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

Images from Pioneer 10

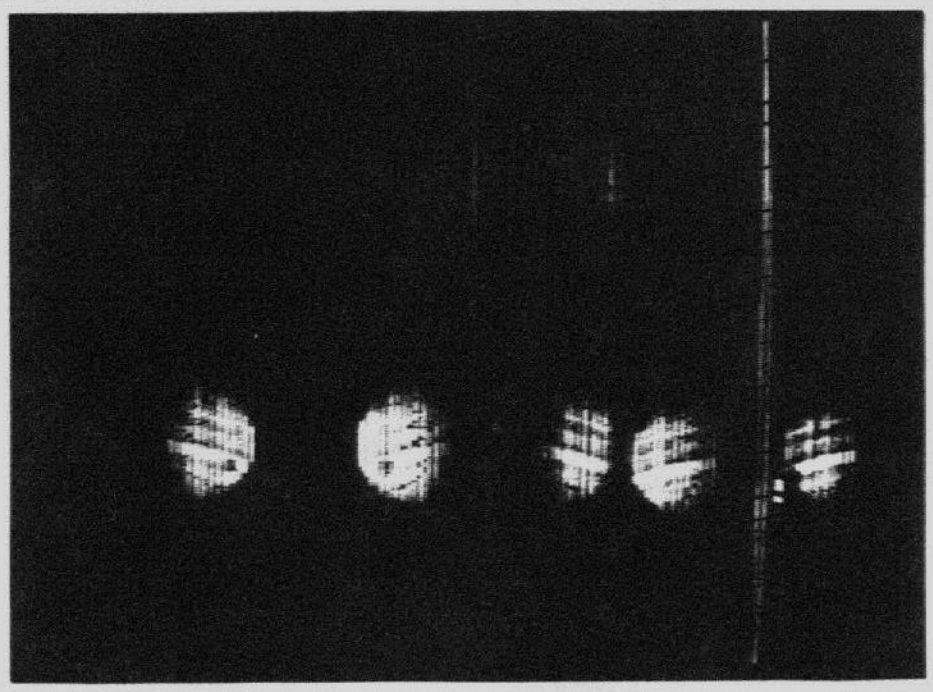
Pioneer 10 is sending images of Jupiter to Earth, giving man his first close-up look at the king of the solar system.

The pictures come from an imaging photopolarimeter (IPP), a versatile, multi-purpose tool that is taking 336 images of the planet and 10 of its four Galilean moons during the 60-day encounter with Jupiter – November 4 through January 3.

Pioneer's electronic eyes scanned the planet from a distance of 81,000 miles at its closest approach on Dec. 3.

Although the resolution won't come close to that in spacecraft pictures of the Moon or Mars, the images should provide much more information than ground-based telescopes, according to Dr. Tom Gehrels of the University of Arizona's Lunar and Planetary Laboratory, principal investigator for the IPP experiment.

The IPP, one of 11 instruments aboard the spacecraft, performs three experiments: it studied zodiacal light prior to Jupiter encounter; it studies how sunlight is reflected by the upper atmosphere of Jupiter, and it takes color images of the planet.



VIEW OF JUPITER . . . from 4.3 million miles taken around 2. a.m. November 27th. Tuesday. Color pictures (shown here in black and white) show Jupiter's Great Red Spot in the southern hemisphere as well as its prominent belts, Jones, dusky polar regions and darkening on the morning twilight side of the planet.

100 percent success for Pioneer 10

Pioneer 10 successfully passed within 81,000 miles of the giant planet Jupiter Monday, December 3 and conducted more experiments with the planet and one of its moons before continuing on its journey toward the edge of our solar system.

The space probe, encountering only minor difficulties, made its closest approach to Jupiter at 6:25 p.m. through a steadily increasing radiation count that began to slacken only 12 minutes before Pioneer reached its goal.

Radiation levels which the spacecraft experienced were nearly 100 times those surrounding the earth. Scientists expected this and were pleased with the way the sensitive electronic circuitry aboard held up.

As Jupiter's motion and gravity flung Pioneer away like a stone out of a slingshot, the spacecraft passed behind Io, one of Jupiter's 12 moons, to determine if the satellite has an atmosphere.

Pioneer 10 will continue traveling, its speed reduced from a peak of 80,000 miles an hour at closest approach to 25,000 miles an hour now, until it passes the orbit of Pluto in 1986.

All Pioneer 10's information has been funneled to Ames.

Jupiter's temperature was found to be 140 degrees centigrade (284 degrees Fahrenheit) on both the day and night side, indicating its internal heat source is greater than the heat received from the sun, 500 million miles away.

There is some controversy over the nature and shape of Jupiter's magnetic field, which is generally agreed now to be nearly three times as strong as the earth's magnetic field. Earth and Jupiter are the only two planets to have that protective shield to ward off ultraviolet radiation from the sun.

Scientists had expected that Jupiter's magnetic field would be dipolar, thatis that the invisible lines of magnetic forces emanating from the north pole and linking with the sourth pole would arc out into space in a symmetrical manner.

But John Simpson of the University of Chicago was saying Monday that at the outer edges of the magnetic field the lines were distorted and elongated.

Dr. Wolfe said after the flyby Monday night that theory was based on distortions created by the high amounts of solar gas within the magnetic field as a result of a recent solar flare, which increased the strength of the solar gases temporarily.

As Pioneer exits the magnetosphere at almost right angles to its entry this controversy should be cleared up since it could help explain the forces that controlled the formation of the solar system.

Christmas Carolers

Interested carolers report to the Auditorium at 12 noon, Dec. 10-13.

Venus' acid clouds

The upper levels of the brilliant clouds of Venus, long a challenging puzzle to astronomers, consist of droplets of sulfuric acid more concentrated than the acid in an automobile battery.

This conclusion was reached by a team of space scientist headed by Ames' Dr. James B. Pollack. They arrived at the identification by measuring the infrared "color" of Venus from a Learjet aircraft and comparing the results with a computer simulation of the color properties of a wide variety of substances.

