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National Aeronautics and Space Administration

GODDARD NEWS

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Goddard scientists develop high precision radio astronomy system

Goddard scientists have developed a high precision radio astronomy system, and are using it in studies of the movement of the Earth's crust.

The system works by employing two or more antennas to monitor fixed extragalactic sources, usually quasars, in a technique called Very Long Baseline Interferometry. Measuring the difference in the arrival times of the quasar's signal at the two stations enables scientists to geometrically determine the distance between the two stations with a high degree of accuracy. One measurement, for example, between Massachusetts and California provided an accuracy of better than one part in a hundred million (i.e. precise to 3 cms or 1.2 in.).

The Very Long Baseline Interferometry technique is one of several methods NASA is developing with other federal agencies to study the movement and deformation of the Earth's crust. These studies should contribute to a better understanding of why and how earthquakes occur.

Dr. Chop Ma, Goddard geophysicist, reported that a number of fundamental questions in geophysics are now being investigated by NASA using space techniques: What is the nature and magnitude of tectonic plate motion? What is the behavior within a plate, especially continental plates, such as North America? What is the relationship between fluctuations in the Earth's rotation and large earthquakes?

The new system, developed for ultra-precision geodesy, is the work of several groups: The Crustal Dynamics Project team of scientists from Goddard; Haystack Observatory, Westford, Mass.; the Massachusetts Institute of Technology, Cambridge; and the Jet Propulsion Laboratory, Pasadena, Calif.

This new method is now using a highly sensitive, accurately calibrated, automated system (Mark III) designed for making geodetic measurements with fixed or mobile radio astronomy antennas of various sizes, ranging from 4 meters (13 feet) to 64 m (210 ft.) in diameter. The project has conducted geodetic observations with the Mark III systems at several different stations, national and international. For example, the group at Jet Propulsion Laboratory is installing the Mark III system into a mobile station for measurements of crustal movements in the western United States.

Very Long Baseline Interferometry can measure the rotation of the Earth and polar motion with a current precision of better than 10 cm (4 in.). Such precise measurements may shed light on the relationship between changes in the Earth's orientation and movements in the Earth associated with large earthquakes. Such movements may occur before an earthquake but so slowly and over so large a region as to be undetectable by conventional

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NASA Deputy Administrator resigns

Dr. Alan M. Lovelace, Deputy Administrator of NASA, submitted his resignation effective Dec. 29 and has agreed to accept an appointment as Associate Administrator/General Manager.

Lovelace was appointed Deputy Administrator by President Ford in June 1976. He had previously been Associate Administrator for the Office of Aeronautics and Space Technology since September 1974.

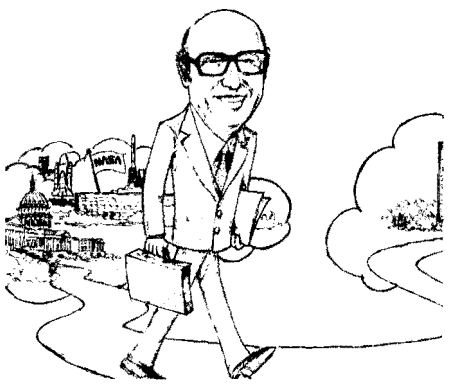
As Associate Administrator/General Manager, Lovelace will perform the basic management duties that he has been performing as Deputy Administrator and will serve as Acting Administrator during the absence of Frosch until a new Administrator has been named by the President and confirmed by the Senate.

Goddard gives Frosch farewell party

Goddard Director A. Thomas Young greets NASA Administrator Robert A. Frosch prior to send-off party.

Goddard gave NASA Administrator Dr. Robert A. Frosch a farewell party at the Goddard Recreation Center on the occasion of his retirement, effective January 20th. Center director A. Thomas Young used the event to wish Dr. Frosch well in his new job and to reflect on the accomplishments made during the Frosch administration.

Frosch is leaving NASA to become the first president of the American Association of Engineers Society, (AAES), a federation of the major engineering societies in the United States.



