



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

NASA Technology Utilization 1972

NASA continued to distribute information about benefits from technology to both the private and public sectors of the national economy at an ever-increasing rate during 1972.

Noteworthy during the year was accelerated use in such fields as medicine, non-destructive testing, and engineering design. Many other fields and disciplines used NASA services in creating new commercial products, and improving others.

GAS ANALYZER

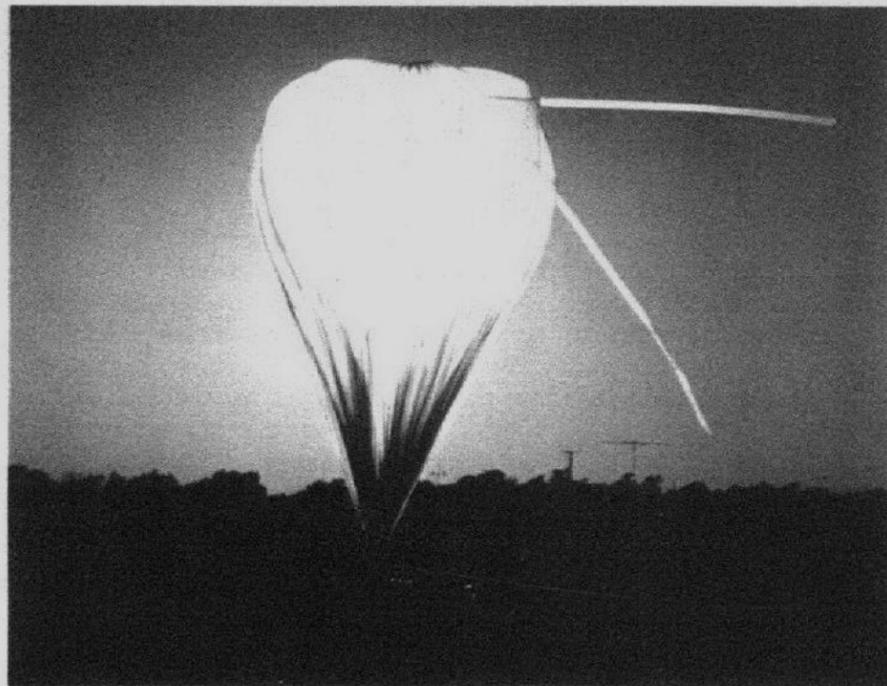
A compact, fully automatic gas analyzer now on the commercial market offers prompt information on respiratory and metabolic functions. It can be used in hospital intensive care units and by anesthesiologists.

SWITCHES FOR INVALIDS

Devices such as eye-operated switches have been used in a Huntsville, Ala., hospital to test various applications of NASA-developed technology to aid quadriplegics.

Immobile patients are able to do such things as open and close doors and windows, control room temperatures, change radio and TV stations, adjust the position of their beds, and

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LIFT OFF AT SUNDOWN . . . A giant balloon begins to rise over the Texas countryside at nightfall, carrying the Ames Infrared Observatory Scope (AIROscope) to 100,000 feet above the earth. (The streamers at top of balloon are tubes through which it is filled with helium.)

Ames experiment looks at the stars

The Ames Infrared Observatory Scope (AIROscope) rises above Texas as the sun is setting. It is carried aloft by a balloon measuring 200 feet in diameter.

Within one and one-half hours the AIROscope is 100,000 feet above the earth; just where Ames scientists want it.

From this vantage point, above most of the earth's obscuring atmosphere, they are able to gather data about planets and stars that has not been collected before.

The team will spend the night measuring long wavelength infrared radiation, or the heat emitted in long wavelengths, from celestial bodies and clouds.

"Our galaxy and all others emit large amounts of cool hydrogen which emit large amounts of radiation in infrared wavelengths," says Charles D. Swift, SSA, Project Manager. "We think these may be areas where new stars are evolving."

The center of our own galaxy is an intense source of infrared radiation. Therefore observations help astronomers understand the nature of these objects and how they generate their energy.