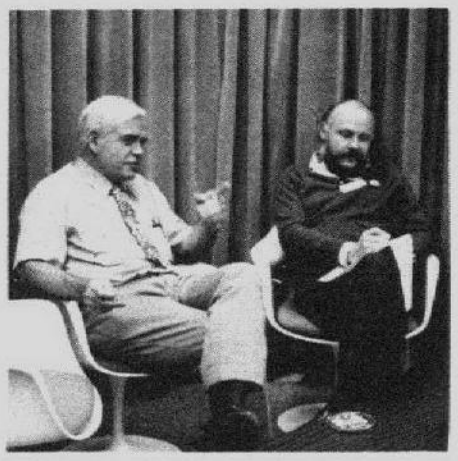
The possibility that the Venus clouds are made of sulfuric acid has been independently suggested by Dr. Andrew T. Young of the Jet Propulsion Laboratory and Father Godfrey T. Sill of the Lunar and Planetary Laboratory in Arizona. These investigators pointed out that concentrated sulfuric acid is a very effective drying agent and could account for the surprisingly low amount of water vapor present near the cloud tops.

While similar to its neighbor planet Earth in mass and size, Venus

(Continued on Page 2)

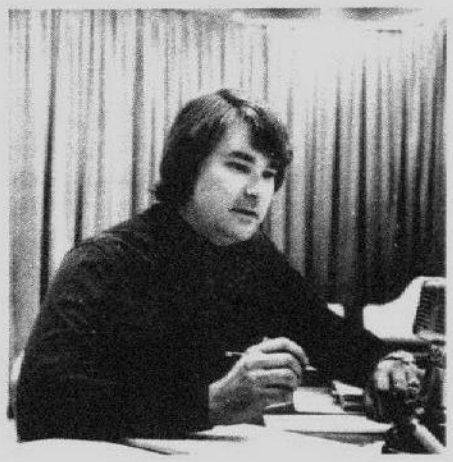
IMAGE OF JUPITER BECOMES LARGER AND CLEARER . . . as Pioneer 10 nears the giant planet late November 29; even the planet's Great Red Spot can be seen. The image was produced by combining the red and blue channels of the spacecraft's imaging photopolarimeter with an artificial green.

Round-the-clock Pioneer operations at Ames



PIONEER PROJECT MANAGER . . . Charles F. Hall and John Noble Wilford of the New York Times discuss the Jupiter fly-by during the exciting week before actual periapsis.

REVIEWING PIONEER 10 RESULTS . . are (l. to r.) David Pearlman, Chronicle writer; Jonathan Eberhart of Science News; Dr. Hans Mark, Ames Director; and Dr. James A. Van Allen, University of Iowa.



ROBERT (SKIP) NUNAMAKER . . . Deputy Pioneer Project Manager, briefs newsmen at a press conference for the Pioneer 10 encounter.

THE PHOTOGRAPHIC TECHNOLOGY BRANCH . . . devoted many hours of work to the Pioneer 10 encounter. Long hours involved (l to r., background to foreground) Charles Ritchie, Dino Ponseggi, Bill Boyd and Kevin Callahan. The photographic technology developing tem of hard copy imaging from TV monitors for distribution of hard copy prints to the news media included Ritchie, Ponseggi and Richard Clayton(not pictured).

DISCUSSING NEWLY ACQUIRED IMAGES of the planet Jupiter are (l.tor.) Stan Miller, Chief of Ames Public Affairs Office; Roland Michaelis, Chief of Photographic Techology Branch; Miles Waggoner, Director of Public Information at NASA Headquarters; Les Gaver, Chief of the Audio Visual Department at NASA Headquarters; and Ben Elson, Aviation Week. Pete Waller (not pictured) is the Pioneer Project Information Officer from the Ames Public Affairs Office.

DR. TOM GEHRELS . . . of the University of Arizona is the Principal Investigator of Pioneer 10's Imaging Photopolarimetry Experiment. Here he reviews a recent photo taken by the tiny spacecraft.

AMES'S DR. JOHN WOLFE . . . (Principal Investigator of Pioneer 10's Plasma Analyzer Experiment) is interviewed here by a representative of the news media.

Acid clouds (Cont. Pg.1)

has a very different atmosphere. The Venus atmosphere contains a hundred times more gas than Earth's atmosphere and almost all of the Venus gas is carbon dioxide, only a minor constituent in Earth's atmosphere. Because of this massive atmosphere, the surface temperature of Venus is a very uncomfortable 750 degrees Kelvin (900 degrees Fahrenheit).

The new aircraft experiment results provide another point of comparison. The dense upper portions of Venus clouds have the same chemical composition as a similar but more tenuous layer of sulfuric acid particles in the Earth's stratosphere.

NASA craft may have detected "Black Hole"

A team of British scientists, using NASA's Copernicus satellite (Orbiting Astronomical Observatory), say they have established that the previously predicted black hole in space is no longer theoretical. It's a fact.

The scientists at London's University College, under the direction of Dr. R.L.F. Boyd with direct observations and data reduction by Dr. Peter Sanford, have tied the binary super giant star system, HDE 226868, to the X-ray source, Cygnus X-1, and have detected evidence of the structure of the visible star's gas clouds swirling around and into the X-ray source or black hole.

Cygnus X-1 emits intense X-rays, representing a million times more energy than the total energy output of our own Sun. The X-rays, coming from the immense gravitational field on he edge of the black hole, compress the visible star's atmosphere prior to its complete disappearance into Cygnus X-1.

This black hole, located in our Galaxy, is estimated to be three times the mass of our Sun, but less than 1/50th of its size.

A black hole is a dying star which has collapsed on itself. Neither light nor matter can escape because of its intense gravitational field. The star's material is so densely packed that a spoonful of material from the center would weigh more than a billion tons. Although it is invisible, the black hole's presence can be detected by X-rays emitted from the extremely hot gases falling into the black hole after being pulled off the visible super giant star. The visible star could eventually disappear altogether down the black hole leaving no trace of its former existence.

