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Naval officers examine Lixiscope.

Businesses examine Lixiscope applications

Over 100 representatives from industry and research institutions around the country gathered at Goddard last month to discuss the possible wide ranging applications of the Lixiscope, a handheld X-ray device developed under the sponsorship of Goddard's Office of Technology Utilization by Dr. Lo I Yin, and co-researchers Dr. Jacob Trombka and Steve Seltzer of The National Bureau of Standards.

The portability and potential medical and dental uses of the Lixiscope were stressed as symposium participants heard presentations from Dr. Yin, and Dr. Trombka, and reports on preliminary evaluations of the Lixiscope by The National Institute of Dental Research, the Howard University Department of Radiology, and Duke University, among others.

"I think the discussion and presentations were very helpful. I certainly learned a lot," said Dr. Yin.

The Lixiscope is a pocket size battery powered X-ray tool using a night vision intensifier to facilitate medical examinations where there is no electricity, where standard large X-ray machines are not available, or in emergency situations, such as at athletic events.

The concept of the Lixiscope was originally conceived for use in X-ray astronomy where single photon imaging is required. The high sensitivity of the Lixiscope also makes it possible to reduce the dose of radiation to the patient significantly.

The pull of a trigger on the device unshields the radioactive source, sending a low dosage of X-rays into the object being examined. The X-rays passing through the object are absorbed by a phosphor screen which converts them to visible light.

Although not yet commercially available, six companies have applied for a license to manufacture or distribute the Lixiscope. NASA has a patent on the device. The cost of a mass produced Lixiscope, which is entirely composed of existing technical components, has been estimated at roughly $5,000.

The device is also being studied for possible medical use aboard the Space Shuttle.

"Both the Lixiscope and the conference were a huge success," said Don Friedman, director of the Technology Utilization Program.

Dr. Jacob Trombka (right) and Dr. Lo I Yin (second to right) listen to preliminary evaluations of Lixiscope.

Voyagers seek clues to mystery of Earth, Jupiter radio waves

Two Voyager spacecraft heading for Jupiter have discovered that low frequency radio waves naturally emitted from the giant planet mysteriously behave in a manner directly opposite to that of its high frequency emissions.

The Voyagers, which are slightly more than halfway to their 1979 encounter with Jupiter have also looked back at the Earth for new clues to the origin of natural low frequency radio waves flooding out into Space from our own planet.

"The polarization plane of the low and of the high frequency radio waves from Jupiter seems to be exactly opposite," said Joseph Alexander, one of a team of Goddard scientists working on the Voyager experiments.

The polarization plane is the plane within which radio waves vibrate as they travel through Space. Whether the polarization plane varies randomly, systematically rotates clockwise or counter clockwise, or stays constant can tell observers a good deal about the nature of the waves' source.

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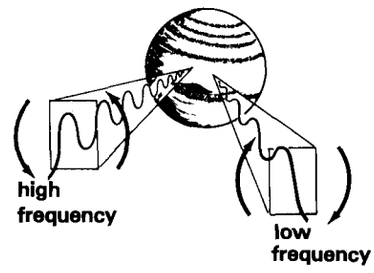


Diagram shows opposite polarization planes of high and low frequency radio waves emitted from Jupiter.

Goddard satellites collect new data from history-making solar flare

A variety of Goddard controlled satellites observed the largest solar flare in recorded history July 11.

The satellites' observations provide a new data base for scientists investigating the little known causes of solar flares and how resulting disturbances in the solar wind effect the Earth.

The solar wind, a cohesive plasma of ionized particles, steadily flows at supersonic speed over the Earth and other planets of the Solar System. Explosions of solar flares on the sun's surface generate huge shock waves in the plasma, blasting new free-flying, highly energetic particles into it and upsetting interplanetary magnetic fields.

Two Interplanetary Monitoring Platforms orbiting the Earth recorded the disturbances in interplanetary magnetic fields, and the intensification of particle flow from the sun.

HELIOS-1, a sun orbiting satellite, was observing the sun from the opposite side of the Earth July 11. It obtained data about changes in and composition of the radio noise, plasma, magnetic fields and energetic particles streaming from the sun.

As artist's sketch shows, the sun streams plasma and magnetic fields, as well as light, into the solar system.

The giant solar flare disrupted the Earth's ionosphere and blacked out short wave radio communication for two hours throughout the entire sunlit hemisphere. Long distance communications uses the ionosphere, a sheath of ionized gas continually being created by normal solar radiation, to bounce signals around the Earth.