Farewell gift: a sketch to be signed by Goddard well-wishers.

More pictures on page 2

Goddard Director A. Thomas Young presents NASA Administrator Dr. Robert A. Frosch with farewell gift at Goddard recreation center farewell party December 10. Young said that the drawing symbolizes the accomplishments during the Frosch administration and the bright future that lies ahead for him in his capacity as the first president of the American Association of Engineering Societies (AAES), a federation of the major engineering societies in the United States created in January 1980.

Deputy Director of Goddard Dr. John H. McElroy autographs drawing given to Dr. Frosch for his resignation.

Goddard bids Frosch farewell

Don Kraft, Delta Mission Analyst and Integration Manager, talks briefly about the Delta project. He stated that during the Frosch administration, Delta underwent dramatic redirection in project goals and prospects. He added that Dr. Frosch came to NASA at a critical time for the Delta project. However, within a few months after his arrival, Delta had a success rate of 19 launches and reached a milestone in history with the Delta 150.

SMM Project Manager Peter Burr talks about the Solar Maximum Mission noting that the project has been declared a technical success by the Office of Space Science. Since it has been operating, SMM has observed over 1700 flares and has returned about 30,000 images of the sun's corona from shots from SMM's coronagraph.

Dr. Albert Boggess (pictured left) of the Laboratory for Astronomy and Solar Physics, explains how in its first year, IUE proved to be an extraordinary scientific success. Describing the mission which carried an 18" telescope into space to observe virtually everything except the sun, Boggess noted the IUE opened up the field of space astronomy to a large group of astronomers.

Bob Pickard, GOES project manager, explains that cloud pictures by GOES used by weather forecasters on television are only part of the services rendered by GOES. In addition, GOES is used for hurricane tracking, mapping gulf streams, freeze line predictions for the citrus industry, and for search and rescue operations.

Goddard employees receive MEA degrees

After three years of night classes 38 Goddard employees will receive Masters of Engineering Administration degrees through a joint Goddard-George Washington University program.

The prime objective of Goddard's three year old Masters of Engineering Administration (MEA) program is to provide an opportunity for qualified science and engineering professionals to study advanced administrative techniques relevant to Center needs. The program is also designed to develop recognized potential contributors to Goddard resulting from these studies.

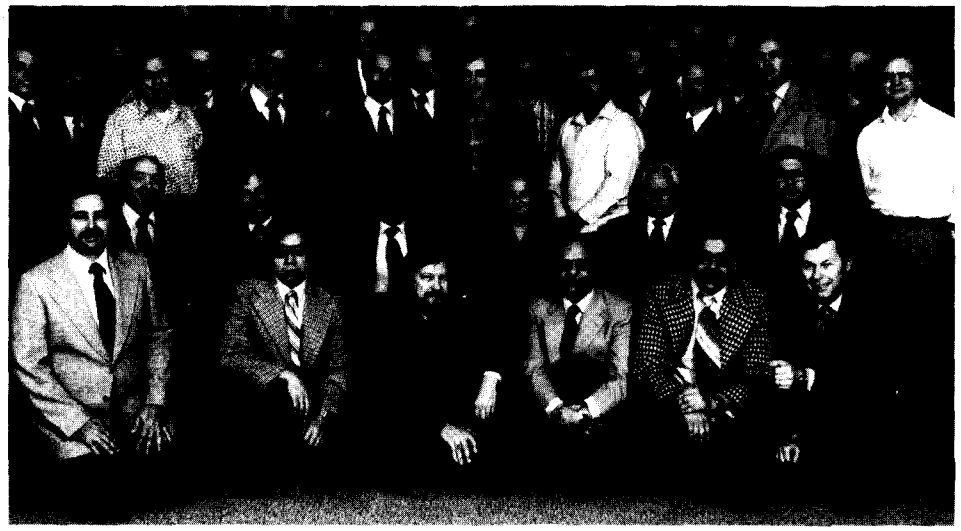
Supervisors and managers nominate and prioritize employees identified as possessing high management potential for their organization and endorse the proposed program of study appropriate for a MEA degree.

