named that has flown in space.

Fullerton, 39 (Lieutenant Colonel, USAF), pilot of the first crew was one of the USAF Manned Orbiting Laboratory Program crewmen selected for the astronaut program in September 1969. He was a member of the support crews for the Apollo 14 and 17 missions.

Engle, 43 (Colonel, USAF), commander of the second crew was selected for the astronaut program in April 1966. He was a member of the astronaut support crew for Apollo 10 and the backup lunar module pilot for the Apollo 14 mission.

Truly, 38 (Commander, USN), pilot for the second crew was one of the USAF Manned Orbiting Laboratory Program crewmen selected for the astronaut program in September 1969. He was a member of the support crew for all three manned Skylab missions.

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# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
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Charles R. Redmond

For Release:

ALSO RELEASED AT NASA HEADQUARTERS

February 23, 1976

RELEASE NO: 76-18

## APOLLO 14 ALSEP EXPERIENCES SHORT-LIVED DEATH

'Reports of my death are greatly exaggerated.'

Mark Twain

On January 18, 1976, an untimely and unexplained occurrence ended the performance of one of five remote scientific stations transmitting data from the moon.

Scientists and engineers at the Johnson Space Center, Houston, were disappointed and puzzled. The station was almost five years old and had an estimated life remaining of from two to three years. Alan B. Shepard and Edgar D. Mitchell had established the station during their visit to the moon on Apollo 14 in February 1971. Other stations, from Apollo 12, which was older, and Apollo's 15, 16 and 17 were still performing admirably. There was no data to indicate the Apollo 14 station was headed for extinction. Although, last March 1975, the 14 station did lose its receiver rendering ground controls useless.

When the transmitter failed last month it left JSC scientists and Bendix engineers, who designed the stations, perplexed. They are even more perplexed now, though. On February 19, the Apollo 14 ALSEP (Apollo Lunar Scientific Experiment Package) returned to life with its transmitter, receiver and experiments functioning extremely well.



In fact, for one of the experiments, the 14 station appears to be performing better than it ever has. The Charged Particle Lunar Environment Experiment (CPLEE) had not been able to perform during the lunar daytime due to temperature excursions which degraded the power supply. The CPLEE is now performing during lunar daytime and sending good data.

The ALSEP team at the Johnson Space Center at present has no idea of why the station came back on. It may have been a relay in the power system which had been stuck, ending the transmissions, and became unstuck. The ALSEP engineers are proceeding slowly in their trouble-shooting out of caution for overloading the station with too many commands. Extreme temperature excursions, as much as 400 degrees F in two hours, were cited as a possible cause for the cessation last month.

The estimated remaining life of the 14 station is from 2 to 3 years, depending on degradation of the power supply. Although originally designed to operate for only one year, the stations have performed remarkably well, with the oldest station, the Apollo 12 ALSEP, now going on its seventh year.

Although not all of the experiments at each station are working, the majority of the experiments still continue to provide earth-based geoscientists with invaluable information on the moon's thin solar atmosphere, conditions within the moon and moonquakes.

A few of the important findings which have resulted from studies of data received from the 5 remote stations includes:

- \* The existence of moonquakes, several thousand a year with most of them less than 4 on the Richter scale.
- \* Indications of a lunar core at or near the melting point.
- \* A thick lithosphere (crust) which has probably precluded mountain-building on the moon.
- \* A tenuous atmosphere on the moon's surface deriving from solar wind particles.



The significance of the renewed activity from the 14 station lies with the station's Passive Seismic Experiment. The 14 station, along with stations set up during Apollo's 12, 15 and 16, provides a network enabling scientists to track and pinpoint moonquakes. It is these moonquakes, together with impacts by large meteorites, which have given scientists their first look at the moon's interior. Studies of the moon's interior now rank among the most important considerations. Geoscientists have been long awaiting a large impact which would send seismic signals through the moon's core to the seismic stations on the near side. Such a large impact has not yet occurred leaving scientists still unsure whether the moon's core is molten, semi-molten or even metallic.

With Apollo 14 ALSEP now on line again, scientists will be better able to interpret that long-awaited for impact, should it come.

# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Robert V. Gordon

For Release:

RELEASE NO: 76-19

March 5, 1976  
2:00 p.m. CDT

ALSO RELEASED AT NASA HEADQUARTERS

## TWO FIRMS WILL STUDY SPACE STATION SYSTEMS

Grumman Aerospace Corporation, Bethpage, New York, and McDonnell Douglas Astronautics Co., Huntington Beach, California, were selected today for negotiation of fixed price contracts to conduct parallel space station systems analysis studies for NASA.

Each 18-month study will cost approximately \$700,000. The Grumman study will be managed by the NASA Marshall Space Flight Center, Huntsville, Alabama. The NASA Johnson Space Center, Houston, Texas, will manage the McDonnell Douglas study. The work is to begin April 1.

The contractors are to define and analyze concepts of space station facilities for low and synchronous altitude Earth orbit including orbit-to-orbit transportation. Emphasis is to be placed on assuring a space station of modular construction with growth potential over a number of years.

The space station would be designed to serve as an operational base in space and also a space laboratory.

As an operational base the space station could serve as a test and construction facility to support the manufacturing, fabrication, and assembly of large space structures which may be required for a variety of earth benefits from space. Other

- more -



uses as an operational base may include retrieval and repair of spacecraft and serving as an orbital propellant depot to refuel transfer systems carrying payloads from low to high Earth orbit or to an escape orbit.

Serving as a space laboratory, the space station could accommodate materials processing, research and development leading to commercial manufacturing, basic and applied physical sciences experiments, space physics and astronomy missions, life sciences research and for continued development of sensor technology in areas such as Earth surveys, navigation, weather and climate research.

Proposals on the studies were also received from the Rockwell International Space Division, Downey, California, and Boeing Aerospace Company, Seattle, Washington.

# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Jack Riley

For Release:  
March 15, 1976

RELEASE NO: 76-20

ASTRONAUT CERNAN TO RETIRE JULY 1

Astronaut Eugene A. Cernan, the last man on the moon, plans to retire from the Navy and leave NASA on July 1.

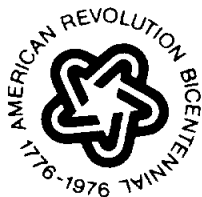
Cernan, 42, a captain, will complete 20 years in the Navy in June. He said today that he was not ready to announce his plans for the future.

Selected as a NASA astronaut in 1963, Cernan is a veteran of three space missions, including two flights to the moon. As pilot of the Gemini 9 mission in June 1966, he became the second American to walk in space.

He was lunar module pilot of Apollo 10 in May 1969. Cernan and Astronaut Thomas P. Stafford flew the lunar module to within 8 nautical miles of the moon's surface in a full scale rehearsal of all but the final minutes of the first lunar landing mission two months later.

Cernan's opportunity to land on the moon came in December 1972, when he commanded Apollo 17 on the last scheduled manned mission to the moon for the United States. He and Astronaut Harrison H. Schmitt landed at Taurus-Littrow on the southeast edge of the Sea of Serenity.

Apollo 17 established several records, including: longest manned lunar landing flight, 301 hours, 51 minutes; longest lunar surface exploration, 22 hours, 4 minutes; largest lunar sample return, 249 pounds; and longest time in lunar orbit, 147 hours, 48 minutes.



- 2 -

In September 1973, Cernan was named Special Assistant to the Apollo Spacecraft Program Manager. He assisted in the planning, development and evaluation of the joint US-USSR Apollo Soyuz Test Project. Following the completion of that assignment in September 1975, he became Chief of Training Operations in the Astronaut Office.

Cernan has logged 566 hours, 15 minutes of spaceflight. He and his wife Barbara, have a daughter, Teresa Dawn, 13.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Robert V. Gordon

For Release:  
March 24, 1976

RELEASE NO: 76-21

ALSO RELEASED AT NASA HEADQUARTERS

## SHUTTLE SPACE SUIT AND RESCUE SYSTEM

Space travelers of the 1980's who will fly aboard the National Aeronautics and Space Administration's Space Shuttle Orbiter will be furnished with a unique space suit and rescue system.

Engineers at the NASA Johnson Space Center, Houston, Texas, are currently developing a new space suit concept and rescue system for use by astronauts and scientists aboard the Space Shuttle.

Design for the Shuttle suit features an "adjustable fit" concept, a departure from the Apollo program in which suits were customized for each astronaut, a long and costly process. It is anticipated that the Shuttle suit, a two piece combination of upper and lower torso, will be manufactured in small, medium and large sizes to accommodate the total astronaut population, including females. Each size can then be individually adjusted for astronaut preference.

When the Space Shuttle becomes operational in 1980 with the capability to conduct as many as 60 missions a year, the Pilot and Mission Specialist will be outfitted with the space suit while the Commander and Payload Specialists will each be provided with a personal rescue system.

- more -



In the event an orbiter becomes disabled and is unable to return to earth, a rescue orbiter will be launched to transfer astronauts and passengers from the marooned craft.

The Personal Rescue Enclosure is a 34-inch diameter ball which contains its own short term simplified life support and communication systems. The ball which was conceived and fabricated by members of the Crew Systems Division at the Johnson Space Center, has three layers (Urethane, Kevlar and an outside thermal protective layer) and a small viewing port of tough Lexan.

Three modes of transfer from one vehicle to another are now being studied by NASA engineers at JSC. One is for a spacesuited astronaut to carry the rescue balls, much like a suit case, from one vehicle to the other. A second mode is to hook up a clothes-line like device between the two spaceships and pass the rescue ball with its passenger from the disabled spaceship to the rescue ship. A third method could be to use the remote manipulator arm in the cargo bay of the orbiter to pluck the rescue ball and its passenger from the disabled spaceship and place it aboard the rescue ship.

The new space suit conceived by suit engineers of JSC's Crew Systems Division, provides a modular construction (upper and lower torso) with a body seal closure at the waist. This eliminates the need for pressure-sealing zippers used in Apollo and Skylab suits and is expected to form a much more reliable ensemble.

Materials used in the Shuttle suit, the same as used in the rescue ball, provide a much longer shelf life, according to suit technicians who have run extensive pressure and abrasion tests on the new materials.

Use of the new, strong and durable Kevlar fabric has permitted technicians to fabricate joints (elbow, wrist, knee, etc.) from the flat fabric rather than following the Apollo and Skylab suit pattern where joints were constructed of molded neoprene rubber convolutes with cables. The fabric joints provide better mobility and, more importantly, reduce the cost and weight of each suit.

RELEASE NO: 76-21

- 3 -

Another feature of the Shuttle suit is the integral portable life support system. When Apollo astronauts walked on the moon they had to first remove a bulky 75 pound life support system from its storage location and then connect it to the suit. The Shuttle suit contains a life support system which is an integral part of the rigid upper torso.

- end -

PHOTOS AVAILABLE UPON REQUEST



# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Robert V. Gordon

For Release:  
Immediate

SPACE SHUTTLE RESCUE SYSTEM: Walt Sayler, NASA suit technician at the Johnson Space Center demonstrates how to enter the rescue ball which will be used in the event Space Shuttle orbiter can not return to earth. The rescue ball will be used in transferring orbiter passengers from a marooned vehicle to the rescue vehicle. Suit technician Bob Williams is shown in the new Shuttle suit.

March 24, 1976



# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Robert V. Gordon

For Release:  
Immediate

SHUTTLE SUIT AND RESCUE SYSTEM: NASA suit technician Bob Williams demonstrates the proposed rescue system which will be used aboard the Space Shuttle orbiter when and if rescue is required. Williams is wearing the new Shuttle suit, a new concept in space suits which will be used aboard orbiter. The rescue ball he is holding is 34 inches in diameter and has its own oxygen and communications system.

March 24, 1976



NASA-JSC

# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Robert V. Gordon

For Release:

March 31, 1976

RELEASE NO: 76-22

## SHUTTLE CONTRACT AMENDMENT - ROCKWELL INTERNATIONAL

The National Aeronautics and Space Administration and Rockwell International have signed a \$1.3 million supplemental agreement which incorporates the follow-on development phase of the Space Shuttle Orbiter project into an existing contract.

The Space Shuttle, to be operational in 1980, will be the major part of a reusable, low-cost space transportation system that will replace most of the current U.S. launch vehicles.

This supplemental agreement was contemplated when the original Space Shuttle Orbiter contract with Rockwell was signed. The additional effort covered under the agreement represents work valued at \$1,337,500, and brings the estimated value of the Orbiter contract with Rockwell to slightly over \$2.983 billion. Rockwell was awarded the contract for Orbiter design, development, and integration with all other elements of the Space Shuttle system in July 1972.

This supplemental agreement formally incorporates seven contract changes previously authorized by NASA for modifications to Orbiter 101 and various other changes.

- end -



# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Terry White

For Release:

April 6, 1976

RELEASE NO: 76-23

LAS CRUCES SYMPOSIUM STRESSES SPACE CAREERS

Motivation of Hispanic and Native American college and high school students to follow science and engineering as career fields will be the main focus of a three-day aerospace symposium April 21-23, at New Mexico State University, Las Cruces.

Held by the University in conjunction with the National Aeronautics and Space Administration, the symposium has issued invitations to faculties from 14 colleges and universities having a high percentage of Hispanic and Native American students. Local area high school students also have been invited to attend. All New Mexico tribes are expected to be represented.

Speakers and exhibits from NASA field centers and from the aerospace industry will highlight space technology applications and career opportunities in the aerospace field. A workshop session for administrators, teachers and counselors will stress the need for additional aerospace courses in the school curriculum, and a job fair will provide attendees with information on summer, Co-op and placement opportunities.