The instruments carried aloft by the giant balloon weigh about one ton. They are contained within an apparatus called a gondola. Secured

in the gondola is one of the largest and most sensitive infrared telescopes flown. It measures 28 inches in diameter.

After the correct guide star is found the telescope remains fixed on it by means of a gyro stabilization system and a star tracker.

Radiation from the infrared source is then focused onto a detector cooled to two degrees above absolute zero. This temperature is necessary to make the detector sensitive to the very small amount of heat coming from these objects. A cryostat containing the detector and liquid helium maintains this extremely low temperature.

Signals from the detector are telemetered to the ground where observers record the data along with the information from the television.

As dawn approaches, and stars are no longer visible, the scientists send a signal to the gondola which releases it from the balloon. A parachute opens and the experiment drifts gently back to earth; to be picked up and reused.

The balloon also falls back to earth; to be picked up by local farmers and used for coverings. It has the consistency of a plastic garment bag.

The maiden launch of the tele-

(Continued on Page 4)



Ronald E. Evans, Eugene A. Cernan, and Harrison (Jack) Schmitt.

Apollo 17 astronauts visit Ames

An overflow crowd of 500 Ames employees heard a first-hand description of the Apollo 17 mission Tuesday. The special "briefing" was given by Apollo 17 astronauts, Eugene Cernan, Ronald Evans and Harrison (Jack) Schmitt.

The astronauts stopped briefly at the Center as they began a two-day visit to the Bay Area.

They presented Ames with a replica of the plaque they left on the moon, commemorating the last lunar landing of the Apollo program.

Clarence A. Syvertson, Deputy Director, acting for Dr. Hans Mark,

Director, also accepted a photograph of the earth, taken from the moon by the astronauts.

Each astronaut thanked Ames employees for their support of the mission.

"Ames is responsible for the first female to fly in a spacecraft," said Mission Commander, Eugene A. Cernan. "It was the Ames BIO-CORE experiment that sent six mice, one of which was a female, to the moon with us."

Due to a 30 minute delay in the astronauts' schedule a film illustrating the mission was not shown.

Bay Area Smog Research Program

Bay Area scientists have begun a multi-laboratory research project that may give this region one of the world's most sophisticated tools for environmentally sound land use planning.

The project is the development of a powerful computer program capable of predicting how a major source of pollution in one part of the Bay Area will affect air quality in any other part.

It is being undertaken jointly by Ames, Lawrence Livermore Laboratory, and the Bay Area Air Pollution Control District. Each offers special resources necessary to carry out the multi-faceted project.

The work is supported by a National Science Foundation grant of \$657,000 and is expected to last two years.

Once verified for accuracy, the computer program will be made available to the Air Pollution Control District.

It will be intended to predict the air quality implications of land uses ranging from building a new industrial complex to shutting down specific freeways during an extreme emergency smog alert. It will also be designed to predict how expanding population and commercial development will affect air quality in

an inland air basin, such as the Livermore Valley.

The project probably could not be done without the combination of resources available in the three participating organizations, according to Carroll Maniger, head of Environmental Research at the Lawrence Livermore Laboratory, which is coordinating the effort.

To start with, it will be necessary to compile extremely detailed and accurate quantities of information on the complex, interacting factors that govern air quality, he said.

These are interactions between wind currents, traffic patterns, terrain, intensity of sunlight, varying quantities of natural and manmade pollutant emissions, and other factors.

To establish this base of information, Ames and the Control District will carry out the most thorough air quality measurements and analyses ever made in the Bay Area.

Ames will draw on its sophisticated airborne atmospheric measurement and chemistry facilities, including a twin-engine Cessna aircraft using an inertial navigation system for extreme accuracy in pinpointing sampling position.

In addition, Ames will conduct

computer studies of photochemistry- chemical reactions occurring in the presence of sunlight. These reactions are only partly understood, although they contribute a very important portion of the air pollution problem in Northern California.

Principal investigators at Ames are Dr. Ronald Reinisch and Hermilo Gloria.