The directorate funded program is coordinated by John Daniels, a Goddard Employee Development Specialist; Edward Wright, Program Coordinator of George Washington University's College of General Studies, Department of Engineering; and Samuel Rothman, Chairman of the School of Engineering Administration, George Washington University.

Of about 200 Goddard employees initially interviewed for the MEA program, 50 were selected and 38 are expected to graduate. According to Goddard coordinator, John Daniels, the decline in enrollment is due to attrition rather than failures. The expected graduation date for MEA students is Feb. 16, 1981.

Classes for the new MEA students began in mid-January as a continuing effort by the Employee Development Branch, headed by Dillard Menchan, in its efforts to offer useful training outlets for Goddard employees.

The prospective MEA graduates are: Stanley Chan, code 272; Lawrence Novak, code 931.1; John T. Dalton, code 933; Gary N. Wolford, code 931; Francis L. Stetina, code 903; James P. Gary, code 934; Thomas A. LaVigina, code 733; Dr. Arun K. Guha, code 409; John Pandelides, code 409; Robert W. McIntyre, code 744; Gerald L. Burdett, code 701; Morton L. Friedman, code 728; John M. Hayes, code 728; Richard J. Broderick, code 711; Kenneth I. Duck, code 725; Richard H. Carter, code 731; Eugene L. Horn, code 734; Robert A. Felix, code 734; James S. Barrowman, code 742.2; John F. Laudadio, code 742.2; Maurice A. Nygarrd, code 741.1; Andrew G. Barr, code 750.1; Donald L. Margolies, code 710.2; Dr. Daniel J. Grant, code 723; William O. Macoughtry, code 861.1; Richard K. Buehler, code 814; Stewart D. Portas, code 814; Henry J. Franks, code 812.3; and Blake T. Lorenz, code 861.3.



MEA graduates are: (Sitting left to right) Buehler, Day, Guha, Cass, Hayes. (Kneeling) Landadio, Chan, Stetina, Pandelides, Friedman, Macoughty. (Standing) Wolford, Burdett, Felix, Horn, Duck, Margolies, Dalton, Meenen, Carter, Franks, Barrowman, Novak, Glaab, Portas, LaVigina, McIntyre, Christian, Chapman, Gary, McGrath, Nygaard, Broderick, Magavro and Bahr.

