



National Aeronautics and Space Administration • Ames Research Center, Moffett Field, California

Earth 2020

Upcoming lectures for the Earth 2020 series presented each Tuesday at 8 p.m. at Flint Center on the DeAnza College campus include the following:

6 August, "Design With Nature," Ian McHarg, Professor of City Planning, University of Pennsylvania;

13 August, "The World Economy in 2020 Vision," Kenneth Boulding, Professor of Behavioral Sciences, University of Colorado.

The staff is invited to attend each lecture which will be given at 3:00 p.m. each Tuesday in the Ames Main Auditorium. Attendance is on a first come, first served basis.

Brief reminder from Dr. Low

As a reminder concerning gifts from foreign governments Dr. George M. Low writes, "Since NASA cooperative and joint working relationships with foreign countries in the areas of aeronautics and space are increasing, I would like to reemphasize the constitutional and statutory requirements delineated in NMI 1030.1A concerning acceptance by NASA employees and members of their families of gifts or decorations from foreign governments.

"Briefly, no gift of U.S. retail value higher than \$50.00 may be accepted
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Noise research group at work

The Large-Scale Aerodynamics Branch has been continuously engaged in noise research since 1967. Similar to other Ames groups, the general purpose of the noise research in this branch is to understand and reduce noise emanating from all types of propulsion such as helicopter rotors, propellers, turbofans, and turbojets, as well as noise generated by airframe components such as wings, landing gears, and flaps.

The research differs in that the main emphasis is on the effect of forward speed on large scale noise sources. The branch is able to specialize in this area because of the availability of the 40 X 80-foot wind tunnel. For example, noise signature of real aircraft were measured at tunnel speeds up to 220 mph.

The branch also conducts supportive research as well as other independent research at the outdoor V/STOL (Vertical/Short Take-off and Landing) test facility, the acoustically treated 7 X 10-foot wind tunnel and the anechoic chamber which can be converted into a low-noise flow facility.

The bulk of the work is done by the noise group comprised of five engineers and a mathematician. Paul Soderman is very experienced in noise research and has been working in the field since 1967. He has conducted research on serrated leading edges which reduce vortex generated noise of airfoils. This has been publicized as the "owl wing" concept and was first begun by H. Julian Allen, former Ames Director. Soderman has done analyses of the noise characteristics of the 40 X 80-foot wind tunnel in order to use the facility as an acoustic test environment. He has come up with diagnostic techniques such as specially designed directional microphone arrays.

In noise research since 1964 is the NRC (National Research Council) associate at Ames, Professor Shofiro Kaji. Professor Kaji is considered an international authority on theoretical fan noise. He has a two year appointment at Ames and will be here until 1975. In general, Professor Kaji is studying both the aerodynamics and the acoustics aspects of unsteady fan effects on lifting surfaces. Specifically, he is presently working on 3-D airfoil response to gusts, compressibility effect and 2-D thickness effect. The goal is to estimate compressor noise sources. He plans to do an experiment and compare the results with his theory.

New deputy director named to AMRDL's Ames Directorate



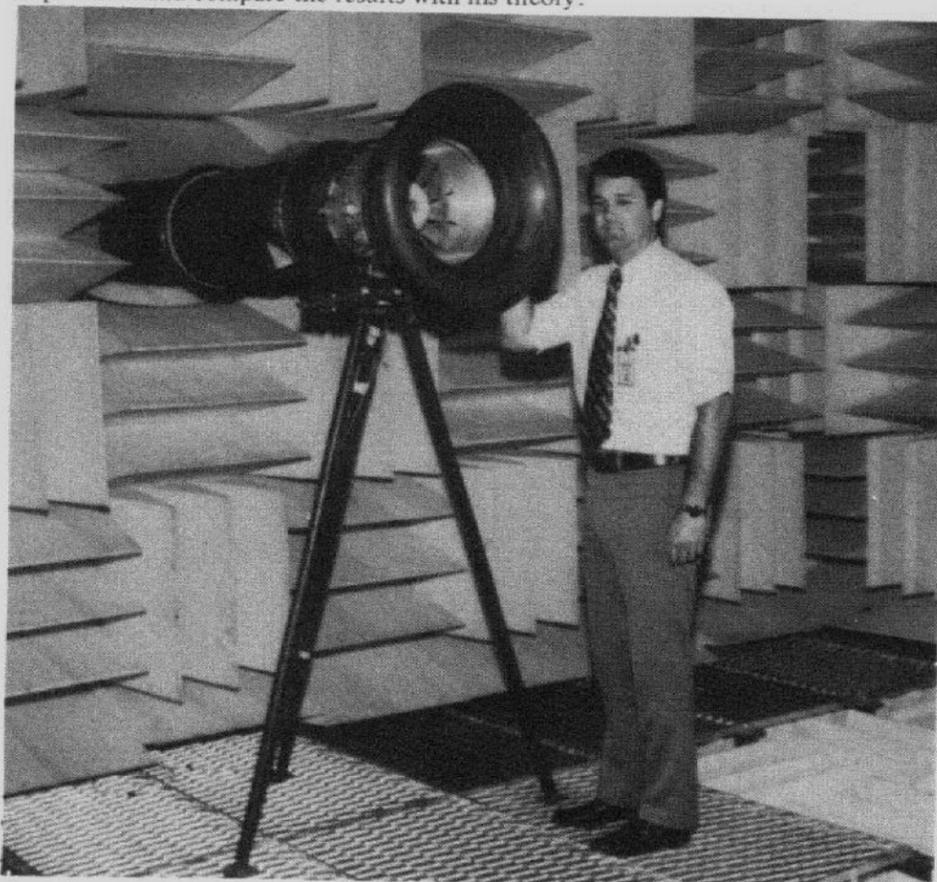
Lieutenant Colonel Theodore K. Wright has been named Deputy Director, Ames Directorate, U. S. Army Air Mobility Research and Development Laboratory (AMRDL), Ames Research Center, Moffett Field, CA. The announcement was made by Paul F. Yaggy, Director, AMRDL HQs, also located at Ames Research Center.

A rated pilot in both rotary and fixed wing aircraft, Lt. Col. Wright comes to his new post from Fort Huachuca, AZ, where he served as Director of the Department of Aerial Surveillance, U. S. Army Intelligence Center and School during the last three years. He received his primary flight training at Gary Air Force Base, Texas and his advanced flight training at Fort Sill, Oklahoma where he won his Army Aviator Wings in 1954.

The new Deputy Director has had extensive experience as an Army research test pilot. Following graduation

from the U. S. Naval Test Pilot School in 1966, he remained there as an instructor until 1968 when he was transferred to the Army Aviation Systems Test Activity, Edwards Air Force Base, for a two year tour as an Experimental Test Pilot. Lt. Col. Wright's research projects include: the OH-58 Kiowa, AH-56 Cheyenne, OV-10 Mohawk and the Huey Tug.

Other assignments include the Republic of Vietnam where he served as an aviator, company commander and airfield commander during his two tours of duty in 1965-1966 and 1970-1971. In addition, Lt. Col. Wright served with the 11th Airborne Division at Fort Campbell, Kentucky, and Augsburg, Germany from the late 1954 to May 1957. His civilian aviation experience includes two years as an instrument flight instructor for an aviation company in the San Francisco Bay area and a year as a
(Continued on page 2)



Brent Hodder is the third engineer investigating the mechanisms of basic noise generation since 1970. His speciality is V/STOL propulsion noise reduction of all of its facets. Hodder is attempting to find the basic noise mechanisms and fluid mechanics responsible for axial flow fan noise and jet noise. His current emphasis is on the effect of large scale atmospheric turbulence on axial flow fan noise and he is also studying other sources of unsteady loading on rotors.

Adolph Atencio, in noise research since 1971, is performing propulsion noise research with specialization in turbo jet noise. He makes measurements at the outdoor test facility and in the 40 X 80-foot wind tunnel. Atencio's main emphasis is in the use of the 40 X 80-foot wind tunnel to make acoustic measurements from
(Continued on page 2)

24 Tech Brief awards



Forty-five Ames scientists and engineers received awards for work announced in the form of 24 Tech Briefs on July 12. Dr. Alan B. Chambers, Technical Assistant to the Director, made the presentations at a ceremony in the Life Sciences Conference Room.

The award winning employees and their papers are (left to right, front row): Charles Winget, "Flexible Temperature Probe for Biological Systems;" Marjorie E. Lehwalt, "Dry Column Chromatography of Plant Pigments;" Catherine C. Johnson, "Moisture-Resistant Coatings for Optical Components;" John A. Parker, "Chemical Modification of Poly (p-Phenylene) for Use in Ablative Compositions;" "Fabrication Techniques for Polybenzimidazole Composites;" "Polyimide Fiber-Glass Composite Resists High Temperatures;" and "Transparent Polymeric Laminates;" Paul M. Sawko, "Transparent Polymeric Laminates;" William J. Gilwee, Robert W. Rosser, "Polyimide Fiber-Glass Composite Resists High Temperatures;" Demetrius A. Kourtidis, "Fabrication Techniques for Polybenzimidazole Composites;" David H. Brocker, "Digital Random-Number Generator;" John C. Gerds, Jr., "Mechanical Planetary Compensating Drive System;" (Middle row) Richard M. Beam, "Metal Tube Used as Solar Engine;" George R. Grant, William D. Gunter, Jr., "Lasser Velocimeter for Simultaneous Two-Dimensional Velocity Measurements;" Kenneth L. Orloff, "Laser Velocimeter with Transverse and On-Axis Sensitivity" and "Laser Velocimeter for Simultaneous Two-Dimensional Velocity Measurements;" William J. Borucki, "High-Speed Spectrograph for Shock Tube Studies;" John Dimeff, "Improved Format for Radiocardiographic Data;" Dr. Gunnar Sevelious, "Improved Format for Radiocardiographic Data;" Howard E. Goldstein, "Reusable Silica Surface-Insulation Material;" Ernest L. Winkler, "Fabrication Techniques for Polybenzimidazole Composites;" James L. Jones, "Stereoscope Television System;" (Back row) Robert J. Zeiger, "Mechanical Planetary Compensating Drive System;" Emanuel H. Gross, "Improved 135.6-MHz Antenna;" Glenn C. Carle, "Microminiature Gas Chromatograph;" and "Soil Moisture by Extraction & Gas Chromatography;" Theodore Wydeven, "Moisture-Resistant Coatings for Optical Components;" Hubert C. Vykukal, Reginal F. King, "Master/Slave Manipulator System;" James R. Jedlicka, "Metal Tube Used as Solar Engine;" Marnell Smith, "Reusable Silica Surface-Insulation Material;" John P. Millard, "Optical Detection of Oil on Water;" and Daniel B. Leiser, "Reusable Silica Surface-Insulation Material."

