NASA News

National Aeronautics and
Space Administration

Lewis Research Center
21000 Brookpark Road, Cleveland, Ohio 44135
AC 216 / 433-4000 / Ext. 415

National Aeronautics and
Space Administration
Twenty-fifth Anniversary
1958-1983

85-1

For Release:
IMMEDIATE

Mary Ann Peto
(res: 216/722-5447)

LEWIS AWARDS ATLAS CENTAUR LAUNCH VEHICLE FOLLOW-ON CONTRACT

CLEVELAND, OH -- The NASA Lewis Research Center, Cleveland, Ohio has awarded a $32,346,000 follow-on contract to the Convair Division of General Dynamics Corp., San Diego, California.

Under the contract, Convair will perform the operations to accomplish the erection, test, and launch of the Atlas Centaur launch vehicles. Additionally,the contract will include the modifications to the launch facility to support test and launch of Centaur on Shuttle for the Galileo and Ulysses missions scheduled for 1986.

The cost-plus-award-fee contract, beginning January 1, 1985 and running through December, 1986 is a continuation of work performed under earlier contracts with Convair. Work will be performed at the Eastern Test Range, Florida.

Centaur is a high energy upper stage currently used with expendable boosters to deliver large payloads to geosynchronous orbit. It is expected to add substantially to the Space Shuttle's ability by carrying heavier payloads from low Earth orbit to geosynchronous orbit or interplanetary trajectories.

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(Distribution January 9, 1984)

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For Release:
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Linda S. Ellis
(res: 216/779-1266)

NASA LEWIS TO OPEN REGIONAL TEACHER RESOURCE

ROOM AT UNIVERSITY OF WISCONSIN-LA CROSSE

CLEVELAND, OH -- For some 25,000 educators in Western Wisconsin, Southeast Minnesota, and Northeast Iowa a wealth of free NASA information will soon be within easy reach.

On January 25, 1985, NASA's Lewis Research Center, Cleveland, Ohio, will open and dedicate a new Regional Teacher Resource Room at the University of Wisconsin-LaCrosse.

The new facility will serve as a resource site for elementary through university level teachers and offer selected NASA films, slides and printed materials on this country's aerospace achievements.

Establishment of this center is a part of Operation Liftoff, a NASA educational program, announced by President Reagan in June 1984. Operation Liftoff is designed to encourage pupils in the nation's 76,000 elementary schools to take greater interest in math and science.

Educators may make use of such instructional materials as lesson plans and activities, educational literature, 35 mm slides and audio and video tapes. The only costs are copying charges for slides and educators are asked to provide their own blank audio and video cassettes.

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(Distribution January 15, 1985)

According to Dr. R. Lynn Bondurant, Chief of the Educational Services Office at NASA Lewis, "The Teacher Resource Rooms act as channels of communication between NASA and educators to determine the educators' needs. Information is available on all aspects of aerospace activity, including aeronautics, astronomy, ecology, meteorology, communications, and space exploration."

Some nine years ago the first Teacher Resource Room was established by NASA Lewis at the Lewis Research Center in Cleveland. Demand for educational materials grew rapidly and before long the Lewis-based center alone was handling more than 30,000 items each year for area teachers.

The first Regional Teacher Resource Room was established by Lewis at Oakland University, Rochester, Michigan, in 1983. In 1984 one was established at St. Cloud State University, St. Cloud, Minnesota, and at Mankato State University, Mankato, Minnesota. Plans are underway to open three more Regional Teacher Resource Rooms within the next six months.

"The Regional Teacher Resource Rooms are an excellent way for NASA to expand its educational outreach program to students who would not otherwise have access to these materials," according to Dr. Bondurant.

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For Release:
IMMEDIATE

Linda S. Ellis
(res: 216/749-1266)

BIG-SCREEN TV AT LEWIS WILL CARRY

SHUTTLE CHALLENGER MISSION MARCH 3-7

CLEVELAND, OH -- Launch, landing and in-orbit highlights of orbiter Challenger's seventh flight--Space Shuttle 51-E--will be shown live on the large 16x20-foot television screen at the NASA Lewis Research Center's Visitor Information Center (VIC).

The launch is set for Sunday, March 3 at 8:30 a.m. EST from Kennedy Space Center with landing at Kennedy set for Thursday, March 7 at 9:33 a.m. EST.

The Lewis VIC will open at 7:30 a.m. on March 3, and will remain open approximately one hour after launch. On March 7, the VIC will open at 8:30 a.m. EST.

The seven-member team for this mission includes Karol J. Bobko, commander; Donald E. Williams, pilot; mission specialists Margaret Rhea Seddon, Jeffrey A. Hoffman and S. David Griggs; French payload specialist Patrick Baudry and payload specialist U.S. Senator Jake Garn (R-Utah).

Primary objectives during the planned four-day flight include the deployment of the second Tracking and Data Relay Satellite, TDRS-B, and Telesat Canada's Telesat-I communications spacecraft.

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(Distribution February 21, 1985)

In addition to deploying the two communications satellites, the crew will conduct an educational experiment demonstrating how toys react in the microgravity of space. Among questions to be answered in the experiment are, "Will a yo-yo go up and down in the microgravity of space? Will a spinning top spin? Will a Slinky slink in an orbiting Shuttle?" Operation of ten toys selected by the astronauts will be videotaped and the resulting documentary will be made available to schools throughout the nation in an effort to make science more interesting for students.

Other payloads aboard Challenger include two French experiments. The French Echocardiograph Experiment (FEE) will investigate the cardiovascular system's adaptation to microgravity and the French Postural Experiment (FPE) is designed to provide a better understanding of the adaptation of postural control in microgravity environment.

Should the launch date for 51-E be delayed, the special live showings at Lewis will be reset to match the new mission schedule. For details call the Visitor Information Center at (216) 267-1187.

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For Release:
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John M. Shaw
(res: 216/749-6664)

'GEE WHIZ' LABORATORY EXERCISE DEMONSTRATES

REAL-WORLD APPLICATION OF BASIC SCIENCE

CLEVELAND, OH -- Electrolysis. In a science class, the use of electricity to produce the bubbling breakdown of water into hydrogen and oxygen is a neat demonstration. Real "gee whiz" stuff.

But like virtually every other lab exercise that is sprung on students in the "sterile" environment of the classroom, the underlying scientific principles involved are applied in the real world in truly fascinating ways. The electrolysis of water, for example, is the basis for the operation of the regenerative fuel cell. The regenerative fuel cell, in turn, is a core piece of equipment for the power generation and energy storage system being developed jointly by Lewis Research Center and Johnson Space Center in Houston for use aboard the Space Station that the United States will build and launch in the next few years. And that's about as fascinating and high-tech a real world application as you'll find.

The Space Station power system will be a miniature electric utility aboard the Space Station that will provide electricity for a small community of people who will be living and working in space. Certain

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(Distribution February 27, 1985)

different conditions will prevail, of course, the most obvious being weightlessness. But the fact remains that the primary task of the power system aboard the Space Station will be to support human life for people living and working space.

In the phenomenon of electrolysis, energy is added to a water molecule, which is at a relatively low energy level, to break it down into hydrogen and oxygen molecules, which form at higher energy levels. That is the phase of the total cycle in which energy from the sun will be converted into electrical energy and stored. To tap into that source of stored energy, the hydrogen and oxygen molecules are ionized, causing them to combine to form water molecules and, at the same time, release the stored energy as electricity and heat.

A regenerative fuel cell integrates a water electrolysis capability with a fuel cell to provide not only direct current power generation but a means for energy storage as well. As shown in an accompanying photograph, during that portion of the Space Station orbit when sunlight will be available (approximately two-thirds of the 95-minute orbit), solar arrays will be used to generate electrical power both for direct use and to electrolyze water into hydrogen and oxygen. During the dark part of the orbit, the hydrogen and oxygen will be recombined in the fuel cell to produce water and electricity. In addition, the fuel cells also can be used to supplement power from the solar arrays to meet peak power demands even during the sunlight portion of the orbit.

Fuel cells have played a major role in U.S. space efforts beginning with the Gemini program and continuing through the Apollo and Space Shuttle programs. The major difference between what has been used during former and current programs and what will be used aboard the Space

Station will be one of power output. Past equipment was required to deliver at most 15 kW. The initial requirement for the Space Station will be 75 kW, a figure that probably will double by the year 2000.

A particularly attractive feature of the regenerative fuel cell as a source of space power is that it can be integrated with both propulsion and life support systems. In the former instance, the boil-off from any liquid hydrogen/liquid oxygen propulsion system could be used as the source of hydrogen and oxygen molecules for power generation and for water for drinking and personal hygiene purposes. In reverse, the hydrogen and oxygen produced during electrolysis could be used for propulsion and other expendable applications, and the oxygen could be used for breathing purposes. Liquid waste could be decomposed by electrolysis into hydrogen and oxygen for propulsion purposes.

Additional future uses for Lewis regenerative fuel cell technology might include application aboard orbital transfer vehicles, which would move cargoes between the Space Shuttle in low earth orbit (150 miles) and geosynchronous orbit (22,300 miles). Moon bases also are long term future candidates for fuel cell application.

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Linda S. Ellis
(res: 216/779-1266)

NASA LEWIS HOSTS 37 SHUTTLE STUDENT

SEMIFINALISTS ON MARCH 25, 26

CLEVELAND, OH -- Thirty-seven high school student semifinalists in the Space Shuttle Student Involvement Program - from Ohio, Michigan, Minnesota, Iowa, Missouri and Wisconsin - will meet at NASA Lewis Research Center on Monday and Tuesday, March 25 and 26.

During their two-day visit the students will present their proposals for candidate experiments aboard future Shuttle missions to a panel of Lewis scientists and engineers. The engineers and scientists will then suggest ways to further perfect the proposals to make them more worthy of consideration.

Thirteen of the students are from Ohio, including nine from the Greater Cleveland area.

The Shuttle Student Involvement Program is a nationwide competition to stimulate the study of science and technology by engaging students in projects to develop actual payload experiments for upcoming Space Shuttle flights.

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(Distribution March 18, 1985)

A highlight for the students during their visit here will be a presentation by NASA Astronaut Robert C. Springer (Lt. Col. USMC) at an evening banquet for the students at the Harley Hotel of Cleveland West, Middleburg Heights, at 7:30 p.m. on March 25. Selected as an astronaut candidate in 1980, mission specialist Springer is currently slated for Space Shuttle mission 51-H now scheduled for launch in late 1985.

Highlighted speaker at Monday's 1:00 p.m. luncheon at the Lewis Center will be Brian L. Vlcek, last year's finalist from Parma, Ohio. He will discuss his winning experiment entitled "Inducing a Geotropic-Type Reaction in Radish Roots with Chemical Stimuli."

On March 26 the semifinalists will tour the Lewis Center where they will see such facilities as the 500-foot deep zero gravity facility and a propulsion systems laboratory where full scale aircraft engines are tested under actual flight conditions.

The Space Shuttle Student Involvement Program is sponsored jointly by NASA and the National Science Teachers Association. This year's is the fifth for the annual competition.

Initially over 2000 biology, chemistry and astronomy experiments proposals were entered from ten geographical regions of the country. These were then evaluated by interdisciplinary teams of teachers, scientists and engineers in order to select each region's 20 semifinalists.

As of the Shuttle 51-C mission in January 1985, 10 student experiments have thus far been flown in space.

The thirteen semifinalists from Ohio are:

Name	Experiment	Residence & School
Elexis A. Benczo	"With the Use of Natural Bioluminescent Chemicals, Calcium & CPK Levels Can be Related to Muscle Atrophy in Micro-Gravity Environment"	Akron, Ohio Schrop Junior High School

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Name	Experiment	Residence & School
Thomas A. Corpus	"Effects of Zero Gravity on Ascending and Descending Chromatograms of Common Substances Prepared in Different Solvents"	Westlake, Ohio Westlake High School
Carolyn L. Galgas	"The Effects of Microgravity on the Fertilization of Gossypium Hirsutum (Cotton Plants)"	Parma, Ohio Parma Senior High School
Darby L. Hiller	"The Effects of Zero Gravity Optically Active Organic Compounds"	Wyoming, Ohio Wyoming High School
Robin E. Ihler	"Manufacturing a Simple Polymer Product in Micro-Gravity"	Akron, Ohio Springfield High School
Sharon M. Mullett	"The Effect of Light and Growth Regulators on the Orientation of Plant Shoots and Leaves"	Parma, Ohio Parma Senior High School
Nicole R. Neidlinger	"The Effects of Microgravity on the Biorhythm of the Fungus Fusarium Fructigenum"	Akron, Ohio Schrop Junior High School
Tanya M. Ollick	"Demonstrations of Magnetic Activity in Microgravity"	Mentor, Ohio Lake Catholic High School
Timothy S. Patterson	"The Effects of Microgravity on the Diffusion Rates of Ammonia Gas and Hydrogen Chloride Gas Through Gore-Tex Fabric"	Zanesville, Ohio Zanesville High School
Thomas M. Walter	"Reproduction in Space: An Investigation of Differences in Early Pattern Formation of Isolecithal (Echinodern) and Mesolecithal (Amphibian) Eggs in Micro-g"	Wheelersburg, Ohio Wheelersburg High School
Tim J. Walter	"Using Hydra as a Model System to Study the Effects of Weightlessness in the Control and Maintenance of Organismic Polarity"	Wheelersburg, Ohio Wheelersburg High School

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Name	Experiment	Residence & School
Andrea M. Webb	"What is the Effect of Zero Gravity on Sponge Cell Aggregation at Normal and Lowered Calcium Levels, and in the Presence of Steroidal Anti-Inflammatory Drugs?"	Akron, Ohio Schrop Junior High School
David G. Yasenchack	"The Effects of Gravity on Allotropic Transformation of Iron and Steel"	Parma, Ohio Parma Senior High School

Semifinalists from Michigan:

William N. Bonner, Jr.	"The Effects of Microgravity on Liquid Lenses Based on Electrocapillarity"	Oxford, Michigan Oxford High School
Caroline K. Horton	"A Rotation-Plant Growth Chamber: A Method to Artificially Cause a Geotropic Response in a Weightless Environment"	Grand Blanc, Michigan Grand Blanc Community High School
Stephen A. Huang	"Effects of Chemotherapy and Electrotherapy on Calcium Loss During Space Travel"	Houghton, Michigan Houghton High School
Ellen D. Levy	"The Effects of Zero Gravity on Rana Catesbeiana and Their Attempts to Maintain Equilibrium"	Ann Arbor, Michigan Ann Arbor Pioneer High School
Laura A. Levy	"Use of High and Low Sensitivity Indicator Systems to Determine the Effects of Higher Energy Radiation in Space"	Ann Arbor, Michigan Ann Arbor Pioneer High School
Cynthia D. Mariage	"Space Magnetism and the Human Brain"	Middleville, Michigan Thornapple Kellogg High School
Gordon T. Satoh	"Exploring the Nature of Thermal Convection in Near Zero Gravity Conditions"	Portage, Michigan Portage Northern High School

Semifinalists from Minnesota:

Amy A. Malecki	"Plasmid Transfer by Conjugation in Zero Gravity"	New Ulm, Minnesota New Ulm Senior High School

Name	Experiment	Residence & School
David W. Meyer	"The Effects of Zero Gravity on Orb-Weaving Spiders"	Sauk Centre, Minnesota Sauk Centre Senior High School
Semifinalists from Iowa:		
Jeff B. Bishop	"Turbulence in Microgravity"	Rockford, Iowa Rockford Senior High School
Kevin C. Krause	"The Effects of a Microgravity Environment Upon the Solidification of Cement"	Rockwell City, Iowa Rockwell City Community High School
Cynthia D. Telfer	"The Gravitational Effect on Gravitropism Responses in Respect to Ethylene"	Sioux City, Iowa North High School
Semifinalists from Missouri:		
Phillip R. Coffman	"Micro-Etching with Lasers in Zero Gravity"	Kansas City, Missouri Park Hill Senior High School
Erik D. Olson	"Formation of Hollow Concentric Spheres in Zero Gravity"	Kansas City, Missouri Park Hill Senior High School
Semifinalists from Wisconsin:		
David R. Angst	"The Effects of Zero Gravity Upon Whisker-Reinforced Composites"	West Allis, Wisconsin Nathan Hale High School
Joel P. Fairbanks	"The Effects of Zero or Microgravity Upon the Fermentation Processes of an Aqueous Yeast Solution"	La Crosse, Wisconsin La Crosse Central High School
Gordon M. Geissler	"The Effects of Microgravity on Convection Currents in an Atmosphere"	Mequon, Wisconsin Homestead High School
Scott A. Gray	"Effects of Microgravity on Crystal Growth in Gels"	West Allis, Wisconsin Nathan Hale High School

Name	Experiment	Residence & School
David G. Hall	"Quantitative Analysis of Iron in Iron Ore in Zero Gravity"	Appleton, Wisconsin Appleton High School West
Kathleen A. Hendrickson	"The Effects of a Weightless Environment on Antibiotic Sensitivity Tests - Using Yeast Cultures"	West Allis, Wisconsin West Allis Central High School
Daniel M. Lawton	"Effects of Microgravity on the Electrophoretic Technique Using the Blood of an Arthritic Patient"	West Allis, Wisconsin Nathan Hale High School
Carolyn S. Petersen	"The Effects of Weightlessness on the Production of Plant Matter"	West Allis, Wisconsin Nathan Hale High School
Beth R. Rankinen	"The Effect of Zero Gravity on the Nest-Building Habits of Red Harvester Ants"	West Allis, Wisconsin West Allis Central High School
Eric J. Schwandt	"Regelation of Ice Formed in Zero Gravity"	Mequon, Wisconsin Homestead High School

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National Aeronautics and
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Lewis Research Center
Cleveland, Ohio
44135

NASA

Reply to Attn of: 0113

April 15, 1985

NOTE TO EDITOR/NEWS DIRECTOR:

NASA's Lewis Research Center will host the Seventh Space Photovoltaic Research and Technology Conference on April 30, May 1 and 2, 1985. This is the only U.S. conference devoted exclusively to photovoltaics for space applications and will be attended by some 90 leading researchers and program managers from government, industry, and the university communities.

The meeting is divided into three broad categories: cell research and technology; space environmental effects; and array technology.

Some 30 technical papers will be presented all day April 30 and the morning of May 1. The afternoon of May 1 will be devoted to workshop sessions and the morning of May 2 will feature three distinguished speakers.

Dr. Fred Teren, Chief, Power Management Distribution Branch,
NASA Lewis Research Center, Cleveland, Ohio
"Influence of Power Management & Distribution on Large Area Photovoltaic Arrays"

Dr. G. Sanjiv Kamath, Head, Epitaxial Materials Section
Hughes Research Laboratories, Malibu, California
"Future Directions for Space Photovoltaic Research"

Dr. William Billerbeck, Manager, Power Systems Department
COMSAT, Clarksburg, Maryland
"Power Requirements for Commercial Spacecraft"

If you would like to attend or have any questions, please call me. I can be reached at 216-433-4000, Ext. 415.

Linda S. Ellis
Public Affairs Specialist

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NASA News

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85-27

For Release:
IMMEDIATE

Linda S. Ellis
(res: 216/779-1266)

NASA LEWIS KICKS OFF MILWAUKEE COMMUNITY INVOLVEMENT PROGRAM

AT SCIENCE CENTER TEACHER RESOURCE ROOM OPENING

CLEVELAND, OH -- Sunday, April 28 marks the beginning of many new and exciting educational activities for thousands of Milwaukee residents and educators.

That day begins a two-week Community Involvement Program (CIP), a joint project with Milwaukee, the Milwaukee School System, and the NASA Lewis Research Center, Cleveland, Ohio. During the CIP NASA aerospace education specialists will provide up-to-date information about NASA and its programs to teachers, students, community and civic organizations. Many of the presentations will be focused to give teachers ideas on how to use this information in the classroom to enhance students' interest and knowledge in science and mathematics.

Kick-off for the two-week program is the official opening and dedication on Sunday, April 28 of a new Regional Teacher Resource Room at Milwaukee's Science, Economics and Technology Center.

Housed in this facility is a variety of information on this Nation's space program, now easily accessible for thousands of educators in the nearby area.

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(Distributed April 16, 1985)

The new facility will serve as a resource site for elementary through university level teachers and offer selected films, slides and printed information on this country's aerospace achievements.

Educators may select from such instructional materials as lesson plans activities, educational literature, 35 mm slides and audio and video tapes. The only costs are copying charges for slides, and educators are asked to provide their own blank audio and video cassettes.

The materials can easily be incorporated into the classroom at all grade levels, but often are not included in current curriculum due to the rapidly expanding and quickly changing field of aerospace technology.

Nine years ago the first Teacher Resource Room was established by NASA Lewis at the Lewis Research Center in Cleveland. Within a few months the Lewis-based center alone was handling more than 30,000 items each year for area teachers. NASA Lewis has since established six Regional Teacher Resource Centers.

The two-week long Community Involvement Program includes a Science in Space Symposium for some 300 teachers on May 4 at the Milwaukee School of Engineering. Keynote speaker that day will be Charles L. Seeger of the NASA Ames Research Center, California. He will speak on the "Search for Extraterrestrial Intelligence."

Another highlight of the CIP will include presentations by Space Shuttle NASA Astronaut Candidate Mark C. Lee on May 6 and 7.

Thoughout the two-week program NASA aerospace education specialists from five NASA cetners throught the country will visit area schools and address such topics as living in space, aeronautics, Space Station, planetary exploration, robotics, to name just a few.

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According to Dr. R. Lynn Bondurant, Chief, Educational Services Office at NASA Lewis, "Community Involvement Programs are major efforts for NASA. The CIP in the Milwaukee area is the only CIP that Lewis is doing in 1985 in the Lewis six-state region." The Lewis region includes Wisconsin, Illinois, Indiana, Minnesota, Michigan, and Ohio.

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85-27

National Aeronautics and
Space Administration

Lewis Research Center
Cleveland, Ohio
44135

NASA

Reply to Attn of: 0113

April 17, 1985

NOTE TO EDITOR/NEWS DIRECTOR:

The two Ohio teachers selected by the Ohio Department of Education as nominees for NASA's Teacher in Space Project will be introduced at a press conference at 10:30 a.m., Friday, April 26, at NASA's Lewis Research Center here.

Present at the press conference will be Governor Richard Celeste; Dr. Franklin B. Walter, State Superintendent of Public Instruction; Andrew J. Stofan, Director of NASA Lewis Research Center, Cleveland, Ohio; and Alan Ladwig, Manager, Space Flight Participant Program, NASA Headquarters, Washington, D.C.

All 616 teachers from Ohio that applied for the Teacher in Space Project are invited to NASA Lewis that day for a Recognition Day ceremony. NASA staffers will provide up-to-date information about NASA and the teachers will tour many laboratory facilities as well as the Visitor Information Center.

The applications of the two Ohio teachers and the other 116 nominees (two from each state plus the District of Columbia, Puerto Rico, Virgin Islands, territories and trusts of the U.S., and Department of Defense and State dependent schools) will then be forwarded to a National Review Panel for further evaluation.

In July 1985 the panel will recommend ten teachers as semifinalists for consideration by the NASA Space Flight Evaluation Committee. Based on physical examinations and interviews, the Evaluation Committee will determine which applicants are qualified to undergo necessary training and will recommend five finalist candidates.

The names of the five finalists will be submitted to the NASA Administrator, who, along with the Evaluation Committee, will select the primary and back-up candidates to undergo training for a space flight now planned for spring 1986.

The 10:30 a.m. press conference will be held in the auditorium of NASA Lewis Visitor Information Center. Please let me know if you'd be interested in attending. I can be reached at 216-433-4000, Ext. 415.

Linda Ellis

Linda S. Ellis
Public Affairs Specialist

Enclosure

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Mary Ann Peto
(res: 216/722-5447)

NASA LEWIS AWARDS $58-MILLION CONTRACT FOR

SHUTTLE/CENTAUR VEHICLES

CLEVELAND, OH -- NASA's Lewis Research Center awarded a $58,291,440 contract to General Dynamics Corporation, Convair Division, San Diego, California for three Centaur G vehicles to be used as upper stages on future Shuttle missions.

The sole-source/cost-plus-incentive-fee contract for fabrication, assembly, test, checkout and delivery of the three vehicles will begin in April 1985 and will continue through October 1987. Most of the work will be performed at the San Diego plant, with a smaller portion of the work being performed at the Eastern Space and Missile Center, Florida.