Symposium program and registration information is available from Armando R. Alba, Director -NMSU Placement and Career Services Office, Box 3509, Las Cruces, NM 88003.

- end -



NASA-JSC

# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Milton Reim

For Release:

April 13, 1976

RELEASE NO: 76-24

VISUAL LANDING MODEL FOR SHUTTLE BEING READIED AT JSC

Before NASA Space Shuttle pilots make their first flight in the Orbiter, they will make their first landing attempts on a 56 by 24 ft. (17.07 by 7.32 meters) visual model of the Edwards Air Force Base, CA, runways and surrounding terrain.

The Orbiter is the United States' new low-cost transportation system designed to carry into earth orbit a crew including scientific and technical personnel and payloads, then return to earth and land much like a conventional jet airliner on an airport runway.

The visual model which will be used for these practice landings was constructed in a model-maker's shop in Kinston/Surrey, England. The model arrived recently at the Johnson Space Center in 42 sections.

Assembly of the model is scheduled for next month in the JSC Building 5 Mission Training and Simulation simulator facility. The sections will be assembled vertically on a structure near a wall and become an integral part of the Orbiter Aeroflight Simulator being constructed for NASA by the Singer Company, Simulator Products Division.

Opposite the model will be a battery of 264 1000-watt metal-halide arc lamps to light the Edwards AFB model, simulating daylight conditions.

- more -



The model sections are constructed of reinforced fiberglass and aluminum. Each section is 4 x 8 feet (1.2 by 2.4 meters) and weighs about 150 pounds (67.5 kg.).

John Piper Ltd., a specialized model making firm located southwest of London, constructed the model based upon aerial and ground photographs, contour maps and first-hand impressions of the area by Piper while on a tour of Edwards AFB last year.

To transmit a pilot's eye-view of the landing site to the windows of the Space Shuttle Orbiter simulator, a special 126 degree optical probe built by Farrand Optical will be utilized. The optical system consists of the optical probe, mirrors, beam splitters and three color television cameras especially designed by Singer. The optical system is mounted on a twin tower gantry permitting the unit to move in all directions. The movements of the optical probe are correlated to the pilot's hand controller in the Orbiter cockpit.

The model provides the Orbiter pilot with a true representation of the colors and the terrain around Edwards AFB. To the eye, the model colors may seem slightly exaggerated, but when the image passes through the TV optical system, the colors match what a pilot will see from the Orbiter cockpit when making a landing approach over the actual site. The horizon and sky viewed by the pilot in the Orbiter simulator is provided by a visual effects generator. The horizon movement accurately tracks the terrain movements.

The view presented in the Orbiter windows covers a horizontal field of view of 120 degrees. At any one time any four of the six Orbiter windows in sequence will depict the view of the landing site. The view can be provided for optimum viewing at either the commander's (left seat) or the pilots side of the cockpit.

The model represents a rectangular area of about 8 1/2 by 20 nautical miles (15.75 x 37 km.) on a northeast by southwest line. The scale is 1 to 2145.

Edwards AFB runways 17 and 22/4 are depicted on the model along with local landmarks and terrain. Runway 17 crosses a salt flat and is about seven nautical miles (13.0 km.) in length and is lined off with four broad asphalt stripes. Runway 22/4 is concrete, 15,000 feet long (4572 meters) with 1700 feet (518 meters) asphalt overruns on each end. Runway 17 will be primary for the Approach and Landing Test Flights of the Shuttle Orbiter scheduled for mid 1977.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Milton E. Reim

For Release:  
April 9, 1976

RELEASE NO: 76-25

PAN AMERICAN WORLD AIRWAYS JSC SUPPORT CONTRACT EXTENDED

Pan American World Airways, Inc., Aerospace Services Division, Cocoa Beach, Florida, has been awarded a 1-year extension to their present contract for Plant Maintenance and Operations Support Services at the Lyndon B. Johnson Space Center (JSC), Houston, Texas.

Pan American is responsible for the operation of all utility systems and maintenance of utilities, buildings, roads, ditches, and special equipment at JSC.

The contract is a cost-plus-award-fee type contract. Pan American was selected for award of this contract for an initial 1-year period beginning February 13, 1974, and ending February 12, 1975, with two additional 1-year extension periods.

This present award represents the second of the two planned extensions and extends the contract period through February 12, 1977. The contractor employs approximately 310 persons, and the annual estimated amount of the contract is \$7.4 million.

- end -



NASA-JSC



# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Milt E. Reim

For Release:

RELEASE NO: 76-27

April 30, 1976  
9:00 a.m. CDT

## ASTRONAUT RON EVANS RETIRES FROM U.S. NAVY, STAYS WITH NASA

Astronaut Ronald E. Evans (Captain USN) retires today from the U.S. Navy after 21 years service and will remain at NASA as a civilian in his current job.

Evans is one of the nineteen astronauts selected by NASA in April 1966. He served as a member of the astronaut support crews for Apollo 7 and 11 flights and as backup command module pilot for Apollo 14.

He was command module pilot on Apollo 17, the last manned flight to the moon, December 6-19, 1972. It was the longest manned lunar flight, 301 hours, 51 minutes.

Evans was accompanied on the flight by Eugene Cernan, spacecraft commander and Harrison H. Schmitt, lunar module pilot. While they were on the lunar surface Evans maintained a solo vigil in lunar orbit performing visual geological observations, hand-held photography of specific targets, and the control of cameras and highly



sophisticated scientific equipment carried in the service module SIM-bay.

On the transearth phase of the flight he completed a 1 hour and 6 minute extravehicular activity successfully retrieving three camera cassettes from the SIM-bay of the service module.

He also served as backup command module pilot for the Apollo-Soyuz Test Project mission which was flown in July 1975.

Evans current assignment is the responsibility for the operational aspects of the launch phase of the Space Shuttle first orbital flight.

Two other NASA astronauts have retired from military service and remained with NASA. They are Gerald P. Carr (Colonel, USMC, Retired) September 1, 1975, and Alan L. Bean (Captain USN, Retired) October, 1, 1975.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Charles Redmond

For Release:  
May 14, 1976

RELEASE NO: 76-28

JUNIOR HIGH STUDENTS TO BENEFIT FROM UNUSUAL EDUCATIONAL PROGRAM

The 465 students at South Charleston Junior High School, West Virginia, are in for an exceptional educational experience on May 27. On that Thursday the school will host Dr. Michael Duke, Lunar Sample Curator from the Johnson Space Center, Houston, and lunar sample material collected during the Apollo explorations on the moon.

South Charleston Junior High students and educators will get a firsthand look at results of extensive analysis on the samples and an explanation from Dr. Duke of the moon's history, how the moon and the earth fit into the solar system, and opportunities to discuss the lunar and planetary exploration programs of NASA.

The junior high school was not selected by the agency for this program, rather a student from the school, 15-year-old David Simpson, was chosen as first prizewinner in an essay contest -- the prize for which was Dr. Duke and the chance to view lunar material in the school.

The essay contest was sponsored by the secondary school magazine Current Science and asked students to answer the question "How Should the United States Continue Its Space Exploration Program?" Current Science is published by Xerox Education publications.

- more -



This will be the first time such a program has been scheduled at a secondary school. It will also be the first time lunar material has been used in a secondary school as part of an instructional program.

David's prize winning essay encouraged continued exploration of the solar system using unmanned probes. He said, "I believe that the United States should continue its efforts in space exploration largely through the use of unmanned probes...International cooperation would be an important factor in such an endeavor. Several nations contributing to a project would considerably reduce the expense for any one nation, and the combined technologies pave the way for larger and more ambitious projects...Such international cooperation would help promote world peace. And once world peace is established, a large portion of government funds could be turned over to space exploration, as a great deal of technology is derived from this field. Such technology could be put to use not only in the exploration of space, but also into other important (areas) such as disease, starvation, and ignorance. Thus, through the exploration of space, man can not only solve serious problems at home, but can learn more about the heavens which have intrigued him since the beginning of history."

The contest drew over 3,000 entries from students across the U.S. and Canada. Contest rules and an article explaining the objectives of the essays were published in a Xerox magazine Current Science distributed to secondary schools. The winning essay was independently chosen from 20 semi-finalists by both Dr. Duke and editors of Current Science.

David Porterfield, vice-principal for South Charleston Junior High, said that the entire school was "excited" over the prospects of the presentation. "We've had visits from industry and other programs

for the students in the past, but this will be a new experience for us. We're very excited about it," he said.

David Simpson, the essay winner, is also excited about the visit from Dr. Duke and felt that more programs of this nature would help explain some of NASA's scientific objectives to students. David said he plans a career in a science, although he is not sure which field at the moment.

Dr. Duke's presentation will take special note of the rapid development of the space agency's interplanetary explorations, which to date have ranged to Jupiter and beyond and which this July will include a Viking biological package landing on Mars, the Red Planet.

Dr. Duke and his curatorial staff believe there are broad opportunities for presentations of this nature. Duke considers the South Charleston Junior High visit a prototype program and feels programs of this nature are needed in the secondary schools across the nation.

Presently the curatorial staff has educational packages available for college-level instruction. The packages use thin-section microscope slides of lunar material and a suggested course outline for use of the slides in petrology classes.

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EDITORS' NOTE:

The complete transcript of David Simpson's winning essay is included in this release.

## An Essay Concerning Space Exploration

"I believe that the United States should continue its efforts in space exploration largely through the use of unmanned probes. The Skylab vehicle could be enlarged and modified to hold a launch platform, and could be serviced by the Space Shuttle which would transport crew and cargo back and forth from earth. Thus, a probe could be readied on the ground, transported to Skylab via the Space Shuttle, and launched from a launching platform on Skylab.

Sending probes to investigate Saturn's rings, the surfaces of the superior planets, and possibly landing a probe on Pluto would prove most interesting. A vehicle sent to the asteroid belt could bring back very small asteroids for study and analysis. And perhaps, if technology and funds permit, a probe could be sent to investigate a close-passing comet.

International cooperation would be an important factor in such an endeavor. Several nations contributing to a project would considerably reduce the expense for any one nation, and the combined technologies would pave the way for larger and more ambitious projects. During a mission, some universal language such as Interlingua would be spoken.

Such international cooperation would help promote world peace. And once world peace is established, a large portion of government funds could be turned over to space exploration, as a great deal of technology is derived from this field. Such technology could be put to use not only in the exploration of space, but also into other important problems such as disease, starvation, and ignorance.

Thus, through the exploration of space, man can not only solve serious problems at home, but can also learn more about the heavens which have intrigued him since the beginning of history."

David Simpson  
987 Harmony Lane  
South Charleston, WV 25303

# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Robert V. Gordon

For Release:  
May 7, 1976

RELEASE NO: 76-29

METRO AWARDED LOGISTICS CONTRACT

Metro Contract Services, Inc. of Houston, Texas, has been awarded a \$1.3 million contract to furnish logistic support at the NASA Johnson Space Center.

Metro, which will employ approximately 123 persons on the contract, will be responsible for management and operation of JSC's logistics support services which include transportation services, packing and shipping, identification and cataloging, and receipt and inspection of property. Metro will also be responsible for warehouse operation, operation of a temporary storage program, and logistics plans and analysis.

The contract, which is a cost-plus-fee-award, became effective on May 1, 1976, and will run through April 30, 1977.

- end -



# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Milton Reim

RELEASE NO : 76-30

ALSO RELEASED AT NASA HEADQUARTERS

For Release:  
2 p.m. CDT, MONDAY,  
May 10, 1976

NASA SELECTS TWO COMPANIES FOR SIMULATOR CONTRACT NEGOTIATIONS

NASA has selected the McDonnell Douglas Corp., Technical Services Co., Inc., St. Louis, Mo., and the Singer Co., Simulations Products Div., Binghamton, N.Y., for parallel negotiations leading to the award of a contract with one of the companies for maintenance, modification and operational support of the simulator training complex at the Lyndon B. Johnson Space Center, Houston, Texas. These simulators will be used for flight crew training for the Space Shuttle program.

The training complex will initially consist of the Shuttle Procedures Simulator (SPS) and the Crew Procedures Evaluation Simulator (CPES). The Orbiter Aeroflight Simulator (OAS) will be added to the training complex early in the contract period followed by the Shuttle Mission Simulator (SMS).

The initial two-year contract period will date from July 1, 1976, and the contract will provide for two additional optional performance periods of 24 months and six months, respectively.

- more -





The work to be performed includes systems and hardware engineering, software development, drafting and illustration, configuration control, installation and testing of modifications to update simulation equipment to configurations compatible with NASA requirements. Also required is the maintenance, servicing and operational support of the equipment, plus other miscellaneous tasks such as documentation and logistics support.

The Management and Technical Services Co., General Electric, Daytona Beach, Fla., and Computer Sciences Corp., Applied Technology Div., Falls Church, Va., also submitted proposals.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Charles Redmond

RELEASE NO: 76-31

For Release:

Upon Receipt

SERV-AIR CONTRACT EXTENDED

NASA Johnson Space Center has awarded an 8-month extension to an existing contract to Serv-Air, Inc., Division of E-Systems, Inc. for continuation of maintenance and modification of aircraft assigned to JSC.

The 8-month extension of the cost-plus-award-fee-contract was for \$3.04 million and brings the total estimated contract value to \$12.61 million.

The aircraft involved are earth resources survey aircraft and air proficiency training craft flown by astronauts. The contract covers ground support in addition to engineering, design, fabrication and installation of electronic and mechanical systems and related logistic functions.