Those not pictured include: A. H. Heimbuch, "Chemical Modification of Poly (p-Phenylene) for Use in Ablative Compositions;" John C. Arveson, "Optical Detection of Oil on Water;" LeRoy R. Ruist, "Metal Tube Used as Solar Engine;" David D. Feller, Edwin D. Neville and Arden O. Cole, "Computer System for Monitoring Radiosprometry Data;" Charles C. Kubokawa, "Integral Aircraft Passenger Seat;" Wilbur C. Vallotton, "Master/Slave Manipulator System;" Peter J. Haro, "Flexible Temperature Probe for Biological Systems;" Edward L. Merek, "Soil Moisture by Extraction & Gas Chromatography;" Robert M. Munoz, "True Airspeed Measured by Airborne Laser Doppler Velocimeter;" John R. Hollahan, "Moisture-Resistant Coatings for Optical Components;" Vance I. Oyama, "Dry Column Chromatography of Plant Pigments;" and George M. Fohlen, "Transparent Polymeric Laminates."

LEO The expansive, generous Leo, King of the Zodiac, is a natural leader. You desire — and deserve — prominence and a high standard of living. Other people look to you for guidance; set an example by saving for your goals with the regular purchase of U.S. Savings Bonds through Payroll Savings.

Speakers Bureau

Mike Wash (Avionics Research Branch) participated in the 5th Annual Moonwalk Festival in North Highlands, a community just outside Sacramento, on July 19 and 20. He was a judge in the "Miss Moonmaid Festival" and was a guest on one of the floats in the parade. The North Highlands community was one of the first to establish a regular observation of the anniversary of Man's first walk on the moon. Mike reports that the Saturday parade featured over 200 floats and bands.

Ed Gomersall (Chief, Applications Aircraft Support Program Office) spoke on July 21 to members of the Sunnyvale Presbyterian Church at their summer fellowship barbeque. The program was to announce the fall schedule for the adult education classes sponsored by the church. Ed's presentation covered general benefits of the space program.

John "Jack" Dyer spoke to the San Mateo Rotary Club at their meeting on July 25. Jack told the noon gathering about the Pioneer 10 and 11 missions. (Jack substituted for originally-scheduled Skip Nunamaker.)

William Hurley (Regional Inspector was the guest speaker at a meeting of the Palo Alto Lions Club on July 16. Bill's noon address was entitled "What Has NASA Done for Us Lately?"

Jim Rogers (Airworthiness Assurance Office) talked to a group of International Civil Air Patrol Cadets while they were on a visit to the Bay Area as part of a U. S. tour. Jim discussed Skylab, including life aboard the craft, while they were at Ames for a tour on July 24.

Record dividend paid

The Moffett Field Employees' Credit Union has just declared the largest dividend in its 17 year history, according to Fred G. Mayer, Manager.

A regular dividend of 5½% per annum compounded semi-annually plus a special ¼ of 1% compounded semi-annually was declared by the credit union's Board of Directors — John F. Pogue, President (NASA-Ames Procurement).

This total of 5.75% compounded semi-annually is the largest dividend ever declared by this credit union, according to Eugene Long, Educational Chairman, in commenting on the successful operating period from 1 January 30 June 1974.

Noise research group at work

(Continued from page 1)

aircraft models and/or aircraft and from these measurements make predictions for aircraft flyover noise. He has made much progress in predicting in-flight noise signatures.

The noise research group leader of the Large-Scale Aerodynamics Branch is Warren Ahtye. Ahtye has been in the noise business since 1972. He is concentrating on diagnostic techniques to extend the capabilities of the 40 X 80-foot wind tunnel for low noise sources and also making measurements of airframe noise. He and David Hickey are working in conjunction with Stanford University on the NASA/Stanford Joint Institute for Aeroacoustics.

First Lieutenant Steven Karel of the U.S. Army is the graduate mathematician. He handles all the complex mathematics for the entire group. Lieutenant Karel sets up solutions of differential equations and he determines the feasibility of computational approaches of the group's results.

The V/STOL group and the Helicopter group must not be overlooked. Acoustic measurements using large scale turbofan powered STOL models and full scale rotors are constantly being made. The data is analyzed and the noise characteristics of many STOL and vertical lift concepts are compared using both experimental results and calculations. Where possible, contributions of both the propulsion unit and lifting element are being considered separately and large scale tests of practical noise suppressors are scheduled.

All the results of this group's work are continually being tested and confirmed so that both commercial and military aircraft can be improved from the aspect of noise reduction. Communities all over the U.S. (and the world) will directly benefit from the research in that aircraft will become quieter. V/STOL and helicopters will hopefully be available to the daily commuter because they will be quiet enough to land in and take off from suburban communities to serve the metropolitan cities.

New deputy director

(Continued from page 1)

helicopter and seaplane pilot in the Gulf of Mexico serving oil operators.

Lt. Col. Wright's awards and decorations include: the Bronze Star Medal, the Air Medal and the Army Commendation medal.

A native of Caribou County, Idaho, the Deputy Director is a 1953 graduate of the Utah State University with a B.S. Degree in Industrial Engineering.

Note: Dr. Irving C. Statler is the Director of the Ames Directorate, one of the four Directorates that comprise the U. S. Army Air Mobility Research and Development Laboratory.

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Deadline for contributions: Thursday between publication dates	

Center personnel at work abroad with Galileo II research aircraft

Ames' Galileo II 990 research aircraft is now in Africa, participating in the most complex international scientific experiment ever undertaken. Called the Atlantic Tropical Experiment, it is being coordinated by the World Meteorological Organization, a specialized agency of the UN. The three-month data-collection

portion of the experiment involves 11 other aircraft in addition to the 990, some 40 ships, several U.S. and Russian satellites and about 4,000 scientists and technicians from 66 nations.

Galileo II, carrying equipment for 17 experimenters, is based at Dakar, Senegal (the western-most point of

Africa), for the duration of the experiment except for two brief periods when it will be flown to Mallorca, Spain, for routine maintenance.

The project is designed to gather information needed to understand the behavior of the tropical atmosphere and its ultimate effects on global weather.

Scientists are hoping to close in on the day when it may be possible to forecast weather weeks in advanced, for any spot on the globe.

The National Oceanic and Atmospheric Administration of the Department of Commerce is coordinating and directing U.S. participation in the experiment.



Galileo II is shown on the flightline at Dakar, Senegal, Africa, where it is participating in an international study of tropical weather. Two Russian IL-18's, also part of the Atlantic Tropical Experiment, can be seen in the background.



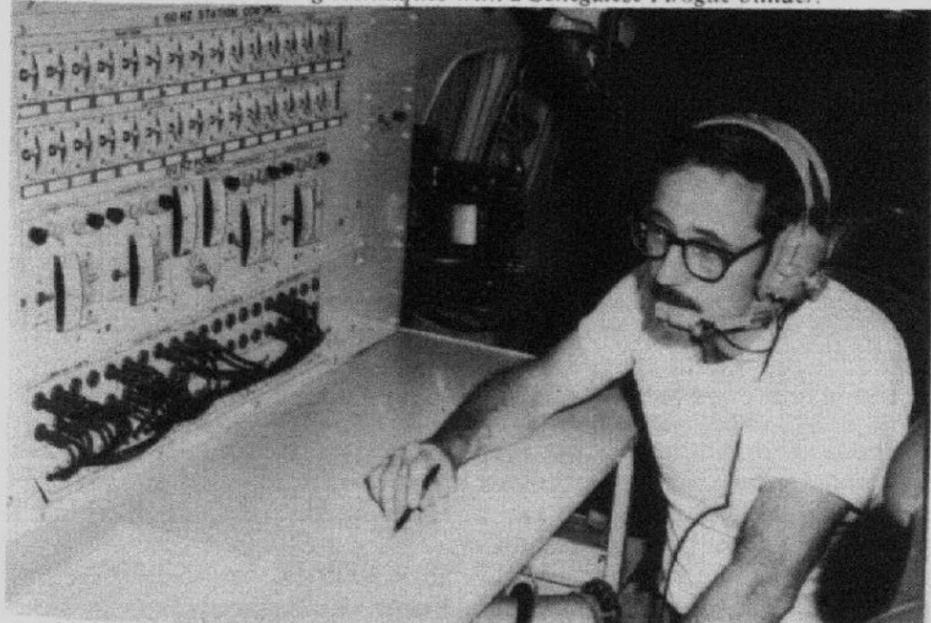
Donna Johnson, of the Ames Airborne Science Office, typed a steady stream of information into the Galileo II computer during data flights.



It wasn't all work in Dakar. Here, Donna Johnson of the Airborne Science Office discusses boat-building techniques with a Senegalese Pirogue builder.



Earl V. Petersen, Ames CV-990 Program Manager for the Atlantic Tropical Experiment (farthest from camera) is shown seated at Mission Director's console onboard Galileo II. At Earl's right is Dr. Alan Betts of the University of Colorado.



Curtis Muehl, Ames Airborne Science Office, is shown at Mission Directors' console during one of the data flights from Dakar. Curt is the facility Manager for the CV-990.



Pilot Fred Drinkwater and co-pilot Donald L. Mallick (Flight Research Center) clean the African dust from Galileo II's windshield prior to a data flight in support of the Atlantic Tropical Experiment, an international effort to learn more about the world's weather systems.

Proposed Ames technology associates program

Throughout the years many Ames personnel have expressed a desire to apply their diverse technical talents to helping society to improve itself in ways supplementary to their mainstream efforts related to aeronautics or space. Consequently, a study is currently under way of a proposed voluntary Ames organization to provide for work on the application of aerospace technology to some of the problems of today's society. In addition to working on applications to known problem areas the proposed Ames organization would work with local government agencies in such areas as highway safety and control, health, emergency services, and similar social areas.

Last week a memorandum was distributed throughout the Center and to Ames retirees in related fields by Deputy Director C. A. Syvertson to determine whether the effort involved in establishing such an organization would be justified. A meeting is planned for Friday, August 9 at 2 p.m. in the Space Science Auditorium, Building 245, to discuss the program with those individuals who may be interested in participating in the organization. Those unable to attend the meeting are encouraged to submit written comments.

Based on the response to the proposal, plans will either proceed as outlined in the memorandum, be modified as based on suggestions, or be abandoned because of insufficient interest.

As described in the attachment to the memorandum, the essence of the program is the establishment of the Ames Technology Associates Program under Ames sponsorship with membership open to current and retired Ames employees. The Associates would examine areas of possible technology transfer and the organization would act as the sponsor for individuals who wish to work in areas of potential benefit. Limited Ames fabrication and facility assistance would be provided to projects undertaken.

Revised traffic court procedures

All operators of motor vehicles, military and civilian, are advised that effective 1 August 1974, the United States Magistrate's Court will have full jurisdiction over all persons cited for violation of traffic regulations occurring aboard Moffett Field. Fines range from

\$5.00 for illegal parking to \$500.00 for driving while intoxicated. Violations are also recorded by the licensing bureau of the state issuing the driver's license. For information regarding payment of fines or court appearances, call the Traffic Clerk, telephone 966-5141.

New graduate TV courses

The University of California at Berkeley is planning to offer a limited number of engineering courses via television beginning this fall. Masters degree programs will be offered initially in Electrical Engineering and Computer Science, Operations Research and Mechanical Engineering. The probable courses for this fall are:

E 102	Introduction to Operations Research
E 115	Methods of Linear Algebra
E 230A	Engineering Analysis
CS 152A	Computer Systems
EECS	Processing and Design of Integrated Circuits
NE 101	Nuclear Reactions and Radiation

In addition to students who will seek degrees, these courses will be available on an audit basis.