By observing the way X-rays are absorbed as they pass through the visible star's atmosphere, the scientists have concluded that the X-ray object is very small. The mass of the black hole, more than three times that of our Sun, is known by the way the visible star moves in its orbit. Such a great invisible star, points to only one conclusion, says Dr. Sanford: "It's a black hole."

The "Black Hole" theory of X-ray stars is accepted by many astronomers, although positive proof is difficult to put forward. No satisfactory alternative theory of X-ray stars exists, however.

The 2200-kilogram (4900-pound) Copernicus was launched from Kennedy Space Center August 21, 1972, carrying an ultraviolet telescope designed by Princeton University Observatory and X-ray telescopes provided by University College, London.

Apollo Soyuz plans

The United States' flight crew for the Apollo-Soyuz Test Project visited the Soviet Union November 18 – December 1, for initial familiarization with Soyuz spacecraft systems.

Discussions of the flight plan, including joint crew activities and onboard documentation were planned.

Astronauts making the trip included the prime crewmen, Brig. Gen. Thomas P. Stafford, commander; Vance D. Brand, command module pilot; and Donald K. Slayton, docking module pilot; backup crewmen Capt. Alan L. Bean, Capt. Ronald F. Evans and Maj. Jack R. Lousma; support crewmen Lt. Col. Robert F. Overmyer and Lt. Col. Karol J. Bobko; and Capt. Eugene A. Cernan, Special Assistant to the U. S. ASTP Technical Director.

Soviet cosmonauts who will take part in the July 1975 Earth-orbital mission underwent similar familiarization with the Apollo spacecraft at JSC last July. Crewmen from both countries will exchange several visits next year for specific training on joint mission events.

The mission is designed to test equipment and techniques for developing compatible rendezvous and docking systems.

Credit Union

The Moffett Field Employees Credit Union has launched a new savings program, according to Eugene Long, Educational Chairman.

"Three Ways To Save" – a flexible plan that has something for all of our members:

1. A regular account that paid 5.5% per annum for the first six months of 1973.
2. A 6% per annum Certificate – two-year term.
3. A 7.2% per annum Certificate – three-year term.

We have forms in the credit union office so that you can transfer your funds from other financial organizations to the Moffett Field Credit Union.

This new program offers members an unprecedented return on their money.

Money identifier

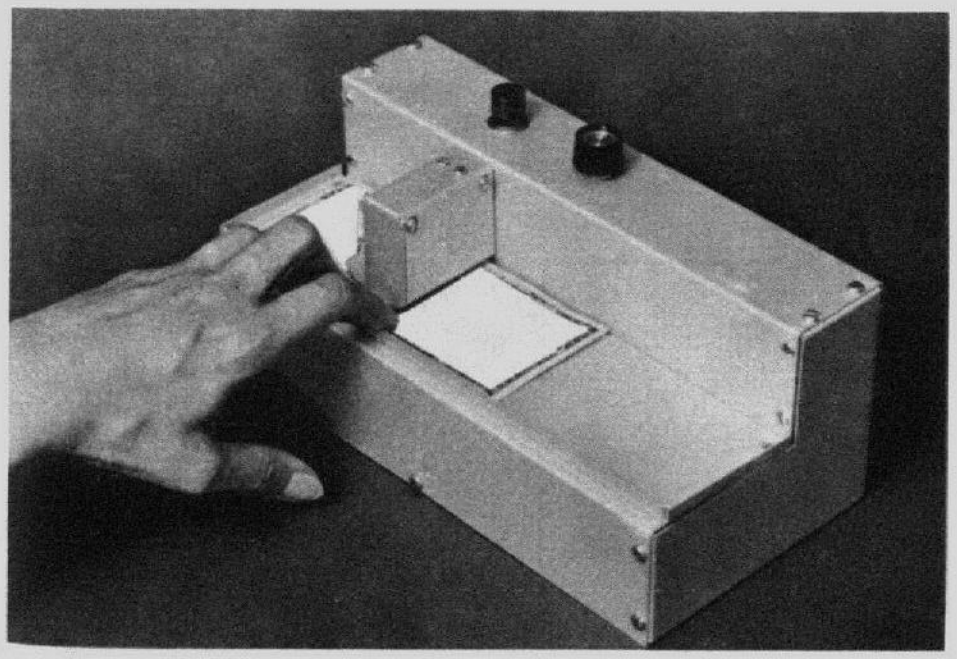
The cliche "money talks" will soon acquire a new literal meaning for blind business persons thanks to a simple paper money identifier developed from NASA technology.

The device will enable a blind person to identify paper money by its sound "signature." Until now no reliable paper money identifier for the blind has been available.

To determine its denomination, a bill is passed under a light source on the small, inexpensive device. A phototransistor measures changes in the bill's light patterns. These changes are converted into sound signals by an oscillator – producing sounds much like the "beeping" tones one hears when making a long-distance telephone call. Since the design of various denominations of paper money differs, each bill gives off its own easily identified sounds.

The "talking money" concept was developed by NASA's Biomedical Applications Team at the Southwest Research Institute, San Antonio, Texas. It stems from technology first reported in 1969 by NASA for the semiautomatic inspection of microfilm records. (NASA Tech Brief 69-10301.)

The paper money identifier is being produced by the Marchak Engineering and Manufacturing Co., Austin, Texas. It is being marketed by Applied Rehabilitation Systems, 3092 Idlewild, Austin. It is available to training centers and schools for the blind as well as individuals.



THE FIRST RELIABLE PAPER MONEY IDENTIFIER . . . to aid blind business persons has been developed from NASA technology. The device identifies paper money by its sound "signature." As a bill is passed under a light source, a photo-transistor measures changes in the bill's light pattern. These changes are converted into "beeping" sounds by an oscillator. Since each denomination of paper has a different pattern a different series of tones is given off.