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May 10, 1976



# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Terry White

For Release:

RELEASE NO : 76-32

May 21, 1976

## JSC ENGINEER NAMED TO INDIAN ENGINEERING SOCIETY BOARD

Jerry Elliott of the NASA Johnson Space Center Space Shuttle Program Office was named to the board of directors of the National Society of American Indian Engineers at the Society's April 15 incorporation meeting. Elliott is a member of the Osage tribe.

Also named to the NSAIE Board of Directors were Cherokee George Thomas of the University of Oklahoma, and Kickapoo Robert Vermillion, an aeronautical engineer with General Electric Company in Los Angeles.

The NSAIE was formed with the goal of increasing the number of Indian engineers through supporting and improving education programs and opportunities. It is estimated that there are less than 1500 Indian engineers in the nation---about one tenth of one percent of all U.S. engineers.

Indian engineers interested in joining NSAIE should write to George Thomas, Director of Indian Programs, Oklahoma University College of Engineering, 202 West Boyd Street, Norman, OK 73109.

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NASA-JSC

# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Milton Reim

For Release:

RELEASE NO : 76-33

May 17, 1976

ASTRONAUT PAUL WEITZ TO RETIRE FROM U.S. NAVY, REMAIN WITH NASA

Astronaut Paul J. Weitz, Captain U.S. Navy, will retire from military service on June 1, 1976, and remain with NASA as a civilian in his present job.

Retiring after 22 years U.S. Navy service, Weitz is one of the 19 astronauts selected by NASA in April 1966. He is currently working on payloads and flight crew documentation for the Space Shuttle program.

Weitz was pilot on Skylab 2, the first manned mission, a 28-day flight from May 25-June 22, 1973. Accompanied by Charles Conrad, Jr., spacecraft commander and Joseph P. Kerwin, science pilot, the three crewmen were able to save the Skylab by erecting a "parasol" shade alleviating a thermal problem caused by the loss of the micrometeoroid shield during Skylab 1 launch.

They were also able to deploy a jammed solar power wing to assure sufficient electrical power to successfully conduct their mission and two follow-on missions of 59 and 84 days respectively.

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# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Jack Riley

For Release:

May 14, 1976

RELEASE NO: 76-34

JSC SELECTS PAN AM FOR SUPPORT CONTRACT NEGOTIATIONS

Pan American World Airways, Inc., Aerospace Services Division, Cocoa Beach, FL, has been selected for negotiation leading to award of a contract for engineering support services at the Lyndon B. Johnson Space Center (JSC), Houston, TX.

Pan American will be responsible for providing engineering design support for facilities and test programs at JSC.

The contract will be a cost-plus-award-fee type contract and is to be awarded for a 1-year period beginning June 1, 1976, and ending on May 30, 1977. The contractor will employ approximately 69 persons and the amount of the contract is expected to be approximately \$1.15 million.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Robert Gordon

For Release:

RELEASE NO : 76-35

May 21, 1976

## SUCCESSFUL ORBITER HEAT SHIELD TEST

Materials which are planned for use as part of the Space Shuttle Orbiter heat-protection armor were recently subjected to the pressures and 2,300 degree F heat of 100 reentries with no damage, according to thermal specialists at the NASA Johnson Space Center, Houston, Texas.

The Shuttle Orbiter which is designed for reuse up to 100 times without major refurbishment, will have four separate light-weight, re-useable heat-resistant materials affixed to the exterior of the 122-foot long space plane. The thermal protection system (TPS) which will provide heat management as the vehicle speeds into orbit and returns to earth, consists of coated reinforced carbon-carbon (RCC) for nose cap and wing leading edges where temperatures exceed 2,300 degrees F; high temperature reusable surface insulation (HRSI) for areas where maximum surface temperatures reach 1,200-2,300 degrees F; low-temperature reusable surface insulation (LRSI) for surface temperatures which reach 700-1,200 degrees F and flexible reusable surface insulation (FRSI), 3 by 6 feet sheets of Nomex fiber, for



areas where temperatures will not exceed 700 degrees F.

The HRSI tests completed one week ago at JSC, began in early April, were supervised by NASA engineers. The test specimens were supplied by the Lockheed Missiles and Space Co. (LMSC), Sunnyvale, CA, which has the responsibility for developing the Orbiter (HRSI) thermal protection system. The test centered on the high temperature insulation materials which were coated with a new glass mixture developed by thermal specialists at the NASA Ames Research Center, Moffett Field, CA.

The insulation tiles were placed beneath a graphite heater in a test chamber in a thermal laboratory of JSC's Engineering and Development Directorate. Nine high temperature tiles were used in the test.

Each tile, nominally 6 by 6 inches, was sprayed with the glass mixture (silicon tetroboride additive with bora silicate glass) and then placed in the chamber and exposed to reentry temperatures of 2,300 degrees F. Pressure inside the chamber was also regulated to duplicate the variable pressures the Orbiter will undergo during the reentry phase of the Shuttle mission which begins at 400,000 feet altitude. The maximum reentry heat is experienced when the Orbiter reaches 200,000 feet altitude and is traveling at 12,000 miles per hour.

The test sequence, which lasted up to 30-minutes, was repeated during the month-long program to duplicate the 100 missions the Orbiter will execute before refurbishment and maintenance of the thermal protection system will be necessary. This is the first time that the high temperature tiles have gone beyond 60 test cycles in NASA thermal test facilities without showing some signs of degradation.

At the end of the 100th test and after inspection of the tiles, Robert Dotts,

subsystem manager for the reusable surface insulation system for JSC said, "We now have a system (the tiles plus the new glass coating) which can fly 100 missions. We have a lot of confidence in the new development."

The high temperature tiles nominally vary in thickness from three-quarters of an inch to three inches. Approximately 25,000 of these tiles will be bonded to the Orbiter's aluminum exterior. They will cover portions of the upper and lower fuselage, or about 5,000 square feet of the vehicle's surface.

The HRSI is made of a low density, high purity silica (glass) fiber insulation which is made rigid with a silica binder. The new coating, reaction cured glass which is formed by mixing silicon tetroborate with boro silicate glass, is mixed with alcohol and sprayed on the tiles and then heated in an oven to a temperature of 2200 degrees F. This results in a black waterproof glassy covering capable of withstanding the 2300 degree heat of reentry.

The reaction cured glass was developed by NASA Ames research team headed by Howard Goldstein. This coating was introduced into the LMSC, Sunnyvale tile production facility in late 1975. LMSC fabricated the tiles and submitted them to the Johnson Space Center for the month long test program.

More than 50 per cent of the Shuttle Orbiter is covered with the low temperature reusable surface insulation LRSI. Approximately 7,000 of these tiles, nominally 8 x 8 inches square, will be applied to the upper wing and side fuselage. They are the same material as the high temperature tile except for the differences in coating and optical pigment used to obtain solar absorptance and high emittance.

The reinforced carbon-carbon insulation covers those parts of the Orbiter which will experience the highest heat load (in excess of 2300 degrees F). It covers



about 500 square feet, along the nose and leading edge of the wings. The carbon-carbon is all an all-carbon composite made up from layers of graphite cloth.

Altogether the insulation materials (RCC, HRSI, LRSI and FRSI) weigh approximately 20,000 lbs. The Orbiter, which is 122 feet in length, weighs, without fuel and payload, 150,000 lbs at liftoff.

The successful completion of this NASA test program along with Lockheed's effort has lead to the implementation of the new RCG coating for the Orbiter HRSI thermal protection application.

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# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Robert V. Gordon

For Release:

May 18, 1976

RELEASE NO: 76-36

ALSO RELEASED AT NASA HEADQUARTERS

SPACE SHUTTLE LANDING SYSTEM COMPONENTS DELIVERED TO NASA

The first ground-based components of the Space Shuttle Microwave Scanning Beam Landing System (MSBLS) have been shipped from Cutler Hammer's AIL Division, Dear Park, NY.

This equipment, in conjunction with other components installed in the Shuttle orbiter (also designed and built by AIL), will provide data during the final approach and landing phase of every Shuttle mission to precisely guide the orbiter to a safe landing on the runway.

The MSBLS ground-based equipment will be installed on a runway at NASA's Dryden Flight Research Center, California, where initial flight tests of the Space Shuttle orbiter are scheduled to begin in mid-1977. At that time, the orbiter will be carried aloft to an altitude of about 7,620 meters (25,000 feet) atop a specially modified 747 aircraft and will be released with the crew flying the orbiter to the ground.

A second MSBLS will be installed on the newly constructed runway at the Kennedy Space Center, Florida, where the initial orbital Space Shuttle missions will be launched in 1979. Both locations will be equipped for approach from either direction and each landing system will be fully redundant. A comprehensive monitoring system with automatic switchover is included in each installation, along with an uninterruptible power supply.



RELEASE NO: 76-36

The Shuttle orbiter will descend in a glide which begins at a very steep angle that gradually moderates, or flares, to make the touchdown soft. To fly such a path precisely, the onboard computers actually direct the aircraft through commands to the control surfaces. The computer must know precisely where the aircraft is at every instant throughout the landing. The standard instrument landing system (ILS) electronic beam cannot do this; consequently, a type of electronic beam created by the MSBLS is required. This type of system provides a total field of positions throughout all the possible approach paths the orbiter can take, instead of providing just a single straight path for the vehicle to follow.

The scanning beam feature of this system provides a flat, wide beam that sweeps across the landing sector. Pulses from the ground transmitter carry a code that identifies the exact angle at which the beam is pointing at each instant of its sweep. In the Space Shuttle, a receiver picks up these pulses and decodes them to determine the track on which it is flying.

The computer aboard the Shuttle can compare with great accuracy the exact location of the Shuttle with the desired location. If there is a discrepancy, the flight path is corrected automatically. The MSBLS provides this positional guidance with a degree of accuracy never before available in a landing system.

- end -

# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Milt Reim

For Release:

RELEASE NO: 76-37

June 2, 1976  
2 p.m. CDT

ALSO RELEASED AT NASA HEADQUARTERS

IBM AWARDED SHUTTLE DATA PROCESSING COMPLEX CONTRACT

NASA has selected the IBM Corp., Gaithersburg, Md., for award of a contract to supply the Space Shuttle Data Processing Complex for the Mission Control Center at the Johnson Space Center, Houston, Texas. The estimated cost is approximately \$24 million.

The complex will consist of three computers and their peripheral equipment to be used in the Mission Control Center in support of the Space Shuttle program. The work to be performed includes the design, fabrication, delivery, installation and checkout of the computer complex and associated software.

A cost-plus-award-fee contract with major fixed price elements is contemplated. The term of the contract will be for 44 months.

Control Data Corp., Minneapolis, Minn., also submitted a proposal.

- end -



# News

National Aeronautics and  
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AC 713 483-5111

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Milton Reim

For Release:

June 8, 1976

RELEASE NO: 76-38

SHUTTLE TRAINING AIRCRAFT DELIVERY TO JSC

The first of two Shuttle Training Aircraft (STA) is scheduled to arrive at Ellington AFB on Tuesday, June 8.

The STA is a modified Grumman Gulfstream II twin engine jet aircraft that will be used in crew training to simulate the flight characteristics of the Shuttle Orbiter.

Johnson Space Center personnel will perform a receiving inspection on the aircraft after its arrival. The STA will then be returned late this month to Grumman, Bethpage, N.Y., for installation of an electric aileron trim system. This minor modification to the STA control system will take approximately one week.

The second STA will remain at Bethpage for continuation of the flight test program to insure that the various landing flight modes of the orbiter can be duplicated by the STA.

The remaining flight tests will concentrate on verifying the STA's ability to match the orbiter trajectory during the period from 35,000 feet through touchdown and verifying several recent engineering changes.

Trajectory matching is accomplished by utilizing thrust reverser engines and direct lift control to vary the Gulfstream II aerodynamics to provide flight characteristics similar to the Shuttle orbiter.

The second STA is scheduled for delivery to JSC late in July 1976.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Robert V. Gordon

For Release:

June 9, 1976

RELEASE NO: 76-39

## BUSS TEST FLIGHT SUCCESSFUL

A one ton scientific instruments package which drifted across the central Texas sky for 12 hours gathering information on various stars, including far distant giant and super-giant stars, was described by its U.S. and Dutch designers as the most successful balloon flight of its type ever conducted. It was the culmination of the 3-year international collaboration between the NASA Johnson Space Center, Houston, Texas, and the Space Research Laboratory at Utrecht, the Netherlands.

Dr. Yoji Kondo, astronomer at the Johnson Space Center, and co-principal investigator for the U.S., said the flight of the balloon-borne instruments was the best yet, in this seventh in a series of star studies which began in 1971. The 1,300 pound package of instruments was launched by a football-field-sized helium-filled balloon from the National Center for Atmospheric Research at Palestine, Texas. The Dutch team was lead by Dr. Cees de Jager, an internationally prominent space scientist.

The experiment, Balloon-borne Ultraviolet Stellar Spectrometer (BUSS), was raised to an altitude of 25 miles by the balloon. This altitude is nearly 100 per cent above the Earth's atmosphere and gives the BUSS instruments a clear look at the stars. The balloon floated westward for nine hours at night. Data on 16 separate stars was gathered and radioed to the ground station where Dr. Kondo and his fellow scientists were monitoring the incoming information.

-more-



The entire payload was successfully lowered to the ground by an 85-foot diameter parachute, similar to chutes used on the Apollo command module. The payload, chute and balloon landed at Ranger, Texas, midway between Abilene and Fort Worth and was recovered by NASA engineers who returned it to Houston.

The purpose of these balloon flights is to evaluate the experiment systems for possible use as experiments aboard the Space Shuttle, our nation's next manned spaceflight program scheduled to fly in early 1979.