During winter and spring quarters, CE 260A & B, Air Transport Engineering is tentatively scheduled.

If you are interested in learning more about this opportunity, please complete the form below and return it to the Training Office, Mail Stop 241-3, as soon as possible.

NAME _____

MAIL STOP _____ EXTENSION _____

For the fall, I am interested in _____

Degree Audit

Subject matter I would like to see offered: _____

WANT ADS

Transportation

1965 VW, new interior & bumpers, recent valve job, exc. cond. in/out, \$650. Call 984-8017 after 5 p.m.

GOLF

Dave Banducci, Tournament Chairman for the Ridgemark Golf Tournament, reports the following winners on that beautiful and well manicured golf course:

First Flight: Dave Banducci, 1st place (Dave sure knows how to run a tournament); Roger Hedlund, 2nd place; Gary Lazzeroni, 3rd place; Tom Almojuela, 4th place; Odell Sapp, 5th place.

Second Flight: Mike Orozco (El Sandbagger never fails) 1st place; Jack Cayot, 2nd place; Jim Martin, 3rd place; Jim Nelan, 4th place; Mitch Radovich, 5th place.

Third Flight: Earl Menefee, 1st place; Clark White, 2nd place; Nancy Krouse, 3rd place; Bill Sutton, 4th place; Bert Nevotti, 5th place.

Fourth Flight: Art Joly, 1st place; Sid Daligcon, 2nd place; Greg Cabebe, 3rd place; Dick Dowell, 4th place; Thelma Nelan, 5th place.

Scores worthy of note: Roger Hedlund, 75; Dave Banducci, 75; Gary Lazzeroni, 78; and Odell Sapp, 79.

SOFTBALL

The Ames fast-pitch softball team hit a mid-season slump and lost three games in a row. Nonetheless, Ames finished second out of 8 teams in the first half of play. Second half games are being played at Roosevelt Field in San Jose, Tuesday nights.

Brief reminder from Dr. Low

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unless it is clear that refusal would offend the offeror. If such a gift must be accepted, it must be done so in the name of the United States, not the individual. Under no circumstances may the individual retain it for his or her own personal use. It must be forwarded to the Assistant Administrator for International Affairs who will deposit it with the Department of State for the use of the United States. (NMI 1030.1A should be referred to for the special conditions for acceptance and retention of decorations.)

"Any NASA employee (or member of his or her family) who may have received such a gift and has not yet forwarded it to the Assistant Administrator for International Affairs should do so immediately, and any recipient in the future should forward gifts promptly. A statement explaining the circumstances under which the gift was accepted should be enclosed."

Housing

House For Rent - 1 Yr., 4 bdr., 2 ba., Fm. Rm., cul-de-sac, good school, 5 mi. from Ames, \$400. 738-1709

FOR RENT: 3 bdrm, 2-story house, Tahoe Keys, fully furnished, AEK, waterfront, private boat dock next to front deck. Exc. view. 736-4328

FOR RENT: Pajaro Dunes Condo. on beach. 2 bdrm, 2 ba, sleeps 6, waterbed, linens, tennis, bicycling. 325-5103

Miscellaneous

KITCHEN WOOD BURNING STOVE - 1922 WEDGEWOOD. 6 covers & warming cabinet, \$200. Also ANTIQUE ANDIRONS, jumbo size, must see to appreciate. Asking \$85 for the pair. 227-5307

2-10-16.5 8-lug Ford rims, \$35. Complete ¾ ton Ford rear end, \$50. Phone 578-5472 evenings.

1968 Honda 90 and 2 helmets, like new, only 1500 mi., \$250. Phone 578-5472 evenings.

Sears 12" bandsaw-floor model, \$75. Phone 578-5472 evenings.

1969 Ford Fairlane 500 station wagon, R&H, PS, AC, good mechanical & rubber, \$650. Phone 578-5472 evenings.

Girls Schwinn Bicycle, single speed, \$15. 964-3772 or 657-4247

Portable dishwasher, Penncrest, \$50. Refrigerator, top freezer, Westinghouse, \$50. Call 738-4849 after 5 p.m.

Riding mower, 1 yr old, originally sold for over \$300, asking \$175. Make offer. 227-5307

Small upholstered chair, \$25; electric lawn edger, used once, \$20; end table, \$7. 322-1380

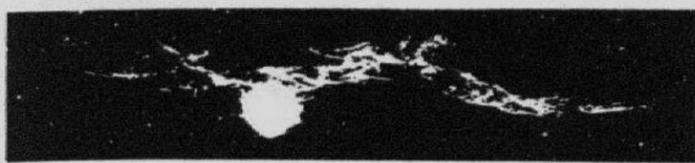
Genuine Navajo, Zuni, Hopi and San Ildefonso Indian jewelry. Turquoise and silver, 40% off. R. Lewis, 257-1921 after 5:30 p.m.

FOR SALE: Console Magnavox Color TV, 25" Screen, excellent working condition, \$175. Call 251-4857 after 5:00 p.m.

Parts for AH3000 Boot, Radiator Hose, Tire Chains, Trailer Hitch, free to proud AH3000 owner. Call Lou Williams, 248-2481

Ride Wanted: Fair Oaks and Columbia (near Maude) to Moffett Field (8:00 - 4:30 shift). Ext. 5941 or 5320, ask for Ann.

RIDE NEEDED: Vicinity of Camino Los Cerros and the Alameda, Menlo Park, 7:30 - 4:00. Home phone 854-3145; Office 965-5674.



the astrogram

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National Aeronautics and Space Administration • Ames Research Center, Moffett Field, California

Sebesta receives Bravery Medal

The NASA Medal for Exceptional Bravery will be presented to Paul D. Sebesta, Staff Assistant to the Chief of the Biotechnology Division, at an honorary awards ceremony to be held in the Ames Auditorium on Friday, August 16, at 9 a.m. Dr. James C. Fletcher, the NASA Administrator, will make the presentation.

The award, which is being presented to a NASA employee for only the third time, is based on Mr. Sebesta's exemplary courage, resourcefulness and initiative under extreme personal danger posed by abandonment of ship during a NASA-sponsored marine expedition. Without regard to his personal safety and despite hazardous heavy surf, Mr. Sebesta brought a crewless skiff under control and saved the life of a prominent Mexican scientist, a member of the expedition, who had been left dazed and injured in the skiff.



"Space window"

NASA officials recently witnessed the dedication of a nineteen-foot "space window" which is housed in The National (Episcopal) Cathedral, Washington, D.C. Those attending the 11 a.m. service and ceremony included past NASA Administrator, Dr. Thomas O. Paine; present Administrator, Dr. James C. Fletcher; and Apollo 11 astronauts, Edwin Aldrin, Michael Collins, and the first man to walk on the moon, Neil Armstrong.

According to an article which appeared in "Cathedral Age" magazine's Volume XLIX, Number 2, Summer 1974 issue, a piece of the rock brought back from the moon by the Apollo 11 astronauts will be embedded in the window when the cathedral nave is enclosed in 1976.

The window was designed by Rodney Winfield and depicts swirling stars and orbiting planets to commemorate man's stepping off his own planet for the first time. Dr. Thomas O. Paine, who was Administrator of NASA during the first moon walk five years ago, is the donor of the window.

Spacelab groomed to succeed Skylab

Spacelab is being designed and built to take over Earth-orbiting laboratory functions as a successor to NASA's Skylab.

When the final Skylab crew completed an 84-day flight in February, many people remarked that the record-breaking stay in orbit marked the end of U.S. manned space stations for a long time.

The lengthy flight of Skylab, which still circles the Earth as a silent reminder of its successful role as the first U.S. laboratory in space, may not be matched for many years, but a new and very different orbital laboratory will be ready for use by 1980.

Called "Spacelab," the versatile new laboratory will be much smaller and much less expensive than Skylab, which carried all of its own complex equipment to support many months of space operations. The reusable Spacelab, in contrast, will remain within the cargo compartment of its launch vehicle - the Space Shuttle now being developed by NASA. Spacelab will use the crew quarters and supporting systems of the Shuttle during its entire stay in orbit.

Spacelab will be staffed by as many as four persons during orbital flights that can last as long as 30 days. Spacelab will be suitable for research projects in Earth resources, solar investigations, astronomy, materials processing, and several other areas.

The "Spacelab" name encompasses several different configurations of new hardware that will be developed by the European Space Research Organization (ESRO) at an estimated cost of \$360 million in 1973 dollars.

Spacelab is truly an international space program. ESRO is responsible for the design, development and manufacture of Spacelab and NASA will operate it as part of the space transportation system of which the U.S.-built Space Shuttle is the major element. The U.S., member nations of ESRO, and other countries will develop experiments and participate in joint missions.

Magic four program

The Board of Directors of Moffett Field Employees Credit Union announces a brand new service to members called the "MAGIC FOUR PROGRAM," according to Fred G. Mayer, Credit Union Manager.

This new program includes the following:

1. Regular passbook savings program - first half of 1974 paid 5.5% per annum plus a 1/4 of 1% per annum - a total of 5.75% per annum.

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Pioneer "premiere" to be presented on Friday

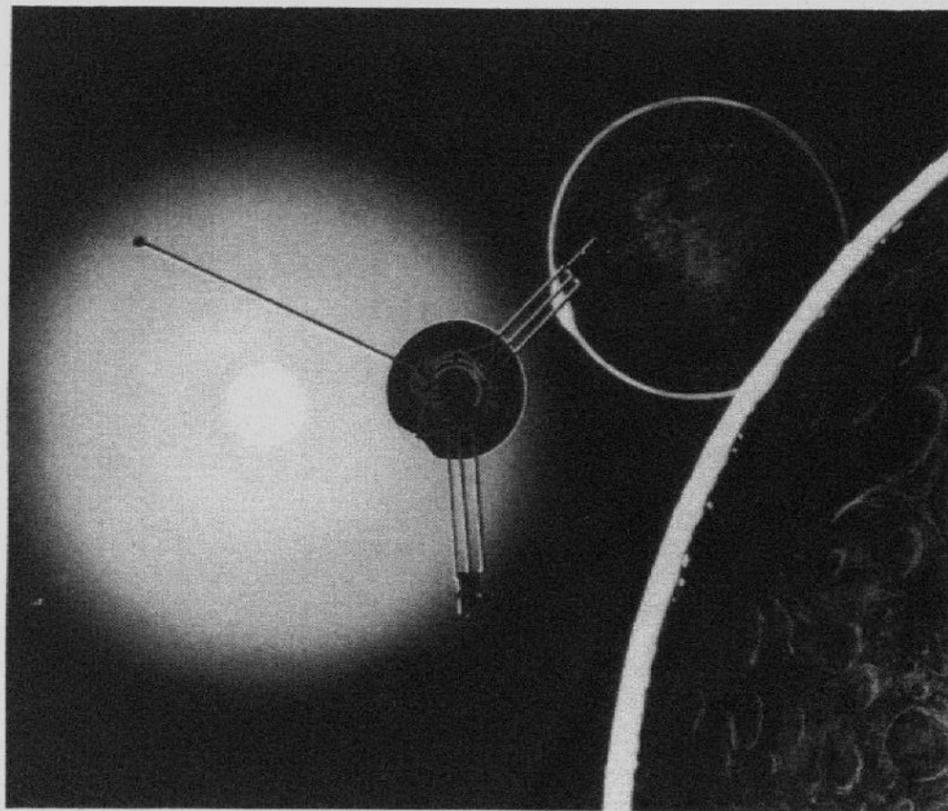
All Center Employees Invited

The premiere showing of Ames' general release movie, "Jupiter Odyssey," will take place on Friday, August 16, 1974, at 4:45 p.m. in the Ames Auditorium.

