

An Experimental Analysis of the Marfa Lights

Progress Report submitted by:

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10 December 2005

Introduction

Between 10 and 14 May 2004 a dozen members of the UT Dallas chapter of the Society of Physics Students conducted a series of experiments in order to determine the origin of mysterious lights commonly seen near the town of Marfa, TX (30.3° N, 104.0° W). The Marfa mystery lights are a phenomenon that occurs after dusk outside the town of Marfa, Texas where lights are observed to appear, disappear, and move about seemingly at random on the horizon. The location of the mystery lights viewing area to Marfa, TX is illustrated in figure 1.

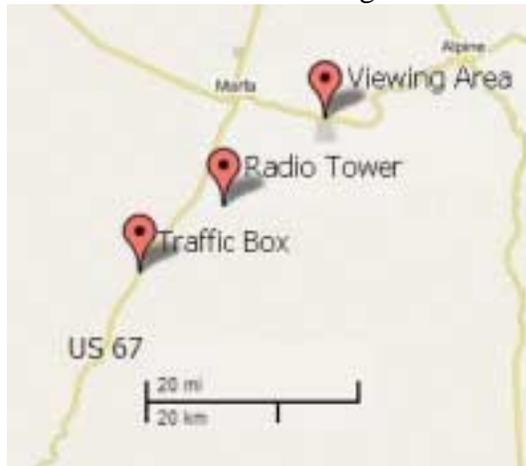


Figure 1. Map showing the location of the mystery lights viewing area, a lighted radio tower, and the traffic monitoring station relative to the town of Marfa, TX. The mystery lights appear along the line connecting the viewing area and the radio tower.

Popular lore has it that the lights are completely unexplained; the popular skeptical explanation is that the lights are distant automobile headlights. It is the finding of the research expedition that all the lights reliably observed during the experiment were car headlights.

Experiment Description

A host of experiments was planned for the expedition, but three proved to be the most fruitful: 1) Video records of mystery light patterns, 2) US Highway 67 traffic volume measurements, and 3) Line-of-sight confirmation of mystery light location. For experiment 1) two video cameras were setup at the official Marfa Mystery Lights viewing area ($30^\circ 16.502'$ N, $103^\circ 52.975'$ W) east of Marfa on US HW 67 to film the lights over the course of several nights. The purpose of the video experiment is to determine if there are observable patterns in the mystery lights. Experiment 2) required the instillation of a traffic volume monitoring box ($30^\circ 4.036'$ N, $104^\circ 10.423'$ W) on US HW 67 south of Marfa between Marfa and Presidio, TX. The idea was to determine if there was a correlation between the number of mystery lights observed at any time and the volume of traffic on US 67. Experiment 3) was an attempt to observe our chase vehicle on US 67 south of Marfa from the Mystery lights

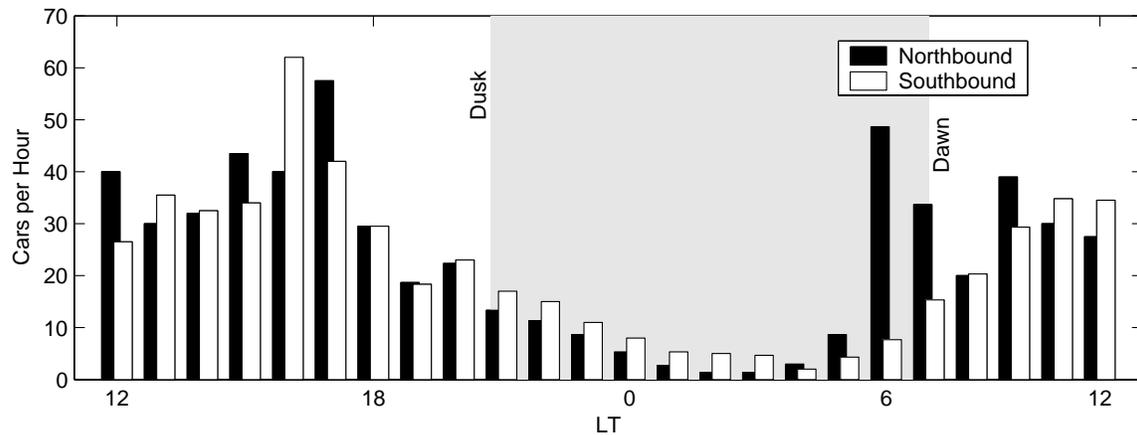


Figure 2. Traffic volume over a three day period along US HW 67 between Marfa and Presidio, TX is shown here in 1 hour bins. Traffic volume decreases after dusk just as the number of observed mystery lights

viewing area. Radio contact between the viewing area and the chase vehicle was established and a series of lights and lasers were flashed by both parties to determine the location of the chase vehicle relative to the mystery lights.

Observations

Video Records: Video from the two cameras was digitized and transferred to a PC for analysis. When these videos are viewed in real-time the mystery lights are observed to appear out of the darkness, twinkle, and disappear seemingly at random. When these same videos are viewed at very high speed the lights move from left to right (south to north) along a very well defined path. Most lights appear and disappear at very specific locations on the horizon. A flashing radio tower (30° 9.431' N, 104° 2.506' W) visible in the frame was used as a reference point when the camera direction was changed. A sample video of this is available on the web at http://utdallas.edu/~roddy/Marfa_Lights/lightvid.wmv

Traffic Volume: Data from the traffic monitoring device was transferred to PC for analysis and is displayed in figure 2. Morning and evening rush

hour traffic is identifiable in the data set as well as a steady decrease in volume from 16:00 to 04:00. It is interesting to note that the majority of traffic on HW 67 is into Marfa in the morning and out of Marfa in the evening.

Chase Car: After the chase vehicle parked on the side of HW 67 south of Marfa and established radio contact with the observation team, the flashing headlights of the chase vehicle were easily identifiable. The chase vehicle's headlights and another flashing light appeared in the exact same area on the horizon as the mystery lights were observed and appeared to be comparable in magnitude and color to the mystery lights. Members of the chase team observing the mystery lights viewing area with binoculars could not identify car headlights, but did observe a 1 mW laser that was being shone towards their location.

Discussion

The motion of the mystery lights seen in the high speed video indicates that the lights, whatever their origin, all behave in a very regular way. The observed regular motion of lights who's numbers diminish as night progresses is

most easily explained by the steadily decreasing flow of traffic north on US 67. All of the lights observed from the viewing area occurred along the line of sight to the radio tower east of US 67 (figure 1) indicating that US 67 is a possible candidate for the lights' origin.

While the number, motion, and location of the mystery lights are all compatible with car headlights on US 67, it is the successful line-of-sight confirmation made by the chase vehicle that proves that the highway is indeed visible from the viewing area. Mystery lights were observed moving through the chase vehicle location while, at that same time, the chase vehicle reported being passed by another car. The chase car observed no mystery lights from their position, only the headlights of other cars.

Summary and Conclusions

All of the mystery lights observed by this group on the nights of 11 and 13 May 2005 can be reliably attributed to automobile headlights traveling along US 67 between Marfa and Presidio, TX.

Future Work

Data analysis is ongoing and proceeds as student time and interest becomes available. We have yet to find historical accounts of Marfa mystery light observations, but continue searching.

Acknowledgements

This research was graciously supported by contributions from faculty, students, and a grant from Schlumberger corp.