Dr. Kondo explained the reasons for examining stars using this system. The BUSS package can gather information on spectral variations of a variety of stars and thereby aid scientists in determining their structure and evolution. Dr. Kondo, along with Drs. Roel Hoekstr, Karel vandeer Hucht, and Dutch project manager Theo Kamperman of the Space Research Laboratory, controlled the instruments while they were airborne by ground command.

Information on one star, super-giant 'Deneb', was of particular interest, according to Dr. Kondo. The huge star, in the Cygnus (or Swan) constellation is 1,400 light years away and the light recorded by the BUSS instruments was emitted at a time in history before Anglo-Saxons settled in England.

'Deneb' is so large, Dr. Kondo explained, that if you placed the Sun in its center, the Earth would orbit the Sun totally within the star's outer limits. 'Deneb' is several hundred times larger than the Sun. It is also losing a large amount of matter (more than several quadrillion tons a year), as it burns.

Among the other stars scanned during the nine hour data take were 'Arcturus', giant star in constellation Bootes, super-giant star alpha Scorpii (Antares), alpha Lyrae (Vega) and alpha Virginis (Spica), a very hot star and one of the brightest observed during the flight.

This is the largest amount of star data gathered during the BUSS program, Dr. Kondo said. Previous flights have also been able to obtain information on numerous stars but had only recorded one-fiftieth of the spectral

range covered with the current payload.

The team of U.S. and Dutch scientists, who have returned to the Netherlands, now begin an in-depth analysis of the information. It is anticipated that preparations for another balloon flight, now scheduled for sometime this fall, will be started soon.

Dr. Kondo has high praise for the engineers and technicians of the Lockheed Electronics Co. which furnishes JSC technical and operational support in this program. The NASA engineering manager was David White, Curtis Wells was the Lockheed team leader. The launch balloon was made by Winzen Research, Inc. Sulphur Springs, Texas, and was filled with 20-million cubic feet of helium.

Dr. Thomas H. Morgan and Dr. Jerry L. Modisette, Houston Baptist University are co-investigators with Dr. Kondo in this experiment.

The BUSS instruments are an Echelle spectrograph and an SEC vidicon telescope.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Charles Redmond

For Release:  
June 11, 1976

RELEASE NO: 76-40

JSC TO CONVERT TO SURFACE WATER

Officials of the Johnson Space Center will join representatives of the Clear Lake City Water Authority and the town of Nassau Bay on June 15, in ceremonies marking the conversion of the three neighboring areas from well-water to surface water.

Under an agreement with the Clear Lake City Water Authority, JSC will switch off its water pumps, which have been drawing about 700,000 gallons of water daily from the ground, and begin using surface water furnished by the City of Houston and the CLCWA.

For the past decade the land area on the west side of Galveston Bay including substantial sections of the Houston Ship Channel have been subsiding at a rate up to three inches a year. Robert Gabrysch, US Geological Survey in Houston, and other local authorities have directly linked the subsidence with the withdrawal of drinking and utility water from the ground.

The conversion of the space center and the surrounding residential neighborhoods represents a first step in an area-wide effort to curtail the subsidence. The space center's water use is a fraction of the Houston metropolitan area use, presently upward to 600 million gallons a day.

- more -



Prior to 1954 nearly all water supplies for the Houston region were obtained from subsurface water. Approximately 350 million gallons a day were pumped from the ground in 1954. Ten years later this had increased to 411 million gallons. Current estimates reflect the 600 million gallon per day figure.

The USGS reported recently that subsidence in the Pasadena area measured 3.5 feet from 1964 through 1973. USGS figures for the Clear Lake City/NASA area show a subsidence of 2 feet from 1964 through 1973.

Since establishment of the space center in 1962, water for operations and maintenance has been furnished by three pumps. Daily JSC consumption has been between 600,000 and 800,000 gallons per day.

USGS and JSC geologists have shown that the degree of land subsidence is directly related to the volume of water pumped from beneath the surface. There is also evidence that each water well has a zone of influence toward subsidence which in turn contributes to localized subsiding.

Numerous surface faults in the area of the space center are currently active, as indicated by vertical displacement of roadways and structures at and near Ellington Air Force Base. A study recently concluded by NASA geologists indicates these fault lines have been activated or accelerated by the continuing decline of fluid pressures caused by withdrawal of both water and crude oil.

NASA management has worked for several years with the USGS to document the local subsidence and to correlate the subsidence with subsurface water withdrawal. JSC, however, could not consider conversion to surface water until a 42-inch water main was constructed under authority of the City of Houston.

Two years ago negotiations were begun with the Clear Lake City Water Authority for JSC purchase of surface water obtained through the Houston City main. A 10 year contract has been signed and contract terms call for the CLCWA to furnish surface water to JSC at established industrial water rates.

A Houston-Galveston subsidence panel is working to obtain similar agreements from other Galveston Bay Area subsurface water users.

The treated surface water will be relayed to the Clear Lake vicinity from the City of Houston 42-inch main which runs along the Old Galveston Road (Texas Highway 3). NASA, Nassau Bay, and the CLCWA shared the cost of installing a 24-inch line from Highway 3 to the CLCWA plant in Clear Lake, a distance of about 6,800 feet. NASA has absorbed the cost of the 18-inch water main from the CLCWA plant to the JSC water plant, a distance of another 6,400 feet.

In addition, JSC has constructed a 600,000 gallon storage tank adjacent to the center's existing one million gallon tank. Clear Lake City, Nassau Bay and the space center collectively use about 4 million gallons of water daily.

The three JSC wells will be maintained and placed on stand-by status for emergency use only in the event of a water-main interruption.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Robert V. Gordon

For Release:

June 11, 1976

RELEASE NO: 76-41

NASA NEGOTIATES SHUTTLE ORBITER SUPPLEMENTAL AGREEMENT

NASA has negotiated Supplemental Agreement No. 89 to the Basic Shuttle Orbiter Contract (NAS9-14000) with Rockwell International, Space Division. The value of the procurement action is \$3,676,500.

The five products involved are long lead time/economic buy actions to furnish hardware and materials for the production orbiter.

The items are glass window panes from Corning Glass Works at Corning, N.Y.; American Enka Rayon Yarn for LTV and green silicon carbide from Carborundum Corporation for LTV, both of these items are for the leading edge structural subsystem, with work performed at Dallas, Texas; remote power controllers from Westinghouse, with work performed at Lima, Ohio and event indicators from Weston Instruments with work at Newark, N.J.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Charles Redmond

For Release:

RELEASE NO : 76-42

June 18, 1976

## JSC Vacuum Chamber to Restore Flood-Damaged Records

The Johnson Space Center will use one of its space environment simulation chambers to dry irreplaceable records and documents damaged in Houston's flood, June 15.

The first batch of records will be dried at noon tomorrow in the vacuum chamber. It consists of medical records from Methodist Hospital and valuable, irreplaceable books from the Contemporary Arts Museum as well as Museum records.

James C. McLane, Jr., Space Environment Test Division Chief, said the material would be placed on heated shelves inside the chamber. The shelves will be heated to 120 degrees Fahrenheit and the chamber pumped to a vacuum. The process will take anywhere from 48 to 72 hours, according to McLane. The first batch of records may be dried by as early as Tuesday.

This technique was pioneered by the McDonnell Douglas Aircraft Corporation for a similar project for the U.S. Air Force when records in St. Louis were water-damaged in a fire.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Charles Redmond  
RELEASE NO: 76-43

For Release:  
June 30, 1976

VACUUM CHAMBER DRYING TECHNIQUE SUCCESSFUL FOR FLOOD-DAMAGED  
RECORDS

Administrative records from the Methodist Hospital and some rare art books from the Contemporary Arts Museum have been successfully restored in one of the Johnson Space Center's large vacuum testing chambers.

The records and books were damaged when flood waters inundated the basements of the Methodist Hospital and the CAM during the heavy downpour in Houston on June 15 and 16. The space center volunteered the use of the vacuum chamber to dry records which would have otherwise mildewed.

JSC is presently drying material from St. Joseph's Hospital and the University of Houston Law Library. The technique of using a vacuum chamber to dry water-damaged material was first used by the McDonnell Aircraft Corporation and later by the General Electric Company. The Johnson Space Center now joins a rather unique list of high-technology institutions which have used space environment simulation chambers for the restoration of valuable documents.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Jack Riley

For Release:

RELEASE NO : 76-44

A.M. July 8, 1976

ALSO RELEASED AT NASA HEADQUARTERS

## NASA TO RECRUIT SPACE SHUTTLE ASTRONAUTS

NASA issued a call today for Space Shuttle astronaut candidates. Applications will be accepted until June 30, 1977, and all applicants will be informed of selection by December 1977.

At least 15 pilot candidates and 15 mission specialist candidates will be selected to report to the Lyndon B. Johnson Space Center, Houston, Texas, on July 1, 1978, for two years of training and evaluation. Final selection as an astronaut will depend on satisfactory completion of the evaluation period.

NASA is committed to an affirmative action program with a goal of having qualified minorities and women among the newly selected astronaut candidates. Therefore, minority and women candidates are encouraged to apply.

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Pilot applicants must have a bachelor's degree from an accredited institution in engineering, physical science or mathematics or have completed all requirements for a degree by Dec. 31, 1977. An advanced degree or equivalent experience is desired. They must have at least 1,000 hours first pilot time, with 2,000 or more desirable. High performance jet aircraft and flight test experience is highly desirable. They must pass a NASA Class 1 space flight physical. Height between 64 and 76 inches is desired.

Applicants for mission specialist candidate positions are not required to be pilots. Educational qualifications are the same as for pilot applicants except that biological science degrees are included. Mission specialist applicants must be able to pass a NASA Class 2 space flight physical. Height between 60 and 76 inches is desired.

Pay for civilian candidates will be based on the Federal Government's General Schedule pay scale from grades GS-7 through GS-15, with approximate salaries from \$11,000 to \$34,000 per year. Candidates will be compensated based on individual academic achievements and experience. Other benefits include vacation and sick leave and participation in the Federal Government retirement, group health and life insurance plans.



Civilian applicants may obtain a packet of application material from JSC. Requests should be mailed to either Astronaut (Mission Specialist) Candidate Program or Astronaut (Pilot) Candidate Program, Code AHX, NASA Johnson Space Center, Houston, Texas 77058.

Military personnel should apply through their respective military departments using procedures which will be disseminated later this year by DOD. Military candidates will be assigned to JSC but will remain in active military status for pay, benefits, leave and other military matters.

Currently, 31 persons are available as Space Shuttle crewmen, including nine scientists. Twenty-eight of them are astronauts assigned to the Johnson Space Center and three hold government positions in Washington, D.C.

The Space Shuttle is a reusable vehicle that will replace virtually all of this nation's space launch vehicles. Shuttle missions could include deploying and retrieving satellites, servicing satellites in orbit, operating laboratories for astronomy, Earth sciences, space processing and manufacturing, and developing and servicing a permanent space station.

Launched like a rocket, the Shuttle will perform Earth orbital missions of up to 30 days, then land like an airplane and be refurbished for another mission. Pilot astronauts will control the Shuttle during launch, orbital maneuvers and landings and be responsible for maintaining vehicle systems. Mission specialist astronauts will be responsible for the coordination of overall orbiter operations in the areas of flight planning, consumables usage and other activities affecting payload operations. At the discretion of the payload sponsor, the mission specialist may assist in the management of payload operations, and may, in specific cases, serve as the payload specialist. They will be able to continue in their chosen fields of research and to propose, develop and conduct experiments.

Crews could consist of as many as seven people -- commander, pilot, mission specialist and up to four payload specialists, who need not be NASA employees and who will be nominated by the sponsors of the payload being flown. Payload specialists will operate specific payload equipment where their special skills are needed.

Potential users of the Space Shuttle include government agencies and private industries from the United States and abroad.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Robert Gordon

For Release:

RELEASE NO: 76-45

Immediate

HOLT CUSTODIAL SERVICES CONTRACT

Klate Holt Company of Houston, has been awarded a one-year \$1.5 million contract extension for custodial support services at the NASA Johnson Space Center .

The cost-plus-award-fee contract was originally awarded to Holt in July 1975. This extension is through June 30, 1977. The contractor employs approximately 160 persons who furnish custodial services in the 82 buildings at the space center and 16 buildings which JSC elements occupy at nearby Ellington Air Force Base.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Robert Gordon

RELEASE NO: 76-46

For Release:  
2:00 pm CDT  
July 16, 1976

ALSO RELEASED AT NASA HEADQUARTERS

## HAMILTON STANDARD SELECTED FOR NEGOTIATIONS ON EMU CONTRACT

NASA has selected Hamilton Standard Division of United Technologies, Inc., of Windsor Locks, Conn., for negotiations that will lead to the award of a contract for development and production of space suits to be used by men and women during Space Shuttle flights.

The contractor's proposed cost of the basic cost plus award fee contract is about \$15 million through September 1980.

The suit, will provide Space Shuttle crew members protection and life support while they work outside the Shuttle in Earth orbit. The suit will feature an "adjustable fit" concept instead of being custom made for individual astronauts as in earlier programs.

- more -



Under terms of the contract to be negotiated, Hamilton Standard will provide hardware and necessary spares to assemble seven suits and supporting equipment. The contract also will call for training, manpower and equipment necessary to support the program at various NASA field centers.

There are two options in the contract each of which will permit NASA to obtain six additional suits and supporting equipment.

The suits will be manufactured in small, medium and large sizes. In a recent announcement NASA said it was seeking applicants for the Shuttle astronaut program and noted that candidates may vary in height from five feet to six feet four inches.