All Center employees, contractors, and their spouses are invited to the premiere of the 30-minute color film which deals with Pioneer 10 and 11 Missions to Jupiter and Saturn, and with outer planet exploration.

Following the film, a reception will be held in the Ames Cafeteria from 5:15 to 6:30 p.m. The reception is being held in celebration of the Center's accomplishment of the first trip to Jupiter.

A cash bar will provide mixed drinks, beer, and soft drinks.



ARTIST'S CONCEPT OF THE UNMANNED PIONEER SPACECRAFT ... in flight on its way past the planet Jupiter and to eventually escape our solar system.

Aerodynamics test conducted on 1974 automobiles

A study aimed at possible fuel savings through improved automotive aerodynamics has begun under a NASA and Department of Transportation (DOT) agreement.

The objective is to validate experimentally the reduction in aerodynamic (air) drag which can be achieved by adding devices or minor design changes in today's automobiles.

Three automobiles, in the standard (large), compact (medium), and subcompact (small) categories, will be studied. The vehicles chosen will represent the most popular American cars

from each category based on 1974 sales volume.

Scale models of the three vehicles will be constructed and tested in a wind tunnel to document changes in drag lift, side force and in yawing, pitching and rolling moments.

Following these tests, one full-scale vehicle, incorporating the best features found in the three, will be tested. Tolerable wind conditions (speed and direction) and techniques for separating rolling resistance and aerodynamic drag will be considered in the experimental design.

NASA/ASEE Summer Faculty Fellowship Research Programs

This summer Ames is participating in two programs sponsored jointly by NASA-Ames and the Stanford ASEE (American Society for Engineering Education) chapter. The programs are in the areas of engineering systems design and in aeronautics and space research. Nineteen college and university faculty members are designing a regional engineering education system in the systems design group for 11 weeks (June 17 - August 30), while twenty-five faculty members are spending 10 weeks in cooperative research and study with the senior staff at Ames and the faculty of Stanford.

During this summer the systems design group will work on a system which will more effectively integrate the various resources (two and four year colleges, graduate schools, government and non-profit labs, industries, private consultants, etc.) available to engineering education in a region. The proper application of new educational technologies and philosophies will be considered in detail. The San Francisco Bay Area will be used as a typical region.

Past summer faculty institutes at Stanford and Ames have studied an advanced solar probe (ICARUS), an international communications satellite system (SAINT), a scientific base on the lunar surface (MOONLAB), an airborne metropolitan commuter system (MATS), an air pollution monitoring system (AIR), a large radio telescope system (CYCLOPS), a system for synthetic food production, and a system for fighting wildfires.

Participating Fellows in the aeronautics and space research program spend approximately 35 hours per week at Ames working with individual research engineers or scientists in fields of nearly every directorate: Aeronautics and Flight Systems, Astronautics, Life Sciences, Development and Research Support. Supplementing the research activity at Ames, the Fellows are given an opportunity to attend courses and seminars offered as part of the Stanford program for presentation at Ames. All Faculty Fellows are expected to spend at least 6 hours per week participating in courses and seminars. Special talks by senior Ames scientists are also scheduled throughout the summer.

The Ames participation is coordinated by the Training and Special Programs Branch of the Personnel Division.

Similar programs are also held at Goddard, Marshall, Johnson, Langley, and Lewis Space Centers in conjunction with respective nearby universities and local ASEE chapters.

Aeronautics and space research group

1st-Year Participants

Fellow	School	Advisor
Dr. William C. Carpenter	University of Maine	Robert MacCormack
Dr. Bernard B. Evans	California State Polytechnic	John MacKay
Dr. Lois E. Flamm	Texas A&M University	Dr. Richard Haines
Dr. Daniel L. Flamm	Texas A&M University	T. Wydeven
Dr. Joseph E. Grimes	California State Polytechnic	Michael Bondi
Dr. Jon A. Hoffman	California State Polytechnic	Vernon Rossow
Dr. George Raczkowski	Texas A&M University	Shizuo Doiguchi
Dr. Susann J. N. Shaw	San Francisco State University	Earl Murman
Dr. Chiao-Yao She	Colorado State University	Ken Billman
Dr. Charles R. Smith, Jr.	Purdue University	LeRoy Presley
Dr. Otis L. Updike, Jr.	University of Virginia	Dr. Harold Sandler
Dr. John F. Wehmiller	University of Delaware	Dr. Keith Kvenvolden
Dr. John E. Jenkins-Lee	Case Western Reserve University	David Nagel

2nd-Year Participants

Dr. Wayne L. Bailey	Jersey City State College	Fred Witteborn
Dr. John R. Cronin	Arizona State University	James Lawless
Dr. William R. Duryea	Saint Francis College	Edwin Merek
Dr. Ronald A. Hess	Naval Postgraduate School	Rodney Wingrove
Dr. Philip Kantrowitz	Queensborough Comm. College	Sal Rositano
Dr. Richard I. Loehrke	Colorado State University	John Kirkpatrick
Dr. Oyvind K. Oseberg	San Francisco State University	Joseph Marvin
Mr. John G. Rossi	State University of New York	Ralph Hallett
Dr. Norman R. Simon	University of Nebraska -Lincoln	Ray Reynolds
Dr. William J. Steinmetz	Adelphi University	Lado Muhlstein
Dr. Leonard C. Rosen	Dartmouth College	Ray Reynolds
Dr. George Trevino	Del Mar College	Lado Muhlstein

Engineering systems design group

Ames Sponsor:
Dr. Leonard Roberts

Ames sponsor: Dr. Leonard Roberts	
Robert Anderson	Purdue University
Thomas Dean	Oklahoma State
Nicholas Dinos	Ohio University
Herbert Eckerlin	North Carolina State University
Joe Eisley	University of Michigan
Carleton Fanger	Portland State University
Barrett Hazeltine	Brown University
Robert Heeren	Pacific Lutheran University
Cecil Johnson	Georgia Institute of Technology
Andrew Jones	Calif. Polytechnic State University
John Kramer	California State College, Sonoma
Peter Lauritzen	University of Washington
Martin Nlick	University of Arizona
Stephen Rice	University of Connecticut
Martha Sloan	Michigan Technological University
Robert Smith	College of San Mateo
Roulette William Smith	University of California, Santa Barbara
Chor Tan	The Cooper Union
Michael Wartell	Metropolitan State College

Room 142
Admin. Bldg. Building
Phone 963-3422

astrogram

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Reporters: NASA Employees

Deadline for contributions:
Thursday between publication dates

NASA recognizes Pioneer 10 Jupiter Achievers

The National Aeronautics and Space Administration will confer its highest individual and group awards on some 50 members of the Pioneer 10 team in recognition of their outstanding contributions to the spacecraft's successful flight past Jupiter December 4, 1973.

Dr. James C. Fletcher, the NASA Administrator, will present the awards on August 16.

The NASA awards include the Distinguished Service Medal, Exceptional Service Medal, Medal for Exceptional Scientific Achievement, Public Service Award, Group Achievement Award, and the Public Service Group Achievement Award.

Charles F. Hall, Manager of the Pioneer Project, Ames Research Center will receive NASA's highest award, the Distinguished Service Medal, for his "outstanding leadership and dedicated performance in managing the Pioneer Project at Ames since its inception in 1962."

The NASA Exceptional Service Medal will be presented to the following honorees:

Richard O. Fimmel, Chief Science Operations, Pioneer Project, Ames Research Center, for his "outstanding effort in managing the science interface activities for Pioneer 10, and in particular Jupiter encounter."

John V. Foster, Director of Development, Ames Research Center, for his outstanding leadership in support of management and administrative performance of the Pioneer Project."

Robert U. Hofstetter, Manager, Launch Vehicle and Operations, Pioneer Project, Ames Research Center, for his "outstanding leadership related to the Pioneer mission analysis activities and launch vehicle interface coordination and to the mission operations during the Pioneer 10 encounter of Jupiter."

Ralph W. Holtzelaw, Manager, Spacecraft Systems, Pioneer Project, Ames Research Center, for his "outstanding leadership and performance related to the Pioneer 10 spacecraft design and development."

Harold Jaffe, Manager, Isotopes Flight Systems, Division of Space Systems U.S. Atomic Energy Commission, for his "outstanding leadership solving major technical problems which could have threatened the availability of Radioisotope Thermoelectric Generator (RTG) flight units for the Pioneer 10 Mission which would have precluded a launch during the 1972 Jovian opportunity."

William E. Kirhofer, Project Engineer/Mission Analyst, Trajectory Consultant and Navigation Team Chief, Jet Propulsion Laboratory, for his "outstanding contributions to the Pioneer 10 spacecraft navigational analyses and the subsequent planning and execution of spacecraft midcourse maneuvers from launch to encounter with Jupiter."

Fred Kochendorfer, Manager, Pioneer Program, NASA Headquarters, for his "outstanding leadership in coordinating the administrative and financial management affairs of the Pioneer Program at NASA Headquarters."

James R. Johnson, Pioneer Project Representative, Unmanned Launch Operations, Kennedy Space Center, for his "outstanding contributions to the successful planning and implementation of the Pioneer 10 spacecraft prelaunch and launch operations at Cape Kennedy."

Eldon W. Kaser, Chief, Development Projects, Contract Branch, Ames Research Center, for his "outstanding leadership and dedicated performance related to initiation and administration of the contract activities for the Pioneer 10 mission."

Edwin T. Muckley, Project Engineer, Atlas/Centaur Project Office, Lewis Research Center, for his "outstanding contribution to development of the launch vehicle system for the Pioneer 10 mission."

Robert R. Nunamaker, Manager, Mission Operations System, Pioneer Project, Ames Research Center, for his "outstanding performance and leadership relative to the planning and conduct of the mission operations for the Pioneer 10 Mission."

Joseph E. Lepetich, Manager, Experiment Systems, Pioneer Project, Ames Research Center, for his outstanding performance and leadership as related to the Pioneer Science Payload design development, and integration with the Pioneer 10 spacecraft."

Norman J. Martin, Chief of Mission Operations, Pioneer Project, Ames Research Center, for his "outstanding performance and leadership as related to the Pioneer 10 Mission Operations and in particular for the Jupiter encounter."

Alfred J. Siegmeth, Manager, Deep Space Network, Pioneer Project, Jet Propulsion Laboratory, for his "outstanding effort in support of the Pioneer 10 Mission tracking, data acquisition, and command requirements."