Centaur, the nation's most powerful upper stage vehicle, is being modified to fit into the Space Shuttle's payload bay to launch various large spacecraft including the Galileo mission to investigate Jupiter's atmosphere and satellites, and the Ulysses mission to study the polar regions of the Sun both in the spring of 1986.

NASA's Lewis Research Center provides management of the Shuttle/Centaur program.

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For Release:
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Linda S. Ellis
(res: 216/779-1266)

NASA LEWIS OFFERS FAMILY ENJOYMENT

CLEVELAND, OH -- A real space age treat awaits those who journey this summer to the NASA Lewis Research Center's Visitor Information Center (VIC).

Just adjacent to Cleveland Hopkins International Airport, this enlightening facility makes space achievements and future goals come alive.

Visitors can see how our world looks from 8000 miles out in space and how satellites are helping us to better understand our world today.

One of the new viewing treats at the Visitor Center is a model of this nation's next logical step into space - the Space Station. Planned to be operational in the mid-1990's, the 40-ton Space Station will house six to eight people for up to six months. It will include a number of pressurized modules and an initial power supply of 75 kilowatts. NASA's Lewis Research Center here has lead responsibility for developing this power system.

One interactive display will help you identify weather patterns and yet another shows how communication is handled via satellites throughout the world.

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(Distribution May 1, 1985)

Among other new exhibits are laser disc displays describing the Space Shuttle transportation system and Voyager's missions to Jupiter, Saturn and beyond. Virtually thousands of still photos, text and a variety of movie segments may be viewed.

Yet another new exhibit describes this nation's next planetary investigations, the Galileo mission designed to provide an intensive and comprehensive investigation of the Jupiter system, and Ulysses, to investigate the polar regions of the Sun. Both missions are set for launch in May 1986 from Shuttle's cargo bay. NASA Lewis is responsible for developing the Centaur upper stage for use in launching these satellites from Shuttle's cargo bay in May 1986.

There are eight major galleries in all the Visitor Center. The time you spend can range from about one half hour for an overview, to several hours for in-depth study.

Lewis, founded in 1941, is one of eight major NASA facilities throughout the U.S., and is NASA's lead center for research and technology for aircraft propulsion, space propulsion, space power, and satellite communications.

Adults interested in not only expanding their own knowledge of this nation's space program, but also in sharing that knowledge with others, may be interested in the Center's ongoing volunteer program. To improve and broaden programming at the VIC, the Center is looking for volunteers to assist in educational efforts and help in explaining displays to visitors.

For the weekend traveler special programs are available. Video tapes and briefings are offered at regular intervals on Saturdays and Sundays in the VIC's air conditioned, 150-seat auditorium.

Spring and summer weekend monthly themes are: May, "Advances in Flight;" June, "Future Flight;" and July and August will feature space exploration.

For Wednesday visitors there's something special for adults age 16 and older. Available that day is a guided two-hour mini-tour of Lewis Research Center test facilities. The tour route may include such facilities as the 500-foot deep zero gravity facility, a supersonic wind tunnel and a propulsion systems laboratory where full scale aircraft engines are tested under actual flight conditions. Reservations for this tour must be made in advance by 1 p.m. on the tour day.

There's also something for the souvenir hunter at the gift shop just inside the VIC entrance. Here are such items as space pens, Space Shuttle models, NASA caps and tee-shirts, jewelry, mission patches and astronaut ice cream.

The Visitor Information Center is open seven days a week. Mondays through Fridays hours are 9 a.m. - 4 p.m.; Saturdays, 10 a.m. to 3 p.m.; and Sundays, 1 p.m. - 5 p.m. Admission is free and there is plenty of free parking close to the VIC.

Lewis is easily accessible via interstates 71, 77, 90 and 480. Take Exit 9 off the Ohio Turnpike. For more details, Wednesday tour and volunteer program information, call the VIC at 216-267-1187.

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85-33

Linda S. Ellis
(res: 216/779-1266)

LEWIS BEGINS OPERATION OF SOLAR POWER

DEMONSTRATION SYSTEMS IN GABON, AFRICA

CLEVELAND, OH -- Some 3000 residents in the Republic of Gabon, Africa, are beginning to benefit from space age technology.

Solar powered community service systems have been installed at four rural villages to improve public health, education, lighting and sanitary water supplies.

NASA's Lewis Research Center in Cleveland is manager for the project which is funded jointly by the United States Department of Energy, $500,000, and the Ministry of Energy and Hydraulic Resources of the Republic of Gabon, $1.1 million.

The Government of Gabon selected the four villages which are: Onguia-Bougandji, Nyali, Donguila and Bolossoville.

Purpose of this demonstration is to show the feasibility of using solar (photovoltaic) power systems as an energy source in a remote, rural, tropical environment and to determine the impact of these systems on the social and economic development of the villages.

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(Distribution May 6, 1985)

The public health system is comprised of a photovoltaic power system, lights, air circulation fan, and a refrigerator/freezer for vaccine storage for the dispensary in each village. The public education system includes a photovoltaic power system, lights for each classroom, and a color television and video cassette recorder/player for the school in each village except Bolossoville where this system is located in their community building. The sanitary water system includes a new drilled well, a solar photovoltaic system, a submersible well pump, a water storage tank, and a water distribution system which pipes water to strategically located fountains in each village. The public lighting system includes a photovoltaic power system mounted on a pole which also has a low pressure sodium vapor lamp. All of the systems are instrumented and data is being recorded daily for complete systems performance analyses.

According to Tony Ratajczak, project manager for NASA Lewis, "The goal of DOE and the Republic of Gabon for this project is to investigate and evaluate the economic, social and technical value of photovoltaic power systems in aiding progress and improving the quality of life in Gabon."

"Because of very low population density and very poor roads in most villages, the Gabonese government is investigating the use of renewable energy systems for its unelectrified areas."

The total photovoltaic array capacity for all of the systems is 12.1 kilowatts. The smallest photovoltaic array is 80 watts for the street lights and the largest is three kilowatts for one of the water pumps.

Batteries used in conjunction with the solar arrays are expected to last about ten years before replacement is required. The solar arrays have a life expectancy of at least 20 years.

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Prime contractor for the systems is Solavolt International, Phoenix, Ariz., and their subcontractor in Gabon is Ceca Gadis.

Solar electric power has been used almost since the beginning of the U.S. space program to generate electricity for onboard spacecraft needs. Solar cells convert visible light directly into electricity.

The Lewis Center has worked closely with the Department of Energy and the Agency for International Development for the past ten years years to advance the use of photovoltaic power systems for remote-area terrestrial needs in this country and aboard. Since 1979, the Lewis Research Center has been responsible for the installation of 58 photovoltaic power systems in 27 countries.

For a period of one year NASA and DOE will provide operational support through Solavolt International, who in turn will work with Ceca Gadis, their subcontractor in Gabon, to provide required repair, maintenance and spare parts. After one year complete responsibility for the system will be turned over to the Societe d'Energie et d'Eau du Gabon.

# # #

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NASA News

National Aeronautics and
Space Administration

Lewis Research Center
21000 Brookpark Road, Cleveland, Ohio 44135
AC 216 / 433-4000 / Ext. 415

For Release:
IMMEDIATE

85-34

Mary Ann Peto
(res: 216/722-5447)

NASA LEWIS AWARDS CONTRACT FOR ROCKET ENGINES

CLEVELAND, OH -- NASA Lewis Research Center has awarded a $11,145,000 contract to United Technologies Corp., Pratt & Whitney Aircraft Group, West Palm Beach, Florida for six RL-10 rocket engines to be used in support of the Shuttle/Centaur program.

The fixed-price-incentive contract is for the fabrication, assembly, test and delivery of the six engines with worked being performed at the contractor's facility in Florida. Beginning in April the contract will run through January 1987.

The Centaur which is a high energy upper stage vehicle is being modified to fit into the Space Shuttle to launch various planetary missions for NASA and also to support Department of Defense missions.

# # #

(Distribution May 9, 1985)

NASA News

National Aeronautics and
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Lewis Research Center
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85-38

For Release:
IMMEDIATE

Mary Ann Peto
(216/722-5447)

CASE AND NASA EFFORTS STRENGTHEN WOMEN'S ROLE IN ENGINEERING AND SCIENCE

CLEVELAND, OH -- Stimulating women's interest in science and engineering, aiding NASA Lewis in recruiting women, and fostering interaction between the NASA Lewis Research Center and Case Western Reserve University is the goal of the Women in Engineering and Science Programs (WESP) sponsored by these institutions.

The WESP program includes both graduate and undergraduate students who are interested in engineering and science.

In addition to allowing the participants to gain firsthand experience in engineering or science at Lewis, they are also given the opportunity to get acquainted with female practitioners who might serve as role models.

The program also provides summer employment opportunities, graduate research fellowships, and other exchanges. Seminars are conducted to increase the students' awareness of the Center's mission and research possibilities.

Under the program, the graduate researchers receive an academic stipend and tuition. And following completion of their masters of science degrees at Case, permanent, full-time employment opportunities at the Center can be explored.

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(Distribution May 17, 1985)

A joint proposal for WESP was first implemented during the 1983-84 academic year and, according to Monica Crespo, Lewis federal women's program manager, and Barbara Karn, director of student programs at Case, nearly all areas of the program were exceptionally successful.

Crespo indicated that a total of six students will be employed at Lewis this summer as the result of this program, including Diane Cifani of Walton Hills, Sylvia Washington of Shaker Heights, and Tamara Gilbert of Cleveland Heights.

"This is an excellent opportunity for us to benefit from the fine academic resources made available to us through the joint program," says Lewis' Judy Montfort, resource development specialist.

# # #

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NASA News

National Aeronautics and
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Lewis Research Center
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85-40

For Release:
IMMEDIATE

Mary Ann Peto
(res. 216/722-5447)

NASA AWARDS CONTRACT FOR SHUTTLE/CENTAUR

GUIDANCE SYSTEM

CLEVELAND, OH -- NASA Lewis Research Center has awarded a $14,900,000 contract to Honeywell Inc., Avionics Div., Clearwater, Florida, for fabrication and delivery of three flight Inertial Measurement Groups (IMG) to be used in support of the Shuttle/Centaur program.

The IMG, which is an integral part of the guidance and navigation system for Centaur, maintains a fixed reference orientation regardless of vehicle movement and measures vehicle acceleration.

The sole-source, firm-fixed-price contract will begin in May 1985 and end in December 1987.

Work will be performed at the contractor's plant in Clearwater, Florida.

The highly successful Centaur vehicle, which has sent spacecraft to investigate the planetary system as well as to launch domestic and military communications satellites, is now being modified to fit into the Space Shuttle. Introduction of the Shuttle/Centaur combination, scheduled for May 1986 with the launch of the Galileo mission to investigate Jupiter's atmosphere and the Ulysses mission to study the polar regions of the Sun, will initiate a new era of American space exploration.

# # #

(Distribution June 3, 1985)

NASA News

National Aeronautics and
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Lewis Research Center
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85-49

For Release:
IMMEDIATE

Linda S. Ellis
(res: 216/779-1266)

TEACHERS AUGMENT SCIENCE AND MATH KNOWLEDGE

AT TWO-WEEK WORKSHOP AT NASA LEWIS

CLEVELAND, OH -- An opportunity to interact directly with NASA scientists and engineers and to discover the wealth of educational resource materials available at NASA's Lewis Research Center awaits some 25 "honors" science and math teachers when they attend a workshop here, July 8-19.

Teachers attending the two-week workshop are from Ohio, Illinois, Indiana, Michigan and Wisconsin.

The purpose of the workshop is to assist the teachers in updating and upgrading their knowledge in space science and technology. Lewis is NASA's leading research and technology center for aeronautical propulsion, space propulsion, space power and satellite communications.

Highlights of the workshop include an opportunity to attend a life science conference on July 10-11 at nearby Baldwin-Wallace College in Berea. The teachers will also tour several unique research facilities at the Lewis Center such as the 500-foot deep zero gravity facility, a

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(Distribution June 25, 1985)

supersonic wind tunnel and a propulsion systems laboratory where full-scale aircraft engines are tested under actual flight conditions. In addition, the teachers will observe and participate with Lewis scientists and engineers at their work site.

"Knowledge garnered during this workshop is focused to help the teachers in upgrading the science and math programs in their local schools," according to Dr. Lynn Bondurant, Chief, Educational Services Office at Lewis. "Each teacher is asked to inform their local community of their summer experience at Lewis," Bondurant added.

Designed for teachers of college-oriented students in grades 7-12, the workshop, entitled NASA Educational Workshop for Mathematics and Science Teachers (NEWMAST), is sponsored by the National Science Teachers Association (NSTA), the University of Toledo, Ohio, the National Science Foundation (NSF) and NASA.

The candidates for the program were selected based on recommendations provided by a steering committee consisting of members from the National Science Supervisors Association (NSSA) and the Council of State Science Supervisors (CSSS), both affiliates of the National Science Teachers Association (NSTA), and the National Council of Supervisors of Mathematics (NCSM), an affiliate of the National Council of Teachers of Mathematics (NCTM) and NASA.

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Teachers attending the workshop follow:

Name & City of Residence	School
OHIO:	
John W. Brubaker Bucyrus, OH	Bucyrus High School
Kenneth L. Frazier North Olmsted, OH	North Olmsted High School
Judith M. Lachvayder Parma, OH	Parma High School
Donald Murad Toledo, OH	St. Francis de Sales High School
Cary M. Seidman Cleveland Heights, OH	W. H. Kirk Middle School
Thomas W. Tappan Delaware, OH	Big Walnut High School
Lawrence C. Varner Akron, OH	Wadsworth Senior High School
ILLINOIS:	
Christine I. Fransen Chicago, IL	Senn Metropolitan Academy
John C. Harrison La Grange Park, IL	Proviso West High School
Frank Kennedy Northbrook, IL	Paul Robeson High School
Peggy L. Olson Stillman Valley, IL	Stillman Valley High School
Larry S. Sterett Biggsville, IL	Union High School
Michael Swierk Winfield, IL	Oak Park and River High School
INDIANA:	
Vertelle L. Staton Gary, IN	Roosevelt High School

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MICHIGAN:

Peter H. Burkey Holland, MI	Fennville High School
Patricia Carlson Grand Haven, MI	Fruitport High School
Mary R. Hodak Dearborn Heights, MI	Fordson High School
Nelson J. Maylone Royal Oak, MI	Abbott Middle School
Mildred A. Quinn Brighton, MI	Scranton Middle School
Jerry A. Sears Northville, MI	Wayne Memorial High School
Lester J. Wallinga Jenison, MI	Calvin Christian Junior High

WISCONSIN:

John A. Carlson Niagara, WI	Kingsford High School
Jane Ann Howell Platteville, WI	Platteville Middle School
Gary E. Sampson Waukesha, WI	Wauwatosa West High School
Annmarie Wacher Kenosha, WI	Lance Junior High

# # #

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NASA News

National Aeronautics and
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Lewis Research Center
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85-50

For Release:
IMMEDIATE

Linda S. Ellis
(res: 216/779-1266)

NASA LEWIS COSPONSORS LIFE

SCIENCES CONFERENCE, JULY 10-11

CLEVELAND, OH -- Science fiction/science fact, space medicine, satellite imagery, the search for extraterrestrial intelligence and studies in the origin of life.

These are a few of the topics that will be discussed here by experts in the field at a July 10-11 life sciences conference. Entitled, "NASA Biology: On Earth and in Space," the conference is cosponsored by Baldwin-Wallace College, the National Association of Biology Teachers (NABT), and the NASA Lewis Research Center.

"Purpose of the conference is to highlight NASA's impact on biology and to take a look at new trends and research areas associated with NASA's life sciences program," according to Dr. Lynn Bondurant, Chief of Educational Services at NASA Lewis. He is overall director for the conference.

Among the outstanding scientists and experts is Frederick Durant, former director of astronautics at the Smithsonian's National Air and Space Museum. In his talk, "From Science Fiction to Fact," Durant will

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(Distribution June 28, 1985)

compare early science fiction with what has really happened and will highlight early rocket pioneers such as Dr. Robert Goddard.

Space Shuttle payload specialist Charles D. Walker will discuss production of pharmaceuticals in space in his presentation, "Electrophoresis in Space." Walker has operated materials processing equipment related to electrophoresis on two Space Shuttle missions.

"Remote Sensing and Biospheric Research: Limits of Imagery," will be the topic for James Lawless of the NASA Ames Research Center, California.

Professor Charles Seeger, San Francisco State University, will discuss "The Search for Extraterrestrial Intelligence (SETI)," and Professor John Oro, University of Houston, will talk about "Studies in the Origin of Life: What Can They Tell Us"?

Some eleven different speakers are scheduled to participate during the two-day conference which will be held in the Art & Drama Center, Baldwin-Wallace College, Berea, Ohio. On July 12 conference attendees will have an opportunity to tour selected research facilities at the NASA Lewis Research Center.

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NASA News

National Aeronautics and
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Lewis Research Center
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National Aeronautics and
Space Administration
Twenty-fifth Anniversary
1958-1983

For Release:
IMMEDIATE

85-58

Mary Ann Peto
(res: 216/722-5447)

NASA AWARDS $12.3-MILLION CONTRACT FOR FLIGHT HARDWARE

CLEVELAND, OH -- The NASA Lewis Research Center has awarded a $12,386,535 contract to Teledyne Industries, Inc., Teledyne Systems Co., Northridge, California for the fabrication, assembly and test of digital computers and remote multiplexer units in support of the Shuttle/Centaur program.

The sole-source, fixed-price-incentive-fee contract will begin in July 1985 and run through October 1987. Work will be performed at the contractor's plant in Northridge, Ca.

Digital computers act as the focal point for the Centaur flight control system, processing data from the other flight boxes including the multiplexer units. They also provide hardware capability to interface with the Orbiter and the ground system.

The first Centaur launch from the Shuttle payload bay--the Ulysses mission--is scheduled for May 15, 1986, followed by the Galileo mission on May 21, 1986.

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(Distribution August 1, 1985)

NASA News

National Aeronautics and
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Lewis Research Center
21000 Brookpark Road, Cleveland, Ohio 44135
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National Aeronautics and
Space Administration
Twenty-fifth Anniversary
1958-1983

85-59

For Release:
IMMEDIATE

Charles Mitchell
(res: 216/243-6228)

NASA LEWIS MERITS 4 AWARDS

FOR NEW TECHNICAL PRODUCTS

CLEVELAND, OH -- NASA Lewis Research Center has garnered four Research & Development magazine's IR-100 awards in this year's contest to select the 100 most significant new products developed during the past year.

Selections were made by a blue ribbon panel of technical judges from more than 1,000 entries submitted.

The award-winning products are Servomechanism for Propeller-Pitch Change, Transmit Module, Communications Traffic Processor and Rotary Power-Transfer Device, developed jointly by Lewis and industrial companies under contract to the Center.

NASA Lewis researchers Stuart H. Loewenthal of Avon Lake and Bruce M. Steinetz of Strongsville plus General Electric engineers developed the Servomechanism for Propeller-Pitch Change. The product can accurately control the propeller blade angle of large (10,000-kilowatt) turboprop aircraft propellers over the complete spectrum of flight operating conditions. With certain modifications, the new product can be adaptable

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(Distribution September 26, 1985)

for applications as aircraft wing pivot mechanisms, tank turret aiming actuators and other heavy mechanisms requiring very accurate pointing and tracking control.

Developed by Lewis researchers Thomas J. Kascak of Lakewood, Godfrey (Art) Anzic and Denis J. Connolly of North Olmsted, and Rockwell International engineers, the Transmit Module is used to provide rf signal amplification and phase shifting at a frequency of 20 gigahertz. It is of monolithic design in which all module functions are contained on a single 6.4 x 4.8 millimeter semiconductor chip with the smallest circuit feature size of about 40 millionth of an inch. Development of the Transmit Module technology makes possible the production of weight and cost effective advanced phased array antenna systems for future communications satellite systems.

NASA Lewis engineer Russell J. Jirberg of Parma, together with electronics engineers from Motorola Corporation of Scottsdale, Arizona have developed a Communications Traffic Processor for the next generation of communications satellites. The new system provides the capacity and routing flexibility needed to handle the nation's growing demands for telephone and computer message traffic. When used aboard satellites having multiple narrow beam antennas, this "switchboard in the sky" will enable more than 60,000 individual voice messages, video pictures and computer data to be routed directly among users throughout the country equipped with low cost ground terminals.

-more-

A Rotary Power-Transfer Device, which transfers electrical power through a rotating joint, was developed by Lewis engineer David D. Renz of Litchfield in cooperation with Sperry Flight Systems engineers. The device is a low loss spacetype design capable of transferring high power (hundreds of kilowatts), AC or DC, to frequencies such as 20 kHz. Loss of only 22 watts per circuit while transferring 100 kilowatts is one of its outstanding features. The roll-ring assembly device has the potential to be one of the major components of the Space Station and other spacecraft where large amounts of power are required, according to the developers.

NASA Lewis has earned the coveted IR-100 award every year except one since first entering the competition in 1966, and ranks fifth as the all-time winner with 48 awards.

Winners of this year's award will be honored at a banquet at the Chicago, Illinois Museum of Science and Industry on Thursday, September 26.

# # #

NOTE: Photographs to illustrate a portion of this news release will be distributed without charge to the media. Write or call:

NASA Lewis Research Center
Public Information Office, M.S. 3-11
Cleveland, OH 44135
216-433-4000, ext. 782
Photo # C-85-2308

NASA News

National Aeronautics and
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Lewis Research Center
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85-63

For Release:
IMMEDIATE

John M. Shaw
(res: 216/749-6664)

NASA LEWIS TO OPEN NEW MICROGRAVITY

MATERIALS SCIENCE LABORATORY

CLEVELAND, OHIO -- Science experiments conducted in space are expected to provide knowledge leading to new materials, more efficient use of the Earth's nonrenewable fuel resources, new medicines, advanced computers and lasers, and better communications.

A new laboratory designed to help experimenters make better decisions here on Earth about what is and is not feasible for science experiments in space will be opened at Lewis Research Center here on September 5 by Lewis Director Andrew J. Stofan.

Called the Microgravity Materials Science Laboratory (MMSL), the new facility offers U.S. scientists and engineers a low-cost, low-risk way to test new ideas for materials science research in space. Initial research capabilities will support metal and alloy solidification and electronic crystal growth studies. Access to such a laboratory will give U.S. companies a competitive advantage in developing better ground-based materials and/or processing of materials through microgravity research.

This capability exists nowhere else in the world. It puts Lewis in the mainstream of America's space research efforts and, along with the assignment to develop the power system for the Space Station, further enhances its position as a major national high technology institution.

A preliminary schedule of the day's activities is attached.

# # #

(Distribution August 26, 1985)

MICROGRAVITY MATERIALS SCIENCE LABORATORY

OPENING CEREMONIES
September 5, 1985
(Administration Building Auditorium)

9:30	Reception	
10:00	Introduction	J. Stuart Fordyce, Director, Aerospace Technology, Lewis Research Center
	Welcome	Andrew J. Stofan, Director, Lewis Research Center
	Microgravity Materials Science Laboratory	Salvatore J. Grisaffe, Chief, Materials Division, Lewis Research Center
	NASA's Microgravity Science Program	Richard E. Halpern, Director, Microgravity Science and Applications Division, NASA HQ
	Space Experiments	Taylor Wang, Payload Specialist, STS Flight 51-B, Jet Propulsion Laboratory
	Industry Space Experimentation	Don W. Clifford, Manager, Electrophoresis Development, McDonnell Douglas Astronautics Company

(Buses to MMSL)

11:15	Ribbon cutting and remarks	John M. Klineberg, Deputy Director, Lewis Research Center
		Guests
11:45	Press conference and tour	Messrs. Stofan, Halpern, and Grisaffe

NASA News

National Aeronautics and
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85-64

For Release:
IMMEDIATE

John M. Shaw
(res: 216/749-6664)

LEWIS RESEARCH CENTER OPENS MICROGRAVITY

MATERIALS SCIENCE LAB

CLEVELAND, OH -- A new laboratory to help make better decisions here on Earth about what is and is not feasible for science experiments in space has been opened at NASA's Lewis Research Center.

The Microgravity Materials Science Laboratory (MMSL), supported by the Microgravity Science and Applications Division, Office of Space Science and Applications, NASA Headquarters, offers a low-cost, low-risk way for U.S. scientists and engineers to test new ideas for materials science research in space before starting formal efforts in their own laboratories.

"The MMSL has been designed to provide easy access for U.S. researchers, from government, universities and industry, to conduct scientific experiments using equipment that functionally duplicates what is on the Space Shuttle," explained Salvatore J. Grisaffe, Chief of the Lewis Materials Division, which will manage the new facility. "Access to such a laboratory will give U.S. companies a competitive advantage in developing better materials through microgravity research."

