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Anomalous Object Tracked Near Moon

A Report from the Lunascan Project

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Lunascan Project
(http://members.evansville.net/slk/lunascan.html)

Lunascan is an Earth-based telescopic imaging project using live CCD technology to document and record Lunar Transient Phenomena[1,2,3] (LTP) and other anomalies observed near the Moon. The project was established in September of 1995 and uses an array of three telescopes, remote controlled from a control room, with numerous video monitors and recorders[4]. Cameras provide live high, medium, and low power television pictures of the lunar surface. Lunascan is being conducted by a number of amateur astronomers and investors in the United States. The primary goal of the project is to perform high-powered scans of the lunar surface in order to document reports of LTPs.

Just a little more than a year into the project, on Saturday, September 21, 1996, the Lunascan team conducted one of many routine scans of the lunar surface using a 16" f/4.5 Newtonian telescope (Figure 1). The sky was relatively clear in the early evening, with a little haze creating a slight halo around the moon. The telescope, equipped with a 400-line GBC 400 CCD camera, viewed the moon in High-Power Scanning (HPS) mode at 400 X[5]. With a video recorder running, the scope/camera system panned to the limb of the moon, then, using the Earth's rotation, slowly scanned across the surface to the terminator. At this point the system was manually pulled back to the limb for the next scan.

[1] http://dragonrest.tripod.com/ltp.html
[2] http://www.ltpresearch.org/
[3] http://www.lpl.arizona.edu/~rhill/alpo/lunarstuff/ltp.html
[4] http://www.astrosurf.com/lunascan/SC-Proj.htm
[5] At 400 X the moon's surface appears as if it were about 600 miles away.

Figure 1 16" Newtonian telescope mounted on Scope Transport Unit.

At 7:26 local time (00:26 UTC[6]), several team members noticed that a bright object had suddenly appeared, and then disappeared, at a point below and to the right of the Moon (Figure 2). In the video, the object (designated ULO-092196) is seen initially for about a second, and then lost as the camera scans past it. Six seconds later, the object is reacquired and observed for another 13 seconds until the camera scans past it again. By the time the next scan occurred, the object was gone. The session was terminated at 10 PM that night as the weather began to deteriorate.

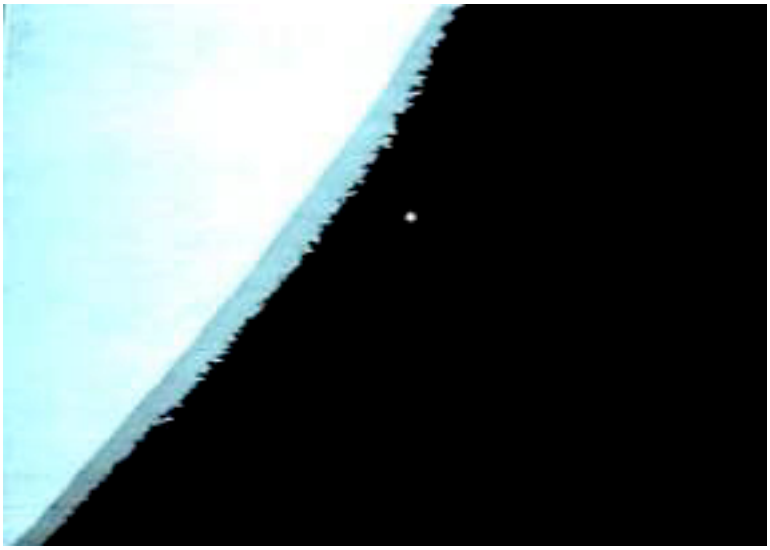

Figure 2 One of the video frames showing object ULO-092196 near the limb of the moon. The slight halo around the moon present that night is seen here as the thin blue strip along the limb.

[6] Coordinated universal time. Signal provided by WWV at Fort Collins, Colorado.

In HPS mode, the scope's field of view (FOV) is 0.06 degrees, which, at lunar range, corresponds to a distance of 241 miles. The total time of observation is 20 seconds which consists of about 400 video frames. Close examination of the video shows no apparent motion of the object relative to the moon over this period of time. Assuming the object is resolved, its size is about 2.06 arc seconds (0.00057 degrees), or about 2.4 miles in diameter at lunar range. The distance from the limb is 37 arc seconds (0.01 degrees). At lunar distance this is about 43 miles from the surface.

