☆ STAR DUST

JACOBBERGER TO DISCUSS GEOLOGICAL DATA PROCESSING

DR. JACOBBERGER

Dr. Patricia A. Jacobberger, Center for Earth and Planetary Studies, NASA, will speak at the September 8 meeting of National Capital Astronomers. She will describe current methods, algorithms, and techniques of processing, correcting and reducing digital remotely sensed geologic data acquired by satellites such as Landsat.

Raw data must be corrected for detector bias and drift, orbital irregularities, Earth rotation, and system signatures. Statistical analysis of the corrected numeric data, which accurately represent the spatial distribution of surface features, yields much information about the surface.

Images assembled from these data typically are highly correlated, of low contrast, and are expressed as a series of gray levels indicating relative brightness in a given spectral bandpass. For visual interpretation, the data corrections are followed by image enhancement by algorithms which exploit the structure of the data matrix, e.g., contrast enhancement through color composite display, principal-components analysis, and image classification.

The contribution of atmospherically scattered light can be modeled and separated from the surface reflectance recorded by the satellite detectors. Thus, either the surface features or atmospheric haze and color can be studied separately.

A variety of techniques and their uses will be illustrated by Landsat images.

Patricia A. Jacobberger received her B.S. in Geology from the University of Nebraska at Lincoln, and the Ph.D. in Earth and Planetary Sciences from Washington University at St. Louis. Prior to joining NASA's Center for Earth and Planetary Studies she was a member of the geology faculty at Appalachian State University in Boone, NC. Her research interests are morphology and sedimentology of terrestrial deserts and semi-arid lands, remote sensing, and processing and analyzing digital satellite image data.

SEPTEMBER CALENDAR — *The public is welcome.*

Tuesday, September 4, 11, 18, 25, 7:30 pm — Telescope-making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 362-8872.
Friday, September 7, 14, 21, 28, 7:30 pm — Telescope-making classes at

JUNE LECTURE

Dr. James A. Ionson, NASA Goddard Space Flight Center, presented an abbreviated account of his theory of solar coronal heating to National Capital Astronomers. In May he received an award from the Maryland Academy of Sciences for this substantial to solar — and stellar — physics.

Coronal temperatures of 3 million K are measured, but the temperature of the photosphere (surface of the visible disk) is only 6,000 K. The second law of thermodynamics obviously precludes such coronal heating by photospheric temperature. Although previous theories have recognized photospheric turbulence — a source of ample energy — as the probable driver, the necessary energy-transfer efficiency had not been shown. Ionson attributes this deficiency to neglect of the ability of a magnetoplasma to store electrodynamic and kinetic energy, capacitance (C), although the ability to store magnetic energy, inductance (L), and resistance (R) were considered. He thus completes the electrical model, the RLC resonant circuit.

Ionson invokes coronal-loop resonance to provide the requisite coupling efficiency, with results that are in excellent agreement with the measurements. He has shown that the resonant period of a typical loop, about 5 minutes, agrees closely with the observed 5-minute global structure oscillation. He models the coronal magnetic loop with the analogous LRC circuit of appropriately narrow bandwidth (high Q). In a rigorous analysis he has shown that at the photospheric magnetic footpoints of the loop the ample convective energy within the loop bandwidth is coupled into the loop with adequate efficiency to account for the observed temperatures, when transported to and thermally dissipated in the corona.

Turbulent displacement of the footpoints excites Alfvén (magnetic) waves in the loop which transport energy to the outer parts of the loop where the energy is dissipated through magnetohydrodynamic (MHD) processes, primarily ion viscosity.

Ionson has shown that representation of the corresponding parameters of the general MHD equation in the electrical LRC equation provides a simple, valid model which results in excellent agreement with the observations.

The editor thanks Peter C. Kammeyer for notes on the lecture, and Dr. Henning Leidecker for clarification of certain points.   rhm

CALENDAR — Continued.

American University, McKinley Hall basement. Information: Jerry Schnall.
Friday, September 7, 14, 7:30 pm — NCA 14-inch telescope open nights with Bob Bolster, 6007 Ridgeview Drive, south of Alexandria off Franconia Road between Telegraph Road and Rose Hill Drive. Call Bob at 960-9126.
Saturday, September 8, 6:15 pm — Dinner with the speaker at the Ding-How Restaurant, 1221 E Street, NW. Reservations unnecessary.
Saturday, September 8, 8:15 pm — NCA monthly meeting at the Department of Commerce Auditorium, 14th and E Streets, NW. Dr. Jacobberger speaks.
Saturday, September 18, 8:00 pm — Discussion group at the Department of Commerce, Conference Room D. Information: Geoffrey Chester, 379-8218.
Saturday, September 22, 8:00 pm — *Exploring the Sky,* presented jointly by NCA and the National Park Service. Glover Road south of Military Road, NW, near Rock Creek Nature Center. Planetarium if cloudy. Information: Dr. John B. Lohman, 820-4194.

NATIONAL AIR AND SPACE MUSEUM OFFERS PROGRAM

On Saturday, September 8 at 9:00 am, Jim Sharp, Chief, NASM Sky Theater, will attempt to dispell many common fallacies and misconceptions about the sky — the moon illusion, lunar and solar eclipses, meteor showers, the motions of comets, and the power of telescopes.