Lawrence Livermore Laboratory will be responsible for incorporating information into a computer program, or model, that is capable of simulating air quality throughout the region as land uses, wind currents and other factors are "modified" by the program users.

Ames' Verticle Gun Facility used for Impact Study

An investigation of impact penetration into soil deposits was conducted recently by Professor James K. Mitchell and James B. Thompson of the University of California, Berkeley, in Ames' unique Vertical Gun facility (Planetary Science and Applications).

These studies under the supervision of Don Gault and John Wedekind evaluated the effects of pore air pressure upon the response of soil deposits to low speed penetration by instrumented cylindrical bodies called impact penetrometers.

Numerous applications of the use of impact penetrometers have been proposed to evaluate soil mechanics in locations with either limited accessibility or severe environmental conditions.

Soil conditions in areas such as the sea bottom, arctic caps, regions of heavy vegetation, and extraterrestrial bodies (moon, Mars, etc.) lend themselves to study.

Sea-bottom deposits, for example, are of interest when attempts are made to implant deep-sea anchors.

Seismic surveys, having potential ecological effects, also require measurements with impact penetrometers to ascertain rock and soil response to dynamic loads. In addition, the military anticipates uses such as remote evaluation of proposed airfield sites.

The work was conducted under a grant by NASA to the University of California Civil Engineering department.

Ames scientists praised by magazine

Two Ames scientists were included in a list of "Laurels" recipients for 1972 in the December 18 issue (P. 7) of "Aviation Week and Space Technology."

Of the 22 men the magazine considered to have made "meritorious" achievements were Dr. R.T. Jones, D, and Charles F. Hall, PA.

Dr. Jones was noted for; "the wing-sweep pioneer who in 1972 revived and advanced the antisymmetric wing concept that shows promise for a variety of applications, ranging from supersonic transports to remotely-piloted vehicles.

Hall, Pioneer project manager, received the honor for; "his successes in directing scientific spacecraft programs, beginning with Pioneer 6 and culminating this year with the launch of Pioneer 10, now more than halfway through the asteroid belt on its way to Jupiter and a journey beyond the solar system."

The Pioneer 10 plaque also received the magazine's special attention (P. 11). Under the title "Topless in Frisco," it was reported that:

"Large reproduction of the Pioneer 10 plaque, designed to acquaint alien civilizations with earth and its inhabitants . . . was set up at the recent American Geophysical Union meeting in San Francisco - minus heads for the nude figures of a man and woman. In a manner reminiscent of a carnival concession, TRW Systems - the prime Pioneer contractors - invited the men attending the meeting to pose for photographs with their heads over the male body and provided attractive young ladies to pose with them.

Xmas party mistake

(Editor's note)

The following is a correction for the Annual Ames Christmas Party story in the last issue of The Astrogram (Jan. 4) submitted by Sal Tardio, Christmas Party Chairman.

"The hangar set-up was the responsibility of Sal Tardio with the help of the Carpenter shops, Clifford Lippard and Ken Wolf, Electronic Instrument Services, and Fred Tucker, Property Management.

Sal Tardio"

House Armed Services Committee at Ames



Staff members of the House Armed Services Committee (HASC) pause during a briefing, highlighting Army aviation research programs, held recently at the HQS, US Army Air Mobility R&D Laboratory (AMRDL). Members (l to r) are; Lt. Col. Charles L. Moore, Escort Officer; Earl J. Morgan, Professional Staff Member, HASC; James F. Shumate, Counsel, HASC; Paul F. Yaggy, Director, AMRDL; and S.A. Augustine, Chief, Programs and Resources Office, AMRDL. Dr. Hans Mark, Director of Ames, received the visitors, and their tour was concluded with a visit and briefing on several of the Center's research facilities.



JENNIFER WALKER



WAYNE HADLAND



ESTHER LEVY



GEORGE LEE

Four Equal Employment Opportunity Counselors Named

Any employee who feels that he is being discriminated against for reasons of race, color, sex, religion, or national origin should talk to an Equal Employment Opportunity (EEO) counselor. They are responsible for maintaining an open and sympathetic channel through which all personnel may raise questions, discuss grievances, get answers, and obtain resolutions to problems in equal employment opportunity.