Arthur C. Wilbur, Chief, Systems Development Branch, Flight Project Development Division, Ames Research Center, for his "outstanding performance and leadership as related to the design, development, and integration of the Radioisotope Thermoelectric Generator (RTG) power sources into the Pioneer 10 spacecraft system."

The NASA Medal for Exceptional Scientific Achievement will be awarded to the following:

Dr. John D. Anderson, Celestial Mechanics Experiment, Principal Investigator, Jet Propulsion Laboratory, for his "outstanding scientific accomplishments and contributions as Principal Investigator for the Pioneer 10 Celestial Mechanics Experiment, which has made major contributions of importance on the gravity fields and orbits of Jupiter and its satellites."

Dr. R. Walker Fillius, Jovian Trapped Radiation Experiment, Principal Investigator, of University of California at San Diego, for his "successful accomplishment of all scientific objectives originally proposed for this experiment. The results of this experiment have made major contributions of fundamental importance to the understanding of the nature of the radiation field of the planet Jupiter."

Dr. Thomas Gehrels, Imaging Photopolarimetry Experiment, Principal Investigator, of University of Arizona, for his "exceptional achievement as Principal Investigator for the Pioneer 10 Imaging Photopolarimetry experiment, which made major contributions to the understanding of the nature of the physical features and atmosphere of Jupiter and its satellites and of the zodiacal light beyond Earth's environment."

Dr. Guido Munch, Jovian Infrared Thermal Structure Experiment, Principal Investigator, California Institute of Technology, for his "exceptional scientific achievement as Principal Investigator for the Jovian Infrared Thermal Structure experiment, which obtained some of man's first direct measurements of the Jovian thermal structure."

Dr. John Simpson, Charged Particle Composition Experiment, Principal Investigator, University of Chicago, for his "outstanding scientific accomplishments and contributions as Principal

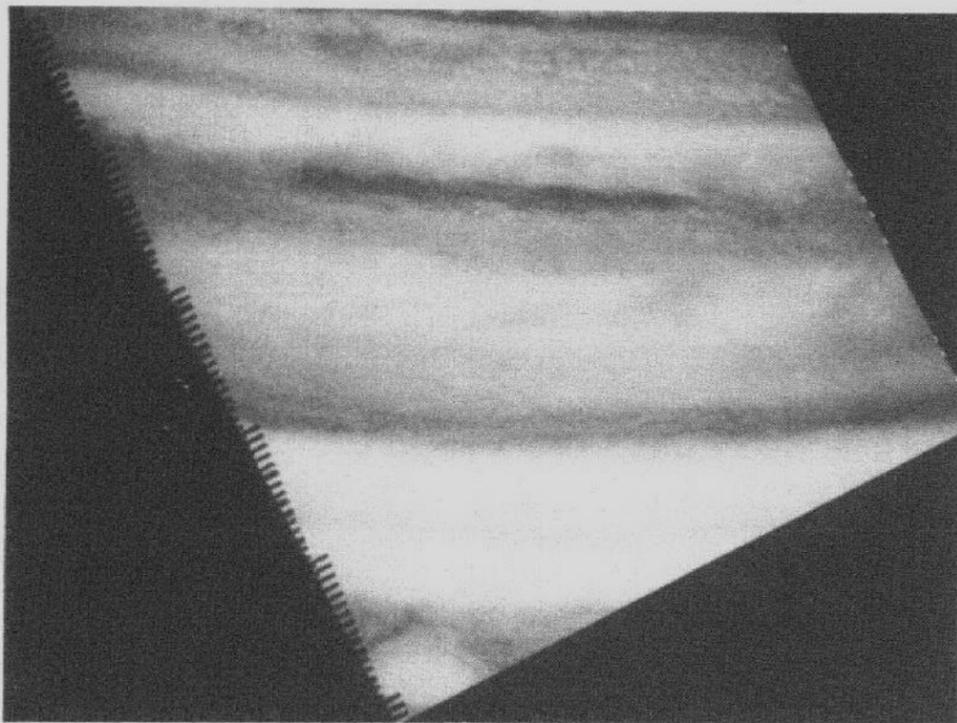
Investigator for the Charged Particle Composition experiment. Results on the distribution of high energy particles from this experiment have been a major contribution to the understanding of the radiation environment of Jupiter."

Dr. Darrell Judge, Ultraviolet Photometry Experiment, Principal Investigator, University of Southern California, for his "outstanding scientific accomplishments and contributions as Principal Investigator for the Pioneer 10 UV Photometry Experiment, which obtained results of fundamental importance to the understanding of the nature of the Jovian environment and several of the Galilean Satellites."

William H. Kinard, Meteoroid Detector Experiment, Principal Investigator, Langley Research Center, for "exceptional achievement as Principal Investigator for the Meteoroid Detector experiment, which has made major contributions to the understanding of the particulate matter in the interplanetary medium between the orbits of Earth and Jupiter."

Dr. James H. Trainor, Cosmic Ray Energy Spectra Experiment Co-Investigator, Goddard Space Flight Center, for his "outstanding scientific accomplishments and contributions as Co-Investigator for the Cosmic Ray Energy Spectra experiment. The results of this experiment which made some of man's first direct measurements of the Jovian energetic particle environment, have made contributions of major importance to the understanding of Jupiter's radiation field."

Dr. James A. Van Allen, Jovian Charged Particles Experiment, Principal Investigator, University of Iowa, for his "exceptional achievement as Principal Investigator for the Jovian Charged Particles Experiment, which has made major contributions of fundamental importance to the understanding of the interplanetary medium beyond the orbit of Mars and of the nature of the radiation field of Jupiter."



CLOSEST JUPITER PICTURE YET RELEASED . . . This picture looking north from the equator was taken at 506,000 miles from Jupiter's cloud tops.

The NASA Public Service Group Achievement Award will be presented to the following teams:

Pioneer 10 Jupiter Team, TRW Systems Group, for "outstanding performance and excellence in the design, development, integration and test of the Pioneer 10 spacecraft system that led to the successful achievement of the mission objectives."

Pioneer 10 Radioisotope Thermoelectric Generator Team: Teledyne Isotopex Energy Systems Div.; Los Alamos Scientific Laboratory; Monsanto Research Corp., Mound Laboratory; Oak Ridge National Laboratory, for "outstanding contributions to the timely design, development, and manufacture of the RTG's which served as the primary source of power for the Pioneer 10 Mission."

Pioneer 10 Jupiter Field Engineering Team, Bendix Corp., for "outstanding performance and excellence in providing computer programming and data processing and the flight mission support of the successful Pioneer 10 Mission."

Pioneer 10 Scientific Instrument Team for "exceptional effort by the Pioneer Scientific Instrument Team in the development of equipment of unusual precision and versatility, for flawless instrument performance throughout the Pioneer 10 mission and for fulfillment of the stated experiment objectives."

The NASA Group Achievement Award will be presented to the following teams:

The Ames Pioneer 10 Scientific Instruments Team, for "highly effective and timely technical direction of the Pioneer Jupiter scientific instrument development and the mission operation support which contributed significantly to the successful performance of the instruments and to the achievement of the Pioneer 10 mission objectives."

Ames Pioneer 10 Spacecraft Team, for "exceptionally effective and timely technical direction of the Pioneer Jupiter spacecraft development that led to the successful launch and flight operation of the Pioneer 10 spacecraft system and to the achievement of the mission objectives."

Ames Pioneer 10 Mission Analysis and Launch Operations Team, for "exceptionally effective and timely flight mission design, maneuver planning, and launch vehicle and operations coordination which resulted in major contributions to the successful achievement of the Pioneer 10 mission objectives."

Ames Pioneer 10 Project Management Team, for "highly effective and timely overall technical, administrative and financial management, and control of the Pioneer Jupiter Project which contributed significantly to the successful achievement of the Pioneer 10 mission objectives."

Ames Pioneer 10 Mission Operations Team, for "the highly effective and timely planning, management and control of the Pioneer Jupiter mission operations that contributed to the successful flight operations of the Pioneer 10 spacecraft and to the achievement of the mission objectives."

Ames Pioneer 10 Contracts Team, for "highly effective and timely implementation and administration of the procurements for the Pioneer Jupiter Project which contributed to the achievement of project milestones on schedule and to the overall success of the Pioneer 10 mission."

Ames Research Center Support Groups, for "highly effective and timely support of the Pioneer Jupiter Project that contributed significantly to the Pioneer 10 mission success."

Mission Analysis Team, Jet Propulsion Laboratory, for the "outstanding contributions by the Pioneer Jupiter Team of the Mission Analysis Division to the design of the Pioneer 10 mission and the orbit determination and navigation of the Pioneer 10 spacecraft."

Ground Data System Team, Jet Propulsion Laboratory, for "outstanding performance and excellence in development and operation of the ground tracking and data system for the Pioneer 10 mission."

Pioneer 10 RTG Team, U.S. Atomic Energy Commission, for the "exceptionally effective and timely manner in which the team provided flight and safety qualified Radioisotope Thermoelectric Generators and Radioisotope Heater Units for the Pioneer 10 Mission."

Pioneer 10 Radio Science Team, for the "highly effective and timely effort that resulted in the innovative development and implementation of the successful Celestial Mechanics and S-Band Occultation experiments on the Pioneer 10 Mission."

Pioneer 10 Headquarters Staff Support Group, for "outstanding individual and collective contribution to, and dedicated support of, the cooperative effort that was vital to the success of Pioneer 10, the first space flight to Jupiter."

Those being honored with the NASA Public Service Award are:

Bernard J. O'Brien, Manager, Pioneer Project, TRW Systems Group, for "outstanding performance and leadership as Project Manager for the Pioneer 10 spacecraft prime contractor."

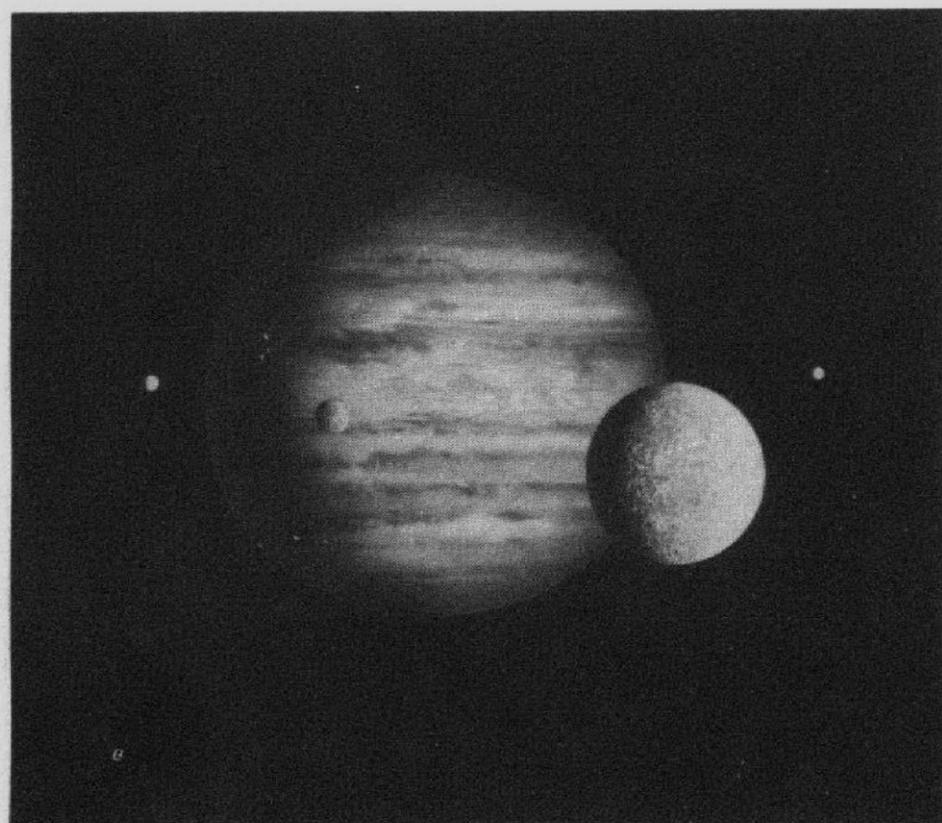
Dr. Herbert A. Lassen, Manager, Advanced Scientific Spacecraft Systems, TRW Systems Group, for "outstanding performance and leadership as the key person in the conceptual design of the Pioneer 10/11 spacecraft for the Pioneer Jupiter Mission."