The suit system consists of the basic suit and a support system which includes breathing atmosphere and cooling components. The life support backpack will be an integral part of the suit.

The Garrett Corp., AiResearch Manufacturing Co., of Torrance, California, was the other bidder.

Technical direction of the contract will be performed by the NASA Johnson Space Center, Houston, Texas.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Milton Reim

For Release:

RELEASE NO: 76-47

July 26, 1976

SHUTTLE MISSION SIMULATOR COMPUTER COMPLEX ACCEPTED AT JSC

A milestone in preparations for the Space Shuttle program was reached today with the acceptance of the Univac 1100/46 Computer System, a sophisticated computer complex that will drive the Shuttle Mission Simulators.

"Prior to acceptance, thirty-days of round-the-clock testing was conducted here at the NASA Johnson Space Center and the computer complex operationally demonstrated reliability far in excess of contractual requirements," said Dr. Bruce B. Johnson, technical manager of the contract.

Completed three weeks ahead of schedule by the Sperry Rand Corp., Sperry Univac, the Univac 1100/46 consists of ten processors, making it one of the most powerful digital computers built to date. It has 900,000 36-bit words of main memory and two billion characters of mass storage. Its speed is measured in MOPS (millions of operations per second), having demonstrated 2.14 MOPS with some unmeasured reserve.

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Center Director, Dr. Christopher C. Kraft, Jr., was present for the acceptance ceremonies of the Shuttle Mission Simulator Computer Complex, and presented group achievement awards to the Sperry Univac and NASA Project Teams for a job well done.

Following acceptance the Univac 1100/46 was turned over to Singer, Simulation Products Division for software development and integration into the Shuttle Mission Simulators.

The simulators will be used to train flight crews and ground personnel in all phases of the Space Shuttle program.

The computer, a multipurpose processing system, will simulate a wide range of mission situations associated with major flight phases including: pre-launch, ascent, aborts, orbit rendezvous, docking, payload handling, undocking, de-orbit, entry, landing and rollout on the runway.

In March 1978, the SMS will begin supporting all flight phases and modes of operation including operating in an integrated mode with the Mission Control Center. The first orbital flight of the Shuttle is scheduled for the spring of 1979.

The unique procurement for the computer complex devised by JSC personnel included a fixed price, standard form contract, with selection based on the lowest cost for the life of the system and performance oriented specifications. Total cost of the contract is \$7,934,876.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Robert Gordon

For Release:

Release No: 76-48

July 27, 1976

ALSO RELEASED AT NASA HEADQUARTERS

SIMULATION COMPLEX SUPPORT CONTRACT AWARDED

The National Aeronautics and Space Administration has selected The Singer Co. Simulations Products Division of Binghamton, N.Y., for award of a contract for maintenance, modification, and operational support of the Lyndon B. Johnson Space Center Simulation Complex at Houston, TX.

The Simulation Complex will initially consist of the Shuttle Procedures Simulator (SPS) and the Crew Procedures Evaluation Simulator (CPES). The Orbiter Aeroflight Simulator (OAS) will be added early in the contract followed by the Shuttle Mission Simulator (SMS). These simulators will be used for flight crew training for the Space Shuttle program.

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The estimated cost for the initial 2-year cost plus award fee contract is approximately \$6.5 million. Two additional, optional performance periods of 24 and 6 months, respectively, are also contemplated.

The work to be performed includes systems and hardware engineering, software development, drafting and illustration, configuration control, and installation and testing of modifications to update simulation equipment to configurations compatible with NASA requirements. Also required is the maintenance, servicing, and operational support of the equipment, plus other miscellaneous tasks such as documentation and logistics support.

Negotiations also were held with the McDonnell Douglas Corp., Technical Services, Co., Inc., St. Louis, MO.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Charles Redmond

For Release:

RELEASE NO: 76-49

August 4, 1976

## SUPPLEMENTAL AGREEMENT SIGNED WITH LOCKHEED

The Johnson Space Center, Houston, has signed a supplemental agreement with Lockheed Electronics Company, Inc., Houston, for additional support at the Slidell Computer Complex, Earth Resources Laboratory, in Slidell, Louisiana.

The additional contract agreement is for \$2.57 million and brings the total value of the contract to \$7.1 million.

The contract provides for scientific and technical support at the Earth Resources Laboratory.

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NASA-JSC

# NASA News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Charles Redmond

For Release:

RELEASE NO: 76-50

September 2, 1976

## SPACE TECHNOLOGY APPLIED TO FISHERIES RESEARCH

A team of fishermen, engineers, physicists, oceanographers, biologists and computer specialists has "found" fish with a satellite in a unique experiment off the Louisiana coast. This exercise represents the culmination of a larger effort -- the Landsat Menhaden and Thread Herring Investigation -- which began last year.

Investigating the feasibility of using satellite data for assessing fisheries resources in the northern Gulf of Mexico, and thereby enhancing management of them, has been a cooperative industry-Federal Government project. Working together have been personnel from the Earth Resources Laboratory of the National Aeronautics and Space Administration (NASA), and Southeast Fisheries Center of the National Marine Fisheries Service (NMFS), and boats, planes, and their crews from member companies of the National Fish Meal and Oil Association (NFMOA).

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Their work has shown that there are relationships between the distribution of menhaden and water turbidity--which the Landsat sensor measures as water color. From the water colorations sensed by Landsat, scientists can infer the probable presence or absence of menhaden. The satellite cannot sense, or "see" fish directly. Menhaden vessels, fishing under the direction of their spotter pilots, confirmed the presence of menhaden in most, though not all, of the high probability concentration areas predicted by analysis of Landsat data, while special navigation systems plotted the location of the fish precisely in areas where they were predicted.

Thus they validated a technique for locating fish concentrations from space which may lead to a greatly improved understanding of coastal fishery ecology and to better methods for resource assessment.

The analysis of Landsat data in near "realtime" began when Landsat I passed over the selected study area in the late morning hours of July 19, 1976, sending electromagnetic multispectral scanner data to a receiving station at the Goddard Space Flight Center in Greenbelt, Maryland. At the receiving station, NASA, NMFS, and NFMOA investigators reviewed the data prior to storing it on four large magnetic tapes. The tapes were then hand-carried to the NASA Earth Resources Laboratory in Slidell, Louisiana, where another team of scientists further processed the satellite's information, geographically referenced it, and analyzed it for high probability

menhaden areas. At approximately 7:15 am on July 20th, less than 21 hours after the satellite began viewing the study area, the first telephone calls were made to inform spotter pilots and vessel captains of the probable locations for menhaden so that they could compare and check their vessel findings with the scientific predictions as an experimental control. Early reports from the fishing industry indicate that the satellite did its job well.

While the test was a success, considerably more work will be required before an operational satellite system can be made available for application to fishery problems. At best, three to five years must pass before such a system could become operational. Other coastal, and perhaps oceanic, species will have to be considered and additional investigations may be required. Special computer programs and facilities will have to be developed. The concept, however, has been demonstrated and that should make future efforts easier.

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# NASA News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Robert V. Gordon

For Release:

RELEASE NO: 76-51

August 12, 1976

Also Released at NASA Headquarters

NOTE TO EDITORS:

SPACE SHUTTLE ROLL-OUT SET FOR SEPTEMBER 17

Roll-out of the first Space Shuttle Orbiter will occur on Sept. 17, 1976, at the NASA/Rockwell International Space Division facility, Palmdale, Calif.

A ceremony to mark this milestone in the nation's future Space Transportation System will take place at 9:30 a.m. PDT. Media representatives are invited to attend.

Press facilities will be available on site for radio, television and print coverage. Formal application for accreditation is not necessary, however, newsmen planning to attend are asked to notify Bob Gordon by letter (Code AP3, Johnson Space Center, Houston, Tex. 77058) or telephone 713/483-5111. Access badges will be issued at the News Center Building 743, upon presentation of credentials.

The News Center will open Sept. 16, one day prior to the roll-out.



NASA-JSC

# NASA News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Terry White

RELEASE NO: 76-52

For Release:  
August 31, 1976  
2 pm CDT

## JSC NEGOTIATES WITH MASON-REGUARD FOR PROTECTIVE SERVICES CONTRACT

The NASA Lyndon B. Johnson Space Center, Houston, has selected Mason-Reguard of Lexington, Kentucky for negotiations leading to award of a cost-plus-award-fee contract for protective support services at the Center.

Included in protective services are security, police services, operation of fire department, safety/fire engineering, and emergency ambulance service. Mason-Reguard's proposed cost and fee for providing these services for the period October 1 1976 through September 30, 1977 is approximately \$1,837,000.

NASA has the option to extend the contract at the end of the first year for two more one year periods.

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NASA-JSC

# NASA News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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For Release  
September 2, 1976

RELEASE NO: 76-53

NASA AEROSPACE EDUCATION PROGRAM AT \_\_\_\_\_

\_\_\_\_\_ will host the National Aeronautics and Space Administration's lecture-demonstration program, which will be conducted by Mr. John R. Donaldson. Mr. Donaldson is a faculty member of California State University, representing Johnson Space Center, Houston, Texas. He is serving as an Aerospace Education Specialist for NASA.

Mr. Donaldson received his Bachelor of Science degree from Central State University, Edmond, Oklahoma, and his Master's degree from the State University of New York at Buffalo. He has done graduate work at the University of New Mexico, New Mexico Highlands University, Oklahoma State University, and the University of Texas at San Antonio. He has taught science and done guidance work in the public schools for twelve years. For six years he was Science Consultant for McGraw-Hill Publishing Company, where he worked with schools with many of the new curriculum projects.

- more -





The Aerospace Education Services Project is a lecture-demonstration program designed to acquaint the educational community and the general public with the role of the National Aeronautics and Space Administration in the exploration of air and space.

The lecture-demonstrations are conducted by Aerospace Education Specialists, who are teachers authoritatively informed on the space sciences and the activities of NASA. They present assembly programs and work in the classroom with the teachers and students.

A typical assembly program lasts approximately 50 minutes and includes discussions and demonstrations of aeronautics, rocketry, propulsion systems, satellites, probes, orbits, human factors, communications and manned space flight.

The programs are presented without charge to the requesting school or organization.

Following the auditorium program, the lecturer is available for classroom visits for further indepth discussions of space topics directly related to specific disciplines or to the special interests of the students.

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# NASA News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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For Release  
September 2, 1976

RELESSE NO: 76-54

NASA AEROSPACE EDUCATION PROGRAM AT \_\_\_\_\_

\_\_\_\_\_ will host the National Aeronautics and Space Administration's lecture-demonstration program, which will be conducted by Mr. George Johnson. He is a faculty member of California State University and is serving as an Aerospace Education Specialist for NASA.

Mr. Johnson received his Bachelor of Science degree from the University of Southern Colorado, has taught science in public schools for five years, and is a former faculty member at Oklahoma State University. He is a private pilot, and a member of the Civil Air Patrol, Aircraft Owners and Pilots Association, National Pilots Association, and the National Aerospace Education Association.

- more -



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# NASA News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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For Release  
September 2, 1976

RELEASE NO: 76-55

NASA AEROSPACE EDUCATION PROGRAM AT \_\_\_\_\_

\_\_\_\_\_ will host the National Aeronautics and Space Administration's lecture-demonstration program, which will be conducted by Mr. Fred Kubesch. Mr. Kubesch is a faculty member of California State University, representing Johnson Space Center, Houston, Texas. He is serving as an Aerospace Education Specialist for NASA.

Mr. Kubesch received his Bachelor of Science degree from the University of Houston and his Master's degree in Education from Prairie View A & M University. He has also completed graduate work in geology and oceanography at Texas A & M University. In addition, he has eight years experience as a science teacher and coach in Texas public and parochial school systems.

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The Aerospace Education Services Project is a lecture-demonstration program designed to acquaint the educational community and the general public with the role of the National Aeronautics and Space Administration in the exploration of air and space.

The lecture-demonstrations are conducted by Aerospace Education Specialists, who are teachers authoritatively informed on the space sciences and the activities of NASA. They present assembly programs and work in the classroom with the teachers and students.

A typical assembly program lasts approximately 50 minutes and includes discussions and demonstrations of aeronautics, rocketry, propulsion systems, satellites, probes, orbits, human factors, communications and manned space flight.

The programs are presented without charge to the requesting school or organization.

Following the auditorium program, the lecturer is available for classroom visits for further indepth discussions of space topics directly related to specific disciplines or to the special interests of the students.

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# NASA News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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For Release:  
September 2, 1976

RELEASE NO: 76-56

NASA AEROSPACE EDUCATION PROGRAM AT \_\_\_\_\_

\_\_\_\_\_ will host the National Aeronautics and Space Administration's lecture-demonstration program, which will be conducted by Mr. Thomas J. Hill. Mr. Hill is a faculty member of California State University, representing Johnson Space Center, Houston, Texas. He has served as a Space Science Education Specialist for seven years while on the faculty at Oklahoma State University, in addition to ten years as a science teacher in public schools. He is now serving as an Aerospace Education Specialist for NASA.

Mr. Hill received his Bachelor of Science degree at Sam Houston State University and his Master of Science degree from Oklahoma State University. He also has graduate work in oceanography at Texas A & M University and graduate work in astrophysics, geophysics, and meteorology at the Michigan Institute of Technology.

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- end -

# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

Terry White

RELEASE NO: 76-57

For Release:

September 10, 1976  
2 p.m. CDT

## JSC AWARDS SHOP SUPPORT CONTRACT TO DI-JAY, INC.

The NASA Lyndon B. Johnson Space Center, Houston, Texas, has selected Di-Jay, Inc. of Seabrook, Texas, for negotiation of a contract for central shop support services at the Center.