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(Distribution September 13, 1985)

A functional duplicate may be anything from a reproduction of only the portion of the Space Shuttle equipment in which the actual materials experiment resides (e.g. the furnace system) to an exact copy of the flight hardware. MMSL functional duplicates will, of course, operate in the Earth's gravity (one-g).

The MMSL is one part of NASA's Microgravity Science and Applications Program, which fosters research in the science and technology of processing materials in low gravity. The aims of the program are to obtain a clearer understanding of the factors controlling Earth-based processes in order to guide their improvement; the development of new materials that cannot now be made on Earth; and the evolution of procedures to support long-term space operations.

The goal of the new laboratory will be achieved in two ways:

1. U.S. researchers in the industrial, academic, and government communities will be encouraged to submit ideas for microgravity materials science experiments.

2. Experiments conducted in the laboratory will provide a means to determine which of the proposals that have been accepted appear to have the greatest potential for further development in the microgravity environment of space.

In the MMSL, a researcher can establish a scientific baseline toward determining the specific role of gravity in a particular experiment. By conducting carefully planned scientific experiments in a one-g environment on Earth, scientific research will be more precisely defined before moving toward the more costly phase of experimental work in space.

Initially, the MMSL will be dealing with experiments involving metals, alloys, and electronic crystals. Laboratory capabilities will be expanded in the future by support from NASA's Commercial Use of Space Program into the areas of ceramics, glasses, and polymers. Applications to use the Lewis MMSL will be submitted in the form of brief proposals from interested investigators.

The MMSL is the newest but by no means the only microgravity research facility at Lewis. The Cleveland facility also has two drop towers, in which experiment packages can free-fall through distances up to 500 feet and achieve a weightless condition for up to five seconds. In addition, the Lewis Lear jet can be flown through a parabolic trajectory to achieve a microgravity environment inside the plane for up to 22 seconds. A typical scenario for a microgravity materials experiment at Lewis would begin by establishing 1-g baseline data in the MMSL and then proceeding, if indicated, to one of the drop towers or the Lear jet to qualify the project for space flight.

The Space Shuttle currently offers up to seven days of microgravity, and the Space Station eventually will offer an opportunity for very long-term microgravity research and processing. However, the most efficient use of such space resources demands that experimental procedures be based on a firm scientific understanding with extensive prior ground-based examination in order to exploit the space experiment fully.

# # #

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NASA News

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85-65

For Release:
IMMEDIATE

Linda S. Ellis
(res: 216/779-1266)

NASA LEWIS RESEARCH & TECHNOLOGY PROGRAM

TO IMPROVE SPACE SHUTTLE MAIN ENGINE

CLEVELAND, OH -- Mention Space Shuttle and most people think of spectacular launches from Kennedy Space Center. NASA's Lewis Research Center in Cleveland, however, also is very much involved in the Space Shuttle program in equally important ways.

In a joint effort with NASA's Marshall Space Flight Center in Huntsville, Ala., Lewis is pursuing a program to improve Shuttle engine performance, reduce operational costs and to develop advanced engine technology for future space travel.

Though the Space Shuttle propulsion system has performed flawlessly for many space missions, the engine's operational life and performance levels still can be improved.

According to Stanley J. Marsik, Lewis' Space Shuttle Main Engine Technology Program Manager, "The current engine represents the first generation of reusable engines. In a way, the first reusable space engine can be compared with the Model-T automobile. Now that we have experienced numerous flights with this engine, we have learned how to improve its life and performance. We now are working towards advancing the technologies necessary to support those improvements."

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(Distribution September 6, 1985)

Although the current Space Shuttle main engine is the most sophisticated rocket engine in use today, it incorporates the state-of-the-art technology at the time of its development, some 15 years ago.

In this new age of engine reusability, demands will increase for higher performance with lighter weight components. These requirements result in higher operating pressures and temperatures as well as increased mechanical vibrations, fuel flow turbulence and severely taxed engine components such as turbine blades, bearings, seals, fuel ducting and combustion chambers.

Engineers are studying new high-temperature, high-strength metal alloys and other advanced materials such as new protective coatings, and new combustion processes. Advanced computer modeling techniques study loads on turbine blades and fuel flow.

Researchers are examining use of a hydrostatic ball bearing wherein a film of gas would separate the bearing from metal surfaces, resulting in no metal-to-metal contact.

New methods of measuring wear and deterioration are being studied so that parts are replaced only when absolutely necessary.

Engineers also are studying ways to monitor engine health by installing a series of computer-connected diagnostic sensors on the engine to signal deviations from normal performance and to facilitate more economical on-the-ground maintenance.

Ten disciplinary groups have been formed at the two NASA centers to work with some 130 different technology elements of engine design.

The engine builder, Rocketdyne Division of Rockwell International, other NASA contractors, and several universities are supporting the program to advance these technologies.

The 10-year program is scheduled for completion in 1991. Technology developed may be the foundation for an engine in the next decade to carry humankind to the Moon, Mars, and beyond.

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NASA News

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For Release:
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85-65

Mary Ann Peto
(res: 216/722-5447)

NASA AWARDS $79-MILLION CONTRACT FOR

SHUTTLE/CENTAUR PROGRAM SUPPORT

CLEVELAND, OH -- NASA Lewis Research Center has awarded the General Dynamics Corp., Convair Division, San Diego, California, a $79,194,665 contract in support of the Shuttle/Centaur program for the period August 30, 1985 through June 1987.

Under the cost-plus-award-fee contract, General Dynamics will supply labor, materials and resources necessary to provide management and engineering services plus launch operations services necessary to implement the Shuttle/Centaur program.

Included in this multi-contract concept are services such as overall program management; administration and engineering support; technical management; operations, planning and integration and launch complex modifications.

Work will be performed at the contractor's plant in San Diego and at the Eastern Launch site in Florida.

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(Distribution September 6, 1985)

In May 1986, the Shuttle/Centaur combination will signal the beginning of a new era of exploration of our solar system with the launch of the Ulysses mission. The Ulysses, an international mission, is the first and only planned mission to observe the polar regions of our Sun.

The Galileo, scheduled for launch one week later, will explore the Jovian atmosphere. And in the spring of 1988, the Shuttle/Centaur combination will launch the Venus Radar Mapper mission to investigate the surface and interior of Venus.

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85-66 IMMEDIATE

Charles Mitchell
(res: 216/243-6228)

BEREA WOMAN HEADS COMPUTER

SERVICES AT NASA LEWIS

CLEVELAND, OH -- NASA Lewis Research Center has announced the promotion of Peggy L. Yohner of Berea to Acting Chief, Computer Services Division, making her the highest ranking woman manager at the Center. She served as deputy chief of Computer Services just prior to the promotion.

In her new position, Mrs. Yohner is responsible for directing the activities of some 140 civil servants and 80 on-site contractors, including mathematicians and computer programmers, who maintain and operate a centralized computation facility used for engineering problem solving, data acquisition, data reduction and other mathematical calculations. They also evaluate systems and select and implement computer hardware and software to be used in the above functions.

Mrs. Yohner joined Lewis in 1948 after graduating with a bachelor of science degree from Ohio State University in 1947. She has specialized in the fields of numerical analysis of compressors and turbines, incompressible and compressible fluid flow research engineering,

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(Distribution 13, 1985)

scientific programming and data reduction. She has authored six technical papers on computer modeling techniques used in compressor design, turbine design and boundary layer theory.

Managerial responsibilities included staffing, strategic planning, budgeting and overseeing procurement activities of the Computer Services Division. Mrs. Yohner recently had project responsibility for procuring the major new mainframe computers and for procuring an upgraded super-computer due to be installed later this year. As chief of the Data Systems Branch, Mrs. Yohner was responsible for the acquisition, recording and analysis of data for all of the experimental test facilities at NASA Lewis.

Mrs. Yohner has received numerous awards and honors including being selected as one of the recipients of the Cleveland YWCA's Women of Achievement Award in 1981; named the Outstanding Woman at NASA Lewis in 1975; named campaign manager of the NASA Lewis U.S. Savings Bond Drive; served on Lewis' Suggestion Awards Committee, the Advisory Group for the Federal Women's Program and Planning Committee and on the Lewis International Women's Year Program Committee.

She has been active in community affairs, having served on the Executive Board of Zonta International (Berea Chapter), and on several charitable organizations and church committees.

Mrs. Yohner and her husband, Kenneth, are the parents of two daughters, Margaret, stationed in London, England with the U.S. Department of State and Heide, an engineering student at Purdue University.

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85-66

National Aeronautics and
Space Administration

Lewis Research Center
Cleveland, Ohio
44135

NASA

Reply to Attn of: 0113

October 1, 1985

NOTE TO EDITOR/NEWS DIRECTOR:

On October 8 and 9, Lewis Research Center will host the Second Symposium on Semiconductor Electronic Devices Using Deep Impurities and Double Injection $(DI)^2$ Techniques. The purpose of the symposium is to provide a forum for discussion and transfer of this technology among scientific and engineering managers, semiconductor device physicists, and electrical design engineers.

The enclosed program gives detailed information. If you would like to attend or have any questions, please call me. I can be reached on 216-433-4000, Ext. 415.

Linda Ellis

Linda S. Ellis
Public Affairs Specialist

Enclosure

85-73

SECOND SYMPOSIUM
ON
SEMICONDUCTOR ELECTRONIC DEVICES
USING
DEEP IMPURITIES AND DOUBLE INJECTION TECHNIQUES

NASA LeRC ADMINISTRATION BUILDING AUDITORIUM

PROGRAM

TUESDAY, OCTOBER 8, 1985

8:30 a.m.	Registration and Distribution of Materials
9:00 a.m.	Welcome to NASA Lewis Research Center Dr. Henry W. Brandhorst, Jr., Acting Chief Power Technology Division
9:15 a.m.	Purposes of Symposium and Technical Format Gale Sundberg, NASA LeRC
9:30 a.m.	Introduction to Deep Impurity, Double Injection $(DI)^2$ Semiconductors Dr. H. Thurman Henderson, University of Cincinnati
10:30 a.m.	Break
10:45 a.m.	Implications for NASA Gale Sundberg, NASA LeRC
11:10 a.m.	Industrial Developments of $(DI)^2$ devices Dr. Maurice H. Hanes, Westinghouse R & D Center
11:35 a.m.	High Temperature, Radiation Tolerance Investigations Dr. W. T. Joyner, Hampden - Sydney College
12:00	Lunch
1:15 p.m.	Injection - Gated $(DI)^2$ Switching Graduate Students, University of Cincinnati o Planar, S-Type and Applications o Planer, N-Type and Applications o Vertical Geometries for Power Devices with Current and Optical Gating Methods
2:10 p.m.	MOS-Gated $(DI)^2$ Switching Graduate Students, University of Cincinnati o Device Configurations with Applications o Scaling Factors : Current and Voltage o Plasma Modes o Compound Electrodes
3:00 p.m.	Break

3:15 p.m. Optical and Infrared Applications of $(DI)^2$ Devices

- o Optical Gating, Extrinsic Photoconductors and Photon Dosemetry
  Dr. Jerry Wagner, Rose-Hulman Institute
- o Extrinsic Infrared Imaging
  Nick Pequignot, Wright Patterson Air Force Base

3:45 p.m. Logic and Communications Applictions of $(DI)^2$ Devices
Graduate Students, University of Cincinnati

- o Voltage Controlled Delay : nanoseconds to seconds
- o Signal Generation, Memory, Convolution and Frequency Control

4:15 p.m. New Micro-electronic Transducers Based on $(DI)^2$ Technology

- o Air and Gas Flow Meter and Anomometer
  Walter Hsieh, University of Cincinnati
- o Highly Sensitive Magnetic Transducer
  Larry Berardinis, University of Cincinnati
- o Frequency Modulated Temperature Transducer
  Jean Motz, University of Cincinnati

5:15 p.m. Reception and Social Hour at the Visitors Information Center

6:30 p.m. Adjourn for the Day

WEDNESDAY, OCTOBER 9, 1985

8:30 a.m. Modeling for Design Optimization
Dr. T. J. Shieh, University of Texas at Arlington

- o Recent One-Dimensional Breakthroughs
- o Two-Dimensional Modeling
- o Compound Electrodes

9:30 a.m. Progress of $(DI)^2$ Devices in GaAs
Amatava Bose, University of Cincinnati

10:00 a.m. Break

10:15 a.m. Display and Demonstrations of Selected $(DI)^2$ Devices

11:00 a.m. Some Specialty Device Possibilities
Graduate Students, University of Cincinnati

- o Amorphous Silicon - Submicron Devices and Radiation Tolerant Memories
- o Very High Voltages to 100 KV - Limitations of the Bulk and Surface Effects
- o Closing, Opening Switches and Very Fast Light Gated Devices

12:00 Lunch

1:15 p.m. Critique, Questions and Discussion

2:30 p.m. Adjourn

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85-75

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Mary Ann Peto
(res: 216/722-5447)

NASA AWARDS $6.7 MILLION CONTRACT FOR SUPPORT

OF SHUTTLE/CENTAUR EQUIPMENT

CLEVELAND, OH -- The NASA Lewis Research Center has awarded a $6,741,273 contract to Teledyne Industries, Inc., Teledyne Systems Co., Northridge, California in support of the Shuttle/Centaur program.

The sole source, cost-plus-award-fee contract is for the management and engineering, repair services, and hardware support for the digital computers and remote multiplexer units for Centaur launch vehicles.

Work will be performed at the contractor's plant in Northridge, Ca. The contract will begin November 1, 1985 and run through September 30, 1987.

Digital computers act as the focal point for the Centaur flight control system, processing data from the other flight boxes including the multiplexer units. They also provide hardware capability to interface with the Orbiter and the ground system.

The first Centaur launch from the Shuttle payload bay--the Ulysses mission--is scheduled for May 15, 1986, followed by the Galileo mission on May 21, 1986.

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Linda S. Ellis
(res: 216/779-1266)

NASA LEWIS AWARDS $8.7 MILLION FOR

SPACE STATION CONTRACTS

CLEVELAND, OH -- The NASA Lewis Research Center, Cleveland, Ohio, has awarded a total of $8.7 million in four advanced development contracts in support of the definition and preliminary design (Phase B) of the power system for the nation's first permanently manned Space Station.

A major technical issue in Phase B is a determination of whether solar-generated power for the Space Station will be best supplied by photovoltaic arrays or by a solar dynamic (heat engine) system. Photovoltaic arrays are the accepted system used to produce electricity for both manned and unmanned space missions. However, the electrical power requirements for the Space Station are 10 times higher than any mission flown to date and would require arrays of approximately one half acre for the initial station. Interest in solar dynamic systems lies in their higher overall efficiency and relatively smaller size.

In a solar dynamic system, electricity is produced by an alternator driven by a turbine in a heat engine cycle. Heat for these cycles is provided by focusing the sun's rays, by means of a concentrating mirror, into a heat receiver where the engine gas or liquid is then heated. The system operates as a closed-cycle heat engine and a radiator cools the working fluid and rejects the waste heat to space.

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(Distribution November 15, 1985)

Under a $1,010,303 cost-plus-fixed-fee contract awarded to Sundstrand Corp., Rockford, IL., two issues of an Organic Rankine Cycle engine will be studied. The Rankine is a vapor cycle using the boiling and condensing of an organic fluid such as toluene. The magnitude of possible chemical and thermal degradation of the working fluid will be studied. The contract will run for 36 months with performance at Rockford, Illinois.

A $1,010,000 cost-reimbursement contract to Grumman Aerospace Corp., Bethpage, NY, will study the solar dynamic waste heat radiator technology. The contract will run for 27 months with performance at Bethpage, NY.

A $3,117,059 cost-plus-fixed-fee contract to Boeing Aerospace Co., Seattle, Wash., will study the heat receiver/storage unit and identify and recommend testing required for concept verification. The contract will develop tooling and fabrication processes, perform detailed engineering design and analyses, fabricate test hardware, and conduct verification and demonstration tests. The contract will continue for 36 months and place of performance is Seattle, WA.

A $3,619,870 cost-sharing contract to Harris Corporation, Melbourne, FL, will generate conceptual designs for the solar dynamic dish concentrator. The contract will further identify and test materials, identify and recommend testing required for concept verification, perform engineering designs, fabricate the concentrator and conduct verification and testing. The contract will continue for 36 months and place of performance is Melbourne, FL.

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Linda S. Ellis
(res: 216/779-1266)

NASA LEWIS OFFERS WORKSHOP FOR

CLEVELAND AREA GUIDANCE COUNSELORS

CLEVELAND, OH -- Students in the Greater Cleveland school system may have better opportunities for careers in the nation's space program thanks to a Guidance Counselors Workshop on December 5 at the NASA Lewis Research Center here.

During the day-long session some 80 guidance counselors from Greater Cleveland will visit Center work sites and directly interact with individuals in career areas such as civil engineers, architects, chemists, program analysts, model assemblers and secretaries.

The Workshop is cosponsored by NASA Lewis' Educational Services Office and the Office of Equal Opportunity Programs.

"Enormous career possibilities exist within NASA and the goal of the workshop," according to Dr. R. Lynn Bondurant, Chief of Lewis' Educational Services Office, "is to apprise the guidance counselors of those career possibilities and to assist them in their role of providing guidance to their students about careers and college requirements."

The guidance counselors will visit the Teachers Resource Room where they may select from a myriad of educational resource material on all aspects of aerospace activity, including aeronautics, astronomy,

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(Distribution November 25, 1985)

ecology, meteorology, communications, and space exploration. There are lesson plans and classroom activities, educational literature, 35 mm slides and audio and video tapes.

Lewis, founded in 1941, is NASA's leading research, technology and development center for aeronautical propulsion, space propulsion, space power and satellite communications.

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Charles Mitchell
(res: 216/243-6228)

AGENCY'S HIGHEST ACHIEVEMENT MEDALS

GO TO NASA LEWIS CENTER EMPLOYEES

CLEVELAND, OH -- NASA's highest medals for outstanding achievements in science, engineering and government service will be presented to 14 NASA Lewis Research Center employees and a Cornell University professor in honor ceremonies here November 26.

Other awards being presented are best technical paper of 1985, NASA certificates of appreciation and 40, 45 and 55-year service pins.

Associate Administrator for Aeronautics and Space Technology Dr. Raymond Colladay will come here from NASA Headquarters in Washington, D.C. to present the awards together with the Lewis Center Director Andrew J. Stofan.

Robert C. Hendricks of North Olmsted earned NASA's Exceptional Scientific Achievement Medal for his pioneering efforts in the field of cryogenic research. His cryogenic hydrogen heat transfer research was the most comprehensive program of its type in support of U.S. rocket development, and his high and low gravity nucleate and film boiling research was among the first in the world.

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(Distribution November 26, 1985)

Frank K. Moore, a professor at Cornell University is also a recipient of the NASA Exceptional Scientific Achievement Medal for distinguishing himself through his contributions to the advancement of scientific knowledge in analytical fluid mechanics as it relates to aeronautics and space propulsion systems.

Three merited the NASA Exceptional Engineering Achievement Medal. They are Ira T. Myers of Westlake, John L. Shannon, Bay Village and Edward A. Willis, Olmsted Township.

o Myers: For being a leader in the development of the first power transistors and diodes capable of controlling and managing hundreds of kilowatts of electrical power in space.

o Shannon: For his substantial contributions to the technology base in applied fracture mechanics. His work on the influence of interstitial elements on the fracture toughness of titanium alloys led to the development of extra-low interstitial alpha-beta alloys now widely used in the aerospace industry.

o Willis: For his leadership and conviction which played a key role in convincing the aircraft industry of the potential for use of the rotary engines in light aircraft. He developed the technology and led the team effort in creating a highly advanced version of the rotary engine in aircraft applications.

There are 10 NASA Exceptional Service Medal recipients. They are Paul G. Anderson of Bay Village, Byron E. Batthauer, Strongsville, Jeanette M. Biby, Berea, Arthur G. Birchenough, Brook Park, Richard D. Clapper, Brunswick, John J. Gulan, Westlake, Daniel j. Keliher, Bay Village, David J. Poferl, Berea, Peter Ramins, North Ridgeville and Harold E. Sliney, Parma.

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o Anderson: For his exceptional contributions in directing the development, implementation and administration of an integrated, Center-wide system of resource and procurement management.

o Batthauer: For being actively involved in the advocacy of flight research at Lewis, including studies of propeller noise and icing, and of solar cell performance at high altitudes. His implemented flight operations procedures have been so successful that they have been adopted by other NASA centers.

o Biby: For providing invaluable service to the employees of Lewis through her administration of the Federal Employees Health Benefits Program.

o Birchenough: For his significant innovative contributions to the development and design of megawatt scale wind turbines for utility applications.

o Clapper: For significantly improving the level of the training programs offered at Lewis.

o Gulan: He has established and successfully administered a number of productive and innovative programs in support of health and occupational medicine functions at Lewis.

o Keliher: For his exceptional leadership and service to the Center while managing a variety of highly complex facility-related engineering and construction activities.

o Poferl: For strengthening and focusing research in the areas of general aviation propulsion systems and propulsion systems dynamics.

o Ramins: His experimental research contributed to the development of the multi-stage depressed collector as a practical device used by industry.

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o Sliney: For his pioneering research in the field of high temperature lubricants, both liquids and solids.

Robert A. Miller earned the Best Technical Paper Award in recognition of excellence in value of his publication entitled "An Oxidation Based Model for Thermal Barrier Coating Life."

Wojciech Rostafinski of Rocky River and Beverly F. Sage, Bay Village, received NASA Certificates of Appreciation. The former for giving freely of his time and technical expertise to advocate NASA programs throughout the U.S. and in foreign countries, and Sage for instituting comprehensive expertise to the organizations served by the Lewis Freight Traffic Office.

Isidore Warshawsky will receive a 55-year service award pin and C. Robert Morse will receive a pin for 45 years of government service.

Forty-year service award recipients are Herman Mark of Berea, Richard H. Cavicchi, Fairview Park, William H. Robbins, North Ridgeville, Sam Calamia, Seven Hills, Sheldon Heimel, Cleveland Heights, Robert G. Deissler, Fairview Park, Louis J. Sliman, Parma and Mike A. Minichello, North Ridgeville.

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85-84

Charles Mitchell
(res: (216/243-6228)

NASA LEWIS DIRECTOR HONORED

AT CEREMONY IN WHITE HOUSE

CLEVELAND, OH -- NASA Lewis Research Center Director Andrew J. Stofan was presented the 1985 Presidential Rank Award to distinguished Executives at the White House on December 12 for his career-long achievements in managing advanced research and technology programs for NASA.

The Westlake, Ohio resident also receives a $20,000 stipend as a result of being selected to receive the Presidential award.

Long recognized both nationally and internationally as an outstanding manager and technical expert, Stofan has directed the Lewis Center since 1982. The Center is a major NASA installation engaged in research and technology for space propulsion, space power, aeronautical propulsion, satellite communications, power system for the Space Station and others. Lewis has some 2,700 federal and 1,000 support service contract employees and an $800 million annual operating budget.

Within two years after joining the Lewis Center in 1958, Stofan was considered a nationally recognized expert on the behavior of rocket fuels in the unique environment of launch and flight. As a result of his continuing efforts and successes, he was named Director of Launch

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(Distribution December 13, 1985)

Vehicles in 1974. In that capacity, Stofan managed the multi-million dollar development and operation of the Atlas/Centaur and Titan/Centaur launch vehicles and supported the integration and launch of numerous communications satellites, scientific spacecraft, Mars landers, Voyager and missions to the outer planets.

In January 1978, he transferred to NASA Headquarters in Washington, D.C. where he chaired a major subcommittee that reviewed the Space Shuttle flight certification program. His group's recommendations were important to the first successful launch of the Shuttle.

As Acting Associate Administrator for the Office of Space Science and Applications, Stofan was responsible for directing the overall NASA Space Sciences programs concerned with the study of the Solar System and the Universe, and was concurrently responsible for a variety of communications and other "working" satellite programs.

Since returning to the Lewis Center, Stofan has been successsful in having Lewis named lead Center for developing the power system for the Space Station, establishing the Microgravity Materials Science Laboratory and strongly encouraging participative management throughout the Center.

In addition to his latest recognition, Stofan's honors and awards include the Presidential Rank of Meritorious Executive, the NASA Exceptional Service and Distinguished Service Medals and group achievement awards.

He and his wife, Barbara, are the parents of two daughters, Lynn and Ellen.