NEW EMPLOYEES

Thomas, Paula C., Contract Administrator (Code 271.3), 12-14-80

Blanchard, Bruce J., Hydrologist (Code 924), 12-14-80

Magida, Matthew B., Materials Engineer (Code 313.1), 12-14-80

Rice, Gerald R. Jr., Payroll Clerk (Code 151.2), 12-14-80

Kost, Kathryn A., Chemist (Code 724.1), 12-14-80

Schroder, Susan F., Aeorospace Engineer (Code 731.1), 12-14-80

Harper, Doris J., Student Aid (Code 252), 12-14-80

Cho, Shu-Hsien, Meteorologist (Code 910.2), 12-16-80

Evans, Carolyn M., Physicist (Code 942), 12-31-80

Smith, Peter M., Mathematician (Code 931.2), 12-31-80

Choudhury, Bhaskar J., Physical Scientist (Code 924), 12-31-80

Helfer, Dorothy P., Mathematician (Code 933.1), 01-04-81

Stark, Michael E., Mathematician (Code 582.1), 01-04-81

Gormley, William D., Mathematician (Code 582), 01-04-81

Holweck, Susan L., Clerk-Typist (Code 225), 01-02-81

Sacks, Kathy L., Clerk-Typist (Code 225), 01-02-81

Pumphrey, Trudy A., Secretary (Code 915), 01-02-81

Kempler, Suzette L., Clerk-Stenographer (Code 962), 01-02-81

Streitmatter, Robert E., Astrophysicist (Code 660), 12-19-80

White, Larry A., Mech Engineering Tech (Code 695), 12-21-80

Bowlus, Carol A., Personnel Clerk (Code 225), 12-21-80

Maroof, Naseema M., Operations Research (Code 302), 12-21-80

Stephens, Mark A., Mathematician (Code 933.1), 12-28-80

Schrom, Brenda H., Secretary (Code 485), 12-28-80

Wilson, Valerie K., Secretary (Code 403), 12-28-80

Henry, Stephanie G., Mathematician (Code 873.1), 12-21-80

Placanica, Samuel J., Aerospace Engineer (Code 712.3), 12-28-80

Continued to page 6

Employees in NTTF receive award

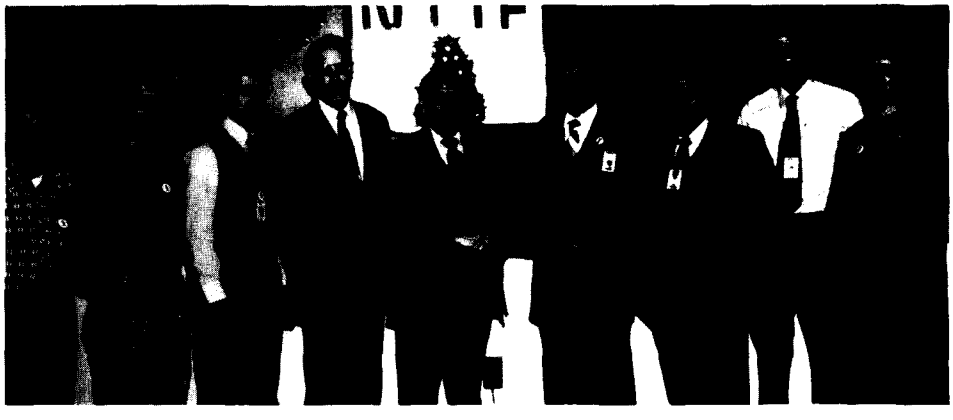
Employees at the Network Test and Training Facility (NTTF) Spaceflight Tracking and Data Network (STDN) station, Goddard, have been awarded the quarterly Outstanding Performance Award by the Bendix Field Engineering Corporation (BFEC) STDN program management. The award was presented to the station by Lawrence A. Jochen, BFEC president and STDN program director.

The award, for the July, August and September 1980 performance period was made in conjunction with the STDN Motivational Program. The programs purpose is to improve overall performance in all phases of the Bendix contract operation for Goddard. The outstanding STDN tracking station or STDN support element is selected for each quarterly period from the Bendix-operated network. The winner is awarded a plaque to be prominently displayed for the benefit of all employees in recognition of their outstanding achievement. In addition, a monetary award to be used at the employees' discretion accompanies the award.

NTTF is the local link in Goddard's world-wide 14-station STDN. In addition to the station's tracking and telemetry support of orbiting spacecraft, NTTF is the network's center for equipment and systems maintenance training and provides testbed services for network equipment design and testing.

KEEPING TRACK:

Participating in the NTTF station award presentation are (from left to right) Donald L. McCarthy, representing NTTF's Logistics Section; Michael S. McDiarmid, NTTF's Facilities Section; Dale C. Shelden, NTTF operations; John P. Gale, manager of U.S. Operations-STDN; Lawrence A. Jochen, BFEC vice president and program director-STDN; John J. Jobes, senior manager-NTTF; Chester H. Shaddeau, Jr., NASA station director; Barry L. Crouch, NTTF's Training Section; and Margret L. Fitzgerald, NTTF's Administration Section.



Ocean chlorophyll patterns studied

This montage of the ocean chlorophyll patterns off the coast of Jacksonville, FL in April 1980 was created from the U-2 borne Ocean Color Scanner (OCS) data taken by a Goddard team participating in the Georgia Bight Experiment. The Florida coast, which is not included in the photo, is off to the left. Speckles are clouds. The Gulf Stream is light shaded water to the right and the dark area is colder shelf water with high chlorophyll content. (High chlorophyll water appears dark in this computer processed image.) A filament shelf water, with chlorophyll in the range of 1.5 and 2.0 mg/M^3, is visible along the western edge of the Gulf Stream.