Di-Jay will be responsible for management, supervision, services and materials to perform support services in aerospace electronic instrument fabrication, precision cleaning, and metal finishing support of the JSC Technical Services Division central shop.

The cost-plus-fixed-fee contract begins October 1, and runs through September 30, 1977, and has an estimated value of \$451,000. Di-Jay will employ about 24 people for the contract.

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NASA-JSC



# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Milton Reim

For Release:

RELEASE NO: 76-58

September 15, 1976

SECOND OF TWO SHUTTLE TRAINING AIRCRAFT DELIVERED TO JSC

The second of two Shuttle Training Aircraft (STA) was delivered to the NASA Johnson Space Center today. The first STA was delivered to JSC on June 8, 1976. The aircraft will be used in training pilots for the United States newest space transportation system, the Space Shuttle.

The modified Grumman Gulfstream II twin engine jet aircraft was flown to Ellington Air Force Base from the Grumman plant in New York.

The STA aircraft will simulate Shuttle Orbiter handling qualities, performance characteristics, and flight control procedures during the subsonic atmospheric flight phase from 35,000 feet altitude to simulated Orbiter touchdown.

This flight profile is accomplished through the independent control of six-degrees of freedom, effected with the use of normal Gulfstream II



control surfaces as well as auxiliary direct lift, side force control surfaces, and in-flight reverse thrust. The motions of these surfaces are commanded by an airborne digital computer with a model-following technique.

To do this, the full six-degree of freedom Orbiter equations of motion are mechanized within the airborne digital computer. The STA responses to the simulation pilot commands are compared with those of the Orbiter, and the STA control surfaces are driven to eliminate response differences. The STA is consequently forced to follow the Orbiter model.

The simulation pilot occupies the left side of the STA cockpit, which incorporates Orbiter flight instruments and controls. An instructor pilot occupies the right-hand seat, which is equipped with standard Gulfstream II controls and instruments. The simulation pilot will normally have control of the STA during training exercises, but the instructor pilot can assume STA control at any time by depressing a single disengage switch.

The third member of the crew for the STA training flights is the flight simulation engineer. He sits in a jump seat behind the two pilots

where he operates the simulation computer and assists the instructor pilot.

Training of the crews for the Approach and Landing Test flights of the Shuttle Orbiter is scheduled to begin late in October.

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# NASA News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Terry White

For Release:

RELEASE NO: 76-59

September 21, 1976  
2 p.m. CDT

## NASA JSC MODIFIES CONTRACT WITH IBM

The NASA Lyndon B. Johnson Space Center, Houston, Texas, has modified a contract with International Business Machines Corporation, Gaithersburg, Maryland, to cover software for ground-based computing and data processing systems at the Center.

Modification of the cost-plus-award-fee contract with IBM brings the contract value to \$19,463,000. IBM will develop computer programs for vehicle mission management and flight operations for the Space Shuttle Program and related scientific and medical operations.

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# NASA News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

Milton Reim

RELEASE NO: 76-60

For Release:

September 22, 1976  
2 p. m. CDT

## MCC SUPPORT CONTRACT SIGNED WITH AERONUTRONIC FORD

The National Aeronautics and Space Administration has signed a contract with Aeronutronic Ford Corporation for support services for Mission Control Center (MCC) and various other ground based data systems managed by the Johnson Space Center (JSC) at Houston, Texas.

Work to be performed consists of ground data hardware and software systems engineering, implementation, maintenance and operations. Other functions under the contract will include logistics, reliability and quality assurance for MCC and other JSC managed ground based data systems.

Aeronutronic Ford will perform the majority of the work at the Houston, Texas, location with support from its facilities at Willow Grove, Pennsylvania.

Contract NAS9-15014 is a cost-plus-award-fee contract. The contract effort is valued at about \$46,550,000 with the period of performance from July 1, 1976 through September 30, 1978.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Terry White

For Release:

RELEASE NO: 76-61

September 24, 1976  
2 p.m. CDT

NASA NEGOTIATES WITH HAMILTON STANDARD FOR SHUTTLE OXYGEN SYSTEM CONTRACT

The NASA Johnson Space Center, Houston, Texas, has selected Hamilton Standard Division of United Technologies Corporation, Windsor Locks, Connecticut, for negotiations that will lead to award of a contract for development and production of a portable oxygen system for Space Shuttle crew and passengers.

The system consists of a face mask, rebreather loop, heat exchanger, oxygen bottle and recharge kit and will be capable of independent operation or connected to the Shuttle oxygen system. The portable oxygen system will meet four special Shuttle needs: emergency oxygen in case of cabin atmosphere contamination, prebreathing before spacewalks for denitrogenizing crewmen's circulatory systems, life support during rescue operations, and emergency oxygen after landing if the atmosphere around Shuttle Orbiter is contaminated.

- more -



Hamilton Standard's proposal is for a cost-plus-fixed-fee contract of approximately \$1.9 million. The contract will run from November 13, 1976, to July 13, 1979.

Under provisions of the proposed contract, Hamilton Standard will deliver ten oxygen supply units and 50 recharge kits for NASA certification, training and flight use as well as provide ground support equipment and manpower. The contract will also contain options for 62 additional units and 310 recharge kits.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Charles Redmond

For Release:

RELEASE NO: 76-62

October 8, 1976

SPACE CONSTRUCTION METHODS STUDY

The Johnson Space Center, Houston, has awarded a contract to the Martin Marietta Aerospace Company, Denver, Colorado, for a study of the equipment required to support construction of a Solar Power Satellite (SPS) in geosynchronous orbit in the time frame around 1990.

The \$96,200 nine-month contract calls for a conceptual design and system definition of the equipment to support orbital construction of large space systems. In addition, the study will determine the development and maintenance costs of the equipment.

The study will assume that construction of an operational power satellite will begin in 1995, and be supported by a construction base in orbit. The study will also assume technology available in 1980, and may draw upon technology assumed to be available in 1990. It will assume use of the Space Shuttle.





# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Robert T. White

For Release:

RELEASE NO: 76-63

October 13, 1976  
1:00 pm CDT

## NASA-JSC PICKS ALPHA FOR CONSTRUCTION CONTRACT NEGOTIATIONS

Alpha Building Corporation of Houston has been selected for negotiations leading to the award of a cost-plus-award-fee contract for Construction Support Services at the Lyndon B. Johnson Space Center, Houston, Texas.

The services include minor construction and alteration of laboratory systems, facilities, utilities, roads, sewers, walks, and other site work as required by space program requirements and shall normally be for projects estimated at \$10,000 or less.

Proposed cost and fee for providing these services for the period beginning December 1, 1976, and ending November 30, 1977, is approximately \$1,369,000.

At the end of the first contract year, the Government has the option to extend the contract for two additional 1-year periods.

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NASA-JSC

# NASA News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Terry White

For Release

October 19, 1976

RELEASE NO: 76-64

## SCOUTS HOLD SPACE-ARAMA CAMPOUT AT JSC

More than 300 Bay-area Boy Scouts are expected to pitch their tents at the NASA Johnson Space Center Friday, October 22, 1976, to begin a three-day Bayshore District Space-Arama. The campsite will be in a wooded area near the northeast edge of the Center.

In addition to Scout competitions, demonstrations and displays, the Scouts will visit a full-scale mockup of the Space Shuttle in the Mockup Trainer Development Laboratory as well as making a tour of other areas of the Center.

Home-built spacecraft, built by Scout patrols and troops, will compete in Sunday morning's Great Space Race just prior to the closing ceremony and striking camp. Winners of the Great Space Race will be the guests of Astroworld in November.

For further information, call Mike Hazelrigs at (office) 713-333-6401, or (home) 713-333-3529.

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NASA-JSC

# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Terry White

For Release:  
October 19, 1976

RELEASE NO: 76-65

## NASA GATHERS DATA FOR SETTING FEMALE ASTRONAUT CRITERIA

Physicians at the NASA Johnson Space Center in Houston are gathering baseline data on female physiological performance and tolerance limits as an aid in setting criteria for recruiting the agency's first women astronauts.

JSC cardiologist Dr. R. L. Johnson of the Cardiopulmonary Laboratory is seeking answers to whether women respond differently from men of comparable age to treadmill exercise and to circulatory system stresses induced by decreased lower body pressure. Women employees at the Center are being asked to volunteer for testing on a treadmill and in a Lower Body Negative Pressure (LBNP) device to provide some baseline data on women.

"We expect to use both of these tests in the selection of pilots and mission specialists in the Shuttle Program," Johnson said. "Although the tests have been conducted with many male subjects in the past, there is little information on how women respond to treadmill exercise," he said.

By testing representative groups of female volunteers, the Cardio-



pulmonary Laboratory hopes to furnish information to serve as background for some of the selection criteria to be used for women astronaut applicants.

On the treadmill test, speed and tilt of the moving belt is varied while the subject's heart rate and blood pressure are monitored. The LBNP device encases the subject from the waist down. Pressure in the chamber is then reduced and the reaction of the cardiovascular system to pressure changes is observed.

"During the course of these tests, we will obtain electrocardiograms and vectorcardiograms, and perform some non-invasive test that evaluate hearts sounds and mechanical efficiency of the heart," Johnson said. "These provide a good index of cardiac status."

NASA is accepting applications for at least 30 Space Shuttle astronauts - 15 pilot candidates and 15 mission specialist candidates - with a closing date of June 30, 1977. The call for Shuttle astronaut applicants was issued in July 1976. After the June 1977 deadline, selection will be completed by December 1977.

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# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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Robert V. Gordon

For Release:  
October 22, 1976

RELEASE NO: 76-66

JSC FACILITY TO DEVELOP SPACE CARGO HANDLING METHODS

A new laboratory at the NASA Johnson Space Center is currently determining how to apply the use of industrial robot and teleoperator technology to the movement of delicate instruments and cargo in and out of the Shuttle Orbiter, the space transportation system workhorse of the 1980's and 90's.

The recently completed Manipulator Development Facility at JSC incorporates what may be the world's largest remotely controlled manipulator system. A super size of the mechanisms used in industry, the manipulator system has a reach of nearly 50 feet and will be used with other equipment to study problems associated with payload deployment and retrieval in space.

The Space Shuttle, which will become operational in the early 1980's, will carry various payloads, ranging in size from very small to a maximum of 15 feet in diameter and 60 feet long. The Orbiter will launch from Earth like a rocket and land like an aircraft.

-more-



The versatile remote manipulator arm, located in the Orbiter's 60 foot long cargo bay, will be operated by an astronaut who directs the arm with a pair of hand controllers from inside the Orbiter cabin. The astronaut views the operation through a window, and is also aided by a closed circuit television system.

How to move payloads in the weightless environment of space, and how to operate efficiently and safely in space are among the key questions which will be answered by NASA engineers and technicians through the MDF.

In addition to the manipulator arm, the laboratory (Building 9A at JSC) houses high fidelity working models of Orbiter components, including a full scale orbiter forward cabin section, a 15 by 60-foot cargo bay, manipulator operating station, and an 80 by 100-foot air bearing table. Large simulated payloads can be steered by the remote arm as the payloads float over a cushion of air. The overall system is linked by computer and closed circuit television.

Although the immediate objective of the facility is to devise techniques on how to move bulky payloads, such as satellites, in and out of the Orbiter's payload bay, this unique lab may one day become one of the numerous training tools to be used by Shuttle astronauts.

The MDF also will be the proving ground on man's ability to walk like a fly inside the Shuttle Orbiter. It has been a problem for American astronauts, particularly in the Skylab program (1973-74), to be able to hold themselves in one spot without awkward cleats which locked to the grid floor.

Since Shuttle will be a day-to-day work place in space in the 1980's and 90's, it is necessary that astronauts be able to anchor themselves to the flat, smooth interior of the Orbiter and move with ease. Suction cup shoes have been selected as the design solution.

Engineers at NASA have taken a suction cup, commonly used by glass workers, and modified it for use aboard Shuttle. To test this concept, an engineer wearing the suction cup shoes, is strapped (horizontally) in a cage-like apparatus which is placed aboard the air bearing table. Jets of air are forced out the bottom, and the engineer literally floats across the floor.

This method virtually removes any friction of movement and the engineer "walks" along the side of the wall.

The overall operation of the Manipulator Development Facility is under the direction of the Spacecraft Design Division which is headed by Allen J. Louviere.

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# News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
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Charles Redmond

For Release:

RELEASE NO: 76-67

October 21, 1976

## TESTS SEEK CAUSE FOR MOTION SICKNESS

Studies following American and Soviet manned space flights, and studies conducted by Johnson Space Center scientists aboard a zero-gravity training aircraft indicate that zero gravity and hyper gravity affect the nervous system.

Aircraft parabolic flights with subjects strapped on a couch parallel to the flight path have shown that a specific reflex relayed through the spinal column, the Hoffman reflex, is potentiated (heightened) during periods of zero gravity for the duration of the weightlessness. This same reflex is attenuated (reduced) during periods of hyper gravity.

The Hoffman reflex is considered by neurophysiologists as a good reflex for testing the effects of gravity on reflex activity since it is easily monitored, and involves the spinal column for the feedback portion of the nerve loop. In these tests an electrical current is applied to a nerve behind the knee and the response is measured from the calf muscles. The potentiation or attenuation is measured as electrical output from the muscle.

-more-





In addition to this objective testing, subjects are asked a battery of subjective questions following each parabolic flight to determine their instances of motion sickness symptoms.

Results of the aircraft testing are, in part, being evaluated in terms of the reflex variability to determine if different reflex patterns can be related to individual susceptibility to motion sickness.

