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GODDARD NEWS

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Keeping Track

By H.C. Bevan
Station Director, Winkfield.

After twenty years of operation in the NASA STADAN and STDN world network of ground stations, the Winkfield station phased out of the STDN on September 30, 1980. It has been operated and maintained for NASA under the supervision of the British Science Research Council (SRC) since 1960, and apart from a period of two years from 1965 to 1967 when Bendix F.E.C. supplied about 30 staff members to augment the station complement, the staffing of the station has been by British nationals. Since 1967 it has been manned under contract by Airwork Limited. The present Airwork Ltd. station manager is Mr. Stan Sydes. Although ceasing to be a member of the exclusive STDN "club", the station will remain fully operational until the end of the useful life of the British UK-6 satellite for which it has been the prime station since launch in June 1979. During its 20 years of life, the station has supported over 200,000 telemetry, command, and tracking passes on over 250 different satellites, covering disciplines as diverse as meteorology, high energy physics, ocean monitoring, X-ray and UV astronomy, ionospheric and radio propagation studies, space propulsion systems and earth resources. Its actual contribution to these studies, has been small but vital and all the station staff have been proud to play a part in this exciting venture of man into the universe around him. In recognition of the part Winkfield has played in space research, the GSFC management has awarded the station the coveted "Group Achievement Award". It hangs in a place of honor at Winkfield and will be a continuing reminder of a very happy and profitable association between the American and British peoples in the beginnings of

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Winkfield station phased out

From left to right, are Dr. H.G. Hopkins, Appleton Laboratory, UK Science Research Council (who was responsible for building the Winkfield station in 1960 and for its operation until his retirement in 1974); Mr. Charles A. Taylor, Director Network Systems Division, NASA HQ; Mr. D. Duovarjo, Contracts Division, NASA HQ; Mr. Robert S. Sade, Director, Networks Directorate, Code 800 GSFC; Mr. G. Lewes Addison, Senior Administrator, Appleton Laboratory, UK Science Research Council; Mr. Harold C. Bevan, SRC, Winkfield Station Director (who has worked at Winkfield since the building of the station in 1960, apart from a period of 7 years, 1972 to 1979 on the IUE and UK-6 project teams); Mr. Daniel A. Spintman, Associate Chief, Network Operations Division of the Networks Directorate, Code 850, GSFC; Mr. Clyde Medhurst, SRC Winkfield deputy station director (who has worked at Winkfield since 1961 apart from a period of 4 years, 1968 to 1972 on the UK-4 project team); Mr. Tecwyn Roberts, International Affairs Office, Code 802, of the Networks Directorate and NASA representative at BFEC, Columbia. Tec was, until 1979, Director of the Networks Directorate Code 800, until he resigned because of ill health.

R&D conference to be held in December

—How to find the right research and development project, recognize when it goes off track and ensure that it solves the user's problems are three of the topics to be covered at an upcoming conference sponsored by The American University's Center for Technology and Administration this December.

The conference, How to Successfully Keep Research and Development on Track, will be held at the Sheraton International Conference Center in Reston, Va., (near Dulles Airport), from 1 p.m., Dec. 10 to noon, Dec. 12, 1980.

More than 80 senior persons from organizations involved with research and development will lead the conference's 40 workshops. Workshop leaders include Goddard's Dr. Enrico Mercanti, Donald S. Friedman and H. J. Peake (retired). For further information, contact Robert Szakonyi or Lowell H. Hattery at (202) 686-2513 or 686-3658 at the Center for Technology and Administration, The American University, Washington, D.C. 20016.

New NASA "telescope" may give best view yet of elements in atmosphere, outer space

Researchers at NASA's Goddard Space Flight Center have built the first reliable instrument for observing an almost unexplored band of the spectrum. It may offer the easiest means to date for monitoring substances in the atmosphere, including destructive flourocarbons, and for identifying elements in outer space.

Similar in operation to a radio telescope but driven by lasers, the new 'Submillimeter Laser Heterodyne' instrument is the first ever with sufficient tuning resolution to detect elements by their spontaneous energy emissions in submillimeter wavebands.

"Because it is in these wavebands that elements are theorized to show their strongest and most characteristic signals, we expect the instrument to give us a clearer view of what is overhead," says Dr. Gerhard Koepf, one of the instrument's developers.