Bonds awarded to NTTF supervisor

J.T. "Tom" Smith, Supervisor of the Network Test and Training Facility (NTTF) Communications System, has been awarded $750.00 in U.S. Savings Bonds by Bendix Field Engineering Corporation under its cost reduction suggestion program.

NASA will save over $27,000 by replacing leased lines and data sets used to link high speed data from NTTF to NASA communications circuits, using NASA-owned equipment already available, as Smith suggested.

NTTF is a three-faceted member of Code 800's 14 station Spaceflight Tracking and Data Network (STDN). It is the Greenbelt tracking station, the center for network equipment maintenance training and a test center for network equipment.

John Jobes, BFEC Senior Manager of the NTTF, presents bonds to Smith. John Gale, Manager of STDN U.S. Operations, delivered the award on behalf of BFEC.

Astronauts visit Australian tracking station

This picture was taken at a recent STDN/Astronaut briefing at the Orroral, Australia tracking station. Astronauts Lt. Comdr. David Walker (left) and Dr. Sally Ride presented a model of the Space Shuttle to Australian Prime Minister Frayier.

REORGANIZATION & KEY APPOINTMENTS

Management Operations Directorate

The administration of the support services contracts (NPC-401) is transferred from the Personnel Division, Manpower Analysis Office (Code 220.1), to the Procurement Management Division, Policy and Review Office (Code 241), to ensure closer programmatic alignment.

Flight Projects Directorate

1. With the assignment of the definition phase activities of the Origin of the Plasmas in the Earth's Neighborhood (OPEN) Project to th Cosmic Background Explorer (Cobe) Project office, the title of the Cobe Project is changed to Cobe/OPEN Project (Code 401). Roger Mattson, formerly Project Manager, Spinning Solid Upper Stage (SSUS) Project (Code 495), is appointed Project Manager, Cobe/OPEN Project (Code 401, 344-7751). Kenneth O. Sizemore is appointed Deputy Project Manager for the OPEN Project (Code 401, 344-5108).

2. The orbital lifetime of the Magnetic Field Satellite (Magsat) spacecraft was successfully completed (by re-entry) in June 1980, and responsibility for its data processing and principal investigation activities during CY81 and CY82 was assigned to the Magsat Project Manager, Gilbert W. Ousley (Code 404). In addition to these duties, Ousley is appointed Project Manager for the Active Magnetospheric Partical Tracer Explorers (AMPTE) Project (Code 404).

3. The title of the Multimission Modular Spacecraft (MMS) Project (Code 408) is changed to MMS/FSS Project to give the Flight Support System (FSS) greater visibility in the area of Shuttle utilization. Frank J. Cepollina continues as Project Manager of the retitled project.

4. Peter D. Burr, formerly Project Manager for the Solar Maximum Mission (SMM) Project (Code 409), is appointed Project Manager, Upper Atmosphere Research Satellite (UARS) Project (Code 430, 344-8536). Charles E. Trevathan was assigned as Deputy Project Manager/Technical for the UARS Project effective February 24, 1981, and is appointed Deputy Project Manager, UARS Project (Code 430, 344-8536). Richard A. Austin, formerly Deputy Project Manager/Resources for the SMM Project (Code 285), is appointed Deputy Project Manager/Resources for the UARS Project (Code 430, 344-6474).

5. Gerald L. Burdett, formerly Deputy Project Manager/Technical for the SMM Project, is appointed Project Manager, Space Telescope (ST) Project (Code 440, 344-7461). Arun K. Guha, formerly SMM Systems Engineer, is appointed Deputy Project Manager, ST Project (Code 440, 344-7461).