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85-84

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85-86

For Release:
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Linda S. Ellis
(res: 216/779-1266)

LEWIS PROVIDES SOLAR POWER FOR EARTH STATION IN INDONESIA

Cleveland, OH -- Thanks to space age technology, students of Indonesia's Eastern Islands University Association, spread over more than 1,600 miles of ocean, are now joined more closely by satellite communications.

A new communications system has helped make the member campuses' scarce professors, research findings, and library resources more widely available to the rapidly increasing number of students throughout the region.

A teleconferencing center and an earth station recently installed in the village of Wawotobi, on the island of Sulawesi, is powered by a solar power system managed by NASA's Lewis Research Center. The earth station will provide the communications link between Wawotobi and Jakarta and other earth station equipped campuses using PALAPA, the Indonesian communications satellite system.

The U.S. Agency for International Development (AID) Rural Satellite Project became operational in Indonesia in 1984 through an agreement with the Indonesian Ministry of Education and Culture.

The teleconferencing center is comprised of a classroom large enough for 50 people which is equipped with a speaker system, microphones, a telecopier, an electronic blackboard, and a computer graphics display.

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(Distribution December 23, 1985)

The system will be completely interactive and have the capability to be connected with 11 main campus locations of the Eastern Island University Association and a conference room in the offices of the Director General of Higher Education in Jakarta.

Purpose of the teleconferencing system is to demonstrate the use of satellite communications in developing countries. Purpose of the solar power system is to show the feasibility and practicality of using solar (photovoltaic) power systems for small earth stations in remote areas.

Diesel electric generators are generally used to power earth stations in the absence of conventional power lines. However, the high cost of diesel fuel plus the high operating, security, and maintenance costs for diesel generators, make the use of a photovoltaic system very attractive.

The total photovoltaic array capacity to power the earth station is 1.5 kilowatts. The battery used in conjunction with the array is expected to last about ten years before replacement is necessary. The photovoltaic array has a life expectancy of more than 20 years.

According to Richard DeLombard, Project Manager at Lewis, "The high cost for diesel-generated electricity along with the small electrical requirements typical of remote areas make photovoltaic systems very attractive for remote areas. Because photovoltaic systems are modular, they can be tailored to meet the exact electrical requirements much more closely than can diesel generators.

The PALAPA satellite system provides national communications services to the 5,000 islands inhabited by Indonesia's population of 130 million. The satellite system is tied into a terrestrial microwave system to provide television, radio, telephone, and telegraph services nationwide.

Prime contractor for the photovoltaic power system is Hughes Aircraft Co., Long Beach, California, and their subcontractor in Indonesia is P. T. Elektrindo Nusantara.

NASA and Hughes will provide operations support to provide required repair, maintenance and spare parts through June 1986. After that time, complete responsibility for the system will be turned over to PERUMTEL, the Indonesian national telecommunications authority.

Photovoltaic power systems have been used almost since the beginning of the U.S. space program to generate electricity for onboard spacecraft needs. Photovoltaic cells convert sunlight directly into electricity.

This project completes renewable energy systems programs managed by the Lewis Research Center for the Department of Energy and the U.S. Agency for International Development. Since 1976 the Lewis Research Center has been responsible for the installation of 71 photovoltaic power systems in 27 countries plus the U.S. including Hawaii and Alaska. These systems have provided power for entire villages, for water pumps, grain grinders, lights, vaccine refrigerators, schools, highway signs, forest lookout towers, insect traps, rural dispensaries and the earth station.

The Lewis Research Center managed programs have made a significant impact on the commercial availability of photovoltaic power systems.

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Charles Mitchell
(res: 216/243-6228)

NASA LEWIS ENGINEER RECEIVES HIGH

ACHIEVEMENT AWARD FROM ALMA MATER

CLEVELAND, OH -- Lonnie Reid, head of the Aerodynamic Section at NASA's Lewis Research Center, was named Tennessee State University's Outstanding Mechanical Engineering Alumnus of 1985 for his significant contributions to engineering and technology.

The Beachwood, Ohio resident received the award at the university's Alumni Seminar held recently.

As head of the Aerodynamic Section, Reid supervises a team of engineers who conduct aerodynamic modeling research on components for the Lewis Altitude Wind Tunnel. His prior research includes extensive analytical and experimental work on compressor aerodynamics.

Reid served in the U.S. Army and later entered Tennessee State on a football scholarship in 1957. He graduated in 1961 with a bachelor's degree in mechanical engineering. He since has earned a master's degree and is currently working on his Ph.D. in mechanical engineering at the University of Toledo.

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(Distribution January 10, 1986)

He served for many years as a volunteer math tutor in the Vocational Information Program. Another outside interest is long distance running in which Reid has competed in the Boston Marathon and other local and national races.

Reid and his wife, Christine, are the parents of four sons. One is a senior engineering major at Akron University.

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NASA News

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Charles Mitchell
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FORESTIERI OF BEREA TO HEAD

EXTERNAL AFFAIRS AT NASA LEWIS

CLEVELAND, OH -- NASA Lewis Research Center has announced the promotion of Americo F. Forestieri of Berea to Director, Office of External Affairs.

In his new position, Forestieri will direct and plan the activities of public affairs and educational specialists, writers, editors and others who provide wide-ranging information for use by local and national media and the general public.

Just prior to his latest appointment, Forestieri served as Deputy Chief of the Advanced Programs and Planning Office. In that capacity he acted as the Lewis focal point to assure the existence of advanced technology options for the Space Station power system.

Forestieri joined NASA Lewis in 1951 and has worked in the fields of corrosion, solid state diffusion, ion microscopy, lasers and nuclear power systems. However, his major contribution to NASA Lewis is in the field of photovoltaics where he is an internationally recognized expert. Photovoltaic research is the study of solar cell devices to convert sunlight into electrical energy.

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(Distribution March 19, 1986)

In 1982 and 1983, Forestieri was nominated for the William R. Cherry Award, the highest honor that can be bestowed upon researchers for outstanding contributions to the photovoltaic field.

Forestieri has presented invited papers in several countries, including France, West Germany, Luxembourg and England, and has written more than 35 technical papers, mostly on photovoltaic research.

Forestieri was engaged in photovoltaics research, both as engineer and manager, from 1966 until 1983 when he was selected to join a NASA Headquarters team to help develop concepts for the Space Station. Partially due to his efforts, NASA Lewis was named lead NASA center for developing the power system for the Space Station.

The External Affairs Director earned both bachelor's and master's degrees in electrical engineering from Case Western Reserve University and has completed course requirements toward a Ph.D. in physics, also from CWRU.

Forestieri and his wife, Nancy, are the parents of three grown children.

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Linda S. Ellis
(res: 216/779-1266)

BRUNSWICK TEACHERS ENHANCE KNOWLEDGE OF SCIENCE & TECHNOLOGY

CLEVELAND, OH -- Some 400 teachers from the Brunswick, Ohio, school system will learn the latest in space science and technology when they attend a Teacher In-Service Day at NASA's Lewis Research Center here, March 31.

"Goal of the day-long program is to improve the quality of education by advancing and improving teachers' knowledge so that they may transfer that knowledge directly to the classroom," according to Dr. R. Lynn Bondurant, Chief of the Educational Services Office at NASA Lewis.

The Brunswick School District, since November 1985, has been participating in a "partnership for educational excellence" program with the Lewis Center. Purpose of the partnership program is to enhance the knowledge in the aerospace field of career-oriented teachers in science, math and engineering.

The Lewis Center, founded in 1941, is NASA's leading research, technology and development center for aeronautical propulsion, space propulsion, space power and satellite communications.

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(Distribution March 24, 1986)

During their day at Lewis the teachers will see actual research facilities at the Lewis Center such as a propulsion systems laboratory where full scale aircraft engines are tested under actual flight conditions. They will visit a supersonic wind tunnel, and will hear special presentations on Halley's Comet and space station. Additionally, they will learn of career opportunities and educational resources available for classrooms.

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86-13

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WELLINGTON TEACHERS ADVANCE THEIR

KNOWLEDGE OF SCIENCE & TECHNOLOGY

CLEVELAND, OH -- Some 65 teachers from the Wellington Schools, Wellington, Ohio, will learn the latest in space science and technology when they attend a Teacher In-Service Day at NASA's Lewis Research Center here, April 28.

"Object of the program is to enhance the quality of education by advancing and improving teachers' knowledge about aerospace technology with the goal of directly transferring that knowledge to the classroom," according to Dr. R. Lynn Bondurant, Chief of the Educational Services Office at NASA Lewis.

During their day at Lewis the teachers will visit actual research facilities at the Lewis Center such as a propulsion systems laboratory where full-scale aircraft engines are tested under actual flight conditions. They will also visit a supersonic wind tunnel, tour the Visitor Information Center and will hear special presentations on space station and space spinoffs. Additionally, they will learn of aerospace career opportunities and educational resources available for classrooms.

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For Release:
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Linda S. Ellis
(res: 216/779-1266)

NASA LEWIS IS SPACE AGE TREAT

CLEVELAND, OH -- Do you know how many planets have rings? Would you like to learn how a Vertical Takeoff and Landing (VTOL) aircraft operates? Do you know how a jet engine performs?

You can find the answers to these questions and much more when you take the time this summer to visit the NASA Lewis Research Center's Visitor Information Center (VIC).

At the VIC, located adjacent to Cleveland Hopkins International Airport, you can collect new information about Uranus, Saturn, and Jupiter and their moons. See astonishing details of large Galilean satellites including Io, Europa, Ganymede, and Callisto. All this and more is available for viewers in the Solar System Gallery.

In the Aeronautics Gallery you can learn about one of the most versatile research aircraft coming of age today, the XV-15 Tiltrotor. This unique aircraft can set its rotors at a full upright helicopter mode to nearly 90 degrees forward, much like that of a conventional turboprop. It can take off and land like a helicopter and has the speed and range of a fixed wing airplane.

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(Distribution May 1, 1986)

The intricate operation of a jet engine is described in yet another exhibit area.

One interactive display will test your coordination skills. This "Complex Coordinator" device was developed in the early days of the astronaut program to test and improve eye, hand and foot coordination. Another interactive display identifies weather patterns around the world.

One of the newer exhibits is a model of this nation's next logical step into space - the space station. The 40-ton space station is planned to be operational in the mid 1990's, and will house six to eight people for up to six months. With an initial power supply of 75 kilowatts, the space station will have a number of pressurized modules for living quarters. NASA's Lewis Research Center here has lead responsibility for developing this power system.

Another special exhibit describes the U.S.' next planetary missions: the Galileo spacecraft designed to probe the Jupiter system, and Ulysses, to investigate the polar regions of the Sun. The missions are slated for launch from shuttle's cargo bay. NASA Lewis is responsible for developing the Centaur upper stage for use in the launches.

There are eight major galleries in the Visitor Center. An overview of the galleries takes about one-half hour, or you can spend several hours for in-depth study.

Lewis, founded in 1941, is one of eight major NASA facilities throughout the U.S., and is NASA's lead center for research and technology for aircraft propulsion, space propulsion, space power, and satellite communications.

Special programs are conducted for the weekend traveler too. Video tapes and briefings are offered at regular intervals on Saturdays and Sundays in the VIC's air conditioned, 150-seat auditorium.

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Spring and summer weekend monthly themes are: May, "History of Rocketry;" June, "Rockets of the Future;" and July thru September will feature "Exploring Beyond the Planets."

A special "extra" for Wednesday visitors age 16 and older is a guided one-hour mini-tour of Lewis Research Center test facilities. The tour route may include such facilities as the 500-foot deep zero gravity facility, a supersonic wind tunnel and a propulsion systems laboratory where full scale aircraft engines are tested under actual flight conditions. Reservations for this tour must be made in advance by 1 p.m. of the tour day.

For those keepers of mementos, there is the gift shop just inside the VIC entrance. Here visitors may purchase such items as mission patches, space shuttle models, space jewelry, NASA tee-shirts and caps, and even astronaut ice cream.

The Visitor Information Center is open seven days a week. The hours are: Mondays through Fridays, 9 a.m. - 4 p.m.; Saturdays, 10 a.m. to 3 p.m.; and Sundays, 1 p.m. - 5 p.m. Admission is free and there is plenty of free parking adjacent to the VIC.

Lewis is easily accessible via interstates 71, 77, 90 and 480. Take Exit 9 off the Ohio Turnpike. For more details and Wednesday tour information, call the VIC at 216-433-2001.

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86-23

Charles Mitchell
(res: 216/243-6228)

NASA SELECTS CLEVELAND FIRM FOR $22 MILLION CONTRACT NEGOTIATION

CLEVELAND, OH -- NASA Lewis Research Center, Cleveland, has selected G.R. Osterland Company, 2410 Scranton Road, Cleveland, for final negotiations leading to award of a cost-plus-award-fee, 5-year contract valued at approximately $22 million for routine construction, modification and maintenance services. All work will be performed on-site.

The contractor will be responsible for interior and exterior painting, insulation and asbestos removal, roof repair, road and parking lot repair, demolition work, electrical heating and air conditioning, piping and other general repair and rehab of Lewis facilities.

Four other Cleveland companies submitted proposals for this work including Boyas Excavating, F. Buddie Contracting, Colejon Mechanical Corporation, and Roediger Construction, Inc.

# # #

(Distribution May 29, 1986)

NASA News

National Aeronautics and
Space Administration

Lewis Research Center
21000 Brookpark Road, Cleveland, Ohio 44135
AC (216) 433-2901

For Release:
IMMEDIATE

86-28

Charles Mitchell
(res: 243-6228)

RELEASE: 86-74

NEW SUPER COMPUTER SUPPORTS KEY NASA PROJECTS

CLEVELAND, OH -- Predicting what happens to newly-designed aircraft engines, prior to their manufacture, is just one of the many complex functions performed by the newest super computer at NASA Lewis Research Center, Cleveland, Ohio.

Called the Cray X-MP, the computer was installed recently to assist Lewis scientists and engineers in key, wide-ranging research efforts. One such effort is developing mathematical models of jet engines and their components, including the study of air flow through inlet ducts, compressor turbine blades and exhaust nozzles. Modeling of combustion processes in aircraft engines and mechanical parts for indications of stress on bearings and turbine blades also is being performed with this super computer.

"A typical solution on the CRAY X-MP might take 1 hour, while the same solution would take 200 hours on a popular business mainframe computer," explains Dr. Allan R. Bishop of the Internal Fluid Mechanics Division. Bishop is a major user of the computer and is seeking answers on the reliability of structural design and the effects of solar radiation and temperature on internal fluid mechanics and spacecraft components.

-more-

(Distribution June 11, 1986)

Solutions to research problems, thought virtually impossible just 10 years ago, are being provided routinely by the CRAY X-MP. For example, Lewis engineers responsible for conducting thermal analysis of the Shuttle/Centaur avionics components are using geometric models of the components produced by the super computer to predict exactly where a component will be affected by solar radiation in space. "It is impossible to do the analysis without the super computer," Lewis researcher Rafael Sanabria said.

Through three dimensional computational analysis, the CRAY X-MP provides Lewis engineers the same results in 1 day that would take 100 days on today's popular business mainframe computers.

The type of research underway by Lewis' Structural Mechanics Branch would be prohibitively expensive and time consuming without the super computer. Its researchers seek answers to structures subjected to cyclic thermomechanical loading and inelastic straining of turbine blades and combustor liners in the hot sections of gas turbine engines.

Lewis' super computer also is being shared with other NASA centers, industry and universities. Universities using the computer include Cleveland State, Case Western Reserve, Ohio State, Northwestern and Rensselaer Polytechnic Institute.

# # #

86-28

NASA News

National Aeronautics and
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Lewis Research Center
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For Release:
IMMEDIATE

86-31

Linda S. Ellis
(res: 216/779-1266)

FINALISTS CHOSEN IN SPACE SCIENCE STUDENT INVOLVEMENT PROGRAM

CLEVELAND, OH -- Kelly C. Dixon of Parma, Ohio, and Timothy D. Beacom of Sioux City, Iowa, are two of seven students named as national winners in the Sixth Annual Space Science Student Involvement Program (SSIP).

Dixon and Beacom were selected from some 360 competitors in Regions V and VII -- which include Ohio and Iowa. The seven were selected from 1500 competitors in seven regions throughout the country.

Dixon attends Parma Senior High School, Parma, Ohio, and her experiment is entitled, "The Effect of Microgravity on In Vitro and In Vivo Chick Osteogenesis;" Judith M. Lachvayder (teacher/advisor). This experiment concerns calcium loss under microgravity conditions and compares skeletal growth and the formation of chicks in vitro (outside the living body) and in vivo (inside the living body). Dixon was Lachvayder's second Space Science Student Involvement Program national winner.

Beacom attends North High School, Sioux City, Iowa, and his experiment is entitled, "Ion Bombardment on Ice;" Mary F. Feddersen (teacher/advisor). This experiment addresses the natural bombardment of ices in space, eroding crystal lattice, formation of complex molecules and synergistic effects (bombardment of particles and ultraviolet). Ice bombardment is used in the semiconductor chip industry to obtain greater purity of chips.

-more-

(Distribution June 20, 1986)

The SSIP is a joint venture of NASA and the National Science Teachers Association. The objectives of the program are to stimulate interest in science and technology in grades 9 through 12, and to develop students' awareness of space as a resource for experimentation.

The winners and their teacher/advisors will be honored at a special space science symposium at the Kennedy Space Center, Fla., in August 1986. There the winners will formally present their proposals, tour the center and receive awards. The National Science Teachers Association will announce the top three winners who will receive scholarships.

# # #

86-31

NASA News

National Aeronautics and
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Lewis Research Center
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86-34

For Release:
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Charles Mitchell
(res: 216/243-6228)

THREE NASA LEWIS SCIENTISTS

SHARE 'TOP INVENTOR' AWARD

CLEVELAND, OH -- Three NASA Lewis Research Center scientists were selected to receive the 1986 Lewis Inventor of the Year Award at the 11th annual ceremony here that honored 17 new inventors.

Selections for the Inventor of the Year award were based on the importance and value of the inventions to the government.

Leonard J. Westfall of North Olmsted was selected for the top award for his discovery entitled, "Arc Spray Fabrication of Metal Matrix Composite Monotape." With Westfall's invention, arc metal spraying can be used to spray liquid metal onto an array of high strength fibers that have been wound to a large drum contained inside an atmospheric chamber. The process is used to produce a large metal matrix composite monotape, used for fabricating high temperature, fiber-reinforced superalloy composites.

Randall F. Gahn, Columbia Station, and Norman H. Hagedorn, Bay Village, co-invented a process called "Negative Electrode Catalyst for the Iron Chromiun REDOX Energy Storage System" to share top honors with Westfall. They developed a REDOX cell to operate at elevated temperatures while utilizing the same two metal couples in each of the two reactant

-more-

(Distribute June 27, 1986)

fluids. Each fluid includes a bismuth salt and may also contain a lead salt. A low cost, ion permselective membrane separates the reactant fluids. REDOX is a unique electrical storage system developed by Lewis researchers.

All 17 honorees received a plaque of an embossed replica of the first page of their patents and also become eligible for a monetary award when their patent application was filed.

The names, hometowns and titles of inventions of the other NASA Lewis inventors recognized at the ceremonies are as follows:

BRUCE A. BANKS, Olmsted Township, "Diamondlike Flakes."

RICHARD A. LAUVER, Rocky River (five inventions), "Chemical Approach for Controlling Nadimide Cure Temperature and Rate," "Chemical Approach for Controlling Nadimide Cure Temperature and Rate with Maleimide," "Chemical Approach for Controlling Nadimide Cure Temperature and Rate," Chemical Approach for Controlling Nadimide Cure Temperature and Rate with Maleimide," and "Chemical Control of Nadimide Cure Temperature and Rate."

WARREN H. PHILIPP, North Olmsted, "Alkaline Battery Containing A Separator of a Cross-linked Copolymer of Vinyl Alcohol and Unsaturated Carboxlic Acid." Co-inventors: with Philipp were DEAN W. SHEIBLEY, Sandusky, and OLGA D. GONZALEZ-SANABRIA of Olmsted Falls.

ROBERT E. CUNNINGHAM, Cleveland, "Variable Force, Eddy-Current or Magnetic Damper."

BEN T. EBIHARA, Strongsville, "Multistage Spent Particle Collector and a Method for Making Same."

DAVID P. FLEMING, North Olmsted, "Dual Clearance Squeeze Film Damper."

DONALD L. CHUBB, Olmsted Falls, "Thermionic-Photovoltaic Energy Converter."

STEPHAN STECURA, Parma, "Thermal Barrier Coating System."

JAMES L. SMIALEK and GEORGE C. RYBICKI of Strongsville, "Oxidation Resistant Slurry Coating for Carbon-Based Materials."

BRUCE A. BANKS, "Piezoelectric Deicing Device."

MICHAEL J. MIRTICH, North Olmsted, JAMES S. SOVEY, Strongsville, and BRUCE A BANKS, "Oxidation Protection Coatings for Polymers."

# # #

86-34

NASA News

National Aeronautics and
Space Administration

Lewis Research Center
21000 Brookpark Road, Cleveland, Ohio 44135
AC (216) 433-2901

86-38

For Release:
IMMEDIATE

Linda S. Ellis
(res: 216/779-1266)

TWO-WEEK TEACHER WORKSHOP AT NASA LEWIS

FOCUSES ON SCIENCE AND MATHEMATICS

CLEVELAND, OH -- Some 20 science and math teachers will have an opportunity to engage closely in one-on-one working relationships with engineers, scientists and technicians at the NASA Lewis Research Center when they attend a workshop here, July 7-18.

Teachers attending the two-week workshop are from Ohio, Illinois, Indiana, Michigan, Minnesota, New York and Wisconsin.

Purpose of the workshop is to assist the teachers in updating and enhancing their knowledge in space science and technology. Lewis is NASA's leading research and technology center for aeronautical propulsion, space propulsion, space power and satellite communications.

Highlights of the workshop include an opportunity to tour several unique research facilities at the Lewis Center. Of key interest among these is the Microgravity Materials Science Laboratory (MMSL), a new facility which offers U.S. scientists and engineers a low-cost, low-risk way to test new ideas for materials science research in space. Research capabilities in this facility will support metal and alloy solidification and electronic crystal growth studies.

-more-

(Distribution July 3, 1986)

Also on the agenda for touring are the 500-foot deep zero gravity facility, a supersonic wind tunnel and a propulsion systems laboratory where full-scale aircraft engines are tested under actual flight conditions.

"Information gathered during this workshop is focused to help the teachers in upgrading programs in the local schools and to gain a better understanding of careers in the technical area," according to Judith Olson, Deputy, Educational Services Office at Lewis and coordinator for the workshop.

Designed for teachers of college-oriented students, the workshop, entitled NASA Educational Workshop for Mathematics and Science Teachers (NEWMAST), is sponsored by the National Science Teachers Association (NSTA) and NASA.

The candidates for the program were selected based on recommendations provided by an NSTA panel.

Teachers attending the workshop follow:

Name & City of Residence	School
OHIO:	
Karen Bull Cleveland Hts., OH 44118	W. H. Kirk Middle School
Teresa Owen Toledo, OH 43606	Central Catholic High School
Robert Williams Hubbard, OH 44425	Hubbard High School
ILLINOIS:	
Craig Bolanos Palatine, IL 60067	Ridgewood High School
Bernard Bradley Chicago, IL 60614	Newberry Math & Science Academy
Edward Niccum Brookfield, IL 60513	Park Junior High School

-more-

Pamela Witt Gurnee, IL 60031	Education Center

INDIANA:

J. Merle Callahan Loogootee, IN 47553	North Daviess High School
Thomas Elsworth Shirley, IN 47384	Greenfield Central High School
Charles Emmert Noblesville, IN 46060	Noblesville Senior High School
Dwight Michael Geneva, IN 46740	Jay County High School

MICHIGAN:

Eric Douglas Center Novi, MI 48050	Novi Middle School South
Louis Henkel Holland, MI 49423	West Ottawa Middle School

MINNESOTA:

Theresa Brown St. Paul, MN 55106	Hill-Murray High School
Julie Doble Lakeville, MN 55044	St. Paul Open School
Judith Halvorson Bloomington, MN 55420	J. F. Kennedy High School

NEW YORK:

David Wrotniak Buffalo, NY 14218	Mill Middle School

WISCONSIN:

Barbara Decker Elm Grove, WI 53122	Longfellow Middle School
Richard Kumbier Milwaukee, WI 53207	Greendale High School

# # #

86-38

NASA News

National Aeronautics and
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Lewis Research Center
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For Release:
IMMEDIATE

86-39

Linda S. Ellis
(res: 216/779-1266)

MODEL ROCKET LAUNCH KICKS OFF MONTHLY WEEKEND

WORKSHOPS AT NASA LEWIS VISITOR INFORMATION CENTER

CLEVELAND, OH -- Some 35 members of Greater Cleveland Cub Scout Packs #16 and #438 will have an opportunity to build and launch their very own model rockets during a two-day workshop at the NASA Lewis Visitor Information Center, July 19-20.