Four new EEO counselors were recently appointed by Dr. Hans Mark, Ames Director. Jennifer Walker, AFAA; George Lee, STG; Wayne O. Hadland, RFE; and Esther L. Levy, ST, were named to replace Ava N. Johnson, APO; Manuel M. Orozco, FSV; and Michio Aoyagi, RKST.

New Positions

Aoyagi is now Assistant to the Director for EEO. Miss Johnson has taken the position of EEO Specialist and Orozco is the Program Coordinator for the 16-Point Program for the Spanish Surnamed.

The appointees join counselors Jessie C. Gaspar, RKS; Joseph P. Licursi, RSE; Toribio G. Gonzales, RKO; and Sheldon M. Smith, SSA.

Jennifer Walker

Jennifer Walker at 24 is the youngest EEO counselor at Ames, but she is perhaps one of the most qualified to hold the position.

She will graduate this month from California State University at San Jose (CSUSJ) with a degree in both business accounting and black studies.

Prior to attending CSUSJ she worked in the Hunters Point area of San Francisco tutoring elementary school children and in the Mission District as a teacher's assistant. Added to this, is a background of counseling youngsters as a mem-

ber of the Youth Council of the Emmanuel Baptist Church in San Francisco.

Her goals are to be an accountant and to teach. "I've always been interested in business," she said during a recent interview.

"But, without some type of work with people," she added, "life feels incomplete. Working with figures all day, I really look forward to working with people in my spare time. That's why I am so happy to be part of the EEO program here. I can combine both interests."

She has also danced professionally for several years. Recently she began dancing and working as a choreographer for the weekly Barbara Davis TV show on channel 20, cable TV.

Wayne Hadland

"I feel the government should be a model employer," said Wayne O. Hadland, RFE, during a recent interview.

"The problem is that most employees don't know the regulations. For instance, an employee has 14 days in which to file a complaint. But, if most people are like me, they'll sit and stew over the thing. By the time they go to file the time limit has passed and it's too late."

Mr. Hadland said he thought he was chosen to be a counselor because, "I am outspoken. If I think something is wrong, I'll say so."

Mr. Hadland received a bachelor of science degree in mechanical engineering in 1961 from Long Beach State College. Since graduation he has taken several graduate courses at local colleges and universities.

He will graduate from the University of Santa Clara's law school in June.

At Ames he has been, among other things, the project engineer

responsible for Ames' Space Shuttle Aeroelastic Model; one of the most sophisticated engineering projects undertaken by his branch.

Esther Levy

Esther L. Levy, ST, was born in Peculiar, Missouri on the fourth-of-July. Soon after that all-American beginning, she moved to Ontario, Calif. where she attended Chaffey High School and Chaffey Junior College.

After receiving an Associate Arts degree in Business Administration she went to work as a secretary, and as she says, "I've been a secretary all my life."

Of her appointment as EEO counselor she says, "This is something new for me. I am looking forward to helping the program and anyone who should come to me."

"Although I like being a woman, and having doors opened for me, and all that; I think there should be equal pay for equal work. Women should have equal opportunities."

George Lee

George Lee, who was born an American citizen in Canton, China, said he wanted to be an EEO counselor for "quite a few reasons."

"It gives me a chance to help somebody out, and I think it will be a satisfying experience," he added.

"I have already handled one case, he said, "and I found it to be very satisfying. It was good being able to help this person."

"Before we had any program of this type a person had no where to turn. He could talk to his boss, but if it were his boss that was the problem, . . . well, you see."

He said that he hoped the program could soon be extended to the community. "We would like, he said, "to make them aware of the opportunities that are avail-

able here."

Lee, who speaks fluent Chinese, graduated from the University of California with a Bachelor of Science degree in mechanical engineering in 1953. He received a Master of Science degree in mechanical engineering the following year from the same institution.