6. The Solid Spinning Upper Stage (SSUS) Project (Code 495) is incorporated into the Delta Project (Code 470). Martin F. Sedlazek, formerly Deputy Project Manager/Resources for the Delta Project, is appointed Deputy Project Manager for SSUS within the Delta Project (Code 470, 344-6638). Camillo Arcilesi is appointed Deputy Project Manager/Resources for the Delta Project (Code 470, 344-7344). Harry O'Dell is appointed Assistant Project Manager for West Coast Operations.

7. Gerald W. Longanecker, formerly Project Manager, Cobe Project (Code 401), is appointed Project Manager, Tiros Project (Code 480, 344-6869).

8. George C. Keller, formerly Associate Project Manager for Mission Implementation, National Oceanic Satellite System (NOSS) Project, is appointed Assistant Deputy Project Manager for Science and Evaluation, NOSS Project (Code 485).

Responsibility for planning, coordination and implementation of new start activities through the definition phase was assigned to the newly established position of Associate Director of Flight Projects for New Projects, occupied by Paul A. Mowatt (Code 400.1), with the Headquarters approval of the recent Center reorganization effective November 16, 1980. This New Projects Office has definition responsibility after a concept has been shown to be both beneficial and technically and programmatically feasible. This organization is responsible for the preliminary implementation plans produced by the Phase A effort under the direction of task managers assigned to the Office. These plans will define the systems approach and management approach, identify any required advanced technology efforts (risk areas), and produce initial cost estimates. Prior to Phase B implementation, the Project Manager, who will also manage the Phase C/D development and flight phases, will be assigned to the Office. With few exceptions, projects will remain under the direction of the Associate Director for New Projects until Phase B, or A109 Phase I has been completed. At this point, a formal and complete project organization will be established with the Project Manager reporting to the Director of Flight Projects. As a result of this transfer of responsibility the Preliminary Systems Design Group (Code 402) is abolished and its employees reassigned to the New Projects Office (Code 400.1); however, they will retain their mail code 402.

The organization for a typical project now includes a full Deputy Project Manager assigned to the Flight Projects Directorate in lieu of the former Deputy Project Manager/Technical assigned to the Engineering Directorate. The Deputy Project Managers/Resources are organizationally reassigned from the Management Operations Directorate to the Flight Projects Directorate, retaining responsibility for the financial, scheduling, procurement, and other administrative activities.

First tier management under the Project Manager includes those functions that will implement the mission/user system concept and will emphasize the system management function under the direction of the Systems Manager. The next level of management includes a Spacecraft Manager, responsible for spacecraft, integration and test, and launch operations; and Instrument Systems Manager, responsible for all instrument and instrument-related components; a Ground Systems Manager, responsible for all system requirements to deliver data after capture (not including the Project Operations Control Center and Networks); and a Mission Operations Manager, responsible for establishing mission requirements and coordinating all institutional elements required to implement flight operations.

Instituting a major change from the current structure, all the positions described above, some subsystems managers, the Project Financial Managers, and the Project Support Managers are assigned to the Flight Projects directorate.

Specialists for Engineering (thermal, structural, mechanical, electrical, etc.) and resource activities currently designated to support the projects will remain administratively assigned to their functional organizations, as will the Project Procurement Managers.

Organizational Title Change

Effective January 18, 1981, the title for Code 915 is changed to Climate and Radiations Branch.

Effective November 16, 1980, the Theoretical High Energy Astrophysics Office (Code 665) was established within the Laboratory for High Energy Astrophysics, Science Directorate, and Dr. Reuven Ramaty was appointed Head of the organization.

Effective December 28, 1980, the title of the Work Control Office (Code 290.1) within the Plant Operations & Maintenance Division, Management Operations Directorate, is changed to Resource Administration Office.

MILESTONES

PREFACE: Thematic maps derived from the classification of remotely sensed multispectral data from satellites can provide valuable information for use in mapping and monitoring natural resources. However, the spatial resolution of remotely sensed imagery largely determines the type of land use information which can be extracted using computer classification methods. Because high resolution imagery offers greater detail and thus the opportunity for greater land use classification accuracy (or error) than that afforded by low resolution imagery, analysts are seeking new strategies for high resolution information extraction.