Dr. William J. Dixon, Assistant Project Manager for System Engineering, TRW Systems Group, for "outstanding performance and leadership as the Assistant Project Manager for System Engineering for the Pioneer 10 spacecraft prime contractor."

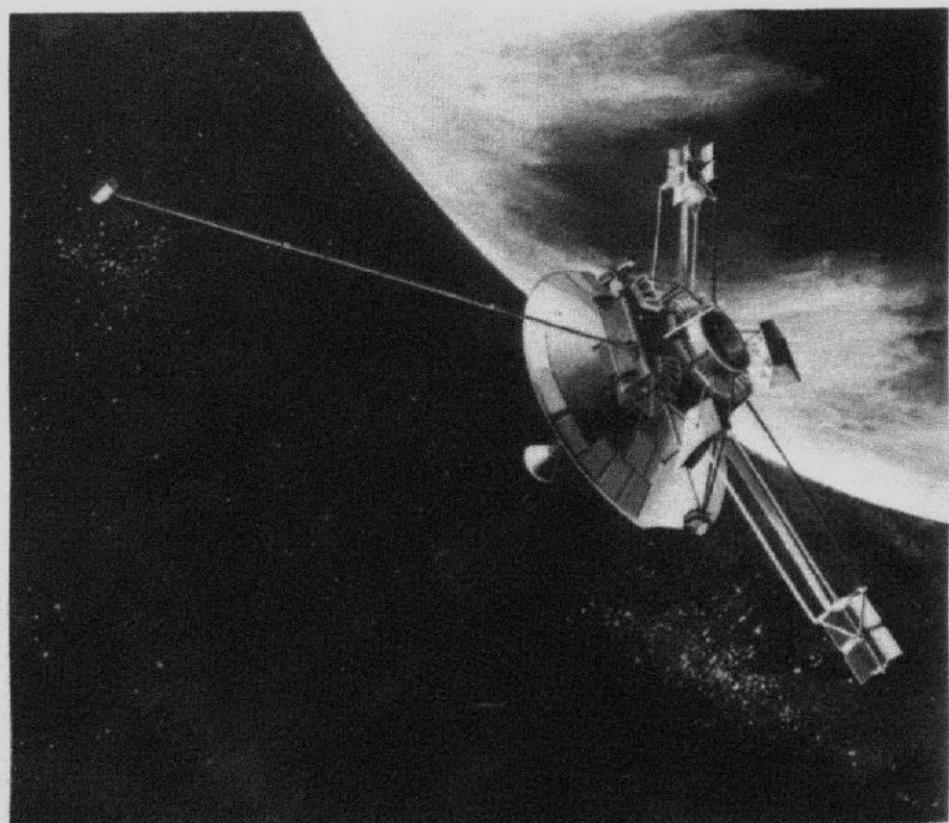
William F. Sheehan, Assistant Project Manager for Assembly, Test and Launch, TRW Systems Group, "outstanding leadership and performance in managing the spacecraft contractor's responsibilities for Pioneer 10 assembly, test, and launch activities."

Louis A. Watts, Project Manager, Pioneer Jupiter Imaging Photopolarimeter, Santa Barbara Research Center, for "outstanding performance and leadership in managing the design, development and launch support of the imaging photopolarimeter for Pioneer 10."

Walter L. Natzic, Manager, Pioneer Mission Operations, Bendix Field Engineering Corporation, for "outstanding performance in managing the Pioneer 10 mission operations support services contractor team."



Artist's concept of the planet Jupiter and its four moons. From left to right: Callisto, Europa, Io, and Ganymede.



Artist's concept of the Pioneer spacecraft scanning the face of Jupiter from its closest approach of 81,000 miles.

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Ames bus pool proving successful

The Ames bus pool is rapidly passing the pilot program stage. The pool is proving to be a successful innovation and, according to Cupertino City Councilman Donald Frolich of the Ames Research Facilities Engineering Branch, could start a chain reaction among lots of large companies.

Thirty passengers may be accommodated by the self-sustaining Ames transportation system; the bus is actually from the Santa Clara County Transit District.

Riders were recently interviewed by a member of the San Jose Mercury's staff and here are a few comments from the enthusiastic Ames participants:

Bonnie Malmos, a secretary who lives two miles from Westgate, said, "Oh, I've ridden it ever since it started. Now I can relax all the way to work."

Dell Williams, Chief of the Materials Science Branch, stated, "If we get those long gas lines back, it will be good to have an assurance built in that we will get to work. I walk to the stop to catch the bus — about 15 minutes. Does me good."

Summer aid Paula Moreno confessed, "I wouldn't have any other way to get to work!"

To quote Tom Harmount, Chief of Flight Projects Branch, "I don't like to drive. I'm in favor of keeping cars off the road; and you see, we are keeping some 30 of them off in this operation."

Rider Norman Martin, head of Flight Operations Section in the Mission Operations Branch, wears two hats since he is also on the Saratoga Planning Commission.

"This gives me a few needed moments to do my homework on an environmental impact report," he smiled. "This bus pool is the only way to go for me."

Verlin D. Reed, the Center's Energy Manager, also agrees that the bus pool is "the only way to go." Reed feels that



PAULA MORENO . . . a summer aide working in the Thermal Protection Branch, pays her bus fare for her ride to work.

the government should be a leader in this area. He emphasized that without the total support of Ames management (administration, etc.) the pilot program would never have gotten off the ground. As it turned out, management was quite enthusiastic about the bus pool and Ames and Ames representatives approached the transit district for the establishment of the special route. Since subsidizing from the district was not necessary, the bus pool formed and began on June 1.



DELL WILLIAMS . . . Chief of the Materials Science Branch, enjoys his morning newspaper aboard the Ames commuter bus.



NORMAN J. MARTIN . . . reviews the environmental impact plan in his capacity as a Saratoga planning commissioner on his way to work at Ames.

Alan Shepard retires

Rear Admiral Alan B. Shepard, Jr., America's first man in space and one of 12 men to explore the moon's surface, retired from NASA and the U. S. Navy on August 1.

Shepard joined the Marathon Construction Company of Houston as a partner and chairman of the firm. Marathon is a subsidiary corporation of Coogan and Walters of Houston, the largest

(Continued on Page 4)

Professional AIAA papers

For the AIAA Mechanics and Control of Flight Conference held in Anaheim, CA, on August 5-9, the following Ames personnel were participants:

In the session entitled *Conventional and V/STOL Aircraft 1*, Fredric H. Schmitz was the chairman. Earl F. Keener and Gary T. Chapman presented a paper entitled "Onset of Aerodynamic Side Forces at Zero Sideslip on Symmetric Forebodies at High Attack." Edward J. Hopkins and Alan D. Levin presented a paper entitled "Experimental and Theoretical Study of Low-Aspect Ratio Swept and Oblique Mach Numbers between 0.6 and 1.4." (August 5)

In the session entitled *Astrodynamics 1: Mission Analysis*, Robert Jackson discussed the paper entitled "Science Objectives and the Mariner Jupiter/Saturn 1977 Mission Design." (August 5)

In the session entitled *Astrodynamics IV: Navigation—Theory and Analysis*, Frederic W. Boltz presented a paper entitled "Autonomous Orbital Navigation Using Kepler's Equation." (August 5)

In the session entitled *Conventional and V/STOL Aircraft 3*, John S. Bull and John D. Foster presented a paper entitled "Jet Transport Energy Management Fuel Consumption and Noise Impact in the Terminal Area." Fredric H. Schmitz and C. Rande Vause presented a paper entitled "Simple Near-Optimal Takeoff Control Policy for Heavily Loaded Helicopter Operating from a Restricted Area." (August 6)

In the session entitled *Conventional and V/STOL Aircraft 4*, James A. Franklin was the chairman.

For the AIAA 6th Aircraft Design, Flight Test, and Operations Meeting held in Los Angeles, CA, on August 12-14, the following Ames personnel were participants:

In the session entitled *Propulsion — An Interactive Lift Source*, Gary C. Hill and Mark H. Waters presented a paper entitled "Conceptual Design of a Lift Fan Plus Lift/Cruise VTOL Fighter Aircraft." (August 13)

In the session entitled *Two Segment Approach — Its Development and Implementation Outlook*, Dallas G. Denery, Kenneth C. White and Fred Drinkwater presented a paper entitled "Resume of the Status and Benefits of the Two-Segment Approach and its Applicability to the Jet Transport Fleet." William R. Wehrend, Fred H. Shigemoto and Kent Bourquin presented a paper entitled "Review of Two-Segment Approach System Performance Based on Flight Test Results." (August 14)

In the session entitled *STOL Technology*, a paper entitled "Evaluation of a New Jet Propulsive Lift System for Turbofan-Powered STOL Transport." was presented by Thomas N. Aiken. And a paper entitled "Microwave Landing System Requirements for STOL Operations" was presented by Clifford N. Burrous, Stuart C. Brown, Tsuyoshi Goka, and K. E. Park. (August 14)

ACE fall schedule

The following ACE (Association for Continuing Education) television classes begin the week of September 23. Day and time of classes are shown in parenthesis.