Georgene Laub-Aerospace Engineer

by Denise Bernard

Georgene Laub is an Aerospace Engineer for the Ames Directorate in the USA Air Mobility R&D Lab.

Georgene became interested in airplanes when in high school in North Carolina when her father's business was located next to a small airport. She was so enthused that she took flying lessons at age 15 and was one of the youngest lady pilots at that time. She later became a glider pilot.

After high school, Georgene majored in Aerospace Engineering at Purdue University and graduated in 1952 with a B.S. degree and was employed immediately after graduation at Langley Field, Hampton, Virginia as an aerospace engineer.

Georgene also worked for Flight Research Center in 1963 until 1966 when she became employed at Ames. Since working here at Ames she attended Stanford University and graduated in April 1971.

As a woman, Georgene says she has not felt discrimination here at Ames. She states that, "Everyone (including the male personnel) has really been extra nice to me personally as well as professionally." Georgene also states that she thinks more women should enter the aerospace engineering field. It provides challenging and rewarding work.

As for Georgene's leisure time, she has a large organic garden in her backyard where she grows zucchini, crooked neck squash, tomatoes, lettuce, turnips, green beans, okra, eggplant, corn, etc.

Georgene also has a knack for education. Her latest courses include Auto Mechanics and Accounting.

Georgene is an accomplished seamstress and sews most of her own clothes. In fact, she just recently finished her daughter's wedding gown. Her daughter also is a graduate of Purdue University and presently working in Chicago as a Chemical Engineer.

She loves such sports as bowling and football. She is on a bowling team and is an avid Raider fan.

Skylab Gypsy moth project

One thousand gypsy moth eggs in two special vials are aboard the third and final Skylab mission.

Agriculture scientists are trying to find out if the state of weightlessness might be the key to altering the gypsy moth's life cycle. If weightlessness does prove to be the factor, the key point may be found in rearing insects by the millions and thus controlling a whole class of insect pests with similar life cycles.

The first moths in space are part of a research project sponsored by the U. S. Department of Agriculture's Agricultural Research Service (ARS) and the Animal and Plant Health Inspection Service (APHIS) in cooperation with NASA.

USDA researchers have long known that rearing millions of insects, sterilizing and releasing them to mate native insect populations could eventually eliminate the pest.

Because of the nature of the insect, the gypsy moth may be a possible candidate for this type of biological control called "sterile male technique." Whereas millions of insects are necessary for the technique to be effective, the gypsy moth has been difficult to mass rear in laboratory. In addition, this insect reproduces only once a year.

Although gypsy moths are active for about four months, their spontaneous hibernation period or "diapause" stage lasts 150-180 days – considerably dragging out the period they must be held and processed in the laboratory. If weightlessness were found to be a key to producing the diapause time, large numbers of insects could be reared at will and be available for release of sterile males in infested areas.

The gypsy moth eggs aboard Skylab are enclosed in a special container and separated into two lots – part laboratory reared and part wild insects collected in naturally infested areas. A control group for gypsy moth egges will be monitored on the ground and should hatch normally next spring. For weightlessness to be the sought-after answer, the eggs in space would have to hatch appreciably earlier than the control eggs on Earth.

The gypsy moth is a serious threat to the nation's forest resources. While the insect is in its caterpillar stage (May-June), it eats the leaves of trees, sometimes killing them.

The insect presently infests the northeastern United States – Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Maryland and Delaware. In 1973, it defoliated approximately 1.75 million acres of trees.

Speakers Bureau

by Barbara Busch

Dr. Morton Golub (Chemical Research Projects Office) presented a paper at the 9th Western Regional Meeting of the American Chemical Society of San Diego on November 2. His paper was entitled "Thermal Rearrangements in Polypentenamer and Polyoctenamer".

Ed Van Vleck (Space Applications Branch) addressed the San Francisco Chapter of the Armed Forces Communications and Electronics Association at the November 27 meeting held in Palo Alto. He discussed space communications and earth resources management.

Fred Witteborn (Chief, Astrophysics Branch) will talk about Comet Kohoutek at the December 13 meeting of the Los Altos Sertoma. The presentation will be entitled "Whatever Happened to Comet Kohoutek?"

John Cowley (Systems Development Branch) told the Student Engineering Chapter of the University of the Pacific, Stockton, about the Pioneer Project, at the chapter's meeting on December 4.

Charles "Chuck" Kubokawa (Man-Machine Integration Branch) will describe his underwater experiences on Tektite II for the San Francisco Kiwanis Club at their December 11 meeting.

ACE schedule

The following ACE television classes begin the week of January 7. Day and time of classes are shown in parentheses.

Accounting for Managers (Open to students in the Management Development Program) (Th, 5:30-7:05); Principles of Marketing (T, 5:00-6:45); Principles of Management/Organizational Behavior (M, 5:00-6:45); Accounting for Managers (Th, 5:30-7:05); Refinery Processes (MW, 12:00-1:00); Evolution of Sedimentary Basins (TTh, 12:00-1:00); Practical Transistors* (TTh, 7:15-8:00); Digital Troubleshooting Techniques (W, 5:00-6:45); Introduction to Computer Technology (M, 5:30-7:05); Intermediate Algebra (MW, 12:15-1:05); Technical Report Writing (Th, 5:15-7:00); Self Directed Career Development (T, 5:30-7:30); Basic Conversational French I (MWF, 12:10-1:05); Elements of Supervision (TTh, 12:20-1:00); Management by Objectives* (M, 3:15-5:00); Conducting Effective Interviews* (M, 3:15-5:00); Effective Reading* (TTh, 12:00-1:00)

*Video tape programs

For further information, contact the training and special Programs Branch.

Volunteers wanted

"What we need, money can't buy!" is the slogan of the National Center for Voluntary Action, a clearing house for information about organizations that need people to give of themselves to help others. One such organization is Recordings for the Blind, Inc., 488 West Charleston Road, Palo Alto. It needs volunteers to read books on to tapes for free distribution to blind students as well as blind business and professional people who must rely on the eyes of their minds. "Talking books" assist the blind in overcoming this grievous handicap and living productive lives.

