Satellite

GOES CAPTURES MOON

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Space technology has made it possible to observe the Earth from the vantage point of an orbiting satellite. The Geostationary Operational Environmental Satellite (GOES) transmits images of the Earth in either the visible (0.5-1.1 m) or thermal (10-12 m) wavelength region. Sometimes, GOES is fortunate to capture, from 22,000 miles, unuusual phenomena occurring on Earth, or, as in this special instance, to photograph another satellite in the heavens 221,000 miles from Earth.

Figure 1 is an infrared image recorded by GOES at 2101 GMT (4:01 pm EST) on 7 February 1985. This image shows the moon setting over the Far East. With a temperature of 390°K, the full moon appears as a saturated infrared image. Figure 2 is the visible counterpart showing the near full moon and abundant cloudiness over the Pacific Ocean. The moon's declination is between -9 and +9 degrees about 25% of the year (near the vernal and autumnal equinoxes). It can be observed near the limb of the Earth only during these periods. Also, during each equinox period there are only one or two full moons (3).

The Climatology Laboratory at Indiana State University operates an Alden II Wefax Receiving Set consisting of a tripod-mounted antenna system and a

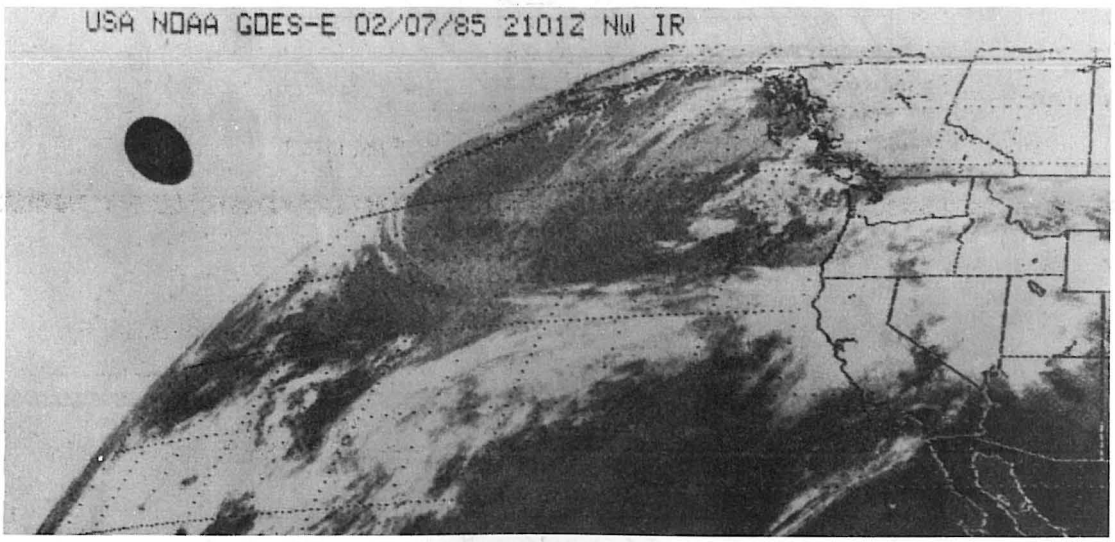

FIGURE 1

FIGURE 2

recorder/receiver assembly with UHF/VHF down-converter module. Reception of GOES-E, W, and ESA Meteosat data is possible on 1691.0 or 1694.5 MHZ. Data for these images were recorder by the Visible and Infrared Spin Scan Radiometer (VISSR) Atomospheric Sounder (VAS) payload onboard GOES-W, which at the time was centered over approximately 108°W.

The relative positions of the nearly full moon, the Earth, the sun and the GOES-W are shown in Figure 4. Since the Earth and the GOES-W rotate while the image is being recorded, the moon "sets" over the west limb of the Earth. This causes an apparent slanting of the moon's image and Figure 4 illustrates why the moon appears elongated and the earth round. Thus, although it is unusual to capture the moon on a GOES image, it does occasionally provide an interesting side light to fleeting events on the earth below.