It is anticipated that these aircraft tests may help predict susceptibility to motion sickness.

However, the study of motion sickness and the attendant studies of postural control are especially difficult because of the large number of separate sensory inputs to the brain. Alterations in vestibular inputs from the semicircular canals and otoliths in the inner ear, visual inputs from the eyes, and position inputs from muscles used for postural control all can contribute to ataxia, or disequilibrium and motion sickness.

The NASA zero-g aircraft tests supplement information gathered on vestibular functions during the three manned Skylab missions in 1973-4 and on previous Apollo flights.

Experiments aboard Skylab revealed a considerable amount of vestibular relearning within the first two weeks of spaceflight. Some crewmembers experienced symptoms equivalent to motion sickness for the first few days of space flight, presumably as a result of adaptive processes in the central nervous system. However, all crewmen became very resistant to motion sickness after about 14 days of spaceflight. Also some crewmen reported slight disorientation when placed in a situation where they

were not upright in a locally defined "up" area of the spacecraft. This was particularly evident during Skylab with the space station's vast areas of living space. There appears to be no correlation between an astronaut's susceptibility to motion sickness on the ground and his susceptibility in space. It is this question concerning susceptibility which the aircraft tests aim to answer.

The theories postulated to explain human balance and posture presently are not well defined. However, there are generally accepted components and these are visual input from the eyes, which define the local vertical environment; the vestibular input from the semicircular canals and otoliths in the inner ear, which sense angular and linear acceleration and the presence or absence of gravity; and muscle sensors which monitor posture. These inputs are interrelated and normally function to maintain the body in a balanced posture. It is believed that ataxia is a response of the brain to unusual information from one or more of the various sensors. Balance itself is reflexive in an earth-normal gravity, that is, we are not conscious of the patterns of body movements which help us to remain upright and walk.

On a moving vehicle many of these inputs to the brain will provide contradictory information and a feeling of discomfort often results. However, motion sickness itself is not an adaptive response and does not improve the situation as, for example, coughing helps eliminate a blockage of the throat. Motion sickness has been experienced by persons without sight but not by persons without vestibular functions intact. It seems then that motion sickness is more directly related to vestibular input, though all of the senses mentioned can contribute to the problem.

Although not much is yet known about the exact interactions among these three sensory systems, it is strongly postulated that the otolith is the receptor affording the most direct gravity information and therefore the source of many of the inputs leading to motion sickness, ataxia or disequilibrium.

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# NASA News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

Milton Reim

RELEASE NO:76-68

For Release:

Upon Receipt

## VIRGINIAN DR. CHRISTOPHER C. KRAFT, JR. AWARDED LEGION OF HONOR

Dr. Christopher C. Kraft, Jr., director of the NASA Lyndon B. Johnson Space Center, Houston, Texas, has been awarded the Insignia of the Knight of the Legion of Honor -- the highest honor given by the French government to a citizen of another country.

Kraft, born in Phoebus, Virginia, and a graduate of Virginia Polytechnic Institute was a member of the original Space Task Group formed at Langley Aeronautical Laboratory in 1958. When the Manned Spacecraft Center was formed, he moved with that group to Houston, in 1962, and became director of the manned space effort in Texas, in 1972.

Kraft received the medal during ceremonies held at noon, Oct. 13, at the Washington, D.C., residence of His Excellency Jacques Kosciusko-Morizet, the French Ambassador to the United States.

- more -



The award was presented in recognition of Kraft's role in the space program and his "tireless efforts toward better understanding and co-operation between the people of the United States and France."

A spokesman for the French Embassy noted that the Legion of Honor is presented only to people of the highest distinction for military bravery or civil achievement.

There are five classes of the Legion of Honor, of which the Insignia of the Knight is one.

Kraft has also been recently notified of his selection as recipient of the National Civil Service League's Career Service Award for 1976.

Bertrand M. Harding, president of the NCSL, said in a letter to Kraft, "The award signals not only the recognition of excellence in the public service, but the contribution of public service itself to the welfare of our nation."

The Career Service Awards are presented annually to ten outstanding career civil servants. This year's ceremony, to be held Nov. 16, at the Smithsonian Institution's Museum of Natural History, will be the 22nd annual Career Service Awards program.

Recipients are traditionally received personally and congratulated by the President in Washington, D.C., at a later date.

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October 22, 1976

# NASA News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Bob Gordon

For Release:

November 4, 1976

RELEASE NO: 76-69

## BOEING SELECTED FOR SOLAR POWER STUDY

The Boeing Aerospace Company today was selected by the National Aeronautics and Space Administration for negotiations that will lead to the award of a contract to study spacebased solar power concepts. Value of the contract is approximately \$970,000, which is jointly funded by the Energy Research and Development Administration and NASA.

The terms of the 12-month, two-phase study, call for Boeing to first derive specific, comprehensive data necessary for NASA on the most effective means of accomplishing solar energy-to-electrical energy conversion on a solar power satellite system and also determine at what location (or locations) in space the various phases of the solar power satellite should be constructed and assembled.

- more -



The second part of the study calls for Boeing to define in more detail the overall solar power satellite system to reduce the uncertainties in the areas of weight and cost estimates. The first phase of the contract is five months in duration and the second phase is seven months long.

The study, along with other related studies conducted by NASA and by outside contractors, will by mid-1978, develop the information necessary to make further assessment of the technical and economic feasibility of the space solar power concept.

The solar power satellite system is envisioned as a means of providing uninterrupted energy beamed to Earth from large satellites in a fixed orbit 22,000 miles above the Earth.

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# NASA News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
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Charles Redmond

For Release:

RELEASE NO: 76-70

Upon Receipt

## NASA SCIENTISTS RELY ON BALLOONS

The Earth's atmosphere is both an object of investigation and a hindrance to investigation. The object of some studies is the ozone layer, a layer of oxygen which shields the Earth from harmful ultraviolet radiation. That ozone layer, however, absorbs almost all of the ultraviolet radiation and cosmic rays which other scientists would like to study.

At the Johnson Space Center in Houston, scientists studying the upper atmosphere -- location of the ozone layer, exotic cosmic rays and particles such as anti-matter -- which are absorbed by the atmosphere, and astronomers testing a new type of ultraviolet telescope, all rely on helium-filled balloons of tremendous size to get their instruments high above the Earth.

- more -





Balloons are used because of certain advantages they hold over other vehicles like airplanes and sounding rockets which also operate in the rarified atmosphere between 30 and 50 kilometers (18 and 31 miles).

Whereas an airplane can carry experiments to high altitudes, it cannot remain stationary for long periods as balloons can. And, the higher the airplane flies, the less payload it can carry. A balloon can carry an extremely heavy payload like 1,800 kilograms (4,000 lbs.) as high as 50 kilometers. Sounding rockets can, of course, fly much higher, but the time they spend in the stratosphere is measured in minutes -- balloon time can be extended to days and weeks.

For these certain advantages NASA uses balloons extensively for a wide range of tests and experiments conducted not only by JSC but other NASA centers as well.

In upper atmospheric studies the Environmental Effects Office at JSC has been using balloons for three years as part of the Space Shuttle stratospheric environmental evaluation and the national examination of the effects on the ozone layer of fluorocarbons (such as Freon) and other gaseous products. The ozone layer is a protective blanket of oxygen which appears to be chemically fragile.

Results of these studies have contributed substantially to the knowledge of the chemical interactions in the upper atmosphere. These results include the first profiles of the concentrations of the gasses chlorine and chlorine oxide and atomic oxygen and hydroxyl radicals at stratospheric altitudes. The National Research Council recently recommended reducing the amount of fluorocarbons released into the air. The

Council recommendations were based in part on information gathered on JSC balloon flights.

The cosmic ray experiments are studying fundamental properties of high energy particles by observing the effects of such phenomena as cosmic rays. The JSC Space Physics Branch has developed a cosmic ray laboratory which is providing new information about high energy particles. The cosmic ray lab and earlier, less sophisticated, payloads have been flown many times to observe particles such as anti-protons and positrons (anti-electrons). These anti-matter particles are thought to exist naturally but their exact quantity is not known. The cosmic ray experiments will help substantiate or alter present theories about cosmic evolution. There are only a handful of laboratories in the world pursuing these studies.

The astronomy observations are part of tests of an ultraviolet telescope being developed by the JSC Space Physics Branch and the Space Sciences Laboratory at Utrecht, the Netherlands. This joint effort has sought to develop a telescope which would look at deep-space objects in the mid-ultraviolet, a range of light which is opaque to ground observation from Earth, but now accessible to observations from extremely high altitudes -- preferably space. The UV telescope is considered a good candidate for early use aboard the Space Shuttle and for possible use aboard the Spacelab flights in the mid-1980's.

The UV telescope is being tested aboard a balloon to allow the telescope to float above 95 percent of the Earth's atmosphere thereby providing astronomers with data almost as high in quality as if it were flown in space.

All of the balloons are launched from Palestine, Texas, by the National Center for Atmospheric Research (NCAR). NCAR (pronounced encar) was established by the National Science Foundation to operate and manage a launch facility for organizations in need of these huge balloons-- sometimes as large as hundreds of feet in circumference.

JSC buys the balloon from an independant manufacturer which makes the plastic envelopes according to the altitude and weight capabilities needed. The payload is also prepared by JSC. Other users of the NCAR facility buy their own balloons and prepare their payloads in much the same manner. Once the balloon and payload are ready, personnel from NCAR do the actual helium filling and launching.

The payloads attached to the balloons are connected to a parachute so that when the experiment or test is completed, sometimes days after launch, the payload can be safely returned to the ground. The balloons are not recovered.

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Editor's Note:

A pictorial essay of the launch and recovery of a typical balloon and payload are available by contacting the Public Information Office, AP3, Johnson Space Center, Houston, Texas 77058.

# News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**

Houston, Texas 77058  
AC 713 483-5111

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John E. Riley

For Release:  
November 11, 1976

RELEASE NO: 76-71

ALSO RELEASED AT NASA HEADQUARTERS

LUNNEY NAMED OFFICE OF SPACE FLIGHT DEPUTY

Glynn S. Lunney has been appointed NASA Deputy Associate Administrator for Space Flight. He replaces Dr. William C. Schneider who is assigned to Goddard Space Flight Center, Greenbelt, Maryland, as Director of Project Management.

In his new post, which he will fill until Dr. Schneider's assignment is completed, Lunney will report to the Associate Administrator for Space Flight, John F. Yardley.

Before assuming his new assignment at NASA Headquarters, Washington, D.C., effective November 9, 1976, Lunney served as Manager, Shuttle Payload Integration and Development Program Office at the Johnson Space Center, Houston, Texas.

Clifford E. Charlesworth will act as Manager of SPIDPO during Lunney's absence, and Charlesworth's replacement in an acting capacity as Manager, Earth Resources Program Office, is his assistant, William E. Rice.



Lunney, a native of Old Forge, Pennsylvania, holds a BS degree in aeronautical engineering from the University of Detroit. His NASA career began at the NASA Lewis Research Center, Cleveland, Ohio in 1958. In 1959, he transferred to the Space Task Group at the NASA Langley Research Center, Hampton, Virginia, and later moved with the Group to Houston. From 1964 to 1968, Lunney served as Chief, Flight Dynamics Branch as well as being a prime Flight Director during the Gemini program. He continued his Flight Director role throughout the Apollo Program, becoming head of the Flight Director's Office in 1969. In 1972, Lunney was named Manager, Apollo Spacecraft Program Office, and Technical Director, Apollo-Soyuz Test Project.

Among Lunney's numerous awards are the NASA Distinguished Service Medal; the NASA Exceptional Service Medal; the Lawrence Sperry Award, 1970; and the Arthur S. Flemming Award, 1974.

Lunney is married and has four children.

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# NASA News

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Charles Redmond

RELEASE NO: 76-72

For Release:

Upon Receipt

## ALTERNATE MARTIAN CHANNEL THEORY PROPOSED

Low viscosity lava, not water, may have caused the large channels on Mars, a scientist at the Johnson Space Center says.

In a paper to be presented at the Meeting of the American Geophysical Union in San Francisco in December, Ernest Schonfeld says the Martian channels could have been formed by a thin, runny, turbulent lava rather than torrents of water proposed by other scientists.

Schonfeld, a lunar scientist working at JSC's Division of Lunar and Planetary Sciences, says the creation of large channels is probably easier to explain with lava than with water. The abundant large channels are one of the most puzzling landforms on Mars. Previous interpretations of Mariner and Viking mission photographs have suggested the channels are remnants of old rivers or floods of water.

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Release no: 76-72

Scientists have not been able to identify the thick sediment deposits that should have resulted if the channels were eroded by water. Viking I landed near the mouth of a very large channel where thick sediment deposits would have been expected. However, the rocks at the Viking I site appear to be volcanic.

Schonfeld proposes that thin, low viscosity basaltic liquid melted beneath the planet's surface and flowed freely to erode the surface channels. The apparent coincidence of the age of the volcanic activity and the Martian channel erosion supports that idea.

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November 24, 1976

# NASA News

National Aeronautics and  
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**Lyndon B. Johnson Space Center**  
Houston, Texas 77058  
AC 713 483-5111

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Terry White

For Release:

December 1, 1976

RELEASE NO: 76-73

## SPACELAB SIMULATION "CREW" UNDERGOES MEDICAL TESTS

Prime and backup payload specialists who will take part in next spring's Life Sciences Spacelab Mission Demonstration (SMDIII) at the NASA Johnson Space Center this week are undergoing the same type of medical examinations that payload operators will have to pass to fly aboard Space Shuttle in the 1980's.