White elected Palo Alto NAACP president



WILLIE WHITE

Willie L. White, APO, Equal Employment Opportunity Officer, was elected President of the Palo Alto Stanford Branch of the National Association for the Advancement of Colored People (NAACP) last month.

He will serve in this post for the next two years. The aim of the NAACP is, "To improve political, educational, social and economic status of minority groups; to eliminate racial prejudice, to keep the public aware of the adverse effects of racial discrimination; and to take any legal action necessary to bring about equality."

SKI CLUB

The Ames Ski Club is sponsoring a ski and gambling trip to Lake Tahoe, Southshore, Feb. 2-4.

The trip includes;

*Two nights deluxe accommodations with private bath at The Tahoe Sands. Coffee shop, restaurant and cocktail lounge on premises.

*Round trip chartered bus transportation. Departs at 7 p.m. from behind buildings 233 and 202.

*Transportation to and from Heavenly Valley ski area and casinos. *\$10 cash refund and 4 cocktails from The Sahara Tahoe.

*Heavenly Valley lift discount of \$1.50 daily.

*Wine provided on bus.

A dinner stop will be made at Sam's on the return trip with a departure from Heavenly Valley at 4:30 p.m.

For information and costs call Tom Coakley at ext. 6415, mail stop 233-1. Payment due date is Jan. 24.

Credit Union Meeting

The Moffett Field Credit Union will hold an annual meeting on Friday, Jan. 26 at 8 p.m. Naperdak Hall at 770 Trimble Road in San Jose is the location of this new and different type of meeting.

A business session will begin at 8 p.m. and end at 8:30 p.m. There will be a no-host bar during the evening with complimentary light refreshments. Dancing to live music will start at 9 p.m. and continue until 1 a.m.

A large selection of door prizes will be given out during the evening. You must be present to win and tickets for this event are on sale at the credit union office at the low cost of \$1. Some of the door prizes to be offered are:

- *A weekend at Tahoe
 - *A case of champagne
 - *Five day free use of Travel Trailer
 - *A weekend at Reno
 - *Set of shock absorbers
- Several more prizes will be offered.

Chinese Banquet

A Gourmet Chinese Banquet will be held at the Golden Pavilion in Los Altos on Friday, Feb. 2. No host cocktails will begin at 6:45 p.m. and dinner at 7:45 p.m. Cost will be \$5.75 per person including tax and tip.

Cocktail hour hors d'oeuvres include: 1000 year eggs with pickled ginger.

Call Guy Wong, ext. 6022 for reservations. Cut off date for payment, or refund, is on Wednesday, Jan. 31.

Happenings

AIAA January dinner meeting

A visit to the United Airlines Facility at the San Francisco Airport. Robert C. Collins, Vice President, Engineering, will speak after a dinner prepared by the same service that provides the flight meals. Dinner - \$3.50 for a small filet. Date: Thursday, Jan. 25, 1973 Place: United Airlines Engineering and Maintenance Facility, San Francisco International Airport.

Reservations are necessary, call one of the following numbers before Wed., Jan. 24:

Stanford, 321-3200, ext. 4061 or Ames (Joan), 965-6440

1973 Winter Convention on Aerospace and Electronics Systems International Hotel, L.A., Feb. 13-15. Sponsored by the IEEE, and Aerospace & Electronic Systems Group.

Theme will be "Emerging Business Opportunities Through New Technologies."

FUN

NASA Employees Club 1973 trip to Greece. Two week trip will leave from Dulles Airport, Washington, D.C. on May 16 and fly directly to Athens, Greece. The return flight will be on May 30.

Based on full complements, the flight alone can be taken for \$245.

Reservations should be made before March, contact G. Degenaro, Code FAP, NASA Headquarters.

Ames experiment

(Continued from Page 1) scope was performed at a facility in Palestine, Texas operated by the National Center for Atmospheric Research. Six more are planned for this calendar year. The next will be some time in the early spring.