The workshop coincides with the celebration of Ohio Space Observance Week, July 16-24, and the 17th anniversary of the Apollo 11 first lunar landing.

During Saturday's activities the scouts, ages eight to ten, will participate in various activities involving principles of rocketry and spaceflight and will begin construction of their model rockets. On Sunday at 3 p.m. EDT the scouts will conduct a countdown and actual launch of the model rockets.

The weekend activities will kick off monthly weekend workshops conducted at the Visitor Information Center for pre-organized groups. For additional information on upcoming workshops, group representatives may call 216-433-2001.

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(Distribution July 11, 1986)

NASA News

National Aeronautics and
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Lewis Research Center
21000 Brookpark Road, Cleveland, Ohio 44135
AC (216) 433-2901

86-40

For Release:
IMMEDIATE

Charles Mitchell
(res: 216/243-6228)

NASA LEWIS UNIQUE SUMMER PROGRAM

ASSURES POOL OF TECHNICAL TALENT

CLEVELAND, OH -- Forty college engineering and science students are being exposed to wide-ranging research at NASA Lewis Research Center in a summer program aimed at assuring a continuous stream of top talent for NASA as well as helping to alleviate a national shortage of such skills.

Participants in the four-year-old NASA-wide program were recommended by minority/female advancement programs at the universities and by an innovative program in which Lewis senior managers actively recruit students from their (managers') alma maters.

During the three-month period here from early June to late August, the students work on a research project so that their textbook knowledge may become practical experience. Lewis engineers and scientists work alongside the students monitoring their progress.

"We attempt to match the research project to the student's individual talent, ambition and degree program objectives," explains Judy Montfort of the Lewis Equal Opportunity Programs Office who has headed the program since its inception. Hands-on training for the 40 engineering and science

-more-

(Distribution July 14, 1986)

aides is augmented by specialized instructions and lectures on their assigned projects. The students are expected to make real research contributions as they proceed.

Colleges and universities represented in the program this year are Case Western Reserve University, Georgia Institute of Technology, Prairie View A&M University, Massachusetts Institute of Technology, Purdue University, Rensselaer Polytechnic Institute, University of Washington, Central State University, Illinois Institute of Technology, Spelman College, Hampton Institute, Cornell University, Southern University, University of Puerto Rico and Tennessee State University.

# # #

86-40

NASA News

National Aeronautics and
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Lewis Research Center
21000 Brookpark Road, Cleveland, Ohio 44135
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86-42

For Release:
IMMEDIATE

Linda S. Ellis
(res: 216/779-1266)

30 SCIENCE FAIR AWARD WINNERS

TO TOUR NASA LEWIS ON JULY 18

CLEVELAND,OH -- Friday, July 18, will be an exceptional day for some thirty regional Science Fair NASA Award Winners. The high school students and their parents will receive the V.I.P. treatment at the NASA Lewis Research Center.

The students, each recognized by NASA for outstanding achievement in creative scientific endeavor, will visit the Lewis Visitor Information Center, the Propulsion Systems Laboratory where full-scale jet engines are tested, 8 x 6 Supersonic Wind Tunnel and the Zero Gravity Facility, used to simulate microgravity effects of space on liquids, gases and combustion. Lewis representatives will describe the Center's activities, including Lewis' role in developing the onboard power system for space station.

Early in the day the winners and their parents will see a presentation on the Teacher In Space Program from finalist Robert S. Foerster.

According to Joseph A. Nervi of the Educational Services Office at Lewis, "We at NASA feel the students' participation in the Science Fairs

-more-

(Distribution July 15, 1986)

will have a lasting effect upon their interest and enthusiasm in career selection in science and engineering." Nervi is overall coordinator for the Lewis program.

Winners coming to Lewis represent schools in the six-state area of Ohio, Illinois, Indiana, Michigan, Minnesota and Wisconsin.

OHIO

NAME	SCHOOL	CITY OF RESIDENCE
Cameron, Steve	Evergreen High School Metamora, OH	Lyons, OH
Hartman, Rodney D.	Bloom-Carroll High School Carroll, OH	Lancaster, OH
Mortimer, Kim	Hathaway Brown School Shaker Hts., OH	Cleveland Hts., OH
Orthwein, John	Patrick Henry High School Hamler, OH	Hamler, OH
Sauer, Mike	Ayersville High School Defiance, OH	Defiance, OH

ILLINOIS

Losiniecki, Mark	Grissom Chicago, IL	Chicago, IL
McDonald, David	Taylorville Junior High Taylorville, IL	Taylorville, IL
Saville, David G.	Mid-County Varna, IL	Lacon, IL
Schwarzberger, Neal	Mather Chicago, IL	Chicago, Il
Welk, Joseph	Taft Chicago, IL	Chicago, IL 60631

INDIANA

Fisher, Tiffiny	Tolleston Middle School Gary, IN	Gary, IN
Guinn, Troy J.	McIntosh Elementary School Auburn, IN	Auburn, IN

-more-

King, John M.	Ss Peter & Paul School Merrillville, IN	Merrillville, IN
Lidy, Steven	Pierre Moran Junior High Elkhart, IN	Elkhart, IN
Matthews, Eric D.	Plaza Park Middle School Evansville, IN	Evansville, IN
Meadows, Angela	Visual & Performing Arts Center Gary, IN	Gary, IN
Meschberger, Ryan T.	McIntosh Elementary School Auburn, IN	Auburn, IN
Mosley, Jeff	J. E. Ober Elementary Garrett, IN	Garrett, IN
Smith, Dane	Mattinsville East Middle School Martinsville, IN	Martinsville, IN
Vegeler, Sean R.	Canterbury School Forty Wayne, IN	Fort Wayne, IN
Wilson, Erik C.	Linton Stockton Junior High Linton, IN	Linton, IN

MICHIGAN

Brady, Nathan	Handley School Saginaw, MI	Saginaw, MI
Bridgewater, Khary	Center for the Arts & Sciences Saginaw, MI	Saginaw, MI
Hoag, Theodore	Roeper School Bloomfield Hills, MI	Bloomfield Hills, MI
Mersha, Assegid A.	Handley School Saginaw, MI	Saginaw, MI
Willner, Jordan	Detroit Country Day Bloomfield Hills, MI	Farmington Hills, MI
Wilson, Adam	Our Lady of the Lakes Keego Harbor, MI	Pontiac, MI

-more-

MINNESOTA

Hipwell, Cynthia	Loyola High School Mankato, MN	N. Mankato, MN
Nelson, Kaia	Wayzata E. Junior High Wayzata, MN	Plymouth, MN
Schroeder, Jonette Joyce	Caledonia High Caledonia, MN	Caledonia,MN

WISCONSIN

Seider, Joel	Alverno Campus Elementary Milwaukee, WI	Milwaukee, WI

# # #

86-42

NASA News

National Aeronautics and
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Lewis Research Center
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86-48

For Release:
IMMEDIATE

Charles Mitchell
(res: 216/243-6228)

NASA HIGH ACHIEVEMENT AWARD

GOES TO WELLINGTON RESIDENT

CLEVELAND, OH -- NASA Lewis Research Center scientist Dr. James D. McAleese recently received NASA's high achievement award for helping to develop a standardized structural analysis system for the aerospace industry. The award includes a $1,500 stipend.

Called the NASA Structural Analysis System (NASTRAN), it is the specifications used throughout the aerospace industry for structural research on missiles and aircraft. McAleese was an original member of the ad hoc group that started work on the specifications 10 years ago.

McAleese heads Lewis' Dynamics Section of the Space Transportation Engineering Division that is responsible for conducting research on structures, loads and control problems associated with launch vehicles. He and his wife, Tammy, live in Wellington and are the parents of Kelly and Jimmy. Kelly is a medical student at Dartmouth, and Jimmy is enrolled in pre-law at Case Western Reserve University.

# # #

(Distribution August 11, 1986)

NASA News

National Aeronautics and
Space Administration

Lewis Research Center
21000 Brookpark Road, Cleveland, Ohio 44135
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For Release:
IMMEDIATE

86-49

Charles Mitchell
(res: 216/243-6228)

NASA SELECTS MARYLAND FIRM FOR CONTRACT NEGOTIATION

CLEVELAND, OH -- NASA Lewis Research Center has selected RMS Technologies, Inc. of Landover, Maryland for final negotiations leading to award of a cost-plus-award-fee, 5-year contract for maintenance operation of the center's computer systems. The contractor's estimated value of this contract is $18 million.

This contract consolidates various on-going contracts and purchase requests and gives RMS Technologies, Inc. exclusive responsibility for maintaining and operating a wide range of automatic data processing equipment located throughout Lewis. Work will be performed on-site.

Other firms submitting proposals were Mercury Consolidated, Inc., Hampton, Virginia, and ISN/Vanguard, Chevy Chase, Maryland.

# # #

(Distribution August 12, 1986)

National Aeronautics and
Space Administration

Lewis Research Center
Cleveland, Ohio
44135

NASA

Reply to Attn of: 0113

September 2, 1986

Note to Editor/News Director:

NASA's Lewis Research Center, Cleveland, Ohio will host a symposium on Microgravity Fluid Management on September 9-10, 1986.

Purpose of the symposium is to assess the current state of technology in microgravity fluids management and to develop a plan to ensure the technologies needed beyond the initial operating concept for Space Station. The ultimate potential of the Space Station as a manned outpost, laboratory, factory, space transportation hub and satellite servicing facility will depend on fluid management capabilities and operations. Types of fluids that will be discussed include super fluid helium, liquid hydrogen, liquid nitrogen, liquid oxygen, water, and boiling metals.

Some 100 representatives from industry, academia and government are expected to attend.

Sponsored by NASA Lewis, the symposium will be held in the Development Engineering Building on the north side of Brookpark Road.

If you would like to attend or have any questions, please call me. I can be reached on 216-433-2900.

Linda Ellis

Linda S. Ellis
Public Affairs Specialist

Enclosure

86-50

Preregistration Procedure

1. By August 22, 1986, return the enclosed registration card.

2. Enclose a check for the $55.00 registration fee. The fee covers conference presentations, lunches on September 9 and 10, social hour and dinner on September 9, and facility tour.

   Make check payable to Sverdrup Technology, Inc.

3. Mail preregistration card and check to

   NASA Lewis Research Center
   Attn: R.W. Vernon, MS 500-217
   21000 Brookpark Road
   Cleveland, OH 44146

Hotel

A block of rooms at a convention rate of $45 for single or double accommodation is available at the Harley Hotel:

Harley Hotel—Cleveland West
17000 E. Bagley Road
Middleburg Heights, OH 44130
216-243-5200

Onsite Registration and Packet Pickup

Onsite registration as well as packet pickup for preregistered participants:

8:00-8:45 a.m.
Wednesday, September 9
NASA Lewis Research Center
Development Engineering Building Lobby (Bldg. 500)
Cleveland, Ohio

NOTE: Persons who do not hold U.S. citizenship should inquire in advance about the registration process.

Message Center Telephone Number

A conference message center at the following number:
216-433-2693

Additional Information

For additional information, contact:

Celine Zenda
Sverdrup Technology
16530 Commerce Court
Middleburg Heights, OH 44130
216-234-2111

NASA
National Aeronautics and Space Administration

Lewis Research Center
Cleveland, Ohio 44135

Microgravity Fluid Management Symposium

September 9-10, 1986

Hosted and sponsored by
NASA Lewis Research Center
Cleveland, Ohio

Purpose

NASA's Office of Aeronautics and Space Technology (OAST) has announced a new initiative beginning in FY 1986 that includes fluid management as one of seven theme areas. Symposium speakers will summarize NASA space missions, applications, and programs requiring fluid management technology.

Additionally, they will point to issues raised by the OAST initiative. They will

- Review present research and development for fluids management
- Assess present technology
- Identify future technological requirements
- Outline typical program activities for experiment definition and hardware-development programs

Symposium Location

NASA Lewis Research Center
Development Engineering Building
Cleveland, Ohio

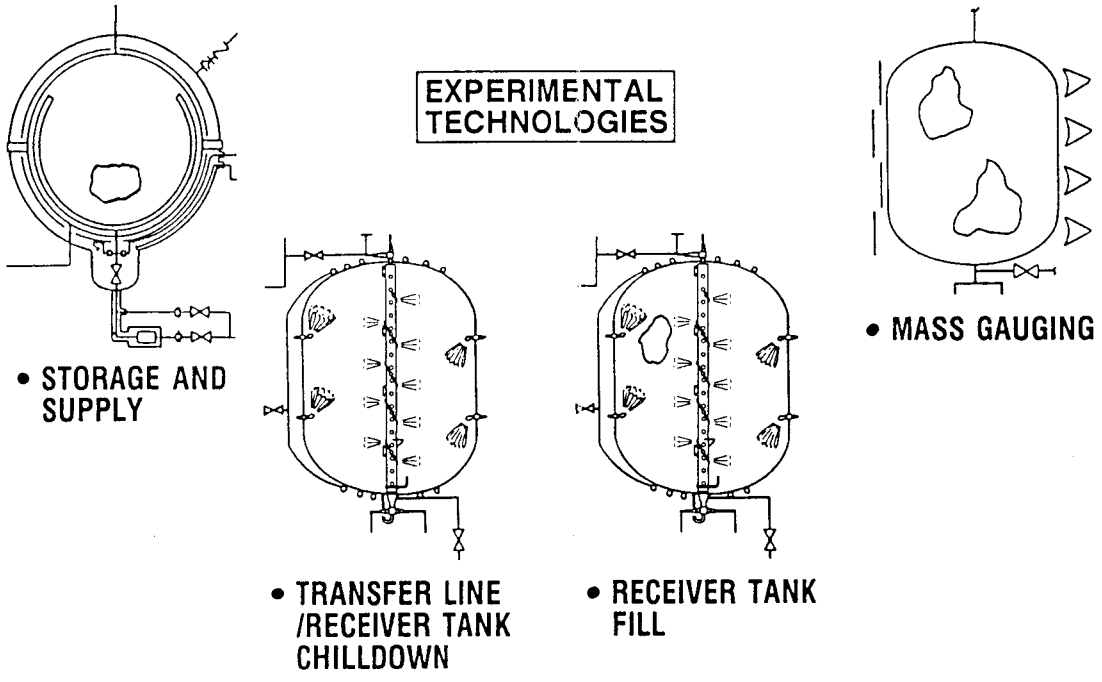
Microgravity Fluid Management Symposium Program

Tuesday, September 9, 1986

8:00 a.m.	Registration
9:00 a.m.	Introduction and OAST Overview
10:00 a.m.	Break
10:30 a.m.	**Session 1: Fluid Storage**
1:00 p.m.	Lunch
2:00 p.m.	**Session 2: Fluid Acquisition and Transfer**
3:15 p.m.	Break
3:30 p.m.	**Session 2 continued**
6:30 p.m.	Social Hour—Harley Hotel
7:30 p.m.	Dinner—Harley Hotel

Wednesday, September 10, 1986

8:30 a.m.	**Session 3: Fluid Management Applications**
10:30 a.m.	Break
11:00 a.m.	**Session 4: Project Activities and Insights**
1:00 p.m.	Lunch
2:00 p.m.	**Tour of Lewis Zero-Gravity Facility**
3:00 p.m.	Conference Ends



National Aeronautics and
Space Administration

Lewis Research Center
Cleveland, Ohio
44135

NASA

Reply to Attn of: 0113

September 9, 1986

NOTE TO EDITOR/NEWS DIRECTOR:

Enclosed is the schedule of weekend programming for October, November and December at the NASA Lewis Visitor Information Center.

Overall theme for the three months is "Living in Space."

October will concentrate on the early studies on differences between living on Earth and living in space. November's topic is "A Day on the Shuttle," and will focus on how astronauts eat, sleep and work in space. December's theme is "Space Station: The Next Logical Step." Videotapes and slide programs will detail some of the new challenges for living and working in space.

Please give me a call at 216-433-2900 if you have questions. We appreciate your continued interest.

Sincerely,

Linda Ellis

Linda S. Ellis
Public Affairs Specialist

86-52

OCTOBER

LIFE IN A "CAPSULE"
Saturday - 4, 11, 18, 25

10:00 a.m. A Day in Space
11:00 a.m. Life in a "Capsule"
12:00 m. This is Lewis and shuttle film
1:00 p.m. Life in a "Capsule"
2:00 p.m. A Day in Space

Sunday - 5, 12, 19, 26

1:00 p.m. A Day in Space
2:00 p.m. Life in a "Capsule"
3:00 p.m. This is Lewis and shuttle film
4:00 p.m. Life In a "Capsule"

NOVEMBER

A DAY ON THE SHUTTLE
Saturday - 1, 8, 15, 22, 29

10:00 a.m. Eating & Sleeping in Space
11:00 a.m. A Day on the Shuttle
12:00 m. This is Lewis and shuttle film
1:00 p.m. A Day on the Shuttle
2:00 p.m. Eating & Sleeping in Space

Sunday - 2, 9, 16, 23, 30

1:00 p.m. Eating & Sleeping in Space
2:00 p.m. A Day on the Shuttle
3:00 p.m. This is Lewis and shuttle film
4:00 p.m. A Day on the Shuttle

DECEMBER

SPACE STATION: THE NEXT LOGICAL STEP
Saturday - 6, 13, 20, 27

10:00 a.m. Shuttle in the World of Weightlessness
11:00 a.m. Space Station Living
12:00 m. This is Lewis and shuttle film
1:00 p.m. Space Station Living
2:00 p.m. Shuttle in the World of Weightlessness

Sunday - 7, 14, 21, 28

1:00 p.m. Shuttle in the World of Weightlessness
2:00 p.m. Space Station Living
3:00 p.m. This is Lewis and shuttle film
4:00 p.m. Space Station Living

National Aeronautics and
Space Administration

Lewis Research Center
Cleveland, Ohio
44135

NASA

Reply to Attn of: 0113

September 11, 1986

NOTE TO EDITOR/NEWS DIRECTOR:

NASA Lewis is proud to announce the official opening and dedication of a new display at the NASA Lewis Visitor Information Center (VIC), the actual Apollo/Skylab 3 capsule. You are invited to attend the dedication ceremonies on Sunday, September 21 at 2 p.m. EDT at the VIC.

Skylab 3 (SL-3) was in orbit from July 28 to September 25, 1973. During the 59 1/2 day flight SL-3 completed 858 revolutions of the Earth and traveled some 24,400,000 miles in Earth orbit. Skylab 3 ended with a Pacific splashdown and recovery by the USS New Orleans. Jack Lousma was pilot for Skylab 3, Alan L. Bean was spacecraft commander, and Owen K. Garriott was scientist-pilot.

NASA Lewis is celebrating its 45th anniversary this month and that day employees and their families will be at the VIC and at various tour stops throughout the Lewis Center. An Open House for the general public will be held September 27 and 28 from 10 a.m. - 6 p.m. each day.

If you would like to attend the dedication on September 21, please call me. I can be reached on 216-433-2900.

Linda Ellis

Linda S. Ellis
Public Affairs Specialist

86-56

NASA News

National Aeronautics and
Space Administration

Lewis Research Center
21000 Brookpark Road, Cleveland, Ohio 44135
AC (216) 433-2901

For Release:
IMMEDIATE

86-59

Charles Mitchell
(res: 216/243-6228)

NEW NASA LEWIS PRODUCTS

AMONG NATION'S 100 BEST

CLEVELAND, OH--Four products developed by NASA Lewis Research Center are included on Industrial Research/Development Magazine's national list of the 100 most significant new technological developments of the past year.

Selections were made by a blue-ribbon panel of judges from more than 1,000 entries submitted. Winners will be honored in a ceremony at the Chicago Museum of Science and Industry on September 25.

NASA Lewis products selected for the prestigious IR-100 award are NASA Lube PS 200, Thermal Barrier Coating System, Arc Spray Monotape Process, and Prop-Fan and UnDucted Fan Engine.

Senior scientist Harold E. Sliney of Parma, Ohio, developed the NASA Lube PS200. The product provides low friction and wear performance in reducing and oxidizing atmospheres at temperatures up to 900^{0}C for such systems as the Stirling engine and gas turbines. The best high temperature oils available on the market today are limited to less than

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(Distribution September 25, 1986)

$300^{0}C$. Sliney's invention has the potential to solve critical problems on advanced technology propulsion and power generation systems currently in the conceptual or developmental stage.

The Thermal Barrier and Coating System was developed by materials scientist Dr. Stephan Stecura, also of Parma. His invention is a two-layer coating system consisting of a bond and ceramic coatings applied to components by plasma spray deposition. The deposited system introduces a thermal barrier between extremely high temperature gases and cooled metal parts. Ceramic coating insulates the working metal, causing metal temperature reductions and substantially increasing the life of the metal parts.

This system has the potential to protect air-cooled blades, vanes and combustors of both stationary and aircraft gas turbines. It provides the thermal insulation that increases the life capability over any system on the market.

NASA Lewis metallurgist Leonard J. Westfall of North Olmsted invented the Arc Spray Monotape Process. This process produces large sections of single-layer composites called monotapes. A liquid metal spray is created by passing two wires through an arc spray gun attached to an inert gas chamber. High pressure inert gas is focused on the molten wire tips to produce a liquid metal spray. The liquid metal, deposited on an array of fibers wound around a drum surface, solidifies to produce a clean, large, low cost section of montape. Westfall's monotapes can be fabricated into complex composite shapes by a difficult hot pressing technique for use on such future products as turbine blades and large panels for hypersonic aircraft.

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The Prop-Fan (a joint effort by Lewis and Hamilton-Standard Company), and UnDucted Fan Engine (a joint effort by Lewis and General Electric), were combined as one entry by IR-100 evaluators. David A. Sagerser of Bay Village was the Lewis project engineer for Prop-Fan and Edward T. Meleason of Fairview Park was project engineer for the UnDucted Fan Engine.

The Prop-Fan and UnDucted Fan are aircraft propulsion devices that offer future lightweight subsonic aircraft more efficient thrust over a wide range of flight speeds and substantial fuel savings. The Prop-Fan achieves high efficiency by utilizing multiple, swept, thin blades and a specially contoured nacelle to reduce drag losses at high speeds. It is driven by a gas turbine engine through a reduction gearbox.

The Unducted Fan Engine has a unique direct turbine drive that eliminates the need for a reduction gearbox to transmit power to the propeller blades. Efficient thrust is produced by combining a high-pressure-ratio core engine with multistage counter-rotating power turbine and counter-rotating advanced high speed propeller.

# # #

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NASA News

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Lewis Research Center
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For Release:
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86-60

Linda S. Ellis
(res: 216/779-1266)

AEROSPACE EDUCATION CONFERENCE COMES TO

CHICAGO'S MUSEUM OF SCIENCE AND INDUSTRY

CLEVELAND, OH -- Learning how to use aerospace education resources to improve instruction will be the objective for some 150 attendees when they gather at Chicago's Museum of Science and Industry on October 10-11, 1986.

The Great Lakes Region Aerospace Education Conference will include teachers, youth group leaders, and aviation and space education advocates from seven states, including Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota and Kentucky.

"Purpose of the conference is to provide expert, significant and substantive background information for the attendees to incorporate into their local community," according to Dr. R. Lynn Bondurant, Chief of Educational Services at NASA's Lewis Research Center. He is overall coordinator for the conference.

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(Distribution September 29, 1986)

The conference is cosponsored by the Great Lakes Region's Federal Aviation Administration, the NASA Lewis Research Center, the U.S. Air Force Civil Air Patrol, and Chicago's Museum of Science and Industry. Cooperating organizations include the Great Lakes Region State Committees and Councils on Aerospace Education, and the State Departments of Education.

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86-60

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86-66

Charles Mitchell
(res: 216/243-6228)

NASA AWARDS $8 MILLION CONTRACT FOR ATLAS/CENTAUR

CLEVELAND, OH--NASA Lewis Research Center, Cleveland, Ohio, has awarded an $8-million contract to the General Dynamics Corp., Convair Division, San Diego, California, to provide management and engineering services to support the Atlas/Centaur launch vehicle program.