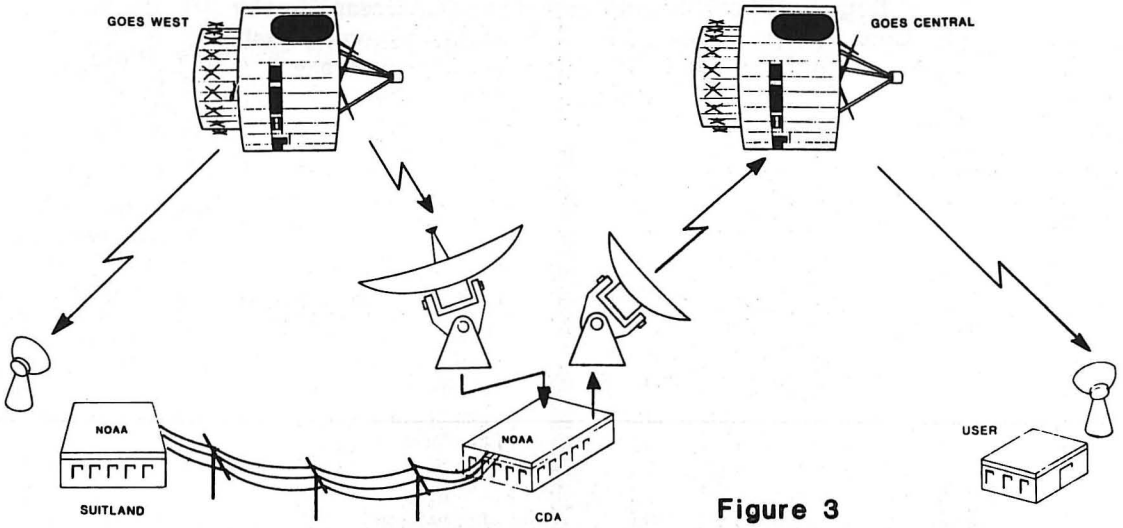

Figure 3

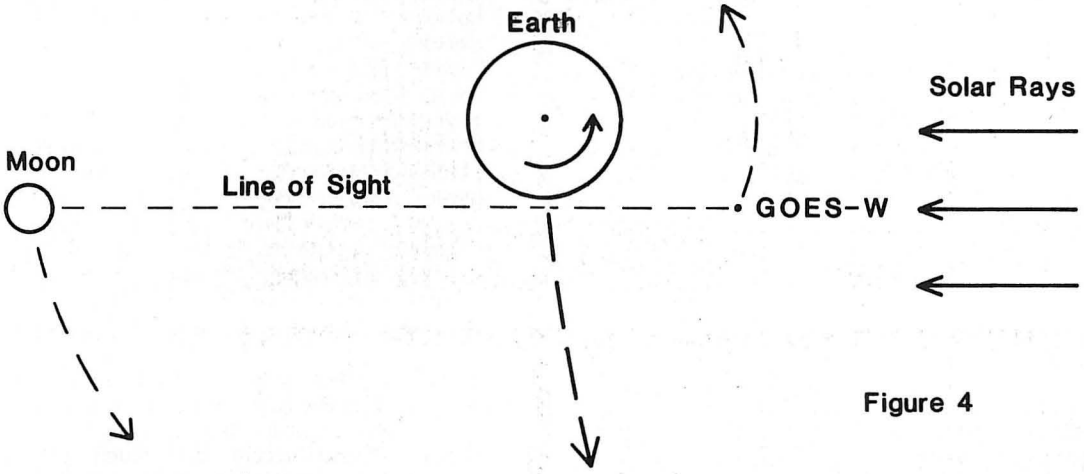

Figure 4

FOOTNOTES AND REFERENCES

1. Mr. Brinkley, a Graduate Assistant in the Department of Geography at Indiana State University, is completing work for the M.A. degree. He received the A.S. in Meteorology from Western Kentucky University and the B.S. in Geography from the University of Utah. He will be a Ph.D. candidate in the fall working in the field of Synoptic Climatology, as he continues working as Associate Coordinator of the ISU Climatology Laboratory.

2. Mr. Gustin, a Gruaduate Assistant in the Department of Geography at Indiana State University, is completing work for the M.A. degree. He attended the University of Illinois and received his B.S. in Geography and his B.S. in history from Indiana State University in 1983. He has been involved as Associate Coordinator of the ISU Climatology Labortary since 1979 with an interest in Jet-Stream Meteorology and its effect on climate.

3. Landecker, P. B., 1984: Lunar Surface as Viewed from GOES. Monthly Weather Review., 112, 2122-2125.

4. U.S. Department of Commerce (1981). "The WEFAX User's Guide", NESS/NOAA, Washington, D.C.