Readers are wanted for all educational areas and for many languages, but help is particularly needed in fields wherein Ames employees and our contractors have special knowledge. For more information, call B. Hurley at 948-1106 or R. Davidson at 493-3717.

Jetsetters notice

Last call for Jetsetters Club members to sign up for Hawaii trip in April. Deadline date is Dec. 20th; after that date reservations will be open to all other NASA employees. We have 35 seats remaining. For more information, contact Jeanne Clemson, 241-18.

Xmas decorations

A tree is probably one of the most important decorations you'll purchase for the holiday. Here are some suggestions from the Food & Drug Administration to help make your Christmas a safer one.

Don't depend on sprays to flame-proof your tree . . . if you use a natural tree the best way to guard against fire is to make sure that the tree you buy is a fresh one. How can you tell? To check for freshness, remember:

- A fresh tree is green and its needles are hard to pull from branches. They don't break when bent between your fingers.
- The bottom of the trunk of a fresh tree is sticky.
- If you bounce a fresh tree on the ground, there will be no shower of falling needles.

Once you determine the tree is fresh, make sure it stays that way:

- Keep it away from sources of heat – such as fireplaces or radiators.
- Cut about 2 inches off the trunk and mount in a sturdy, water-hold stand with wide spread legs. A big tree? Support it with thin guy wires attached to the walls or ceiling.

Treat your tree like you would fresh flowers – keep the base holder filled with water.

Wear gloves when decorating with spun glass "angel hair" . . . it can irritate the eyes or skin. You can substitute non-flammable cotton. When used alone, either the angel hair or this kind of cotton is flame-proof. However, if you spray non-flammable artificial snow onto them, the dried combination will burn rapidly.

Remember, due to the Energy Crisis, President Nixon has requested that Christmas tree lights are not used this year for added decoration.

Christmas Joy

It's Christmas. Time for everyone to pause, catch his breath, reflect upon the good things that have occurred in the year just past—and look forward to the better things all hope for in the months and years to come.

The tradition of gift-giving at this time of year gives each individual an opportunity to make someone else's life just a little bit better and more secure in the year ahead. This can be done simply by making your gift one of U. S. Savings Bonds.

Savings Bonds offer everyone a safe, secure means of storing extra money—at 5½ percent interest, when held to maturity—until such time as it might be needed. Bonds are easy to convert to cash at any time. They are "indestructible"—replaced free if lost, stolen, mutilated, or destroyed.

A more perfect, personalized gift cannot be found anywhere. And everyone on your gift list will appreciate the receipt of Bonds.

So have a very merry Christmas, and help make it merry for all your friends as well. Give them U. S. Savings Bonds—the Christmas gift that can make their lives better throughout the years to come.

Want ads

Transportation

'72 Honda CB 175, Very clean. 225-1530, after 5.

Housing

CONDO: 2 Br, 1 1/3 Ba. Assume 7 1/2% FHA Loan. Blossom Valley, $22,750. Call 264-4627.

SKIING? S. TAHOE CABIN, 2 bath, central heating, sleeps 8, 10 min. from Heavenly Valley. $50/Weekend, $130/Week. Sinnott, 225-8043.

"Vacation Home," South Lake Tahoe, 3 Bdrm, fireplace, w/w carpets, sundeck, dbl. car port, year round road, completely furnished. $75 for a F, Sa, Su night weekend, $150 per week. 523-7653 before 7:30 a.m.

Miscellaneous

FOR SALE:
SOLAR 120 Photo-enlarger for up to 2¼"X2¼" negatives, with sharp Tessar-type lens and 2 negative carriers, $60 – also 35 mm SLR Canon FT-QL. Dean Dolkas 327-4945

RECORDING TAPES – Blank reel-to-reel Memorex tapes, 1200 ft. Never used. Sacrifice $1.50 each or $10 for case of ten. Rich Lenhart x5560.

FOR SALE: H-P 35 Pocket Computer complete, new condition, $210. Call 258-2831 after 5 p.m. or weekends.

HAM RADIO EQUIPMENT:
Drake R4 Receiver w/ matching MS-4 speaker, ex. cond. $225. Heath DX-20 $15, Knight TR106 and V106 6 meter transceiver $40. Call 262-6567.

Twin bed set, Tiger stripe maple 3 and 5 drawer chests, mirror, $350. Bill Mehler, 322-3951.

SEWING MACHINE: Kenmore with attachments, Good condition with cabinet $40. Call 264-4627.

LOST
Women's White Schwinn Bicycle with "FISCAL" sign. Contact Angela Salter, Ext. 5304.

MISCELLANEOUS:
CAR POOL: Palo Alto, Menlo Park area. Contact Bob Zander, Ext. 5370.

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December 21, 1973

MERRY CHRISTMAS HAPPY NEW YEAR

DIRECTOR'S CHRISTMAS MESSAGE

The past year has been one of tragedy and triumph. In the spring, we lost some of our valued friends in the CV-990 accident. A few weeks ago, Pioneer 10 concluded its precedent breaking visit to Jupiter and a new aircraft arrived to replace the one that was lost. In wishing you the very best for the holiday season, I would also like to add my sincere thanks for the way you mastered the problems we have faced. I am sure that new challenges are awaiting us in the coming year and I am confident that we will rise to meet them.

Merry Christmas and Happy New Year!

Hans Mark

Director

TECH BRIEF AWARDS . . . are public announcements of new technology derived from the U. S. Space Program. Three such awards were issued to Ames Employees on November 16 in the Director's Committee Room. Dr. Alan B. Chambers (left), Research Assistant to the Director, made the presentation.

The recipients and their technology are (l. to r.) John R. Anderholm, RSM, "Multipurpose Top for Liquid Helium Dewar;" George R. Holden and Joseph R. Smith, Jr., FLE, "Balanced-Bellows Spirometer."