These support services include logistics management, engineering testing and reliability and quality assurance. The cost-plus-award-fee, follow-on contract begins October 1, 1986 and ends December 31, 1987. Work will be performed at the contractor's plant in San Diego.

Centaur is a high-energy upper stage using hydrogen/oxygen cryogenic propellants. The Atlas/Centaur booster rocket can deliver large payloads to geosynchronous Earth orbit. The Atlas/Centaur combination has launched a variety of scientific missions as well as numerous domestic and military communication satellites.

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Linda S. Ellis
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TELESCOPE WORKSHOP AT NASA LEWIS

VISITOR INFORMATION CENTER

CLEVELAND, OH -- Properties of light, what light is and how it can be used, how mirrors and lenses are used to gather light, and what you can see in the sky with and without a telescope. These are some of the topics that visitors can focus on when they come to the NASA Lewis Visitor Information Center (VIC) on Saturday, October 18.

That day a special workshop, "Refraction Action - Light, Lenses and Looking Up," will take place from 10 a.m. - 3 p.m.

Norman Oberle, well-known Cleveland telescope maker and instructor, will conduct briefings and demonstrations throughout the day on mirror grinding techniques used to make reflector telescopes and the proper use of telescopes.

The NASA Lewis Astronomy Club will provide a special display of telescopes and special demonstrations will be conducted throughout the day in exhibit areas at the VIC for all ages and interest levels. A special exhibit describing the Hubble Space Telescope will be on display

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(Distribution October 3, 1986)

throughout the month. Hubble Space Telescope is a 94 1/2-inch telescope which will be placed in orbit by NASA's space shuttle. With it, astronomers will be able to see with ten times the clarity of the best ground-based telescopes.

The workshop activities and the VIC display areas are all open to the public. For additional information please call 216-433-2019.

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NASA News

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86-69

Linda S. Ellis
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NASA LEWIS TO OPEN REGIONAL TEACHER RESOURCE ROOM

AT THE CHILDREN'S MUSEUM, INDIANAPOLIS, IND.

CLEVELAND, OH -- Thousands of students and educators in central Indiana will soon have a wealth of free NASA information available almost at their fingertips.

On October 30, 1986, NASA's Lewis Research Center, Cleveland, Ohio, will officially open and dedicate a new Regional Teacher Resource Room (TRR) at The Children's Museum of Indianapolis, Indiana.

Elementary through university level teachers and students may use the new facility as a resource site for selected NASA films, slides and printed materials on the United States' aerospace achievements.

The new facility at The Children's Museum makes available such instructional materials as lesson plans and activities, educational literature, 35 mm slides and audio and video tapes. The only costs are copying charges for slides. Educators are asked to provide their own blank audio and video cassettes.

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(Distribution October 22, 1986)

According to Judith C. Olson, Deputy, Educational Services Office at Lewis, "Educators, students, and NASA now all may take advantage of this opportunity for communication. The Regional Teacher Resource Rooms have an inventory of materials including all aspects of aerospace activity - aeronautics, astronomy, meteorology, ecology, communications and space exploration."

Some ten years ago the first Teacher Resource Room was established by NASA Lewis at the Lewis Research Center in Cleveland. Interest in the materials was lively and within a short time the Lewis-based center alone was handling more than 30,000 items each year for area teachers.

The first Regional Teacher Resource Room was established by Lewis at Oakland University, Rochester, Michigan, in 1983. In 1984 one was established at St. Cloud State University, St. Cloud, Minnesota, and one at Mankato State University, Mankato, Minnesota. In January of 1985 a fourth center was opened at the University of Wisconsin-LaCrosse, Wisconsin. Throughout 1985 additional centers were opened at Chicago's Museum of Science & Industry, Milwaukee's Science, Economics and Technology Center, and the University of Evansville, Evansville, Indiana. In 1986 centers were opened at City College, New York, New York; The NASA Industrial Applications Center, University of Pittsburgh, Pennsylvania; Northern Michigan University, Marquette, Michigan; and Champlain College, Burlington, Vermont.

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86-70

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Charles Mitchell
(res: 216/243-6228)

NASA SELECTS LORAIN, OHIO FIRM FOR CONTRACT NEGOTIATIONS

CLEVELAND, OH -- NASA Lewis Research Center, Cleveland, Ohio, has selected Warner-Osborn-Pardee, Inc., of Lorain, Ohio for final negotiations leading to award of a cost-plus-award-fee, follow-on contract for a wide variety of engineering and construction work. Estimated value of the 5-year contract is $56 million.

Services under this contract include work on heating and ventilating, plumbing, electrical and communications systems and buildings and grounds. Major engineering work will be performed at the contractor's office, while minor engineering and all construction work will be performed at the Lewis Research Center.

Other firms submitting proposals were Boyas Excavating, Feldman Mechanical, HWH, Inc., Madison/Roediger, Middough Associates and Schirmer Construction of Cleveland, Ohio, Reliance/Rider, Rocky River, Ohio, and Engineering Design Group, Tulsa, Oklahoma.

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Charles Mitchell
(res: 243-6228)

ULTRA PRECISE MACHINE TOOLS

SUPPORT NASA LEWIS PROJECTS

CLEVELAND, OH--Computer-operated precision tools capable of making finished cuts that are 60 times smaller than the diameter of a human hair are helping to support vital research projects at NASA Lewis Research Center.

The addition of computer numerical controlled (CNC) machine tools over the past dozen years triggered a need to update the technical training for the 30 already highly skilled modelmakers in Lewis' Machining and Metal Processing Branch.

Branch Chief Gerald L. Matusik explains: "We have previously required that our modelmakers set up and operate a very wide variety of conventional machine tools, and we are now expanding that requirement to include a variety of CNC machines. This kind of versatility is needed here at Lewis because of our small staff and the complex and diverse nature of our work."

Among the newer CNC machines are axis milling machines with a capacity to handle up to 10,000 pounds and the capability to perform five separate actions simultaneously. Altogether, there are 12 CNC machines

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(Distribution October 31, 1986)

available to manufacture everything from turbine blade airfoils, contoured inlet models, and compressor impellers to simpler hardware machinable with two and three axis machines.

All numerical programming is done by NASA Lewis personnel, according to Matusik. The more complex work being programmed by modelmakers with advanced specialized training is guided by Jack Noonan, head programmer. Simple part geometries are often manually programmed at the machine by the modelmakers.

Of equal importance to the Machining and Metal Processing Branch was the acquisition of ultra-high precision machining capability three years ago.

James I. Bergstrom, Chief of the Fabrication Support Division and instrumental in acquiring the capability, explains its purpose: "The purpose in acquiring this technology was to produce small ultra precise parts, some with highly specular surfaces needed for laser mirrors, and micro-drilling for arcjet thrusters and Space Station heat exchangers." Most of the ultra-high precision machining is performed on a CNC 10-inch capacity air bearing lathe.

There are three CNC lathes, eight CNC milling machines, and one CNC wire electrical discharge machine and a CNC electron beam welder in use by the branch.

Although today's emphasis is on CNC machining, conventional machining is still used to produce the majority of research hardware made at Lewis, according to Matusik.

Conventional machine tools used include horizontal and vertical lathes - from jeweler's lathes to a 72-inch swing capacity with tracing features.

Grinding equipment includes tool and cutter, surface, cylindrical and centerless grinders and honing and lapping machines.

Milling machines range in size from small vertical ones to large horizontal spindle mills with 48" x 60" capacity.

Other equipment includes jig boring machines, vertical and horizontal shapers, heat treating furnaces, vacuum brazing furnaces, electron beam welders, dynamic balancing machines, airfoil milling machines and electrical discharge machines.

"Although the most advanced machinery is critical to our branch, our most important resource by far is our staff of versatile, high-skilled modelmakers," Matusik concludes.

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NASA News

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NASA AWARDS HIGHEST MEDALS

TO LEWIS CENTER EMPLOYEES

CLEVELAND, OH -- NASA Administrator Dr. James C. Fletcher will present the space agency's highest medals for excellence in science, engineering and service to 17 Lewis Research Center employees in special ceremonies here on November 19.

Dr. Fletcher, together with Lewis Acting Director Dr. John M. Klineberg will also honor two NASA Lewis researchers for writing the best technical paper of 1985 and present 40 and 45-year service pins to 10 employees.

Dr. Kenneth J. Baumeister and Dr. Robert Siegel will receive the NASA Exceptional Scientific Achievement Medal for the following reasons.

BAUMEISTER, Middleburg Heights: "For pioneering research in the field of numerical duct acoustics and the development of innovative techniques making possible the use of numerical methods for the analysis of noise suppression obtained from realistic aircraft inlets."

SIEGEL, Shaker Heights: "For numerous important and wide-ranging contributions to the field of heat transfer, which include some of the earliest work on zero gravity boiling, radiation heat transfer, heat transfer in porous media, and transient natural convection heat transfer."

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(Distribution November 12, 1986)

Receiving the NASA Exceptional Engineering Achievement Medal are the following persons.

CALVIN L. BALL, Columbia Station: "For exceptional creativity, insight and technical leadership in developing technology for cryogenic pumps, multi-stage compressors and small gas turbines which has been widely applied in government and industry."

DR. CHRISTOS C. CHAMIS, Westlake: "For exceptional insight and creativity in developing advanced analysis methods and computer codes for predicting and verifying the structural response and durability of advanced composites components and structures, including those for several major NASA hardware programs."

DELMAR W. DRIER, Parma Heights: "For creative and innovative engineering contributions to the successful development of advanced turbomachinery for aeronautical propulsion."

The NASA Exceptional Service Medal recipients are the following persons.

MARGARET C. APPLEBY, Cleveland: "For exceptional contributions and continuing achievements in developing the high standards in editorial services which has enhanced Lewis Research Center's reputation in providing quality research publications." She also will be awarded a 40-year service pin.

SALAVATORE J. GRISAFFE, Rocky River: "In recognition of significant contributions and outstanding qualities of leadership in the advancement of materials technologies for aeropropulsion, space propulsion and power, microgravity science and applications, and research productivity."

ROBERT G. HOFFMAN, Huron: "For his contribution to NASA in providing outstanding leadership as Chief of the Test Installations Division, Lewis Research Center."

FRANKLIN J. KUTINA, Chagrin Falls: "In recognition of exemplary leadership in managing projects that have made valuable contributions to the U.S. world leadership in propulsion and power generation technology."

DANIEL S. PROK, Berea: "For superior initiative and effective management of the supply and logistics functions at the Lewis Research Center which has contributed to the center's productivity."

RICHARD O. RAABE, Avon Lake: "For contributions to NASA in providing outstanding leadership in the dual role as Deputy Chief of the Facilities Operations and Maintenance Division and as the Lewis Research Center's Energy Manager."

NEAL T. SAUNDERS, Parma: "In recognition of outstanding contributions in the development and management of the Lewis Research Center aeronautics program."

HUGH A. SCHOEFFLER, Rocky River: "For contributions to NASA in providing outstanding electrical engineering expertise and leadership as Chief of the Electrical Engineering Branch, Facilities Engineering Division, Lewis Research Center."

GILBERT K. SIEVERS, North Olmsted: "For keen technological insight, unique managerial skills, and outstanding leadership in leading the development of the high speed propeller (prop-fan) engine program which is now the key feature of new, highly efficient, economically viable commercial transports proposed for the 1990s."

RICHARD E. TEXLER, Middleburg Heights: "In recognition of outstanding leadership in creativity in managing the photographic and printing services which have contributed significantly to the Center's research programs."

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RONALD L. THOMAS, Fairview Park: "In recognition of outstanding contributions to the advocacy, structuring and management of major energy-related programs at the Lewis Research Center."

HAROLD E. ZAGER, Parma Heights: "For outstanding technical leadership, engineering achievements and unusual initiative in maintaining and enhancing the testing capabilities of the Lewis Center's propulsion wind tunnels and support systems."

Arthur N. Curren of North Ridgeville and Kenneth A. Jensen of Bay Village are co-winners of the Distinguised Paper Award which also includes a monetary stipend. Title of their paper is "Textured Carbon on Copper: A Novel Surface With Extremely Low Secondary Electron Emission Charateristics." It describes a method for depositing textured carbon on copper by a sputtering process to increase efficiency of collector electrodes and traveling wave tube.

Receiving 45-year service pins are Melvin J. Derwis of Fairview Park, and W. Charles Noe and Jerrold D. Wear of North Olmsted.

Forty-year recipients are Appleby, Cleveland; Helen C. Monroe, Cleveland; Margit Comer, Kenneth Yass and Andrew B. Szuhai, North Omsted; Lloyd W. Trunk, Westlake and Herbert G. Hurrell, Bay Village.

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NASA News

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86-78

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Charles Mitchell
(res: 216/243-6228)

NASA LEWIS RESEARCH CENTER

COMPLETES REORGANIZATION

CLEVELAND, OH -- A reorganization was recently completed at NASA Lewis Research Center to reflect the Center's shift to space flight projects and to meet the safety recommendations made by the Presidential Commission.

Affected are the Center's Space Transportation Engineering Division, Engineering Design Division and the Reliability and Quality Assurance Office. The former two were consolidated to form a new Engineering Directorate while the latter was upgraded to a major staff office that will report directly to the Center Director.

Acting Center Director Dr. John M. Klineberg said in a speech to the Lewis staff that the reorganization was necessary because of Lewis' increasing involvement in developing space flight hardware and was precipitated by the cancellation of the Shuttle/Centaur program. A 10-person team appointed by Dr. Klineberg recommended that a reorganization was the most effective way to use Lewis resources, particularly manpower, in light of those developments.

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(Distribution December 12, 1986)

The Engineering Directorate will be headed by Steven V. Szabo, Jr., of Avon, Ohio, who was chief of the Space Transportation Engineering Division. His deputy will be Joseph A. Yuska, Rocky River, Ohio, who headed the Engineering Design Division before the merger. The new directorate will be responsible for all engineering support for the Center's projects in aeronautics, space flight and experimental research and technology.

Dr. Robert G. Rohal of North Royalton, Ohio will be Acting Chief of the Reliability and Quality Assurance Office. That office will be responsible for planning, directing, executing and evaluating all facets of hardware development to ensure the highest possibilities of success.

Szabo, Yuska and Rohal have held increasingly important posts since joining the Lewis Center. Szabo has been associated with the Centaur Project in various capacities since coming to Lewis in 1963. He was involved in activities associated with zero gravity propellant behavior and in demonstrating Centaur engine restart after the engine coasted in space. In 1974, Szabo was promoted to assistant chief of the Mechanical Systems Branch of the Centaur Project, and subsequently promoted to various supervisory positions within that directorate. He is the author of several technical papers on propulsion and propellant systems.

Yuska joined Lewis in 1962 and has conducted studies on the aerodynamics of sounding rockets and the aerodynamic design of Lewis' 9 x 15-foot V/STOL Wind Tunnel. He has been responsible for managing test operations in such test facilities as the Propulsion Systems Laboratory, Vertical Lift Fan and the Coaxial Hot Jet Facility.

Rohal began his Lewis career in 1960 as a research engineer in the Chemical Rocket Propulsion Division and has worked in the Nuclear Power Systems Division. Rohal also provided engineering support to the

Atlas/Centaur and Titan/Centaur launch vehicle programs. He first joined the Reliability and Quality Assurance Office in 1980 where he held various supervisory positions including chief, Space Project Office in R&QA; manager, R&QA support to Atlas/Centaur, Shuttle/Centaur and other programs.

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NASA LEWIS CENTER FUNDS

IMPACT OHIO ECONOMY

CLEVELAND, OH -- The NASA Lewis Research Center's financial activities during Fiscal Year 1986 contributed to strengthening practically every sector of the Ohio economy, with the Greater Cleveland area benefiting the most.

Ohio firms and universities have perhaps been most profoundly affected by the Center's operations. In FY86, Lewis obligated approximately $127 million in contracts and research grants to some 100 firms and universities in amounts ranging from $864 to $1.6 million at the top range. The awards were spread out over 16 of Ohio's 21 Congressional districts.

The total purchases in FY86 cover a considerable diversity of procurements--everything from the latest state-of-the-art research and development to hose fittings. Additionally, some of the funds were designated specifically to help spur the growth of small businesses and to assist in areas of high unemployment in the State.

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(Distribution December 30, 1986)

The Lewis Center employs roughly 2,700 civil service workers and about 1,200 on-site contractors. During FY86, Lewis civil service employees and on-site contractors earned approximately $160 million in salaries and benefits. These salaries were taken home to 109 different cities in Ohio. Seven cities in the Greater Cleveland area have at least 120 residents employed at Lewis. North Olmsted, with 341 residents employed at Lewis, leads the way among cities in the Cleveland area.

NASA Lewis traditionally supports and utilizes many of Ohio's universities through research grants. Grants are envisioned as "seed money" aimed at benefiting both Lewis and the participating schools. They allow schools to attract and retain top professors while exposing Lewis to a pool of talented students from which to recruit and hire.

Ohio colleges and universities receiving research grant funding in FY86 were: Case Western Reserve University, $797,637; University of Toledo, $211,642; University of Akron, $137,034; Ohio State University, $99,980; Cleveland State University, $75,831; University of Dayton, $51,915; Central State University, $50,000; University of Cincinnati, $38,553; and Miami of Ohio University, $25,189.

Each year, too, dozens of students, interns and researchers are hired on a temporary basis by Lewis to contribute to the center's missions. While most of these persons are natives of Ohio, many come from around the country and the world.

Ohio utilities are also major beneficiaries of the Lewis Center presence. In FY86, Lewis spent more than $12 million on gas, electric and telephone service in addition to contracts and research grants obligated during that same period.

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NASA News

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NASA AWARDS $11 MILLION CONTRACT FOR ATLAS/CENTAUR

CLEVELAND, OH -- NASA Lewis Research Center, Cleveland, Ohio, has awarded an $11 million contract to General Dynamics Corp., Space Systems Division, San Diego, Calif., to erect, test and launch Atlas/Centaur vehicles at the Eastern Missile and Space Center, Fla. The launch vehicles will carry Fleet Satellite Communications spacecraft, a Department of Defense satellite.

The cost-plus-award-fee, follow-on contract with General Dynamics, began January 5, 1987 and ends December 31, 1987, unless the launch period is extended.

Centaur is a high-energy, upper stage using hydrogen/oxygen cryogenic propellants. The Atlas/Centaur combination has launched many large payloads, including a variety of scientific missions and domestic and military communications satellites to geosynchronous Earth orbit.

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87-6

Charles Mitchell
(res: 216/243-6228)

NASA SELECTS BETHESDA, MD. FIRM FOR CONTRACT NEGOTIATIONS

CLEVELAND, OH -- NASA Lewis Research Center, Cleveland, Ohio, has selected Electronic Data Systems, Bethesda, Md., for final negotiations leading to the award of a fixed-price contract to install a highly automated, information processing network for personnel at the Lewis Research Center. Estimated value of the 5-year contract is $31 million.

Major components and services to be provided range from computer terminals to scientific/engineering workstations, printers, plotters, software and telecommunications equipment to integrate with existing and future mainframe computers.

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Linda S. Ellis
(res: 216/779-1266)

ELEMENTARY TEACHERS LEARN LATEST AEROSPACE

CONCEPTS AT NASA LEWIS WORKSHOP

CLEVELAND, OH -- Some 75 Cleveland area elementary school teachers will learn the latest techniques and concepts for teaching aerospace topics when they attend a February 5-6 Aerospace Education Workshop at NASA's Lewis Research Center.

"Focus of the workshop is to enhance the quality of education by increasing teachers' knowledge about aerospace technology with the goal of directly applying that knowledge to classroom activities," according to Dr. R. Lynn Bondurant, Chief of the Educational Services Office at NASA Lewis.

A presentation on the NASA Teacher in Space Program will be given by Ms. Nancy (Niki) M. Wenger of Parkersburg, West Virginia, one of the ten national teacher finalists. Other activities will include suggested classroom projects on living and working in space, aeronautical projects, uses of television in the classroom, and computer networking.

The teachers will wrap up the second day's activities by touring the Visitor Information Center and the Teacher Resource Room which contains a myriad of free NASA educational materials for teachers.

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Linda S. Ellis
(res: 216/779-1266)

5000 CLEVELAND AREA SCHOOL CHILDREN

STAGE APRIL 8 SIMULATED SHUTTLE LAUNCH

CLEVELAND, OH -- The metamorphasis of school buses to Space Shuttles, classrooms and entire schools changed into planets and galaxies, elementary students turned into astronauts. No, this is not a stage set for Star Trek. Rather, it is thousands of Cleveland area school students preparing for a simulated Space Shuttle launch.

Scheduled for April 8, the event will involve students from five Cleveland elementary schools and four suburban elementary schools.

Purpose of this mind-bending event is to bring alive for students the classroom study of science, math and space related topics.

"The students will participate in every aspect of a Shuttle launch, including countdown, liftoff, planning and conducting onboard experiments, and debriefing after landing," according to Dr. R. Lynn Bondurant, Chief, Educational Services Office at NASA Lewis.

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(Distribution Feburary 26, 1987)

Each school has redesigned a school bus in the image of a Space Shuttle. Onboard each Shuttle, each appropriately named by the students, will be a team of astronauts, computers, experiments and two-way radios. The event will get underway at the nine different schools the morning of April 8 with "liftoff" from each site.

At about 11 a.m. EST each Shuttle will rendezvous with their partner school at NASA's Lewis Research Center. Here the astronauts will meet, conduct experiments and then board the Shuttles for return to their originating school or planet.

That evening a welcome home celebration will take place and parents and children will receive congratulatory messages from officials.

In addition, students from St. Vincent/St. Mary High School, Akron, and Walsh Jesuit High School, Stowe, will be participating in the simulated Shuttle flight program. These students will spend 24 hours onboard a simulated Shuttle on April 3-4. Their Shuttle will be located at the St. Vincent/St. Mary High School orbit (parking lot). To prepare for their mission the students will participate in underwater training, flight simulator training, and preparing experiments.

Cleveland area organizations and businesses are supporting the simulated Shuttle flight program.

Elementary schools participating in the April 8 launch follow and are listed with their rendezvous school:

Parknoll Elementary School
499 Nobottom Road
Berea, OH 44017

(rendezvous schools)

Fullerton School
5920 Fullerton
Cleveland, OH 44105

Alfred A. Benesch School
5393 Quincy
Cleveland, OH 44104

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Pine Elementary School (rendezvous school)
4267 Dover Road
North Olmsted, OH 44070

Daniel E. Morgan School
1440 E. 92 Street
Cleveland, OH 44106

Lowell Academy (rendezvous school)
3200 Clinton Avenue
Lorain, OH 44055

Walton School
3409 Walton Avenue
Cleveland, OH 44113

Helen Muraski Elementary School (rendezvous school)
20270 Royalton Road
Strongsville, OH 44136

Iowa Maple School
12510 Maple Avenue
Cleveland, OH 44108

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Charles Mitchell
(res: 216/243-6228)

NASA LEWIS AWARDS $6.1 MILLION CONTRACT FOR SPACE STATION TEST FACILITY

CLEVELAND, OH -- NASA Lewis Research Center, Cleveland, OH, has awarded a firm fixed price $6.1 million contract to the M.K. Ferguson Company, Cleveland, to build a 26,000-square-foot space power system test facility for the Space Station program.

Groundbreaking is scheduled for this spring at NASA's Lewis Research Center with a completion date in late fall of 1988.

The power system for the Space Station will be the largest ever launched into space. The facility will be used to validate the performance and operation of the complete, integrated electrical system for the Space Station. Since the power source for the Space Station will be a combination of photovoltaic (using solar cells to convert sunlight directly into electricity) and solar dynamic (using sun rays to heat a fluid to drive a turbine/alternator), the facility will have the capability to test both.

When completed, the facility will house a 9500-square-foot "clean" room, cleaner than most hospital operating rooms. The facility will also feature special purpose computer rooms and areas for energy storage, power processing and power system simulation.

# # #

(Distribution February 27, 1987)

NASA News

National Aeronautics and
Space Administration

Lewis Research Center
21000 Brookpark Road, Cleveland, Ohio 44135
AC (216) 433-2901

For Release:
IMMEDIATE

87-14

Linda S. Ellis
(res: 216/779-1266)

NASA LEWIS VISITOR CENTER FEATURES

SPECIAL GRADED SCHOOL PROGRAMS

CLEVELAND, OH -- Take a tour of the solar system, find out why and how airplanes fly, or learn the many ways we use the Sun as a source of energy. These are just a few of the new programs available for school groups at the NASA Lewis Visitor Information Center (VIC) here.