The following conventional explanations were initially considered:

- Low Earth Orbit (LEO) satellite -- The orbital period of LEO satellites is approximately 90 minutes, which is a geocentric angular velocity of 360 degrees in 1.5 hours or 0.075 degrees per second. In the 20 seconds the object was observed, if it were an LEO satellite, it should have moved about 1.5 degrees or three lunar diameters (the angular diameter of the moon as observed from the Earth is 0.5 degrees).
- Geosynchronous satellite -- A geosynchronous satellite would move 0.004 degrees per second relative to the fixed stars (360 degrees in 24 hours). In 20 seconds, it would move 0.08 degrees. If the object were a geosynchronous satellite, it would have moved completely out of the FOV in 20 seconds.
- Star or planet -- The moon's orbital period causes it to move relative to a fixed star (or planet) at a rate of 0.00015 degrees per second. In 20 seconds this is about 5% of the width of the FOV, or about 1/3 of the distance from the object to the limb of the moon.
- Balloon -- A balloon drifting at 10 mph, 100 miles away would move 0.03 degrees in 20 seconds, or half the FOV. With the elevation angle of the telescope 32 degrees above the horizontal, such a balloon would be at an altitude of about 50 miles.
- Meteor -- The lunar escape velocity of 5400 mph is the minimum velocity at which a meteoroid can approach the moon. (The majority of objects in the solar system would approach the moon at much greater speeds.) In 20 seconds, an object at that speed would move a distance about 10% of the FOV.

None of the above explanations are plausible since no significant motion relative to the moon was detected in the video.

Two other possibilities were considered next:

- Asteroid -- The motion of an asteroid would be hard to detect over such a short period of time (over a 20 second period, an 8 arc second displacement would be typical, which is only about 3% of the FOV). However in checking with the Near-Earth Asteroid Tracking program[7] it was confirmed that ULO-092196 was not an asteroid.
- Object in lunar orbit -- If the object were in lunar orbit, there are two times in which it would appear (to an Earth-based observer) to be stationary relative to the moon: the point

[7] http://neat.jpl.nasa.gov/

in the orbit where the object is moving directly toward the Earth, and the point where it is moving directly away. These two points would be close to the positions where the object was farthest from the moon's limb and are the only places where the object would likely be seen at all.

That the object was orbiting the moon seemed a possibility. The only problem with the orbiter hypothesis is that the chances of the moon capturing an asteroid are small. It's low gravity makes captures rare, and orbits quickly degrade (within about a year) due to the gravitational anomalies associated with mascons (large concentrations of unusually high density material located below lunar maria).

Assuming the object was at the apparent 45-mile altitude above the moon in the video image and had a two-hour orbital period, there would only be a period of 11 minutes between when the object emerged from behind the moon and when it moved across the moon's disk where it would be lost in the direct moon light. Within that 11-minute time span, the object might be visible for only a few seconds at its farthest distance from the moon's limb before it became lost in the halo (Figure 2). Such an object might therefore appear suddenly and disappear just as suddenly after the 20-second period that the object was observed.

The ULO-092196 event occurred two years after the Clementine mission, and a year before Lunar Prospector. No known man-made objects were in the vicinity of the moon, or in lunar orbit during this period. More than five years later, the identity of this object remains a mystery.

Francis Ridge has over forty years of experience as a UFO investigator, and in SETI-related research activities. He started in 1960 with the National Investigations Committee on Aerial Phenomena. He then worked as a field investigator for the J. Allen Hynek Center for UFO Studies. In his book, *Regional Encounters: The FC Files*, Mr. Ridge documents close encounters in the mid-west from before the turn of the century to the present. In the summer of 1995 he organized the Lunascan project to document and record LTP and other anomalies observed near the Moon.

Lan Fleming has a Bachelor of Science degree in Metallurgical Engineering from the Illinois Institute of Technology, and a Master of Science degree in Computer Science from DePaul University. He was a Computer Systems Analyst in the Artificial Intelligence Department at Southwest Research Institute from 1987-1990. Since 1990 he has been a Computer Systems Specialist at the Intelligent Systems Laboratory at Johnson Space Center, Houston, initially for Lockheed Engineering and Science Company and currently for Hernandez Engineering, Inc. His work involves the design and implementation of software for modeling and simulating space craft systems, primarily life support systems.