Carter Alexander, PhD, of the Johnson Space Center, Bill A. Williams, PhD, Patricia Cowings, PhD, and Richard E. Grindeland, PhD, of NASA Ames Research Center, Moffett Field (Mountain View), California, are at JSC for a battery of medical tests. The exams are similar to those to be given to persons named to operate scientific experiments to be carried into orbit by Space Shuttle when the vehicle becomes operational in 1980.

Among the tests are electrocardiograms (EKG) and vectorcardiograms made while the subjects exercise on a treadmill and lie in a horizontal tank

- more -





called a lower body negative pressure (LBNP) device. In the treadmill test, speed and grade of the moving belt are varied while the subject's heart rate and blood pressure are monitored. The LBNP device encases the subject from the waist down; pressure in the chamber is then reduced and reaction of the cardiovascular system to pressure changes is observed.

An LBNP device was flown aboard Skylab to simulate the stresses on the cardiovascular system that occurs upon return to Earth's one gravity from zero gravity in orbit. Other more traditional clinical medical measurements will also be performed on the four subjects.

Scheduled for the spring of 1977, the SMDIII will be the third such rehearsal of developmental life sciences experiments that typify those to be flown aboard Spacelab in Shuttle Orbiter's cargo bay. Spacelab is being developed by the European Space Agency (ESA), a consortium of 10 European nations.

Simulation crew selection is separate and distinct from the actual Shuttle pilot, mission specialist and payload specialist selection process. NASA JSC is accepting applications until June 30, 1977, for at least 30 Space Shuttle astronauts--15 pilot candidates and 15 mission specialist candidates. Procedures for selecting payload specialists are yet to be announced.

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# NASA News

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Robert Gordon

For Release:

RELEASE NO: 76-74

December 3, 1976

## ALT 747 MAIDEN FLIGHT

A 747 jetliner, modified for use in the Shuttle Orbiter Approach and Landing Tests, Thursday was test flown at Seattle, Washington, and program officials at the NASA Johnson Space Center described the one hour, 40-minute flight as very successful.

Carl A. Peterson, JSC manager for the 747 project, said he was very pleased with the results of the initial flight which was conducted at the Boeing Aerospace Company facility near Seattle. The 747 was flown by a combined NASA and Boeing flight crew and carried 15 engineers who checked out data acquisition and systems performance.

The 747 will undergo ten more test flights in Seattle before its delivery early next year to the NASA Dryden Flight Center, Edwards, California, where the Shuttle Orbiter flight test program will be conducted.

- more -



The 747 will carry the Orbiter to about 22,000 feet and release the 150,000-pound unpowered spaceplane which will be piloted to a landing at Edwards Air Force Base.

Modifications to the 747, which NASA purchased in June 1974, began earlier this year and include increasing the power of the four engines, adding stabilizer fins to the horizontal tail, installing struts to hold the Orbiter and adding instrumentation and equipment to monitor and analyze flight performance during the Approach and Landing Test program. In addition to the 22 ALT flights the 747 will be used in 265 ferry flights, carrying the Orbiter to and from launch and landing sites.

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# NASA News

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Charles Redmond

For Release:

RELEASE NO: 76-75

Upon Receipt

ALSO RELEASED AT NASA HEADQUARTERS

## U.S. TO STUDY NEW SOVIET MOON SAMPLE

Several grams of moon soil collected last August by an unmanned Soviet spacecraft have been transferred to NASA for analysis by American scientists, the space agency has announced.

A three-member U.S. scientific delegation returned Thursday (Dec. 16) from Moscow, where they examined the two-meter (six-foot)-long core of moon soil collected and brought to Earth by the Luna 24 spacecraft this past August.

The Luna 24 material, from a region of the moon called Mare Crisium (Sea of Crises), will be the third Russian sample obtained by American scientists in exchange for material collected by Apollo astronauts from other places on the moon.

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Although the Luna 24 material is not the first Russian sample to be obtained, its arrival at NASA's Lunar Sample Curatorial Facility in Houston, Tex., will generate excitement among the several hundred scientists who are involved in an active program of lunar sample research.

"The Luna 24 sample is unique in two ways," says Dr. Noel Hinners, NASA Associate Administrator for Space Science. "First, it comes from a region of the Moon from which we have never obtained samples. Even more important is the fact that Luna 24 obtained a complete core down to a depth of two meters (about six feet) so we have a new slice to add to the three deep cores collected by the Apollo Program."

The historical record contained in the Luna 24 core may go back several hundred million years. From studies on the larger, deeper (3 meters or about 10 feet) cores of lunar soil returned by the Apollo 15, 16 and 17 missions, scientists expect that the Luna 24 core will also contain many different soil layers, each one representing the excavation of a small impact crater somewhere on the Moon. Measurements on the Apollo cores have shown that some of these layers were deposited as much as a billion years ago, and each layer preserves traces of exposure to the Sun and cosmic rays during the Moon's past. The Luna 24 core will make it possible to extend this lunar history into a once-unknown part of the Moon.

Study of the Luna 24 sample will test the belief that Mare Crisium is covered by dark-colored lava flows that poured out onto the Moon more than three billion years ago. The sample will also provide essential geological and chemical information to add to the data accumulated from samples collected by the six manned Apollo and two unmanned Luna landings.

An important aspect is the possibility the sample contains particles of the blanket of material thrown out of the huge crater Giordano Bruno, about 1,200 kilometers (745 miles) away, according to Dr. Michael Duke, curator of lunar samples at NASA's Johnson Space Center, Houston. This would be significant since Giordano Bruno crater is on the Moon's far side, an area extensively mapped from orbit but never actually sampled. This sample could contain the first material ever returned that is directly related to a feature on the Moon's far side.

The Luna 24 core may also preserve a potentially exciting record of the past history of the Sun. The soil, formed by meteorite bombardment, has been exposed for millions of years to all the solar and cosmic radiation that strikes the surface of the airless Moon. Trapped in the soil fragments are actual atomic particles blasted out of the Sun millions of years ago. By comparing the Luna 24 core with similar cores returned by the Apollo missions, scientists hope to obtain new information about how the Sun has behaved in the past.

The Luna 24 samples also will provide a test of predictions made by observing the unexplored regions of the Moon through Earth-based telescopes. Scientists who have made spectral studies of the light reflected by lunar samples predict that the Luna 24 material will be a basalt lava with a low titanium content, much like the lavas returned by the Apollo 12 and Luna 16 missions. If these predictions turn out to be correct, scientists can obtain better chemical analyses of the Moon from telescopic observations or from instruments in orbit around the Moon.

The small amount of sample available presents no problems for getting out the necessary scientific information. "The Apollo Program helped develop many methods for getting a lot of information out of very small samples," said Dr. Bevan French, Chief of NASA's Extraterrestrial Materials Research Program. "With the methods now available, we can produce hundreds of chemical analyses from a single tiny crystal or determine the age of rock fragment smaller than an aspirin tablet." Many of these techniques are now being routinely applied to obtain exciting new information from meteorites and terrestrial deep-sea basalt samples, Dr. French said.

The Luna 24 spacecraft was launched from the Soviet Union on Aug. 9 and landed on Mare Crisium on Aug. 18. (Mare Crisium is visible to the unaided eye as a small dark spot on the upper right-hand edge of the Moon.) The robot spacecraft sent a thin, flexible, hollow drill about six feet into the ground, obtaining a complete section of

the lunar soil layers. The drill was then rolled up into a sample container about the size of a basketball. The Luna 24 spacecraft blasted off the Moon on Aug. 19, and the sample chamber landed safely on Aug. 22, in western Siberia. The core is now being studied in the Vernadsky Institute of Geochemistry and Analytical Chemistry in Moscow, the Soviet Union's leading geoscientific center and repository for their lunar samples.

Besides Dr. Duke, members of the American scientific delegation who were in Moscow this week to examine the Luna 24 core are Prof. Gerald J. Wasserburg of the California Institute of Technology and Dr. Charles Simonds of the Lunar Science Institute in Houston.

Russian scientists have been invited to describe their analyses of the Luna 24 samples at the Eighth Annual Lunar Science Conference, to be held in March in Houston. These conferences, which have been held yearly since the first Moon rocks were obtained by the Apollo program in 1969, are a major event in the presentation of lunar and planetary science results.

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The agreement under which the American and Russian lunar samples are exchanged was negotiated between NASA and the U.S.S.R. Academy of Sciences in 1971. Already analyzed by American scientists have been samples from the Russian Luna 16 and Luna 20 probes, which returned material from the Moon in 1970 and 1972. The agreement also provides for the exchange of lunar scientific data between Russian and American scientists and for scientific visits between the two countries. The agreement also provides for the future exchange of lunar samples.

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December 17, 1976

# NASA News

National Aeronautics and  
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Milton E. Reim

For Release:

RELEASE NO: 76-76

Upon Receipt

## NASA EXCEPTIONAL SERVICE MEDAL AWARDED ROBERT C. HOOD

Robert C. Hood, NASA Johnson Space Center employee, was honored recently at the 1976 annual awards ceremony at NASA Headquarters in Washington, D.C.

Hood, Manager, Orbiter Project Control Office at the Johnson Space Center, Houston, Texas, was awarded the NASA Exceptional Service Medal for outstanding managerial leadership and personal dedication to planning and direction of business management activities for the Space Shuttle Orbiter Project.

Hood was a United States Navy Flight Navigator and a project engineer with Western Electric before joining the NASA manned space program in 1962.

- more -



He held various positions of responsibility during the Apollo manned lunar program before assuming his present position.

Hood is a 1956 graduate of the University of Tennessee with a BS degree.

His parents, Mr. & Mrs. J.E. Hood, reside on Route 4, Church Hill, Tennessee 37642.

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December 17, 1976

# NASA News

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Milton E. Reim

For Release:

RELEASE NO: 77-77

Upon Receipt

## PHILIP H. WHITBECK RECEIVES NASA EQUAL EMPLOYMENT OPPORTUNITY AWARD

Philip H. Whitbeck, NASA Johnson Space Center employee, formerly of Stillwater, Minnesota, was honored recently at the 1976 annual awards ceremony at NASA Headquarters, Washington, D.C.

Whitbeck, Director of Administration and Program Support at the Johnson Space Center was awarded the NASA Equal Employment Opportunity Award for outstanding achievements in development and implementation of programs contributing to employment and advancement of talented women and minorities into managerial positions and for work with predominantly minority universities encouraging interest in public administration.

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Whitbeck joined NASA in 1959, and held various positions of responsibility in management during the formative years of the manned space program through the present. He was appointed to his current position in 1971.

He was a member of the Task Group responsible for the transfer of the Von Braun group from the Army to NASA for the development of the Saturn moon rockets.

Whitbeck was a recipient of the NASA Exceptional Service Medal in 1969, for his contribution to the first manned lunar landing of the Apollo program.

He is a 1947 graduate of the University of Minnesota with a BA degree in Political Science.

His mother Mrs. H. J. Whitbeck resides at 1411 North Cornelian Street, Stillwater, Minnesota 55110 and his brother Mr. William J. Whitbeck at 2420 Irving Ave., Minneapolis, Minnesota 55405.

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December 17, 1976

# NASA News

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Milton E. Reim

For Release:

RELEASE NO: 76-78

Upon Receipt

## NASA EXCEPTIONAL SERVICE MEDAL AWARDED JAMES L. NEAL

James L. Neal, NASA Johnson Space Center employee formerly of Laurel, Delaware, was honored recently at the 1976 annual awards ceremony at NASA Headquarters in Washington, D.C.

Neal, Director of Procurement at the Johnson Space Center, Houston, Texas, was awarded the NASA Exceptional Service Medal for outstanding managerial leadership and personal dedication in planning and directing JSC's Procurement Program, contributing to the progress of the Shuttle Program, and success of previous manned space programs.

Neal, since 1951, has held positions with, E.I. Dupont, U.S. Army, Pratt & Whitney Aircraft, U.S. Atomic Energy Commission and in 1961, joined the NASA manned space program.

- more -



He was a procurement officer during the manned lunar program holding various positions of responsibility and in 1974, Neal was appointed Director of Procurement for the Johnson Space Center.

Neal is a 1951 graduate of the University of Delaware with a BS degree in civil engineering.

He is married to the former Barbara Mead Jacobsen and they reside in LaPorte, Texas. They have four children.

The parents of Neal, Mr. & Mrs. Harley F. Neal reside on Route 3, Laurel, Delaware 19956.

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December 17, 1976

# NASA News

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Terry White

RELEASE NO: 76-79

For Release:

December 22, 1976  
2:00 p.m. CST

## JSC EXTENDS LOCKHEED COMPUTING SUPPORT CONTRACT

The NASA Johnson Space Center has signed a contract with Lockheed Electronics Company, Inc. for engineering, scientific and computing center support services at the Houston Center.

Services performed at JSC include computing center support for Space Shuttle, Large Area Crop Inventory Experiment (LACIE), and the Earth Resources Aircraft Program. The cost-plus-award-fee contract is valued at approximately \$29.9 million.

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# NASA News

National Aeronautics and  
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Terry White

For Release:

RELEASE NO: 76-80

December 30, 1976  
12:15 P.M. CST

## JSC EXTENDS BOEING SAFETY, RELIABILITY CONTRACT

The NASA Johnson Space Center has extended for two years a contract with The Boeing Company for safety, reliability and quality assurance engineering support at the Center. Boeing's tasks under the contract involve current and future space vehicle programs, ground support equipment, facilities and payloads including experiments.

The \$11,090,929 extension brings the estimated value of the cost-plus-award-fee contract to \$19,874,827.

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