Astronomers have long known how to tune radio telescopes to the spontaneous emissions of elements, which occur in many frequencies as atoms and molecules periodically undergo changes in their architecture. However, without access to the submillimeter band, astronomers traditionally have had to use a variety of instruments to spot an element by its weaker emissions in the surrounding microwave radio and infrared frequencies.

NASA plans to use the new instrument, developed in cooperation with MIT's Lincoln Laboratories to monitor fluorocarbons, hydrochloric acid and other chemicals suspected of depleting the ozone layer of the upper atmosphere. Monitoring the layer is of continuing concern to scientists because it is the sole barrier protecting life on Earth from lethal levels of ultraviolet radiation from the Sun.

"Once completely tested," says Dr. Robert Hudson of the Goddard Stratosphere Physics and Chemistry Branch, "the instrument's first flights are aboard balloons, likely to be followed by a two year ozone monitoring mission aboard NASA's Upper Atmosphere Research Satellite (UARS) scheduled for 1985.

The atmosphere is likely to be just one of its targets, however. Dr. David Buhl, a Goddard astronomer predicts it will also have applications in studying a variety of astrophysical phenomena in deep space.

"To give an exotic example," says Buhl, "it would be interesting to get submillimeter observations of interstellar masers, whose composition has only been studied to date by their microwave emissions." Masers, coherent beams of microwaves, arise naturally when an expanse of gas floating between stars becomes excited by electromagnetic noise from its neighbors and gradually amplifies this noise into beams of microwaves. "We have yet to see the strongest signatures of many of the elements in the cloud to determine clearly just what is giving rise to all this radiation," says Buhl. For similar reasons, astronomers see promise in the submillimeter band for advancing studies of stellar composition and evolution.

The new NASA instrument passed its first test in May this year as it successfully identified carbon monoxide molecules in the Orion Nebula from the Mauna Kea Observatory in Hawaii.

To make its observations, the instrument enters the submillimeter band through a unique combination of old and new technology. Rather than try to tune to an element's exact frequency, as does a radio telescope, it mixes the antenna signal from an element with a lower frequency 'local' signal of its own. This mixing "steps-down" the element's signal to its equivalent signature in the radio range. Explains Dr. Gerhard Koepf, "it gives us a way to quickly get a handle on the submillimeter picture and recognize familiar faces from previous work with radio signatures."

In principle, "stepping down" (or heterodyning) the element's signal is much the same as ringing two differently pitched tuning forks and hearing the alternative reinforcement and interference between the two sounds result in a lower tone.

While heterodyning has long been used below the submillimeter bands, adapting it to entering the much narrower submillimeter frequencies gave the art its toughest challenge yet. "It meant developing a local signal with sufficient stability and tuning resolution to translate very precise frequencies," says Nelson McAvoy, another Goddard member of the instrument tea team. Several similar attempts by other teams have failed. Notes McAvoy, "in terms of everyday television, our instrument is the first able to turn to the signal of just one station, whereas previous instruments switched back and forth un-

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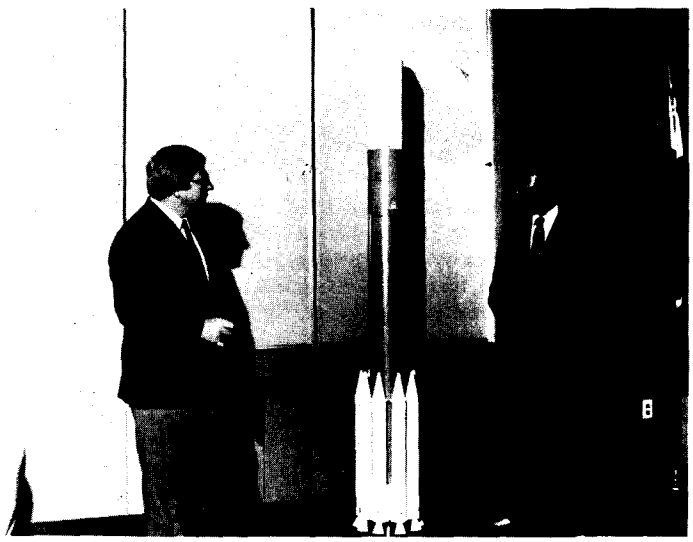


Smithsonian receives Delta model

Above, David Grimes, (left) Project Manager, presents a model of the Delta rocket to Noel Hinners, the Curator of the National Air and Space Museum.