Students in kindergarten through twelfth grade may participate in a discussion, demonstration and tour tailored to their grade level on the newly instituted agenda at the VIC. The programs are designed to be compatible with school curriculums.

According to Doris Forror, curriculum coordinator at the VIC, "Purpose of the new programming is to offer to the student a variety of programming designed to bring alive their classroom study of space related activities."

Tailored for a second grade class, the tour of the solar system uses slides to study the Sun, each planet and its satellites, asteroids and comets. A tour of the related area of exhibits at the VIC is included.

-more-

(Distribution March 3, 1987)

Third graders learning the many ways we use the Sun as energy will focus on fossil fuel burning, wind, solar dynamic, photovoltaic and fuel cells. They, too, will see selected exhibits and a selected research facility.

The four forces acting on an aircraft and the four controls of those forces are featured for sixth graders finding out why and how airplanes fly. Portions of the VIC exhibit area that describe propulsion systems and aircraft development and testing are toured. Also a trip to the NASA hangar is included where students may see real airplanes up close.

Arrangements for the programming must be made by the teacher some six weeks in advance. The programs are offered Monday through Friday and groups up to 65 are acceptable.

For complete programming details call 216-433-2001.

# # #

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NASA News

National Aeronautics and
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87-15

For Release:
IMMEDIATE

Charles Mitchell
(res: 216/243-6228)

THIRTEEN NASA LEWIS EMPLOYEES

COMPLETE TRADES APPRENTICE TRAINING

CLEVELAND, OH -- Thirteen NASA Lewis Research Center employees successfully completed the Trades Apprentice Program to qualify as skilled laboratory and electronic systems mechanics, electricians and machinists.

Graduation followed four years of intensive classroom instructions coupled with hands-on training for the 13 employees. It also marked the 33rd time graduation was held here and boosts the total number of graduates to 994 since the program began in 1942.

All of the latest graduates are former Lewis co-op students who hold associate of applied science degrees from Cuyahoga Community College or Lorain County Community College. They continued classroom work related to their specific trade at Polaris Vocational Center in Middleburg Heights.

Names of the graduates are as follows:

EMYE L. BENAVAGE of Fairview Park is a graduate of Lorain County Community College and is an electronic systems mechanic.

WALTER E. HENDRICKS of Elyria is a graduate of Lorain County Community College and is a model maker machinist.

-more-

(Distribution March 4, 1987)

GERALD M. HILL of Olmsted Falls is a graduate of Cuyahoga Community College and is an electrician.

JAMES H. KNIGHT of Olmsted Falls is a graduate of Cuyahoga Community College and is a research laboratory mechanic.

DANIEL J. KOVACH, JR. of Maple Heights is a graduate of Cuyahoga Community College and is a research laboratory mechanic.

DAVID R. PLUMER of Parma is a graudate of Cuyahoga Community College and is an electronic systems mechanic.

JOHN H. SNEAD lives in Nova, Ohio, near Ashland. He is a graduate of Cuyahoga Community College and is an electronic systems mechanic.

PATRICK SPANOS of Sheffield Village is a graduate of Lorain County Community College and is a model maker machinist.

RICHARD E. TABAR of Hinckley is a graduate of Cuyahoga Community College and is a research laboratory mechanic.

RAYMOND P. WADE of Berea is a graduate of Cuyahoga Community College and is an electronic systems mechanic.

BRUCE A. WRIGHT of Euclid is a graduate of Cuyahoga Community College and is a research laboratory mechanic.

CHI-CHIU WYPASEK of Elyria is a graduate of Lorain County Community College and is an electronic systems mechanic.

MICHAEL A. ZELEK of Berea is a graduate of Cuyahoga Community College and is an electrician.

# # #

87-15

NASA News

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87-18

For Release:
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NASA LEWIS TO OPEN REGIONAL TEACHER RESOURCE CENTER

AT CENTRAL MICHIGAN UNIVERSITY, MOUNT PLEASANT

CLEVELAND, OH -- Educators in the lower penisula of Michigan now have quick and easy access to a vast quantity of free NASA classroom materials.

On April 9, 1987, NASA's Lewis Research Center, Cleveland, Ohio, will open and dedicate a new Regional Teacher Resource Center at Central Michigan University, Mount Pleasant, Michigan.

Kindergarten through university level teachers may use the new facility as a resource site for selected NASA films, slides and printed materials on this country's aerospace accomplishments.

The new facility at Central Michigan University makes available such instructional materials as lesson plans and activities, educational literature, 35 mm slides and audio and video tapes. The only costs are copying charges for slides. Educators are asked to provide their own blank audio and video cassettes.

According to Judith C. Olson, Deputy, Educational Services Office at Lewis, "The Regional Teacher Resource Centers provide an excellent means for communications between NASA, educators and students. The inventory of materials includes all aspects of aerospace activity - aeronautics, astronomy, ecology, meteorology, communications and space exploration."

-more-

(Distribution March 20, 1987)

Eleven years ago the first Teacher Resource Center was established at the Lewis Research Center in Cleveland. Interest in the materials grew quickly and in a short time the Lewis-based center alone was handling more than 30,000 items each year for area teachers.

The first Regional Teacher Resource Center was established by Lewis at Oakland University, Rochester, Michigan, in 1983. In 1984 one was opened at St. Cloud State University, St. Cloud, Minnesota, and one at Mankato State University, Mankato, Minnesota. In January of 1985 a fourth center was established at the University of Wisconsin-LaCrosse, Wisconsin. Throughout 1985 additional centers were opened at Chicago's Museum of Science & Industry, Milwaukee's Science, Economics and Technology Center, and the University of Evansville, Evansville, Indiana. In 1986 centers were opened at City College, New York, New York; the NASA Industrial Applications Center, University of Pittsburgh, Pittsburgh, Pennsylvania; Northern Michigan University, Marquette, Michigan; Champlain College, Burlington, Vermont; The Children's Museum, Indianapolis, Indiana; and Parks College, St. Louis University, Cahokia, Illinois.

# # #

87-18

National Aeronautics and
Space Administration

Lewis Research Center
Cleveland, Ohio
44135

NASA

Reply to Attn of: 0113

March 23, 1987

NOTE TO EDITOR/NEWS DIRECTOR:

The countdown is underway for the 5000 Cleveland area students participating in the April 8 simulated Space Shuttle launch.

Students at the nine area schools are busy preparing their flight plans, developing experiments, training pint-sized astronauts, studying launch and landing techniques, creating flight uniforms, and last but not least, changing school buses into Space Shuttles.

Flight plan for the day's activities follows:

Launch from individual schools	9 a.m. - 10:30 a.m. EDT
Rendezvous at NASA Lewis Research Center hangar parking lot	11:15 a.m. EDT
Meet alien crews and exchange mementos	
Depart NASA Lewis for alien planets (respsective partner schools)	11:45 a.m. EDT
Depart alien planets for home schools	2 p.m. EDT
Post-flight program at Woodling Gymnasium, Cleveland State University, Cleveland	7:30 p.m. EDT

State of Ohio Superintendent of Instruction Dr. Franklin Walter and Young Astronaut Foundation Executive Director Wendell Butler are among the dignitaries expected for the evening event. Students will participate as well with songs, poems and dance routines.

Please let me know how I may assist you in covering this event. I can be reached at 216-433-2900.

Sincerely,

Linda Ellis

Linda S. Ellis
Public Affairs Specialist

Enclosure

87-20

NASA News

National Aeronautics and
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Lewis Research Center
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AC (216) 433-2901

87-12

For Release:
IMMEDIATE

Linda S. Ellis
(res: 216/779-1266)

5000 CLEVELAND AREA SCHOOL CHILDREN

STAGE APRIL 8 SIMULATED SHUTTLE LAUNCH

CLEVELAND, OH -- The metamorphasis of school buses to Space Shuttles, classrooms and entire schools changed into planets and galaxies, elementary students turned into astronauts. No, this is not a stage set for Star Trek. Rather, it is thousands of Cleveland area school students preparing for a simulated Space Shuttle launch.

Scheduled for April 8, the event will involve students from five Cleveland elementary schools and four suburban elementary schools.

Purpose of this mind-bending event is to bring alive for students the classroom study of science, math and space related topics.

"The students will participate in every aspect of a Shuttle launch, including countdown, liftoff, planning and conducting onboard experiments, and debriefing after landing," according to Dr. R. Lynn Bondurant, Chief, Educational Services Office at NASA Lewis.

-more-

(Distribution Feburary 26, 1987)

Each school has redesigned a school bus in the image of a Space Shuttle. Onboard each Shuttle, each appropriately named by the students, will be a team of astronauts, computers, experiments and two-way radios. The event will get underway at the nine different schools the morning of April 8 with "liftoff" from each site.

At about 11 a.m. EST each Shuttle will rendezvous with their partner school at NASA's Lewis Research Center. Here the astronauts will meet, conduct experiments and then board the Shuttles for return to their originating school or planet.

That evening a welcome home celebration will take place and parents and children will receive congratulatory messages from officials.

In addition, students from St. Vincent/St. Mary High School, Akron, and Walsh Jesuit High School, Stowe, will be participating in the simulated Shuttle flight program. These students will spend 24 hours onboard a simulated Shuttle on April 3-4. Their Shuttle will be located at the St. Vincent/St. Mary High School orbit (parking lot). To prepare for their mission the students will participate in underwater training, flight simulator training, and preparing experiments.

Cleveland area organizations and businesses are supporting the simulated Shuttle flight program.

Elementary schools participating in the April 8 launch follow and are listed with their rendezvous school:

Parknoll Elementary School
499 Nobottom Road
Berea, OH 44017

(rendezvous schools)

Fullerton School
5920 Fullerton
Cleveland, OH 44105

Alfred A. Benesch School
5393 Quincy
Cleveland, OH 44104

-more-

Pine Elementary School (rendezvous school)
4267 Dover Road
North Olmsted, OH 44070

Daniel E. Morgan School
1440 E. 92 Street
Cleveland, OH 44106

Lowell Academy (rendezvous school)
3200 Clinton Avenue
Lorain, OH 44055

Walton School
3409 Walton Avenue
Cleveland, OH 44113

Helen Muraski Elementary School (rendezvous school)
20270 Royalton Road
Strongsville, OH 44136

Iowa Maple School
12510 Maple Avenue
Cleveland, OH 44108

# # #

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NASA News

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87-22

For Release:
IMMEDIATE

Charles Mitchell
(res: 216/243-6228)

NASA LEWIS CENTER

HONORS 18 INVENTORS

CLEVELAND, OH -- Eighteen NASA Lewis Research Center scientists and engineers will be honored at the 12th Annual Inventors' Day Award Ceremony here on April 10.

The inventors will receive a plaque of an embossed replica of the first page of their patents. They also became eligible for a monetary award when their patent application was filed in 1986.

The names, hometowns and titles of inventions of those honored at the ceremony are as follows:

BRUCE A. BANKS, Olmsted Township, (three patents), "Apparatus for Producing Diamondlike Carbon Flakes," "Apparatus for Producing Oxidation Protection Coatings for Polymers," and "Ion Beam Sputter Etching."

CHARLES BARRETT, Farivew Park, "Nickel Base Coating Alloy."

DR. HENRY W. BRANDHORST, JR., Berea, "Lithium Counterdoped Silicon Solar Cell."

ARTHUR N. CURREN, North Ridgeville, "Textured Carbon Surfaces On Copper by Sputtering."

ELISEO DIRUSSO, Westlake, "Viable Friction Seconary Seal For Face Seals."

-more-

(Distribution April 9, 1987)

RANDALL F. GAHN, Columbia Station, "Method and Apparatus for Rebalancing A Redox Flow Cell System."

KENNETH A. JENSEN, Bay Village, "Textured Carbon Surfaces on Copper by Sputtering."

DR. HENRY G. KOSMAHL, Olmsted Falls, "Linearized Traveling Wave Amplifier With Hard Limiter Characteristics."

CARL E. LOWELL, Lakewood, "Nickel Base Coating Alloy."

CHARALAMPUS MARINOS, Westlake, "Heat Exchanger for Electrothermal Devices."

MICHAEL J. MIRTICH, JR., North Olmsted, (two patents), "Apparatus for Producing Oxidation Protection Coatings for Polymers," and "Heat Exchanger for Electrothermal Devices."

PAUL F. PENKO, Berea, "Heat Exchanger for Electrothermal Devices."

ROBERT F. ROMAN, Brook Park, "Textured Carbon Surfaces on Copper by Sputtering."

SHARON K. RUTLEDGE, Bedford, "Ion Beam Sputter Etching."

JOHN J. SMITHRICK, Cleveland, "Oxygen Recombination in Individual Pressure Vessel Nickel-Hydrogen Batteries."

JAMES S. SOVEY, Strongsville, (two patents), "Apparatus for Producing Oxidation Protection Coatings for Polymers," and "Heat Exchanger for Electrothermal Devices."

DR. IRVING WEINBERG, Rocky River, "Lithium Counterdoped Silicon Solar Cell."

RALPH J. ZAVESKY, Parma, "Heat Exchanger for Electrothermal Devices."

Originated at Lewis, Investors' Day is now a NASA-wide function.

# # #

87-22

National Aeronautics and
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Lewis Research Center
Cleveland, Ohio
44135

NASA

Reply to Attn of: 0113

NOTE TO EDITOR/NEWS DIRECTOR:

A press conference will be held at NASA Lewis Research Center's Icing Research Tunnel at 11 a.m. EDT, Wednesday, May 20, 1987, in conjunction with the American Society of Mechanical Engineers' historical landmark ceremonies. Participating in the conference will be:

Dr. John M. Klineberg
Acting Director
NASA Lewis Research Center

Frederick P. Povinelli
Assistant Associate Administrator for Management
Office of Aeronautics and Space Technology
NASA Headquarters

Frank M. Scott
Past National President
American Society of Mechanical Engineers

John J. Reinmann
Chief, Icing and Cryogenic Systems Technology Branch
NASA Lewis Research Center

Immediately following the press conference there will be an opportunity for the media to view, photograph or videotape an actual icing demonstration.

Please contact the Public Affairs Office at 216-433-2889 if you are interested in attending this event.

Charles Mitchell
Public Affairs Specialist

Enclosures

NASA News

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87-26

For Release:
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Charles Mitchell
(res: 216/243-6228)

ICING FACILITY AT LEWIS RESEARCH CENTER

DESIGNATED AN INTERNATIONAL LANDMARK

CLEVELAND, OH -- NASA Lewis Research Center's Icing Research Tunnel will be formally designated an International Historic Mechanical Engineering Landmark by the American Society of Mechanical Engineers (ASME) during ceremonies here Wednesday, May 20, 1987.

ASME is a worldwide technical and educational organization that strives to preserve historically important engineering works through its Landmark Program.

NASA's predecessor, the National Advisory Committee for Aeronautics, built the icing tunnel at Lewis in 1944 at the request of the U.S. Army Air Force to help solve aircraft icing problems. "From the beginning, it provided unique features that allowed scientists to solve aircraft icing problems using full scale components for the first time," says Lewis scientist Dr. William Olsen, an expert on the history of the tunnel.

-more-

The Icing Research Tunnel was recently renovated and is currently being used to evaluate icing protection systems and to investigate icing of fixed and rotating aircraft components. It is a closed-loop refrigerated wind tunnel with a test section that is six feet high, nine feet wide and 20 feet long. Some unique features and facts about the tunnel:

It is the largest refrigerated icing tunnel in the world and features two revolutionary "firsts" in design -- a unique spray system that produces microscopic cloud droplets and a sophisticated heat exchanger.

It is the oldest active icing tunnel in the world, and the icing technology used on the world's aircraft since World War II was largely researched and developed at Lewis.

It is capable of duplicating the various temperatures and icing conditions aircraft may encounter anywhere in the world.

The Lewis Icing Research Tunnel has operated on a continuing basis since June 1944. Its workload fell dramatically when jet engines replaced propellers, but increased again to meet icing research needs of helicopters and general aviation aircraft beginning in the early 1970s. In 1986, Lewis modernized and expanded the capabilities of the tunnel to accommodate its heavy workload.

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Photos to illustrate this news release are available to the media free of charge. Write or call the Public Affairs Office, NASA Lewis Research Center, 21000 Brookpark Road, Cleveland, OH 44135, 216-433-2889.

NASA News

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For Release:
IMMEDIATE

87-28

Linda S. Ellis
(res: 216/779-1266)

NASA LEWIS IS ENRICHING EXPERIENCE

CLEVELAND, OH -- Be certain to place NASA Lewis Research Center's Visitor Information Center (VIC) on this summer's slate of exciting places to visit.

At the VIC, adjacent to Cleveland Hopkins International Airport, you can trace the history of flight from Kitty Hawk to tomorrow's generation of hypersonic aircraft.

An especially impressive newer display is the actual Apollo/Skylab 3 capsule. This capsule was in orbit from July 28 to September 25, 1973. During the 59 1/2 day flight it completed 858 revolutions of the Earth and traveled some 24,400,000 miles in Earth orbit. Skylab 3 ended with a Pacific splashdown and recovery by the USS New Orleans. Jack Lousma was pilot for Skylab 3, Alan L. Bean was spacecraft commander and Owen K. Garriott was scientist-pilot.

Yet another special exhibit is a model of this nation's next logical step into space--Space Station. The 40-ton Space Station is planned for operation in low Earth orbit in the mid 1990s. NASA Lewis has overall responsibility for the onboard electrical power supply. Approximately one-half acre of solar cells will be required to produce the 75 kw of

-more-

(Distribution May 11, 1987)

power needed for the first phase of the station, the largest space power requirement to date. The power will be used for such essentials as life support systems, experiments, communications and data handling.

A laser disc display describes the Space Shuttle transportation system and Voyager's missions to Jupiter, Saturn and beyond.

Visitors can learn how Earth-orbiting satellites communicate worldwide, report weather data, inspect forests and monitor pollution.

There are eight major galleries in all at the Visitor Center. The time you spend in the displays can range from about one-half hour for a quick overview, to several hours for detailed study.

Lewis is one of eight major NASA Centers throughout the U.S., and is NASA's lead center for research and technology for aircraft propulsion, space propulsion, space power and satellite communications.

Weekend travelers may take advantage of special programming at the Visitor Center. Video tapes and briefings are offered at regular intervals on Saturdays and Sundays in the VIC's air-conditioned, 150-seat auditorium.

Spring and summer weekend monthly themes are: May, "Aviation Today;" June, "Flight Into Tomorrow;" and July through September will feature programs focusing on various Lewis projects.

A special "extra" for Wednesday visitors 16 and over is a guided one-hour mini-tour of Lewis Research Center test facilities. The tour route may include such facilities as the 500-foot-deep zero gravity facility, a supersonic wind tunnel and a propulsion systems laboratory where full scale aircraft engines are tested under actual flight conditions. Reservations for this tour must be made in advance by 1 p.m. of the tour day.

Also available for collectors of all ages is a space age gift shop just inside the VIC entrance. Here such items as Space Shuttle models, space jewelry, NASA tee-shirts and astronaut ice cream are available for purchase.

The Visitor Information Center is open seven days a week. Hours are: Mondays through Fridays, 9 a.m. - 4 p.m; Saturdays, 10 a.m. to 3 p.m.; and Sundays, 1 p.m. - 5 p.m. Admission is free and there is plenty of free parking adjacent to the VIC.

Lewis is easily accessible via interstates 71, 77, 90 and 480. Take Exit 9 off the Ohio Turnpike. Because the Brookpark Road bridge is closed for repairs, visitors approaching from the west should enter I-480 at the Clague Road entrance, travel east, and exit at the Grayton Road exit. For more details and Wednesday tour information, call the VIC at 216-433-2001.

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87-28

NASA News

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87-37

For Release:
IMMEDIATE

Charles Mitchell
(res: 216/243-6228)

SUMMER ENGINEERING STUDENTS

AID RESEARCH AT LEWIS

CLEVELAND, OH--A three-month summer program aimed at assuring a continuous stream of top technical talent for the NASA Lewis Research Center is entering its fifth year with 39 students participating, doubling the original number.

The students, representing 24 colleges and universities across the U.S. including Puerto Rico, began arriving in mid-May and will finish in August. While here, they are assigned research projects to transfer their textbook knowledge into practical experience. Senior Lewis scientists and engineers work alongside the students to monitor their progress. The goal of the program is to match the students' projects with their career ambitions, talent and degree program objectives.

"Our program is helping to alleviate a national shortage of critical technical skills," explains Judy Montfort of the Office of Equal Opportunity Programs. Montfort, who has headed the program since its inception, added that another objective of the program is to expose these

-more-

(Distribution July 9, 1987)

top minority and female engineering and science students to Lewis' work in the hope that some of them will return to Lewis for their career once they graduate.

Hands-on training for the students is augmented by specialized instructions and lectures on their assigned projects. The students are expected to make real research contributions as they proceed.

To date, 24 program participants have been hired as a result of this unique summer exposure.

# # #

87-37

NASA News

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87-38

For Release:
IMMEDIATE

Linda Ellis
(res: 216/779-1266)

TEACHERS UPDATE SCIENCE AND MATH

KNOWLEDGE DURING TWO-WEEK WORKSHOP AT LEWIS

CLEVELAND, OH--Some 25 "honors" science and mathematics teachers will have an opportunity to interact with scientists and engineers and discover the wealth of educational resource materials available at NASA's Lewis Research Center when they attend a workshop here July 27-August 7.

Teachers attending the two-week workshop are from Ohio, Illinois, Indiana, Michigan, Minnesota and Wisconsin.

Purpose of the workshop is to assist the teachers in updating and enhancing their knowledge of space science and technology. Lewis is NASA's leading research and technology center for aeronautical propulsion, space propulsion, space power and satellite communications.

Highlights of the workshop include visits to several unique research facilities at the Lewis Center. Of special interest among these is the Microgravity Materials Science Laboratory (MMSL), a new facility which offers U.S. scientists and engineers a low-cost, low-risk way to test new

-more-

(Distribution July 13, 1987)

ideas for materials science research in space. Research capabilities in this facility will support metal and alloy solidification and electronic crystal growth studies.

Also on the agenda for touring are the 500-foot deep zero gravity facility, a supersonic wind tunnel and a propulsion systems laboratory where full-scale aircraft engines are tested under actual flight conditions.

Designed for teachers of college-oriented students, the workshop, entitled NASA Educational Workshop for Mathematics and Science Teachers (NEWMAST), is sponsored by the National Science Teachers Association (NSTA) and NASA.

The candidates for the program were selected based on recommendations provided by an NSTA panel.

Teachers attending the workshop follow:

NAME & CITY OF RESIDENCE

OHIO

Mr. Rodney Dominick
Cleveland, OH 44110

Mr. Roger W. Grossenbacher
Lancaster, OH 43130

Mrs. Beverly Porter
Cleveland, OH 44122

Ms. Margaret Raub
Strongsville, OH 44136

Ms. Phyllis Brooks Taylor
New Concord, OH 43762

Mr. Rodney Thompson
Rittman, OH 44270

Mr. Nathan J. Van Wey
Canton, OH 44710

-more-

ILLINOIS

Ms. Cathy A. Flannery
La Salle, IL 61301

Mr. Jeffrey L. Hunt
Aurora, IL 60506

Mr. Douglas R. Kuban
Pecatonica, IL 61063

Ms. Maureen Laude
Chicago, IL 60652

Mr. Fred H. Lewis
Marissa, IL 62257

INDIANA

Mr. Arthur Middleton
Rensselaer, IN 47978

Mr. Allan R. Weiheimer
Indianapolis, IN 46240

MICHIGAN

Ms. Geraldine P. Adelini
Warren, MI 48093

Ms. Mary Kay Bouck
Portland, MI 48875

Ms. Carol A. Spencer
Pontiac, MI 48055

Mr. Michael Slootmaker
Fremont, MI 49412

MINNESOTA

Ms. Debora Brooks-Golden
Plymouth, MN 55446

Ms. Gale Jolene Nelson
Albert Lea, MN 56007

Mr. Richard W. Snydle
Bloomington, MN 55437

-more-

WISCONSIN

Mr. William John Boone
Waukesha, WI 53186

Mr. Marvin Goretski
Stevens Point, WI 54481

Mr. Milt Hassel
Oshkosh, WI 54901

Mr. James Jagler
Sheboygan, WI 53081

Mr. Wayne Le Mahieu
Sheboygan Falls, WI 53085

Ms. Vicki G. Selck
Milwaukee, WI 53221

# # #

87-38

NASA News

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87-41

For Release:
IMMEDIATE

Linda S. Ellis
(res: 216/779-1266)

35 SCIENCE FAIR AWARD WINNERS

TOUR NASA LEWIS ON JULY 31

CLEVELAND, OH -- For thirty-five regional Science Fair NASA Award Winners, Friday, July 31, will be a special day. The students and their parents will be treated to recognition, presentations and tours tailored to the students' creative scientific endeavors.