Operation of the AIROscope is part of an ongoing program in infrared astronomy conducted by the Space Science Division. A growing number of scientists from universities around the world participate with Ames personnel. The Ames engineers and scientists responsible for AIROscope are:

Jerome G. Borucki, SSA; Gordon J. Deboo, RFD; Gregory W. Edwards, SSA; Roger C. Hedlund, RFD; Roger V. Krause, SSA; Owen L. Koontz, SSA; Mary J. Livsey, SSA; Allan J. Mord, SSA; Kenneth J. Pitts, SSA; Stanley G. Scott, SSA; Charles D. Swift, SSA; and Fred C. Witteborn, Chief of the spectroscopy Branch.

WANT ADS

Automobiles

FOR SALE

68 Fiat Spyder, gd cond, make me an offer I can't refuse, 964-7289.

Thunderbird engine complete w/ auto trans., 312 cu. in., 68,000 mi. \$50. Seth Anderson, 948-4678.

For Sale-63 V.W. bug, gd tires, needs clutch, asking \$250, 252-7369.

72 Vega 4-spd, radio, heater, ex. cond., \$1,900, 258-6422.

65 Corvette, Stingray convt., 4-spd. new engine, r & h, \$1875, 967-3986.

53 Ford, all new upholstery & head liner \$150, J. Smith. 968-6597.

60 Mercedes 220 S. \$950 or best offer, call Art Gobets, 739-2787.

71 Toyota Corona, 4-spd, 24,000 mi. must sell, \$1700 firm, 964-0749.

71 MG-B Roadster, low mileage, like new, make offer, 578-2676.

69 Austin American, 2-dr, 4-spd. new tires, disc brakes, \$585, call Mr. Trejo, 262-3367.

WANTED

Work car, must be in gd. cond., R. Page, 258-6019.

Miscellaneous

FOR SALE

Frigidair dryer (220 volt), yours if you pick it up & make repairs, phone Gobets, 739-2787.

15 Men rubber raft, 6 inflatable comp., good for white water rapids, \$50, 326-5036.

Borzol puppies (Russian Wolfhound) fine blood lines for showing and hunt. Roger Craig, 657-9296.

VM portable record player, 15/33/78, make offer, 739-2306.

Shower doors, \$5, quality screen, new, \$25, hollow-core interior & exterior, \$10-15, lock set \$5. 326-0204.

Oak end table Medit. style, ex. cond. \$75, call 253-6016.

Canon FX SLR camera, zoom lens, 2 & 3X teleextenders, flash, tripod, \$125. 246-3356.

Puppies, male 10-wk, 1/2 lab- 1/2 shepard, beautiful color, \$8, 322-6557, Skip Yem.

Vari power 3-9 rifle scopes, new \$60, Redfield & Weaver, Skip Yem, 322-6557.

10-spd boy's bike, 27" whl, 23" frame, hand brakes, \$50, Skip Yem, 322-6557.

Garlotti 10-spd bike, 22 lbs, Columbus frame, \$175/offer. 732-6758.

Electric typewriter, Singer port., auto. shift, \$169 value for \$79, call 969-9268.

NASA Technology Utilization

(Continued from Page 1) signal the nurse.

TESTING TECHNIQUES

Nondestructive testing techniques developed by NASA are gaining wide-spread industrial use. A good example is a rapid-scan infrared tire tester being used daily by a major U.S. tire manufacturer.

NASTRAN, a computer program designed by NASA to analyze the behavior of structures under stress, is now a design familiar to more than 600 American engineers outside the space agency. More than 70 industrial firms, universities, laboratories and government agencies are using it to solve their structural engineering problems.

AUTO DESIGN

For example, front suspension and steering linkages in a line of American cars and light trucks are now being designed with NASTRAN assistance. NASTRAN analysis can also be supplied in the construction of bridges, power plants, skyscrapers, and airplanes.

Increasingly items of fire-proof or fire protective clothing and fire-retardant or fire resistant building materials appeared on the commercial market, spurred by NASA research.