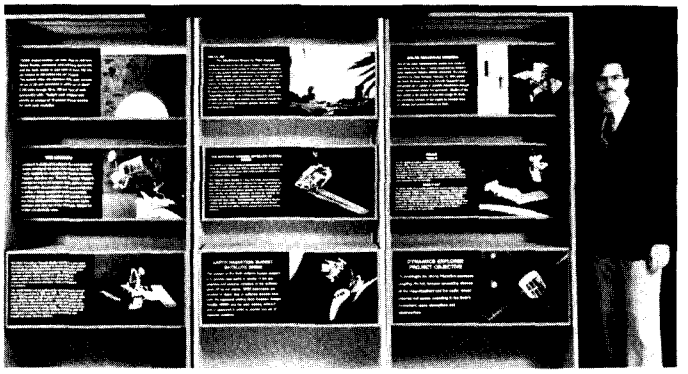
The Delta Project model will probably go on exhibit at the National Air and Space Museum, late next spring or early summer, according to Greg Kennedy, the Assistant Curator at the Museum.

Says Kennedy, "Right now we're in the planning stages of an exhibit on space shuttles and expendable launching vehicles in which the Delta model will be included."

The model was taken to the Smithsonian Museum on August 28, 1980 to give visitors a better understanding of NASA's rocket program.

NASA's Delta Project model of the Delta rocket 151 is a 1:20 scale model, which was built at McDonnell Douglas Aeronautics between April and May 1980.

People



"Goddard Missions for the 80's"

Ronald Moltere, a Visual Information Specialist of the Presentations Section here at Goddard, recently designed the "Goddard Missions for the 80's" exhibit, which presently stands in building 8 in front of the second floor auditorium.

The purpose of the exhibit is to give Goddard employees an overall view of what Goddard plans to do for the 80's. The special programs chosen for the exhibit are the Upper Atmosphere Research Satellite (UARS), National Oceanic Satellite System (NOSS), Earth Radiation Budget Satellite (ERBS), Tracking Data Relay Satellite System (TDRSS), National Oceanic Atmospheric Administration (NOAA), Dynamics Explorer Project Objective, Solar Maximum Mission, Landsat-D, and Goes- DE and F, which are all current projects. All of them are satellites with the exception of the Delta model.

Moltere said, "It took about a week to complete the exhibit. Later on I plan to design a complete exhibit on all of the nine different programs.

Goddard training program produces Certified Professional Secretary

In 1976 Goddard established an incentive program to provide tuition and up to two quality increases to secretaries gaining certification under the Certified Professional Secretaries (CPS) Program. Bonnie Kaiser, of the Employee Development Branch, designed an 18-month training program to assist GSFC clerical workers and secretaries in achieving this goal.

Teresa Ricketts, Code 754, participated in the pilot training program conducted in 1977-79. In May 1979 she sat for the CPS test and successfully passed 5 of the 6 parts. This past May she retook the Secretarial Skills and Decision Making portions of the test. In early August she was notified that she was successful and is now a Certified Professional Secretary. Teresa was one of 10 secretaries in the state of Maryland achieving the CPS rating in 1980.

The exam is given annually by the Institute for Certifying Secretaries of the National Secretaries Association as a measurement standard for proficiency in the secretarial profession. The 2-day, 6-part test is so difficult that a 6-year time limit is allowed for successfully completing it.

Teresa joins Gretchen Evans, Code 663, who received her CPS certification in 1979. Congratulations Teresa on a job well done.

Kerrebrock heads Aeronautics Office

Dr. Jack L. Kerrebrock, Head of the Department of Aeronautics and Astronautics at Massachusetts Institute of Technology, has been named Associate Administrator for Aeronautics and Space Technology at NASA Headquarters, effective June 1, 1981.

He will be responsible for NASA's aeronautics, space and energy research and technology programs.

Kerrebrock replaces Dr. James J. Kramer who retired in October 1979.