MBA PROGRAM - GOLDEN GATE UNIVERSITY

Management Information System	(TTh	9/24- 1/16	7:00- 8:15 AM)
Sem. in Current Economic Problems	(MW	9/23- 1/15	7:00- 8:15 AM)
Sem. in Personnel Administration	(MW	9/23- 1/15	12:00- 1:15)

MANAGEMENT DEVELOPMENT PROGRAM

Principles of Financial Management	(Th	9/26-12/12	5:30- 7:15)
Planning & Operations Management	(T	9/24-12/10	5:00- 6:45)
Management & Organizational Behavior	(M	9/23-12/9	5:00- 6:45)

SPECIAL & GENERAL INTEREST PROGRAMS

Materials & Processing Characteristics of Electronic Circuits	(T	9/24-12/10	7:00- 8:45 AM)
Physical Design for Elec. Engineers	(Th	9/26-12/12	5:00- 6:45)
Survey of Electronic Communication Systems	(W	9/25-12/11	5:00- 6:45)
Applications of Materials Science	(W	9/25-11/27	5:00- 6:45)
Calculus Revisited I (Self Study)	(MWF	9/23- 1/13	7:15- 7:45 AM)
Basic Algebra	(TTh	9/24-12/12	12:20- 1:05)
Introduction to Fortran IV	(Th	9/26-12/12	5:00- 6:45)
Basic Accounting	(MW	9/23-12/11	12:00- 1:00)
Principles of Effective Business Writing	(M	9/23-12/9	5:30- 7:15)
Government Contracts Administration	(M	9/23-12/9	5:00- 6:45)
A Rational Approach to Decision Making	(Th	9/26-12/12	7:00- 8:45 AM)
Elements of Supervision	(TTh	9/24-12/12	12:00- 1:00)
English As A Second Language (Adv.)	(MWF	9/23-12/13	12:20- 1:05)
Basic Conversational French I	(MWF	9/23-12/13	12:00- 1:00)
Effective Reading	(TTh	9/24-10/24	12:00- 1:00)

SAN JOSE STATE UNIVERSITY COURSES

System Programming Techniques	(TTh	9/24-12/19	7:00- 8:20 AM)
System Modeling	(MW	9/23-12/18	7:00- 8:20 AM)
Information Management	(TF	9/24-12/20	12:05-12:55)
Technical Invention Processes	(Th	9/26-12/19	12:05-12:55)

For further information, contact the Training and Special Programs Branch.

19 Scouts tour Galileo II in Dakar



Ames' Galileo II research aircraft is currently based at Dakar, in the African independent nation of Senegal, where it is one of 12 aircraft from several nations participating in the largest meteorological research program ever attempted. A group of nineteen Louveteaux Scouts (similar to our Cub Scouts) from Dakar recently toured the aircraft, a converted Convair 990 jet transport. The tour was coordinated by Robert J. Welenofsky, a Scout veteran of San Jose, and an instrumentation engineer with Northrup Corporation, a NASA contractor. The aircraft will remain in Dakar for the duration of the 101-day data-collection phase of the Atlantic Tropical Experiment; a large scale, international effort to learn more about tropical weather and its effect on world weather systems.

Earth 2020

Upcoming lectures for the Earth 2020 series presented each Tuesday at 8 p.m. at Flint Center on the DeAnza College campus include the following:

20 August, "Plagues on Managing the Future," Joseph Coates, Program Manager, Office of Exploratory Research and Problem Assessment, National Science Foundation;

27 August, "A Brain for Planet Earth: Computers in Global Management," Michael Arbib, Chairman, Computer Science, and Professor of Psychology, University of Massachusetts.

The staff is invited to attend each lecture which will be given at 3:00 p.m. each Tuesday in the Ames Main Auditorium. Attendance is on a first come, first served basis.

Magic four program

(Continued from Page 1)

2. 6% per annum - 2 year certificate, available in \$1,000.00 lots.
3. 7.2% per annum - 3 year certificate, initial \$5,000.00 and \$1,000.00 increments thereafter.
4. 8.4% per annum certificate - 6 month maturity; \$10,000.00 initial with \$5,000.00 increments.

These fine programs are available to all Moffett Field Employees Credit Union members. If you are not a member and you are either an active or retired civil servant, military, or dependent of such in San Mateo or Santa Clara counties - you may be eligible to participate - telephone, write, or some see us!

Speakers Bureau

S. N. "Sy" Stein, M.D. (Guest Scientist) was the guest speaker on August 12 for an Aviation Safety one-day meeting at Point Mugu. Attendees were the Navy pilots and flight operations officers at Point Mugu. His presentation was entitled "Flight Safety - A Medical Point of View."

Al Hertzog (Assistant Director/Administration) met with a noon discussion group in San Jose on August 15. The members of the group, which has no official name, have been holding regular meetings for 26 years, to discuss a variety of topics of interest to the members. Al briefly defined his past and current responsibilities at Ames, and the group "fired questions" relating to NASA's work in procurement and administration.

Shepard retires

(Continued from Page 3)

developer of K-Mart shopping centers in the U.S. He has been associated with Coogan and Walters as an investor for several years.

Dr. James C. Fletcher, NASA Administrator, praised Shepard's dedication and determination. "Al Shepard was the first American to make a space flight and his determination to overcome a physical ailment after his suborbital mission carried him to a highly successful manned lunar landing mission."

WANT ADS

Transportation

1964 Chevrolet Impala S.S., two door power steering/power brakes, body in good condition, new brake cylinder and shoes recently installed. Will require new muffler. Good gas mileage and easy on oil. \$250. or best offer. Call 854-3145.

Housing

FOR SALE - House in Los Altos, Big Tree area, 4 bedrooms, 2 bath, 2000 sq ft, heated pool, 1554 Vineyard Dr. Asking \$89,000. Call: Kerner - X5980 or 967-8713

Miscellaneous

Looking for people interested in raising Rhododendrons and saving money by purchasing directly from grower. For details contact Bob George - 257-4110.

Outboard motor, British Seagull 3 HP, long shaft, lightweight, 2 years old, in new condition. Ideal for sailboats 12 to 21 ft. \$195. phone 732-7384.

CANON FtB SLR Camera w/wide angle, telephoto, case, etc. Nearly new! Bob McCracken, Ext. 5664 or 578-2676.

8 Ft. camper shell (Sports Liner) for long wide bed, \$100. Call 735-9029.

Wrought Iron Side Railing - 30" high by 8 ft., three step railing - 30" high by 3 ft., \$25 each. Phone 259-6069.

Notice

During a fire last winter, the Watsonville High School suffered the loss of many books and periodicals. Anyone wishing to donate back issues of periodicals or scientific journals and books may call Priscilla Gominak at X5304.

Society to review Skylab results

Skylab results will be aired at the American Astronautical Society's 20th annual meeting, scheduled August 20-22 at the University of Southern California.

The meeting will be co-sponsored by USC's Institute of Safety and Systems Management (ISSM).

General Chairman is C. R. Able, President of McDonnell Douglas Astronautics Company and Vice General Chairman is Dr. Herold A. Sherman, Executive Director of ISSM.

Top officials of the National Aeronautics and Space Administration also will participate. Skylab Director, William C. Schneider will serve as program chairman and Thomas E. Hanes, Skylab Experiments Director, will be technical program manager.

Included in the AAS program will be Skylab evaluation, Life Sciences, Apollo Telescope Mount Experiments, a crew critique, experimental results, and a summary of lessons to be applied to the Space Shuttle and other future programs.



the astrogram

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NUMBER 24
August 29, 1974

National Aeronautics and Space Administration • Ames Research Center, Moffett Field, California

McConnell named to Applications post - succeeded by Jenkins

Dr. Dudley G. McConnell has been appointed Assistant Associate Administrator for Applications by NASA Administrator James C. Fletcher.

At the same time, Dr. Fletcher announced the promotion of Dr. Harriett G. Jenkins to succeed Dr. McConnell as Assistant Administrator for Equal Opportunity. Dr. Jenkins has been Dr. McConnell's deputy since February.

Both appointments were effective August 12th.

"Since NASA's Equal Opportunity Program is now well established, underway and producing results, and since Dr. McConnell has expressed a desire to return to the scientific field, where he attained prominence, we want to take advantage of his experience and ability to manage technical programs," Dr. Fletcher said.

Dr. McConnell has been in Washington in 1969. He had participated in several agency-wide policy studies before his appointment to the Equal Opportunity post in April, 1973. He also served as Director of the Scientific and Technical Information Office.

In his new position, Dr. McConnell will be primarily responsible for developing a coordinated planning capability and a systems analysis function for the agency's space applications program.

Before joining NASA in February, Dr. Jenkins was educational consultant for the Response to Educational Needs Project of the Anacostia District of District of Columbia Schools.

She served earlier as Assistant Superintendent for Instruction in the Berkeley School District in California, culminating a long tenure as a district school official.

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Prior to his new appointment, Dr. Dudley McConnell (third from left) visited Ames, its EEO office and officers in his capacity as NASA's Assistant Administrator for Equal Opportunity Programs. He met with EEO counselors and advisory group to discuss training, performance and involvement. Pictured with him are (l. to r.) Willie L. White, Jr., Leon Perry (Headquarters Public Affairs Officer) and Herm Gloria.

Dr. Fletcher pointed out that during the period NASA's equal opportunity programs were administered by Dr. McConnell, overall minority employment within the agency increased by almost 11 per cent and minority professional employment by 15 per cent.

"We are indebted," Dr. Fletcher said, "for the enthusiasm with which he accepted a difficult assignment and for the important progress NASA has achieved under his direction."

Dr. McConnell spent 12 years in laboratory research at NASA's Lewis Research Center in Cleveland before coming to NASA Headquarters in Wash-



Dr. Harriett Jenkins

ERTS used for water resources

NASA's Earth Resources Technology Satellite (ERTS-1) is rapidly becoming an important tool for hydrologists as more and more data are returned from the spacecraft and analyzed in relation to present water resource management practices which permit man to extract water economically from only about 0.01 per cent of the total global supply.

In industrial nations it is apparent that better utilization of water is a necessity. The United States per person demand in the larger cities, for example, is more than 20 times that required by a person living in some of the underdeveloped countries.

Another example: Annual flood losses in the United States can exceed \$1.5 billion a year, and with further land development on flood plains this cost will continue to rise. On the other hand, many major cities are threatened with short water supplies and need new sources.

ERTS data can help in the management of these and other problems by observing and monitoring large areas on a repetitive basis to provide indices of the volume of water available in a particular region. For example, satellite observations of surface water and snow accumulation, or even possible location of subsurface water supplies in relation to urban centers, irrigated areas, and industrial development, make future planning more accurate, economical, and coordinated.

ERTS data are being used for flood control, irrigation, and soil moisture identification; ground water level measurements; lake and dam counts; identification of current circulation patterns; pollution and sedimentation in estuaries and lakes; ice and snow coverage; even glacier and iceberg monitoring.

Images of surface characteristics are used as well as information from small Data Collection Platforms (DCPs), which collect surface data and transmit them to orbiting satellites for retransmission to water resources management agencies, often in less than one hour. DCPs gather information impossible or difficult to acquire by other means.

More than 100 DCPs are now operating from Iceland to Hawaii and Northern Canada to Central America. There will be more later to work not only with ERTS-1, but with Nimbus, the new Synchronous Meteorological Satellite, the later Geo-stationary Operational Environmental Satellite (GOES) to be operated by the National Oceanic and Atmospheric Administration (NOAA), and follow-on advanced Earth Resources Environmental Satellites.

Wind tunnel design study

A design study contract has been awarded for modifications which could make the largest wind tunnel in the world bigger - and quieter.

The modified tunnel at Ames would permit full-scale testing for a number of aircraft of the future, many of which are still in the design stage.

John A. Blume & Associates, Engineers, San Francisco, have been awarded a \$1.7 million contract to study design modifications to the 40 by 80-foot wind tunnel.