NASA, Stanford institute study noise pollution

Ames and Stanford University School of Engineering have established the NASA-Stanford Joint Institute for Aeroacoustics.

The new institute will do fundamental research into the causes of noise pollution and train acoustical scientists and engineers.

David H. Hickey, assistant chief of Ames' Large Scale Aerodynamics Branch, was named deputy director of the institute; Prof. Krishnamurty Karamcheti, a Stanford aerodynamics noise expert, is the institute director.

Acoustic studies, especially those related to environmental noise problems, are growing steadily more important, the Ames-Stanford agreement points out. Future aeronautical development in particular depends "crucially" upon a more precise understanding of acoustics and aerodynamic noise generation.

"At present there exists a serious lack of scientists and engineers with the education and research experience in acoustics to carry out the studies required to meet national needs in this area," the agreement states.

"The environment necessary for long term research and graduate education in acoustics can be provided by establishment of an institute as a focus of cooperation between a university and a national research laboratory mutually interested in the science.

"Stanford University and NASA's Ames Research Center are ideally suited to pool their respective talents and facilities to develop the badly needed institute and to carry out their respective objectives in research and education in acoustics."

The agreement notes the research center's past work and special competence in developing acoustic facilities and investigating noise problems with jet airplanes, helicopters, and vertical or short take-off and landing aircraft. Ames possesses some of the most sophisticated acoustic research equipment available, including the world's largest wind tunnel, anechoic (no echo) chambers, and data handling systems.

Stanford also has some research equipment, but the university's main contributions are expected to be its faculty's expertise in fluid mechanics, aerodynamics, turbulence, mathematical methods including numerical analysis, information theory, solid mechanics, applied physics and electrical engineering.

Faculty members and senior scientists at Ames will collaborate in acoustic research, one of the institute's primary objectives. Graduate students and post-doctoral fellows will participate in research projects, fulfilling a second key objective of developing trained investigators.

Distinguished U. S. and foreign scientists in the field will be invited to visit the institute for varying periods, and collaborative research with other universities and institutions is expected to develop. Special courses and seminars in acoustics will be organized for the benefit of scientists and engineers at other industrial and research centers.

Finally the institute expects to publish results of its research and proceedings of its seminars and symposia for the benefit of other professional groups.

Educators' conference

A Pioneer-Jupiter Educators' Conference was held at Ames on November 30 – December 1, in connection with the Jupiter Fly-by Encounter.

The conference attracted 100 participants from 14 states, Washington, D.C., and Canada. Attendees were elementary and secondary teachers, college and university instructors and department heads, textbook publishers, planetarium directors, science writers, aerospace workshop directors and representatives of state departments of education.

The opening greeting was given by Dr. Hans Mark, Ames Director. Also addressing the group were Charles Hall, Pioneer Project Manager; Robert "Skip" Nunamaker, Deputy Manager of the Pioneer Project; and Dr. John Wolfe, Pioneer Project Scientist. Dr. Edward J. Smith of the Jet Propulsion Laboratory, Dr. John A. Simpson of the University of Chicago, William H. Kinard of NASA Langley Research Center, Dr. Tom Gehrels of the University of Arizona and Dr. James A. Van Allen of the University of Iowa (all Principal Investigators) discussed their particular experiments on the Pioneer 10 mission. Dr. Cyril Ponnamperuma of the University of Maryland presented "Prospect of Life on Jupiter"; Eric Burgess, Co-Founder of the British Interplanetary Society, addressed the group on "Emerging Consciousness"; and Dr. Robert Kraemer, Director of Planetary Programs at NASA Headquarters closed the conference with a summary of NASA's planetary exploratory programs.

In addition to the presentations, the attendees had two tour sessions at Ames; attended a banquet at which the guest speaker was Lt. Col. Alfred Worden, Chief of the Systems Studies Division, who discussed the Apollo 15 mission; and traveled to the Minolta Planetarium at DeAnza College to view the planetarium's "Encounter with the Giant" program.

The conference was organized and managed by Educational Programs Officers Mike Donahoe and Garth Hull and Educational Specialist Barbara Busch, of the Public Affairs Office.

Help make Christmas safe

The Food and Drug Administration has made careful research and planned a presentation of suggestions to homes with young children to take special precautions this holiday season concerning Christmas decorations.

Parents should avoid decorations that are sharp or breakable. Trimmings with small removable parts can be swallowed. Bubbling lights can be particularly hazardous because their bright colors and bubbly movement can tempt children to break the candle shaped glass, which contains a hazardous chemical.

Also, try to avoid using decorations that resemble candy or food but aren't. A young child doesn't know the difference between real food and look-a-like food.

If you must use Christmas tree lights this year, be sure to turn out tree lights and other decorations when you go to bed or leave the house. Never use electric lights on a metallic tree. These trees can become charged with electricity from faulty lights and electrocute someone touching a branch. Instead, use colored spotlights above or beside the tree – but never fastened onto it.

Also wear gloves when decorating with spun glass – "angel hair"... it can irritate the eyes or skin. You can substitute non-flammable cotton. When used alone, either the angel hair or this kind of cotton is flameproof. However, if you spray non-flammable artificial snow onto them, the dried combination will burn rapidly.

The Food and Drug Administration urges you to take these suggestions for precautions on making your Christmas safe.

FOUR HUNDRED AMES EMPLOYEES . . . turned out Monday afternoon (December 10) to welcome the CV-990 "Galileo II." Deputy Director C.A. Syvertson dedicated the new CV-990 in memory of the 11 crew members who perished in the "Galileo I" which crashed last April.

Skylab expands knowledge of Earth's resources

Astronauts Gerry Carr, Edward Gibson and William Pogue will be well equipped to survey the Earth during the final Skylab mission that could last three months.

The third Skylab astronaut crew may take as many as 50 vertical looking passes, using the Earth Resources Experiment Package (EREP), a battery of six remote-sensing devices carried aboard the space station. They have planned for only 30 EREP passes, but a longer mission (at least up to 85 days) would permit the additional survey time.