Dr. Walter B. Olstad, the Office of Aeronautics and Space Technology's Deputy Associate Administrator, will continue to serve as Acting Associate Administrator for the interim period prior to June 1981.

Key Appointments

Effective October 26, 1980, Mr. John K. Steckel, formerly Assistant Chief for Operations, Instrument Division, is appointed to the newly established position of Associate Chief, Instrument Division (Code 720).

Telescope

Continued to page 4

controllably between several stations at once."

To produce its highly stable and tunable local signal, the NASA instrument uses two lasers. A first laser beam, produced by electromagnetically 'pumping' carbon dioxide gas until it releases a powerful infrared beam, is used to stimulate a second gas to develop a laser beam whose frequency of oscillation is in the submillimeter range. The gas producing this second beam may, in some cases such as fluorocarbons, be the same as the target element in space. More usually, however, it is a versatile gas such as methyl alchohol.

The second laser beam is then directed into a 'mixer' where its oscillations blend with those of the element's signal. Here too, the instrument required innovative technology. "To handle the extremely high submillimeter signals," says McAvoy, "the team members at Lincoln Laboratories, MIT, directed by Dr. Harold Fetterman, developed what has come to be known as the first 'quasioptical Schottky barrier mixer'."

Contributions from engineers and scientists to development of the new observation tool read like a shopping list of high technology parts. Dr. Gerhard Koepf and Nelson McAvoy developed the stable optically pumped molecular laser local oscillator. Dr. David Buhl built the data integrating and analysing filter bank system. Drs. Harold Fetterman, Peter Tannenwald and Brian Clifton and MIT's Lincoln Laboratories developed the mixer. And Drs. Paul Goldman and Neil Ericson of University of Massachusetts designed a five step off-axis parabolic mirror system for matching the submillimeter receiver to the focus of the NASA Infrared Telescope Facility at Mauna Kea Observatory to give the instrument its first test. The team is publishing its initial test results in Science and *The Astrophysics Journal.*

(NASA Photo: Joe Walters)

NCAR Director briefed on SMM

Wilmot N. Ness (right), Director, National Center for Atmospheric Research (NCAR) in Boulder, Colorado, visited the Experimental Operations Facility of the Solar Maximum Mission (SMM) at Goddard Space Flight Center recently. In this photo, the NCAR Director is being briefed by Rose Reynolds, the system programmer for the coronagraph/polarimeter experiment aboard the spacecraft, and by Kenneth J. Frost, SMM Project Scientist. The coronagraph/polarimeter experiment was designed and built by scientists at NCAR's High Altitude Observatory (HAO), and the HAO scientists are conducting experiments with the instrument as the spacecraft provides one of the most comprehensive observations ever made of solar flares on the Sun.

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Pictures: Photographic Section

Keeping track

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the space age.

The photograph taken against the background of the Minitrack antennas is of the presentation of a memento album of photographs of Winkfield by the SRC Station Director, Harold C. Bevan to Richard S. Sade, Director, Networks Directorate, Code 800, on the occasion of the last official visit of NASA/GSFC management personnel to Winkfield in June 1980.

Station Directors since 1960

Mr. C. Nicolson	1960–'77
Mr. F. Swales	1977–'79
Mr. H.C. Bevan	1979–'80

Bendix Station Managers 1965–'67

Mr. J. Clouse	1965–'66
Mr. R. Scalzitti	1966–'67

Airwork Station Managers 1967–1980

Mr. L.G. Chapman	1967–'75
Mr. G. Allen	1975
Mr. S. Sydes	1976–'80

Honeywell awarded NASA contract

Honeywell's Electro-Optics Center has been awarded a $1.5 million contract from NASA for a focal plane designated for the space agency's multi-spectral linear array (MLA) technology program for earth resources satellite surveys in the mid-to-late 1980s.

The project, which has been under development for GSFC for the past four years, designated Thermal Infrared Array (TIRA), calls for Honeywell to develop and demonstrate a 1,000 element electronically scanned focal plane array operating in the 10.5-12.5 micrometer spectral region using a "pushbroom" scanning principle. The pushbroom scanning design is directed toward meeting NASA's requirements for a long-wave infrared sensor with higher thermal sensitivity and simpler electro-mechanical operation than the present Landsat series of earth survey sensors.