SIGNIFICANT RESULTS: The present method achieves initial results of 94 percent accurate land use classification using synthetic data. It classifies high resolution data (which details components such as forests, lawn, and pavement) into land use classes (such as industrial or residential areas) by analysis of the high resolution image components.

Three traditional computer classification methods (including parallel-piped, maximum likelihood, and unsupervised classifiers) were applied to 7. m resolution test data collected over Laurel, Maryland, in an attempt to recognize various urban land use classes, low and high density residential areas, apartment complexes, and industrial/commercial areas. The classifiers succeeded only in mapping the component cover type within each land use class and were unable to recognize the land use classes.

Given the hypothesis that differences in land use give rise to different distributions of components, an alternative two-stage approach was formulated. The first stage was to produce a classification map of image components by grouping pixels (the smallest individual elements of a satellite picture) with similar spectral responses (cluster analysis).

The second stage was to identify land use classes analysis of the component frequency distribution within selected neighborhoods (windows) centered about each pixel.

A series of computer programs was developed to perform the above two functions. These programs were then tested using synthetic data designed to simulate typical component frequency distributions for an urban area as viewed by a sensor with a resolution of approximately 12m or higher (7.m in this case). A maximum land use classification accuracy of 94 percent was achieved using information contained in a 15 by 15 pixel window.

PRACTICAL USES: Thematic maps derived from the classification of remotely sensed data can provide valuable information for use in mapping and monitoring natural resources. Improved classification methods for high resolution data will facilitate the extraction of more detailed information (i.e., land use maps) than could be obtained from lower resolution imagery.

For further information, please contact Mr. Stephen W. Wharton, Code 923, Goddard Space Flight Center, 301-344-4926.

NEW EMPLOYEES

Continued from page 3

Armstrong, David W., Personnel Staffing Specialist (Code 225), 12-28-80

Woodruff, Raphael A., Accountant (Code 260), 12-28-80

Brooks, Carolyn V., Personnel Staffing Specialist (Code 225), 12-28-80

McCeney, Paul J., AST Flight Mission Operations (Code 861.2), 12-28-80

Ward, Michael T., AST, Flight Mission Operations (Code 861.2), 12-28-80

Lee, Bradford O., Visual Inform Spec (Code 253.3), 12-31-80

Miller, George F., Electronics Techn (Code 692), 12-31-80

Sullivan, Helen, Procurement Analyst (Code 247), 12-28-80

Witcher, Howard C., Engineering Techn (Code 751), 12-28-80

Talapatra, Dipik, Aerospace Engineer (Code 754.1), 12-28-80

Colon, Gilberto, Aerospace Engineer (Code 713.3), 12-28-80

Karbeling, Michael S., Contract Specialist (Code 280), 12-28-80

Wildoner, Beverly L. Secretary (Code 435), 12-28-80

Bossler, Richard L., Elect Integrated Systems Mechanic (Code 291.2), 12-28-80

Witt, William R., AST, Flight Mission Operations (Code 404), 12-28-80

Kolb, Frederick, Aerospace Engineer (Code 302), 12-28-80

Hong, Suk L., Cost Account (Code 280), 12-28-80

Garrett, Michele L., Suv Contract Specialist (Code 232.1), 12-28-80

Moore, Gregory L., Student Trainee (Code 226/224), 12-28-80

Radio systems

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means.

Using this method, the Crustal Dynamics Project has made measurements on the longer baselines to measure continental drift and on the shorter ones to monitor regional activity.

In cooperation with the National Geodetic Survey of the National Oceanic and Atmospheric Administration and several international organizations, Very Long Baseline Interferometry measurements were made by NASA in July, September, and October 1980, as part of the Monitoring Earth Rotation and Intercomparison of Techniques Program. These data, equal in amount to what was acquired in two previous years, are now being analyzed and are to be published next spring. They will provide unprecedented opportunities to compare the details of the Earth's orientation as determined by other techniques and to check the United States-to-Europe baselines for plate motion and stability

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GODDARD NEWS

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