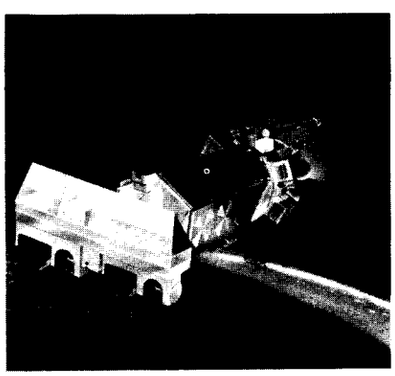
The flare saturated high sensitivity detectors on Orbiting Solar Observatory 8 as it circled the Earth. The satellite, which studies solar active regions and flares in the ultraviolet, obtained data on smaller flares associated with the large flare region.

Atmosphere Explorer-C also observed the flare, obtaining data related to the heating effects on the atmosphere from particles in the solar wind being deposited on the Earth at high latitudes.

In addition, International Sun-Earth Explorer A and B obtained data related to magnetic fields and energetic particles, and Applications Technology Satellite-6 recorded data concerning high and medium energy plasma particles.

The most recent solar flares mark the approach of the next cycle of maximum solar activity, which occurs every 11 years. NASA is planning to launch a Solar Maximum Mission satellite in 1979 at the peak of the cycle.

The Goddard managed Solar Maximum Mission will study the entire electromagnetic spectrum of solar flares to aid in unravelling their physical origin.



A new environment-monitoring spacecraft, Tiros-N, is scheduled for launch in late August. It will help meteorologists, oceanographers and other environmental scientists maintain and perhaps improve the quality of life on Earth.

From its near-polar orbit around the Earth, Tiros-N will facilitate improved long and short range weather forecasts, and provide better information for water resource management and flood forecasting.

NASA/Goddard is funding and managing the project. After checkout of the spacecraft in orbit, Tiros-N will be turned over to the user, the National Oceanic and Atmospheric Administration (NOAA).

Voyagers seek clues

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The Voyager spacecraft are making it possible for the first time to measure the polarization plane of low frequency radio waves, for until now the Earth's ionosphere has shielded the waves from ground telescopes. High frequency waves, which are not blocked, have been observed for years.

But so far, scientists are finding the new data from Jupiter is proving more puzzling than enlightening.

What could cause radio waves to be so radically different?

According to Alexander, one theory is that the waves are generated by entirely different kinds of processes in Jupiter's atmosphere. Another theory suggests the same kind of emission mechanism for both, but proposes that waves generated in the southern hemisphere of the planet are emitted at low frequency and rotate clockwise while those from the northern hemisphere are emitted at high frequency and turn counter clockwise.

As the Voyagers move closer to Jupiter, investigators hope to find new clues to the radio sources by studying, among other factors, how the planet responds to the solar wind.

"The radio waves from both Jupiter and the Earth seem to be stimulated by energetic electrons in the solar wind," Alexander noted. On Earth these are the same particles that cause brilliant auroral displays in the atmosphere.

Just how the Earth's low frequency radio wave are propagated some 10,000 kilometers above the night time auroral zones is another mystery. The radio waves sometimes radiate as much as a billion watts of power into space.

The Voyagers' first results, however, have already shown that a number of theories explaining the radio noise and predicting specific polarization planes for it are implausible.

The Voyager planetary radio astronomy experiment is a collaborative effort between scientists at Goddard, the University of Colorado, and five other institutions. Goddard has performed much of the initial scientific analysis of the data.

The Goddard team consists of Joseph Alexander, Dr. Michael Desch, Michael Kaiser and Dr. James Thieman, all of the Laboratory for Extraterrestrial Physics. Also involved in the Voyager data analysis are Mrs. Pearl Harper and Mrs. Sue Vaughan of Computer Science Corp.

People

Center welcomes new Director of Personnel

Waddell Longus, Goddard's newly appointed Director of Personnel, comes to the Center following a distinguished 7-year career as Director of Personnel, Metropolitan (D.C.) Police Department. While in that position, Mr. Longus also served as a key participant in developing a comprehensive merit personnel system for the entire District of Columbia Government.

Mr. Longus has more than 14 years of personnel experience, including several with the General Services Administration and the Department of the Navy. Following a 4-year stint in the regular Navy, Mr. Longus commenced his civilian career in that department as a budget analyst.