The students, recognized by NASA for outstanding achievement, will see the Lewis Visitor Center, the Propulsion Systems Laboratory where full-scale jet engines are tested, the 8x6 Supersonic Wind Tunnel and the Zero Gravity Facility, used to simulate microgravity effects of space on liquids, gases and combustion. Lewis representatives will describe the Center's activities in research and technlogy for aircraft propulsion, space propulsion, space power and satellite communications.

"Science Fairs have become increasingly popular throughout the six-state area served by Lewis and NASA is proud to honor these young people for their scientific achievements," according to Anita Solarz, a coordinator for the day's activities at the Lewis Center.

-more-

(Distribution July 23, 1987)

Winners visiting Lewis represent schools in the six-state area of Ohio, Illinois, Indiana, Michigan, Minnesota and Wisconsin.

OHIO

NAME	CITY OF RESIDENCE
Max Dudley Alexander, Jr.	Bloomingburg
Jason Anspach	Van Wert
Bill T. Austin	Columbus
James Behrend	Brunswick
Rodney W. Biederstedt	Malinla
Stephen M. Cameron	Lyons
Matt Cline	Zoon
Steven Day	Dayton
Murray Knisely	West Unity
Mark Nighman	Painesville

ILLINOIS

David Flores	Chicago
Kostas Mantis	Chicago
Pete Marwitz	Lansing

INDIANA

Cynthia Cox	Elkhart
Bobbie A. Eaton	Batesville
Amy Gomen	Fort Wayne
Ian Goudy	Angola
Joseph Hull	Gary
Rebecca Lyn Potts	Lafayette

-more-

INDIANA

NAME	CITY OF RESIDENCE
Park W. Reiff	Bluffton
Andrew R. Smith	Lafayette

MICHIGAN

Russell Anderson	Ann Arbor
Debra G. Cohen	Oak Park
Michael Demetriou	Saginaw
Christopher James	Ann Arbor
Jerry Solensky	Troy
Christopher Wheatley	Saginaw
Jordan Willner	Farmington Hills
Nelson H.Y. Woo	Ann Arbor

MINNESOTA

Dana Brandenbury	Lake Crystal
Mark Laborde	Lake Crystal
Andrew Lie	Rochester
Vanessa Lee Stinger	Richfield

WISCONSIN

Kim Endter	Milwaukee
Robynn Lynn Aynn Whitman	Waukesha

# # #

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NASA News

National Aeronautics and
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For Release:
IMMEDIATE

87-42

Charles Mitchell
(res: 216/243-6228)

SAGGIO NAMED COMPTROLLER

AT LEWIS RESEARCH CENTER

CLEVELAND, OHIO--Joseph A. Saggio has been named to the senior position of Comptroller at NASA's Lewis Research Center.

The Office of the Comptroller comprises the Resources Analysis and Management Office, and the Financial Management and Procurement divisions, with a staff of some 250 civil service and support contract employees. The Comptroller manages the budgeting, expenditure and accounting of Lewis' resources.

Saggio earned a bachelor's degree in mechanical engineering from Ohio University in 1959 and started his Lewis career as an engineer in 1962. He transferred to Lewis' Chief Counsel Office in 1971 after receiving a law degree from Cleveland Marshall Law School. In 1980 he was named Chief of the Procurement Division and in 1986 he was promoted to Deputy Comptroller.

Saggio and his wife, Margaret, live in Westlake. They are the parents of two children.

# # #

(Distribution July 24, 1987)

NASA News

National Aeronautics and
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Lewis Research Center
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87-46

For Release:
IMMEDIATE

Linda S. Ellis
(res: 216/779-1266)

ANALYTICAL MODEL SHOWS COMPLEX, THREE DIMENSIONAL AIRFLOWS -- This computer simulation developed at NASA's Lewis Research Center, Cleveland, Ohio, depicts a General Electric Unducted Fan (UDF) engine and shows the flow field generated by two counter-rotating rows of blades and the interactions between the blade rows. The simulation uses color coding to pictorially demonstrate the pressure distributions within the flow field. Red represents the highest pressure areas and blue represents the lowest. The analytical model allows improved verification of propulsion system designs prior to component and full-scale testing. The results are depicted on three cross-channel planes. The first plane is located slightly upstream of the trailing edge of the rear propfan. The remaining two planes are located aft of the rear propfan. The sharply defined boundary between the lower pressure green and higher pressure yellow-orange coloration is the footprint of the aft propfan trailing edge shock wave. The UDF has counter-rotating propellers which are driven directly by a multistage counter-rotating power turbine without the need for a gearbox. The UDF is part of the Advanced Turboprop programs managed by the NASA Lewis Research Center that include the design, fabrication, and testing of advanced propeller systems with high propulsive efficiency at flight speeds and altitudes compatible with today's jet transportation system.

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Photo number: C-87-4720

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NASA News

National Aeronautics and
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87-58

Charles Mitchell
(res: 216/243-6228)

WELDING FOUNDATION GRANTS AWARD

TO TWO LEWIS ENGINEERS

CLEVELAND, OH -- Two Lewis Research Center engineers have been presented the Gold Award for their entry in the national Design, Engineering and Fabrication Award Program sponsored by the James F. Lincoln Arc Welding Foundation.

David L. Krause of North Olmsted and Robert M. Puzak of Lakewood divided the $5,000 cash award for their innovative design for repairing the primary cooler system of the Center's 10 x 10-foot Supersonic Wind Tunnel. The pair analyzed the air cooling system and redesigned the side channel cooling system to prevent thermal stress buildup during operation of the tunnel system. The wind tunnel's air cooling system was built in 1955 and has a capability of altitude simulation of 150,000 feet and wind speeds up to Mach 3.5.

Krause is a structural design engineer responsible for conducting stress and structural analysis of a wide range of components and structures. He is a registered professional engineer in Ohio and holds a

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(Distribution September 18, 1987)

bachelor's degree in civil engineering from the University of Akron. He earned a master's degree from the University of Toledo. Krause and his wife, Karen, are the parents of a young daughter.

Puzak is responsible for conducting thermal and heat transfer analysis of various mechanical designs. He earned a bachelor's degree in mechanical engineering from the University of Notre Dame and is working on a master's degree at Cleveland State University. Puzak coaches soccer in his spare time.

The James F. Lincoln Arc Welding Foundation was established in 1936 by the Lincoln Electric Company to advance the science and application of arc welding, design engineering and fabrication. It has offered awards annually for 51 years to recognize achievements in those fields.

# # #

87-58

NASA News

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87-60

Mary Ann Peto
(Bus: 216/433-2902)
(Res: 216/722-5447)

ROSS NAMED DEPUTY DIRECTOR, NASA LEWIS RESEARCH CENTER

CLEVELAND, OH--Lewis Director, Dr. John M. Klineberg today announced the appointment of Lawrence J. Ross as Deputy Director of the Lewis Research Center, Cleveland, Ohio, effective immediately.

Ross, 45, has served as Director of Space Flight Systems at Lewis since 1980. In this position, his responsibilities included the operation of the Atlas/Centaur expendable launch vehicle program and management of the Advanced Communications Technology Satellite Project. In addition, he was responsible for programs which advanced scientific knowledge through in-space experimentation and studies which provided the basis for planning future space related activities.

Recently, Ross undertook several special assignments for NASA Headquarters including directing the investigation into the failure of a Delta launch vehicle; conducting a study of preferred managment approaches for the Space Station Project; and conducting a feasibility assessment study of an unmanned flight test of the Shuttle solid rocket booster.

During his 23 years at Lewis, Ross has served in many capacities--including design and test enginer responsible for environmental testing of the Centaur stage and for integration of the

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(Distribution September 24, 1987)

Surveyor spacecraft with the Atlas/Centaur vehicle. As Titan/Centaur Manager, he completed development of the Titan/Centaur and directed the launch of the two Viking spacecraft and Helios B.

A native of New York City, Ross received a B.S. degree in electronics engineering from Manhattan College, and continued study for his master's degree in engineering at Case Western Reserve University.

Ross has been awarded the NASA Exceptional Service Medal, the Presidential Rank of Meritorious Executive and the NASA Outstanding Leadership Medal.

Ross and his wife, Carol, reside in Bay Village, Ohio. They have four children.

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87-60

National Aeronautics and
Space Administration

Lewis Research Center
Cleveland, Ohio
44135

NASA

Reply to Attn of: 0113

October 20, 1987

NOTE TO EDITOR/NEWS DIRECTOR:

Aircraft icing became a problem soon after the first airplane flight in 1903.

An update and evaluation of the state-of-the-art in aircraft icing will take place November 4-6, 1987, when NASA Lewis Research Center, Cleveland, Ohio, hosts an International Workshop on Aircraft Icing Technology.

Two icing research tools at NASA Lewis will be available for viewing:

Icing Research Tunnel - The world's largest refrigerated icing tunnel, this facility can duplicate temperatures and icing conditions aircraft may encounter anywhere in the world. Constructed in 1944, it is used today to meet icing research needs of helicopters and general aviation aircraft.

DeHavilland Twin Otter Icing Research Aircraft - This airplane is used to investigate and identify all the characteristics of conditions that produce icing and to test new ways of de-icing.

The workshop is sponsored by NASA, Federal Aviation Administration, American Institute of Aeronautics and Astronautics and Society of Automotive Engineers.

Some 150 participants are expected, representing virtually all sectors of the aviation community.

A complete agenda is attached. If you would like to attend or have any questions, please call me. I can be reached on 216-433-2900.

Linda Ellis

Linda S. Ellis
Public Affairs Specialist

Enclosure

87-64

NASA/FAA/AIAA/SAE WORKSHOP ON AIRCRAFT ICING

AGENDA

Wednesday, November 4, 1987		Administration Building (#3) Auditorium
8:00 a.m.	Registration/Coffee	
8:45 a.m.	Welcome	Neal T. Saunders, NASA LeRC Director of Aeronautics
8:55 a.m.	Workshop Goals and Format	Robert Shaw, NASA LeRC
9:00 a.m.	Aircraft Icing Certification/ Qualification	Richard Adams Federal Aviation Administration
10:15 a.m.	Break	
10:45 a.m.	Ice Protection Concepts	David Blyther Douglas Aircraft
11:30 a.m.	Ground Test Facilities and Techniques	Jay Hunt Sverdrup Technology
12:30 p.m.	Buffet Lunch	Main Cafeteria, Building #15
2:00 p.m.	Simulated and Natural Icing Flight Testing	David Ellis Cessna Aircraft
2:45 p.m.	Icing Analysis Techniques	Robert Shaw, NASA LeRC
3:30 p.m.	Icing Instrumentation	Richard Keller General Electric
4:15 p.m.	Working Group Organization and Assignments	

Wednesday, November 4, 1987		Administration Building (#3)
4:30 p.m.	Working Group Meetings	
	- Ice Protection Concepts (Room 225)	Herb Coffman Bell Helicopter Textron
	- Analysis (Room 215)	Michael Bragg Ohio State University
	- Instrumentation (Foyer)	Robert Ide Army AVSCOM, NASA LeRC
	- Test Techniques (Auditorium)	Andrew Peterson Boeing Vertol
	- Requirements (Auditorium)	George Letton Wright-Patterson AFB
5:30 p.m.	Reception	VIC - Building #8
6:30 p.m.	Banquet	Main Cafeteria - Building #15
8:00 p.m.	Guest Speaker	John H. Enders Flight Safety Foundation

Thursday, November 5, 1987		Administration Building (#3)
8:45 a.m.	Opening Remarks	Auditorium
9:00 a.m.	Working Group Meetings	
	- Rotorcraft (Auditorium)	Robert Flemming United Technologies Sikorsky Aircraft
	- General Aviation (Room 225)	Bruce Barrett Cessna Aircraft
	- Transport/Military (Room 215)	Gordon Dickinson Boeing Commercial Airplane Company
	- Propulsion (Foyer)	Grant Maier United Technologies Pratt & Whitney Aircraft
12:30 p.m.	Brunch	Main Cafeteria - Building #15
2:00 p.m.	Working Group Meetings (continued)	
	- Ice Protection Concepts (Room 225)	Herb Coffman Bell Helicopter Textron
	- Analysis (Room 215)	Michael Bragg Ohio State University
	- Instrumentation (Foyer)	Robert Ide Army AVSCOM, NASA LeRC
	- Test Techniques (Auditorium)	Andrew Peterson Boeing Vertol
	- Requirements (Auditorium)	George Letton Wright-Patterson AFB
5:00 p.m.	Adjourn	

Friday, November 6, 1987		Administration Building (#3) Auditorium
8:45 a.m.	Opening Remarks	Auditorium
9:00 a.m.	Working Group Presentations	
	- Ice Protection	Herb Coffman Bell Helicopter Textron
	- Analysis	Michael Bragg Ohio State University
	- Instrumentation	Robert Ide Army AVSCOM, NASA LeRC
	- Test Techniques	Andrew Peterson Boeing Vertol
	- Requirements	George Letton Wright-Patterson AFB
12:30 p.m.	Adjourn	
12:45 p.m.	Buffet	Main Cafeteria, Building #15
1:30 p.m.	Optional Tours	
	- Icing Research Tunnel - Icing Research Aircraft	

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87-67

Charles Mitchell
(Bus: 216/433-2889)
(Res: 216/243-6228)

NASA LEWIS SELECTS PROCUREMENT CHIEF

CLEVELAND, OH -- Bradley J. Baker of North Ridgeville has been named Chief of the Procurement Division at NASA Lewis Research Center.

Baker has spent his 15-year government career in Procurement with the General Services Administration (GSA) and NASA Lewis Research Center. In his latest position, he manages over 100 employees charged with carrying out a $400 million a year operation to meet all of the Center's procurement requirements.

Baker began his government career with the GSA in Washington, D.C. He joined Lewis in 1978 and assumed progressively important managerial duties as section head, branch chief and deputy chief/acting chief of the Procurement Division. In 1981, Baker was detailed to NASA Headquarters, Washington, D.C., for one year as a participant in the NASA Career Development Program.

He earned a bachelor's degree in economics from Wittenberg University, and a master's degree in public administration from the University of Missouri.

Baker and his wife, Susan, are the parents of six children.

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NASA News

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Charles Mitchell
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(Res: 216/243-6228)

NASA LEWIS SELECTS CALIFORNIA

FIRM FOR CONTRACT NEGOTIATIONS

CLEVELAND, OH---NASA Lewis Research Center, Cleveland, Ohio, has selected QUAD S. Company of Solana Beach, California, for negotiations leading to the award of a $12-million contract for general maintenance services of facilities, research, and mechanical equipment. When awarded, the action consolidates various maintenance services under one contractor.

The maintenance services, to be performed primarily at the Lewis site with some work at Lewis' Plum Brook Station in Sandusky, Ohio, include repairing and testing elevators, cranes and other lifting devices, pumps, fuel tanks, machine tools, cryogenic equipment, compressors, blowers, and exhausters.

The cost-plus-award-fee, five-year contract begins in January 1988.

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NASA News

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87-71

Charles Mitchell
(Bus: 216/433-2889)
(Res: 216/243-6228)

POFERL HEADS LEWIS'

LARGEST DIRECTORATE

CLEVELAND, OH -- NASA Lewis Research Center has announced the appointment of Dr. David J. Poferl as Director of Technical Services.

As head of Lewis' largest directorate, Poferl manages some 750 employees responsible for facilities planning, construction, operation and maintenance, and test hardware fabrication and installation. The directorate personnel comprises engineers, engineering technicians, architects and skilled trades craftsmen.

Poferl, formerly Deputy Director of Aeronautics, has specialized in the fields of chemical thermodynamics, heat transfer, turbine cooling and energy conversion during his 25-year Lewis career. He has written a dozen technical papers in his areas of expertise.

He earned his bachelor's and master's degrees in chemical engineering from the University of Minnesota, and his Ph.D. in chemical engineering from Case Western Reserve University. After attending the Harvard University Program for Management Development, Poferl completed a one-year executive development program at NASA Headquarters, Washington, D.C.

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(Distribution November 30, 1987)

There he managed the Advanced Propulsion Systems Office of the Aeronautical Systems Division. He also attended NASA's Senior Executive Program.

Awards and honors include receiving NASA's Exceptional Service Medal, and the Phi Lambda Upsilon Prize in Chemistry and the Chemistry Faculty Award, both from the University of Minnesota.

Poferl, his wife, Gerrie, and their daughter, Melissa, live in Berea.

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NASA News

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Charles Mitchell
(Bus: 216/433-2889)
(Res: 216/243-6228)

NASA LEWIS SELECTS FIRM FOR

TECHNICAL SUPPORT SERVICES

CLEVELAND, OH -- NASA Lewis Research Center, Cleveland, has selected Sverdrup Technology, Inc., Middleburg Heights, Ohio, for final negotiations leading to award of a contract for scientific, engineering, technical and related services.

The contractor's estimated value of this contract is $118 million. The period of performance includes a 3-year basic period and one 2-year option period.

The cost-plus-award-fee contract is a follow-on to the present contract with Sverdrup that expires in March 1988. Services involve support for nearly all technical disciplines at Lewis, including electronics, aerodynamics and computers.

Work will be performed both at Lewis and at the contractor's Middleburg Heights facility.

# # #

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NASA News

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For Release:
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Charles Mitchell
(Bus: 216/433-2889)
(Res: 216/243-6228)

LEWIS CONTRACTS/EMPLOYMENT

BOOST OHIO ECONOMY

CLEVELAND, OH -- A diversity of major financial activities at NASA's Lewis Research Center helped enrich the Ohio economy by slightly more than a third of a billion dollars in Fiscal Year 1987.

A fiscal year runs from October 1 through September 30 of the following year.

Lewis contracts alone contributed $115 million to the state economy, up some $3.7 million from FY86. A majority of the 250 firms receiving contracts are located in northeast Ohio. The remainder are located throughout 20 of Ohio's 21 Congressional districts, with special efforts made to award contracts to firms located in areas of high unemployment.

The Lewis Center employs roughly 2700 civil service workers and over 1100 support service contractors. In FY87, both groups earned approximately $190 million in salaries and benefits, up $30 million from FY 86 figures primarily because of increased support service contracting. Also, 205 college and university faculty and students served as visiting

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(Distribution December 17, 1987)

researchers for three months here during the past summer. They received $1.1 million in stipends. Additionally, 10 professors worked fulltime during FY87 under grant arrangements and earned an estimated one-half million in salaries and benefits.

Lewis supports and utilizes Ohio colleges and universities primarily through the award of research grants. Research grants benefit both Lewis and the participating schools because they allow schools to attract and retain top professors while engaging academic researchers to work on NASA technical problems.

Ohio schools receiving research grants totaling $8.6 million in FY 87 were: Case Western Reserve University, $3.8 million; Cleveland State University, $1.8 million; Ohio State, $937,000; The University of Toledo, $596,000; The University of Akron, $585,000; The University of Cincinnati, $526,000; The University of Dayton, $160,000; John Carroll University, $45,000; Miami and Ohio universities, $40,000, each; Wittenberg University, $17,000; Kent State University, $15,000, and Cuyahoga Community College, $10,000.

The Lewis presence also had a major economic impact on Ohio utilities. In FY87, Lewis spent $13 million on gas, electric, water, and telephone service.

Institutional purchases for such needs as computers, maintenance and security added another $7 million to the state economy.

# # #

87-76

NEWS IN BRIEF

NASA Lewis Research Center

FOURTH QUARTER 1987

LEWIS TO MANAGE SPACE STATION CONTRACT WORTH ABOUT $1.6 BILLION

NASA has selected Rockwell International, Rocketdyne Division, Canoga Park, CA, for final negotiations leading to the award of a cost-plus-award-fee contract for the detailed design, development, test, evaluation, and construction of the electrical power system for the nation's Space Station. Lewis will be responsible for managing the multiyear contract worth approximately $1.6 billion. The power system will provide electricity for Space Station crew life support systems, experiments, communications and data processing. The electrical power system is required to have the capability to deliver 75 kW of power with a growth potential to 300 kW.

ROSS APPOINTED DEPUTY DIRECTOR

Lawrence J. Ross has been named Deputy Director of the Lewis Research Center. With the Director, Ross is now responsible for the general management of the Center. Ross had served as Director of Space Flight Systems since 1980 where he was responsible for the operation of the Atlas/Centaur launch vehicle program and management of the Advanced Communications Technology Satellite Project. Ross has served the agency in many capacities during his 24 year career and has been awarded the NASA Exceptional Service Medal, the Presidential Rank of Meritorious Executive and the NASA Outstanding Leadership Medal.

LEWIS CONTRACTS/EMPLOYMENT BOOST OHIO ECONOMY

Lewis financial activities helped enrich the Ohio economy by more than $335 million in Fiscal Year 1987. Contracts totaling $115 million went to 250 firms located throughout 20 of Ohio's 21 congressional districts. About 2700 civil service workers and 1100 support service contractors earned approximately $190 million in salaries and benefits. In addition, college and university faculty and students served as visiting researchers and received $1.1 million in stipends and 10 professors worked under grant arrangements earning an estimated $500,000. Ohio schools receiving research grants were: Case Western Reserve, $3.8 million; Cleveland State, $1.8 million; Ohio State, $937,000; Toledo, $596,000; Akron, $585,000; Cincinnati, $526,000; Dayton, $160,000; John Carroll, $45,000; Miami and Ohio, $40,000 each; Wittenberg, $17,000; Kent State, $15,000, and Cuyahoga Community College, $10,000. Additionally, Lewis spent $13 million on gas, electric, water and telephone service and another $7 million for institutional purchases such as computers, maintenance and security.

- more -

LEWIS MANAGES NASA'S FIRST CONTRACT FOR EXPENDABLE LAUNCH VEHICLE SERVICES

NASA and the Dept. of Commerce have selected General Dynamics Space Systems Division, San Diego, CA, for negotiations leading to the award of a contract for expendable launch vehicle (ELV) services for the department's National Oceanic and Atmospheric Adminisration (NOAA) meteorological spacecraft GOES I, J and K. The contract, the first under NASA's plan to acquire ELV services commercially, will be managed by Lewis' Launch Vehicle Project Office.

ADVANCED HIGH-SPEED COMMERCIAL AIRCRAFT FUEL CONCERNS EXPLORED IN WORKSHOP

In support NASA's goal of reducing long-range commerical flight times by as much as 75 percent, Lewis recently hosted a "High-Speed Commercial Transport Fuels Workshop." Some 150 experts in the field gathered to address key issues relating to fuel stability, price, availability, handling and infrastructure. NASA's High-Speed Civil Transport studies are focused on determining the feasibility of an advanced high-speed commercial transport that could become operational early in the next century.

LEWIS RECEIVES 53rd I-R 100 AWARD

Lewis has received its 53rd I-R 100 Award. The awards are given annually by Research & Development magazine for the 100 most significant technological developments of the year. Lewis received its award jointly with Varian Associates, Palo Alto, CA, for an improved barium-oxide-reservoir dispenser thermionic cathode needed to provide more reliable long-life operation of high-frequency/high-power microwave tubes in space.

TECHNICAL SUPPORT CONTRACT

Lewis has selected Sverdrup Technology, Inc., Middleburg Hts., OH, for negotiations leading to award of a contract for scientific, engineering, technical and related services. The contractor's estimated value of this contract is $118 million for a three-year basic period with one two-year option period.

AUTOMOTIVE STIRLING ENIGNE TEST

A Mod II automotive Stirling engine has replaced the standard engine in a postal van allowing it to run on a variety of fuels, including jet fuel or kerosene. The performance and reliability of the engine will be monitored as the van is driven on daily routes in the Washington, DC area. A pick-up truck equipped with an earlier design of the Stirling engine is currently in service at Eglin Air Force Base in Florida. Lewis is managing the Automotive Stirling Engine Program under a U.S. Dept. of Energy program to develop technology for alternative automotive engines.

NEW APPOINTMENTS

Shirley LaCroix has been named executive officer. David Poferl has been appointed director of the Technical Services Directorate and Warner Stewart is now director of the new Office of Interagency and Industry Programs. Brad Baker was named chief of the Procurement Division replacing Joseph Saggio who was appointed director, Office of the Comptroller. Robert Lawrence has been named chief of the Office of Equal Opportunity Programs replacing Ken Aguilar who was named deputy chief of the Personnel Division.