To support the longer mission, the crew will carry 6 rolls of film for the large Earth Terrain Camera, enough for 2,400 detailed 5 inch photographs of the planet's surface. The command module that ferries the new crew up to the space station will also be stocked with 42 cassettes of 70 mm film for the six-camera array of the Multispectrum Photography Facility – enough to make nearly 17,000 pictures with filtered black and white, infrared, and color film.

During the two Skylab missions completed so far, some data has been acquired for all 48 continental U. S. states and 34 foreign countries. The Skylab flights also collected data on the Atlantic and Pacific Oceans, the Gulf of Mexico, the Caribbean and Mediterranean Seas, the Sea of Japan, the Gulf of Aden, and the South China Sea.

Earth resources aircraft from Johnson Space and Ames Research Centers, the National Oceanic and Atmospheric Administration, the University of Michigan, and Colorado State University gathered supplementary remote sensor data during 136 flights in support of U. S. Inventions.

Photography and sensor data from Skylab and it's supporting aircraft may provide a much better understanding of the development of tornadoes, hailstorms and hurricanes.

Therefore the final Skylab flight will concentrate on seasonal changes, the development of sea and lake ice, snow cover patterns, changes in vegetation in northern and southern hemispheres, and major storms particularly below the equator.

Retired employee returns to direct carol group

This year Bill Houck, a retired instrument maker from the Model and Instrument Machining Branch is once again directing the Ames Carol Group. This marks over 15 years of Christmas carol direction by Houck.

Houck is well qualified to direct the choral group. His background in professional music is extensive. As a young man Houck played the violin and obtained junior credit at the McGill Observatory of Music in Canada. He began playing professionally with the violin and the trumpet and later became quite interested in voice through his association with a light opera company. He studied voice privately and directed the Presbyterian Choir as well as the Japanese American Choir in Spokane, Washington.

As a teacher in the Music Department in a state school, Houck gained even more valuable music experience. He also appeared as a soloist on the air in the Army on occasion.

The Ames retiree was a member of the American Federation of Musicians for a number of years. Houck is delighted to pitch in and direct the Ames Carol Group this Christmas and hopes that next year someone will enthusiastically volunteer their musical services to lead the group on to another successful year of carols at Ames.

Susan Collins-Resources Manager

by Denise Bernard,
Astrogram Office

Susan Collins is a Resources Manager for the Life Sciences Directorate here at Ames.

Upon graduation from high school, Susan entered Arizona State University in 1960 where she took such courses as psychology, business and humanities. She graduated from Arizona State with a bachelor's degree in Humanities in 1964 and also a Woodrow Wilson Fellowship.

Susan then came to Stanford University for one year to major in English in 1964-65.

In the fall of 1965 Susan was employed with the Medical Research Foundation in Palo Alto. Half the time she would work for a surgeon doing research on various things such as kidney transplants and cardiovascular dynamics. This was valuable on-the-job training and was taken in very good interest by Susan.

Susan learned not only to assist the doctor in surgery but how to perform minor surgical operations on her own as well.

As for the other part of the time she worked for a group of bio-engineers who were very devoted people with an interest in how the body works. They also built many different kinds of electronic instruments for making measurements of body functions.

As for Susan's present position, she was employed by Ames in 1969 upon the suggestion of a mutual acquaintance that she should come down and apply for the job of a resources manager for the Programs and Resources Office which then consisted of her managing overall funds for the Center.

In September, Susan came to work for the Life Sciences Directorate as a Resources Manager which consisted of her managing the research funds for the Life Sciences Directorate.

The Astrogram asked Susan if she felt any discrimination atmospheres by her being a woman here at Ames and in replying she stated that she hasn't felt any to this point. She also stated that she doesn't want to think of herself as a Crusader because of the fact that throughout her career she's worked exclusively with men and they treat her as an intellectual equal.

She also states that she would encourage not just women, but anybody who cares about others in a humanistic way not so much whether they are men or women-professional-nonprofessionals, black or white because they are still people and they should go on into the field of their choice. If you're nice to people, they'll be nice to you.

As for her hobbies, Susan likes to read, sew, ski, and do creative arts such as crafts (making rugs, etc.).

Tilt-rotor research aircraft

Army and Ames leaders examine a model of the tilt-rotor research aircraft. From left to right are Major General Frank A. Hinrichs, Army Aviation Systems Commands (AVSCOM) Commander; Dr. Hans Mark, Ames Director; General Henry A. Miley, Jr., AMC Commander, and Paul F. Yaggy, AMRDL Director.

Rotorcraft session

A two and one-half day Specialists' Meeting on "Rotorcraft Dynamics," sponsored by the Dynamics Technical Committee of the American Helicopter Society and co-sponsored by Ames, will be held February 13-15, 1974 at Ames.

The program will include four technical sessions, a technical discussion panel session, a tour of Ames facilities and an evening dinner highlighted by guest speaker Paul F. Yaggy, Director of the U. S. Army Air Mobility R&D Lab.

Technical paper presentations will cover a wide range of rotorcraft dynamics from classical flutter to engine-airframe interactions. Advanced theoretical techniques for analyzing rotor aeroelastic stability, dynamic response, ground-air resonance and tilt proprotor dynamics will be presented. The latest technical uses for predicting rotor and fuselage loads and vibration will be discussed and in most cases experimental data will be included. Several techniques and concepts for reducing helicopter vibration will be discussed including actual flight test information.

The program committee was organized by Dr. E. Roberts Wood, Chairman of the AHS Dynamics Technical Committee, General Chairman is E. S. Carter, Jr., Chief of Aeromechanics, Sikorsky Aircraft Division of United Aircraft Corporation. Technical Chairman is Dr. Robert A. Ormiston, Ames Directorate, U. S. Army Air Mobility R&D Laboratory; Administration Chairman is J. C. Biggers, ARC. Members of the Dynamics Technical Committee will serve as Session Chairman and Co-Chairman.