Past President of the D.C. Chapter of the prestigious International Personnel Management Association (IPMA), Mr. Longus was recently elected 1978-79 Chairperson of the (four chapter consortium) National Capital Area of IPMA, which has an approximate membership of 800 personnel workers.

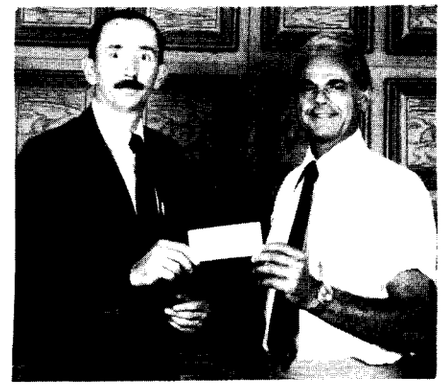
Mr. Longus, who was born in Washington, D.C., and is an avid photographer, resides with his wife, Pat, and their two children in Wheaton, Maryland.

Astro. Club elections

The Goddard Astronomy Club has elected its new officers for the year 1978-1979.

New officers are: Madeline Justiniano, President, X2305; Robert D. Godfrey, Vice President, X4977, and George L. Fleming, Secretary-Treasurer, X6605.

Army Map Service Team shooting on club's range at the Federal Trap League Tournament of 1978.



Richard King, (left) Goddard Trap and Skeet Club treasurer, presents final payment of GEWA loan to George Abid, (right) GEWA president.

Out of the woods

Goddard Trap and Skeet Club pays GEWA loan, celebrates rifle range that once was weeds and brush

In January of 1972, a small group met and decided to form the Goddard Trap & Skeet Club, and build their own range.

With the sponsorship and financial support of the Goddard Employees Welfare Association (GEWA) a formal agreement between the Post Commander of Fort George G. Meade and the Director of the Goddard Space Flight Center was negotiated, whereby the Goddard Trap and Skeet Club and the Fort Meade Rod & Gun Club jointly develop and operate the Trap & Skeet Range at Fort Meade.

The Fort Meade Rod & Gun Club had an abandoned skeet range on Trainfire Road that was overgrown with weeds and brush. With a $500 gift, a $1,500 loan from GEWA, $1,000 raised by several members, and a lot of hard work, the Trap & Skeet Range developed in 6 years to a facility with a clubhouse, a skeet range, an ATA trap range and a modified International Trap Range with regulation field lights for night shooting as well as day shooting.

The Trap & Skeet Range is now valued at $15,000.00 In addition, the Club has paid off its entire loan from GEWA.

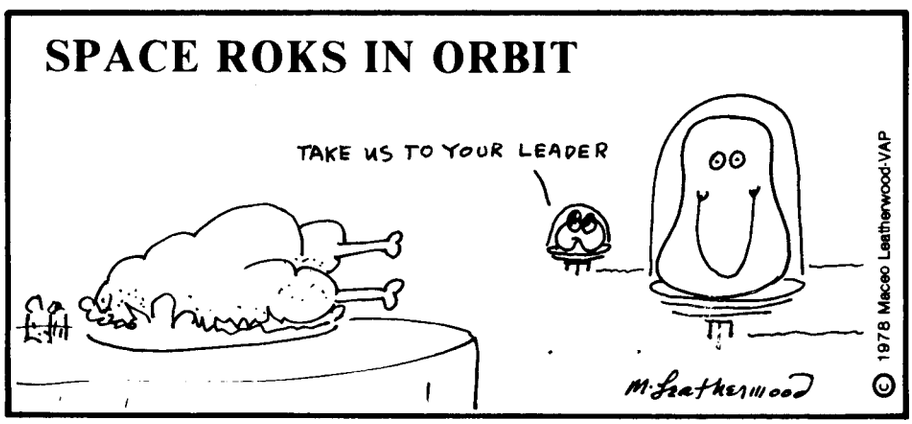
In 1973, the Goddard Trap & Skeet Club organized the Federal Trap League which consists of teams from various federal agencies.

The 1978 Federal Trap League ended on July 12, 1978, with first place honors going to the National Security Agency and second place won by the Goddard Space Flight Center.

Colonel Bilderback represented the Post Commander of Fort Meade and awarded the trophies to the winners. A wrap-up cocktail party was held with barbecue, hot dogs, smoked goose and wild ducks, potato salad, etc.

It was an evening of milestones to be celebrated. The Club paid off its loan to GEWA, honored its first Junior to break 25 straight birds, and noted that over a quarter million targets have now been thrown on the range.