Be on time! There will be no admission before the program has started.

OCCULTATION EXPEDITIONS PLANNED

Dr. David Dunham is organizing observers for the following grazing lunar and asteroidal occultations. For information call Dave at 585-0989.

UT Date	Time	Place	Vis Mag	Pcnt Sunlit	Cusp Angle	Min Aper
09-17-84	06:43	Duluth, MN	4.3	61	14N	5 cm
09-22-84	09:46	Syracuse, NY	6.6	11	11N	5 cm
10-02-84	00:10	Rydal, GA	3.3	51	2N	3 cm
10-02-84	00:31	Newport News, VA	3.3	51	-1N	8 cm
10-02-84	00:36	Hampton, VA	6.7	51	3S	3 cm

ASTEROIDAL:			Star Mag	Delta Mag	Name	
09-02-84	10:13	Ontario, Can.	10.3	1.5	(747) Winchester	10 cm
09-04-84	01:27	Texas	9.3	4.0	(209) Dido	5 cm
09-16-84	02:25	Canada	8.9	3.0	(47) Aglaja	5 cm
09-23-84	08:54	Mid Atlantic Stts.	11.0	9.0	(747) Winchester	10 cm

The two accompanying plots, provided by Dr. Dunham, resulted from the occultations of ZC 2779 (upper) on 29 March 1981 and ZC 1030 on 27 October 1983. Plotted on Cartesian coordinates, the mean lunar limb is horizontal, the star paths parabolic. Here, the vertical exaggeration is about 16 times.

The method allows detection of features far smaller than the diffraction limit of the telescope. by comparing the observed profile, described by the breaks in the star trails, with the predicted profile, one can update the position and libration, hence, the position of the center of gravity (which is what follows the orbit) of the Moon quite precisely relative to the celestial coordinates, as represented by the star.
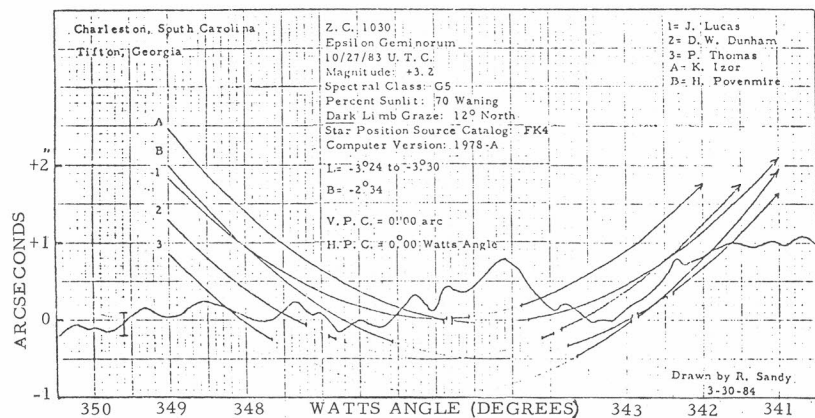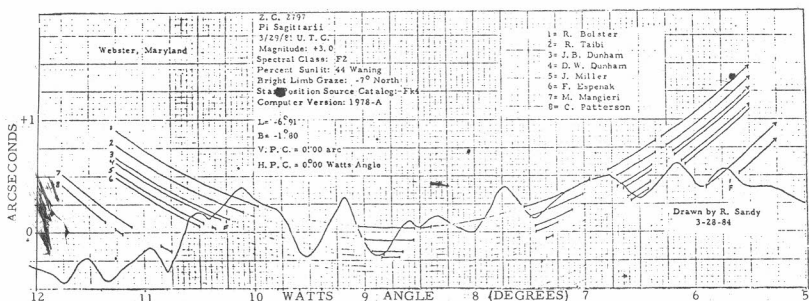
The dynamical data derived from this ongoing program are used in many astronomical calculations. Those interested in participating in these expeditions should contact Dr. David Dunham at 585-0989, or at any NCA meeting.

EXCERPTS FROM THE IAU CIRCULARS

1. July 20 — R. Evans, New South Wales, Australia, discovered a supernova of 14th magnitude in NGC 7184.

2. July 22 — Manfroid, Gutierrez, Hafner, and Vega, European Observatory, observed the appulse of SAO 186001 to Neptune with 0.5- and 1-m telescopes at La Silla with infrared photometers. A 2-s occultation was observed, indicating the presence of a 10-15 km satellite.

3. July 27 — R. Evans discovered another supernova, of 13th magnitude, in Vulpecula, near the border with Cygnus. The discovery photo was made with a 35-mm camera with a 200-mm focal length lens, green filter, and Tri-X film. Nova Vulpeculae 1984 reached magnitude 6.4 on August 5, but is now fading.

5. July 30 — Takamizawa, Tokyo, Japan, discovered a 10th-magnitude comet (1984j) in Capricornus. The orbital elements by Marsden indicate that Comet Takamizawa has a period of 7.265 years.

FOR SALE

Meade Model 628 six-inch Newtonian telescope. Twelve accessories, including Variguide Drive Corrector, 210 PG Photo-guide telescope, and camera adapter. Excelent condition. Current factory price, $1,400. Will sell for $710. Virgil Thurlow, Rt. 1, Box 86-E, Marshall, VA 22115, or (703) 347-9585.

FIRST CLASS