The unclassified meeting is open to all rotorcraft specialists in the U. S. Government, industry, AHS members and other interested parties including foreign representatives.

JOGGERNEWS

Many joggers at Ames have accumulated quite a few miles in the "500" Mile Club. Milestones attained by the various joggers are: 1,500 miles Paul Sebesta... 1,000 miles Arthur Mandell, Tom Carson, George Lenehan and Jerry Barrack...500 miles Vito D'Aloia, Robert McCracken, Frank Nichols, Don Kirk and Dennis Matsuhiro, Bruce Castle...250 Ralph Donaldson, Bruce Ganzler, Roger Hedlund, Davel Colborn, Don Kornreich and Gerd Kanning...100 miles Alan Bakke, Dora and Dick Willoughby, and Alan Herold. If anyone is interested in participating in this activity please contact Bruce Ganzler x5169.

AIAA Meeting set

The American Institute of Aeronautics and Astronautics will hold a special January meeting entitled "Comet Kohoutek Revisited" at 8 p.m. on January 8 in the Minolta Planetarium of De Anza College.

Please call Sandy Huntley, ext. 5257 on or before Friday, January 4.

Booklet available

A new pamphlet entitled "Improving Our Environment" is now available to all Ames employees free of charge. The publication describes the role NASA is playing in applying its technology to improving the quality of Man's environment.

To obtain a booklet please write to the NASA Audio-Visual Facility, c/o Public Affairs Office, Mail Stop 204-12 indicating the number wanted, the name and mail stop.

Requests must be written; no telephone calls will be honored.

Want ads

Transportation

FOR SALE:

Engine, Volkswagen with extra parts, $50. McKibbin, 736-5975.

1969 Ford Torino 2-dr hardtop, PS, new brakes, new tires, new battery, new muffler, very clean. $1,090. Call 356-5676 or 249-3906 after 4:30 p.m.

1965 Chev. Impala, 283 engine, AT. Bad body, interior; good mechanically. $125. Bakke, 246-3356.

Housing

FOR SALE:

2 Br. 1 Ba house on 1/5 acre in Los Gatos. $32,000. Call 356-2503.

TAHOE KEYS TOWNHOUSE. 2 bedroom, 2 bath. Furnished. Available immediately. Weekly or monthly until June 1. $125 per week or $300 per month. 969-1494 or x5639.

For Rent — Unfurnished, 2-bedroom detached apartment, private yard, enclosed garage, car port, Los Altos. $250/mo plus utilities. Call eve. 964-7289.

Miscellaneous

FOR SALE:

Polaroid camera $20. 739-6054

10-speed Racing Bike in excellent condition, overhauled and painted, $60. Call 253-6294.

RCA 21" Color TV, beautiful condition solid walnut cabinet. $70. Call 245-3188 after 5 p.m.

Hardwood bedframe with bookcase headboard. $30. 379-2385

Dalmatian puppies — Pedigree — no papers. $25. 243-6068

Green Sofa. $25. Don Lefforge, 244-7310.

Kneissel White Star fiberglas skis, Look-Nevada heel and toe binding, 210 cm, low mileage. $95. Heathkit solid state stereo amplifier, AA-21, like new, $75. 948-4678, S. Anderson.

Steamer trunk $40. Shop vacuum $15. Murphy dbl. rollaway bed mattress $40. Danish set-2 couches, 2 slat benches, 2 chairs $75. 2 wood packing barrels, $5 each. 24" girls bike $10. Kelton 366-4800

SHELTIE PUPS, male, sable, AKC. 493-9391.

FOR SALE. Comet blue Raleigh girls 26" bike, combination lock and chain included. $25. Call 245-5492 after 5 p.m.

Bicycles-3-speed 20" girls, 1-speed 20" girls, and 3-speed 26" boys. Phone 246-8594

Bookcase 6' x 7' black $50, large drafting table $45, heavy metal workbench 2' x 3' $5, illuminated boat compass $25, meat slicer $15, wire dress form/stand size 16-18 $15, bird cage/stand $15. Kelton 366-4800

School desk, formica top, large storage area, ages 5-12, virtually indestructible, good condition. $10. 257-0583

Lost: Coat. Red and blue plaid coat, with white fur trim, taken from Cafeteria during Ames' Happy Hour December 7. Please return I'm cold! Michele, ext. 6077.

The Life Sciences Library is missing the following oft-requested book: "Of Time, Tides, and Inner Clocks" (Call no. QP 84 S77). Please return.

Car Pool Wanted: Vicinity of Winchester and Williams Rd., 7:30 shift. 243-6068

FOR SALE: Adjustable, lightweight walker with tray. Purchased new, used three weeks. $10. Call Dot Evans, 948-2084, after 5:30 p.m.

WANTED: 150-170cm skis in good condition with execellent bindings for Xmas present, call 253-6294.

One year OSU assignment

Mike Donahoe, an Educational Programs Officer at Ames, will be spending a year at Oklahoma State University (OSU) under an Intergovernmental Personnel Loan beginning January 1.

Donahoe will be assigned as an Educational Associate at the University's Research Foundation in Stillwater, Oklahoma. He will be involved in directing and coordinating the establishment of a center for the dissemination of educational information on the Russian Space program to teachers and students throughout the United States.

The educational materials that Donahoe gathers and relates to others will help expand the frame of reference of U. S. educators and students concerning the many faceted Russian program and how that relates to that of the Western world.

Throughout the year, while Donahoe is in Stillwater, several personnel from OSU will be coming to Ames' Educational Programs Office as part of the program.

Donahoe will return to Ames in January of 1975.

Speakers Bureau

Victor "Tory" Stevens (Flight and Systems Research) talked to the Palo Alto Jaycees on December 12 at their evening meeting. He discussed the overall aeronautics work which NASA-Ames is doing.

Joe Zuccaro (Simulation Experiments Branch) addressed the San Jose Engineers Club on December 11.