The trap and skeet facilities are available to all Goddard employees and their families. For additional information contact: Walter Carrion, President, X5051; or Louis Caudill, V. President, X5608.



Satellite to be launched in late 1981

NASA selects Landsat-D contractor

NASA has selected General Electric Co. of Valley Forge, Pa., to provide a fourth Earth resources satellite, Landsat-D, for launch in late 1981.

The proposed cost for the Landsat-D Mission System is approximately $70.5 million. Goddard Space Flight Center will manage the project.

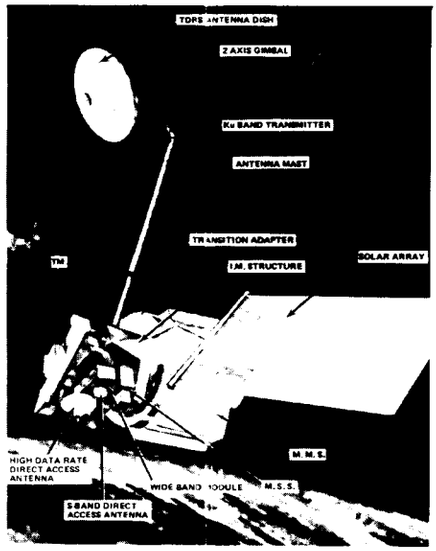
The new Landsat-D satellite will enable scientists to obtain images of the Earth that detail areas as small as 30 meters square in six bands of the light spectrum. It will make heat maps in a seventh band, the infrared, to 120 meters ground resolution day and night.

Landsat-D's predecessor, Landsat-3, was designed to scan in only five spectral bands and offered a best ground resolution of 80 meters square.

Landsat-D will join Landsats 2 and 3 already in orbit around the Earth. The satellites, which emphasize improved vegetation analysis, ready availability of data and frequent coverage for better change detection, greatly facilitate inventorying and managing the Earth's resources.

The Landsat program has made great steps since the mid-1960's, when scientists and engineers first explored the possibilities of remote sensing from Space, using space photographs from the Gemini and Apollo Programs and early meteorological satellites.

Today Landsat data is improving such fields as forest and range resources management, land use mapping, and oil and mineral exploration.



Artist's conception of the new Landsat-D satellite as it will appear in orbit around the Earth.

Storm, frost and flood damage to vegetation at critical growth periods, for example, can be readily assessed by Landsat satellites and effects on crop production determined.

The economic benefits to the United States that can be gained from a more accurate crop production information system have been estimated at over $400 million a year. Extensive economic benefits will be achieved by reducing price fluctuations and providing more stability to the wheat market.

Project Manager for the new Landsat-D is Charles Gunn. Project Scientist is Dr. Vincent Salomonson.

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SAS-3 identifies nearest 'quasar'

Scientists using Goddard's astronomy satellite SAS-3 have pinpointed just beyond our galaxy the nearest of some 600 mysterious quasars so far found in the Universe.

The object was first discovered years ago by another Goddard satellite, SAS-1 (Uhuru), but has never before been identified as a quasar.

Quasars, short for quasi-stellar objects, are the most powerful energy radiators in Space. The power pouring out of tiny quasar regions is comparable to the energy flowing from an entire galaxy of stars.

Besides being the nearest of known quasars, the new quasar, named 0241, is the third to be found in recent months that is radiating x-ray energy.

The quasar was spotted by MIT scientists operating SAS-3. Some 800 million light years away, it had been overlooked previously because it is obscured by the thick dust of our galaxy.

"If 0241 had been spotted sooner, it might have changed the whole history of quasar study," said Goddard's Dr. Stephen Maran, Senior Staff Scientist in the Laboratory for Astronomy and Solar Physics.

Maran is hopeful the nearby quasar may clear up some of the mysteries of quasars' origin. For instance, are they eruptive events in the centers of galaxies? Or are they long-dead objects associated with the beginning of the Universe, yet whose light is still travelling towards us over the vast distances of Space?

Marjorie Townsend manages the SAS-3 project. Dr. Carl Fichtel is Project Scientist.

Smith named deputy of space transportation

Richard G. Smith, deputy director of the NASA-Marshall Space Flight Center, has been appointed Deputy Associate Administrator for Space Transportation Systems in NASA Headquarters, Washington.

Smith will assist in overseeing all of NASA's Space Transportation Systems, including the reusable Space Shuttle.