The new test section being considered would measure 80 by 120 feet. The modifications would also increase the speed capability in the original test section from 230 to 345 miles per hour.

The modified tunnel is needed for adequate wind tunnel testing of new aircraft types which will be able to operate quietly and efficiently from smaller airports.

The two test sections would permit full-scale testing of all fighter and attack aircraft, small-to-medium size transports, and tactical and utility rotorcraft.

The modifications being studied would include repowering the facility from 36,000 to 135,000 horsepower. The design study phase of the program is expected to extend for about two years.

(Continued on Page 4)

Earth 2020

The final lecture of the 1974 summer lecture series will be presented Tuesday, September 3, at the De Anza College Flint Center at 8:00 a.m. It is entitled "Nation States vs. Mother Nature: A Summation," by Richard Gardner, Professor of Law and International Organization, Columbia University Law School.

The staff is invited to attend the lecture which will be given at 3:00 p.m. each Tuesday in the Ames Main Auditorium. Attendance is on a first come, first served basis.

Women's Suffrage Day declared

August 26 was declared Women's Suffrage Day at Ames, in recognition of the 54th anniversary of the ratification of the 19th amendment to the U.S. Constitution. The 19th amendment extended voting privileges to women.

The day was noted at Ames by an outdoor picnic lunch held by Ames' women employees, on the Cafeteria patio.

Pioneer 10 Jupiter Achievers accept awards

NASA's highest individual and group awards were presented to forty-nine members of the Pioneer 10 team on Friday, August 16, in special recognition for their outstanding contributions to the spacecraft's successful flight past Jupiter. The awards ceremony was offici-

ated by NASA Administrator Dr. James C. Fletcher, Ames Center Director Dr. Hans Mark, Ames Director of Development John V. Foster, and Aircraft Operations Division Chief David E. Reese.

The NASA awards included the Distinguished Service Medal, Exceptional

Service Medal, Medal for Exceptional Scientific Achievement, Public Service Award, Group Achievement Award, and the Public Service Group Achievement Award. The specific awards as presented to individuals were identified in the last issue of the Astrogram.

An Ames photographer was present at the gala affair which began promptly at 9:00 a.m. with a procession by the Navy Color Guard and ended with refreshments served at 9:45 a.m. The many honored participants, their families and NASA officials are pictured on this page.



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Speakers Bureau

Ed Van Vleck (Systems Studies Division) will be a guest speaker at the Mensa West Coast convention to be held on Labor Day Weekend at Asilomar. Ed, who is a member of Mensa, will discuss "Futurism."

Fred Baker (Avionics Research Branch) was a guest speaker for the participants of the Summer Reading Program of the Cupertino Public Library. Fred visited the Library on July 18 and talked about the Space Shuttle and a number of other NASA space programs.

On August 14, Barbara Busch (Educational Programs Office) provided introductory remarks for the showing of the "Earth Resources Technology Satellite" movie to the West San Jose Kiwanis Club.

Volunteers needed to learn basic braille

Volunteers interested in learning to transcribe Braille may sign up for classes in September. The Sixth District PTA sponsors this project and transcribes textbooks and other instructional materials for all blind students in Santa Clara County, free of charge to the recipients.

If you are interested in participating in this valuable project, you may enroll at either of the following classes which meet weekly throughout the school year. San Jose: Blind Center, 101 N. Bascom, Thursdays beginning September 12, 9:30 a.m. Palo Alto: Palo Alto High School, (corner of El Camino and Embarcadero), Room 27, Tuesdays beginning September 17, 9:00 a.m.

New credit union service offered

INSTACASH - the new way to borrow money... instantly!

InstaCash is a new service of the Moffett Field Employees Credit Union, according to Fred G. Mayer, Manager.

After an InstaCash application is completed, a ready reserve of cash is available to borrow from - at low, low credit union rates. InstaCash annual percentage rate is a low 12%. InstaCash is money when you need it.

Once your approved limit is established (\$500.00 up to \$3,000.00), you can borrow at our reasonable rates - by mail, in person, or - instantly - by telephone.

This new service will save credit union members time and money. Your money requests will be handled promptly.

When you think money - think InstaCash! Cash when you need it - INSTANT-ly.

Catalog available

Ames employees wishing a copy of the 1974 Ames Film Catalog may request one by dropping a note to the Audio-Visual Facility, in care of mail stop 204-12.

Toastmaster honored

Guy V. Ferry, Research Scientist in the Planetary Science and Applications Branch, has been elected to a two-year term as an International Director for Toastmasters International.

At the recent international convention, held in Anaheim, Mr. Ferry was elected to represent Region 2, which comprises California and Hawaii. As one of 16 International Directors, Mr. Ferry will help determine future plans and policies of the organization, which is devoted to the improvement of communication skills through better listening, thinking, and speaking.

Guy is a member of the Jetstream Toastmasters Club, which meets in Mountain View at noon on Wednesdays. Several other Ames employees are also members of the Jetstream Club or of other TI clubs in the area. Ames employees interested in Toastmasters can call Guy at extension 5492.

Chinese group dinner

The Golden Pavilion in Los Altos (just south of the Cabana) will be the setting for the first Chinese Group Dinner of 1974. The dinner will be held on Friday, September 13, at 7:45 p.m. (6:45 for no-host cocktails), and is \$6.85 per person including tax and tip.

The menu begins with hors d'oeuvres (1000 year eggs with pickled ginger, fried won tons) and includes potato duck, Szechuen pepper chicken, barbecued pork with snow peas, and seven more delicious and exotic dishes.

Reservations and payment must be sent to Guy Wong (213-8, ext. 6026) by Wednesday, September 11. Everyone is welcome - see you there!

Books surplus

The Life Sciences Library, building 239 (basement) is preparing to surplus books no longer needed in the library of branch library collections.

Before instituting formal surplus procedures, the staff wants to be certain that all local needs are being met; therefore, the items being surplus will be available for examination by Ames employees. They may select any titles pertinent to their work for retention in offices of laboratories.

Stop by the library during the week of September 3-10, any time during the day, and the staff will be happy to show employees where the material is on display.

Wind tunnel study

(Continued from Page 1)

The 40 by 80-foot tunnel is one of about 30 major wind tunnels at Ames. Completed in 1944, it has made important contributions in the development of swept wing technology, improvement of high lift devices, and boundary layer control research.

The tunnel is presently powered by six 6,000 horsepower electric motors which drive six 40-foot (12 meters)-diameter six bladed wooden propellers.

WANT ADS

Transportation

'73 CHEVROLET CREW-CAB 3+3 Camper Special 3/4 ton truck. 6,800 miles, power brakes, power steering, radio, AC, 350 engine, new spare tire & rack, 50 gallon gas capacity, with 1973 fully self-contained 11-1/2' Dreamer camper, sleeps 5. Call 364-0780 after 5.

FOR SALE: '68 Motorcycle. Suzuki 305T. Excellent condition. Engine & transmission just rebuilt. \$300 or best offer. 948-5968.

HONDA CL350, Aug. '71. Orange. Luggage rack, new battery, and 2 helmets with visors, only 3300 miles. \$700. Call 248-2481.

'70 MAVERICK 2 door sedan. Radio & heater. Automatic. Good condition. \$1400 or best offer. 321-1858.

CAMPER SHELL '73 Vacationer over-niter with boot \$350. 258-1675.

'73 CAPRI 2000 with decor group; stick shift; 26 m.p.g.; \$2650. 246-0126 after 5:30.

'69 DATSUN PICKUP, 49,000 miles; XLNT battery, tires, upholstery, & radio. Good machine. \$1450. 967-4520.

'70 DODGE CORONET. Power steering, disc brakes, automatic transmission, air conditioning, radio, heater, and vinyl roof. Excellent condition. \$950. Call 247-1687 after 6 p.m.

Housing

FOR RENT: Westridge Townhouse; 2 Bdrm, AEK, w/w carpets, pool, sauna, 2 car garage. Call F. Vetel 948-6636

Large Home: 4 bedrooms, 2 1/2 baths, living, family, dining, studio, garage, walk to schools - shop, \$375.00 monthly. 262-8061

Miscellaneous

FOR SALE: Three piece contemporary bedroom set. Light/dark walnut Scandinavian style. Bookshelf headboard, footboard and rails for queen size mattress. Men's five drawer dresser. Lady's low nine drawer dresser with large mirror. \$150. Arvesen - 736-8793

CONN TENOR SAXOPHONE, excellent condition. Sofa, Rollaway Bed, Desk, Chairs, Chest. 964-7998 after 5.

BLUE & WHITE YOUTH BED w/mattress. \$45. Gold and white (case) black & white T.V. \$25. 341-1849

3 YEAR OLD SEAL POINT Siamese eunuch must find a loving home. 248-0638

SEARS PEDAL EXERCISER, like new. \$25. Call 253-3027 after 4:30

FOR SALE: Singer Sewing Machine with cabinet. \$195. Ironrite Mangle open both ends. \$35. 374-6841

SPAULDING EXECUTIVE IRONS 2 through 9. Steel shaft, leather grips, swing weight D-3, regular shaft. Approx. 8 or 9 years old. Excellent condition. \$50. Call 965-5062 or 966-5027

DINETTE SET: Oak veneer oval table; six chairs green/orange vinyl upholstery, metal base painted light green. Excellent condition. \$65. Call 736-6439 evenings.

GIRL'S STINGRAY BIKE. Turquoise and yellow. Superb condition. Will sell for \$15. Call 997-1357.

CHILD'S HIGH CHAIR, \$9; child's safety car seat, \$10; large wood and brass chandelier, \$40; electric oven, \$20; almost new leather gadget bag for 35mm camera, \$30. Also excellent English antique walnut burl occasional table. 941-5535.

TOTE (or club) bag, very little used, \$12. (A new one costs \$18 or more.) Call: 321-1858.

WANTED: Older compact. Automatic transmission. Excellent running condition. Call after 6 p.m. 241-0693.

TELEPHOTO LENS. 135mm f 2.8. Fits Honeywell Pentax, can be adapted to other cameras. \$40. H. Asch, 736-6999.

BAR BELL SET - Vinyl coated weights, chrome bars. Complete. Never used. \$15. 948-8002.

CARPET AND PAD - Used; large pieces Nylon - champagne beige 2 pieces. Antique gold & light brown. Traverse rods - Graber. 9-12' and 16' adjustable rods. Wash basin complete with faucets & pop-up drain. Used but unmarred. 948-8002.

BIRCH CABINET. Sturdy. Suitable for bedroom or garage. Natural finish-lacquered. Mahogany T.V. Table. 23" Admiral B/W T.V. Table Model. Excel. Cond. 948-8002.

5 SPEED BICYCLE - Hercules. Good tires. Rebuilt. 948-8002

ROOM COOLER - Evaporative type with roller stand. Light fixtures. Quality types, used but like new. 1-Dining Room, 1-Entry, 2-Hall, 3-Bath Room. 948-8002.

FORMICA. 4x4 sheet. Pecky Pecan. 948-8002.

BLOODMOBILE
September 6
Auditorium
9-12