“Rocket Photography 1999”

by

Stephen D. Roberson

I launched my first rocket camera back in the 70's. An old Estes "Camroc" on a D-powered booster of my own design. I never got any recognizable pictures back from it in several flights. Later, I began working with high power rocketry and made my Tripoli certification flight with a rocket carrying a 35mm camera. That was in 1990 and I've been using the same basic system ever since.

Articles detailing this camera appeared in the December 1991 Tripolitan, and the March/April 1992 and August 1993 American Spacemodeling. Since then I have kept flying through several moves. I've amassed a huge collection of photographs from over 50 flights. A spread of my photos in the June 1999 High Power Rocketry sparked my interest in publishing again. It is about time for an update on this project.

The main requirements for my rocket cameras are that they must have an automatic winder, no auto-focus, and a square, easily mounted shape. I wanted a system that required no modifications to the camera, and no electronics, either.

When I first started out I used a variety of cheap point and shoot cameras, mainly Vivitar brand. These are no longer made but have been replaced by other, equally cheap models. Most of them utilized a mechanical shutter that gave a speed of around $1/100^{th}$ of a second. The really isn't fast enough. I did get a few great pictures but most were blurred. Either the rocket rolled due to misaligned fins, or the camera was swinging under the parachute.

Photographic technology never stands still, and new features are added to electronic cameras all the time. The main one that works against rocket photography is auto focus. You need to pick a camera in which the auto focus can be turned off, locked, or "fooled" into setting itself at infinity. Likewise, a zoom lens is a waste of money on a rocket camera.

One item on point and shoot cameras that has greatly improved is the shutter speeds. I was side tracked for a couple of years working with a rocket called "Photon" which was big enough to carry a full-sized 35mm SLR camera, a Canon EOS Rebel. All of this was done just to get a better shutter speed. Many years later, I find that I get just as good a picture with my current camera, the Olympus Stylus. It has a speed of up to $1/400^{th}$ of a second, and placing a bit of tape over the auto focus window forces it to set to infinity.

I've tried lots of different kinds of film, but I keep going back to Kodacolor 400 print film. One of the advantages of print film is that you can get it developed in an hour. This is great if you are like me and in a hurry to see your results. Slide film might provide better color but the faster ones tend to be grainy. I've been scanning my negatives and prints for several years now and the grain makes a big difference if you want to blow up a photo.

Some people ask me why I don't go with a digital camera. Well, there are several reasons. First off, they are expensive. The shapes tend to be a little strange compared to other cameras, and might make it hard to mount in a rocket. Resolution and shutter speeds are adequate but the cycle time between shots is long; you would be lucky to get one shot every 4 seconds. As I write this, I am getting used to my first digital camera, a Canon A50, and as I gain experience with it perhaps my opinions will change. This area of photography is improving very fast and will probably replace film photography, at least for consumers, in a few years.

The mechanism I use to operate the camera has remained basically unchanged since my first flight. Check out the first series of pictures. This camera holder has been modified many times and looks a bit ratty, but it still works. The wooden frame holds the camera in the payload section. A small gear motor turns a cam, which works a lever, which repeatedly presses the shutter button. The motor is powered by a 9 volt battery.

The gear motor is surplus, from a used electronics store. You will have to shop a bit to find your own. I've used 3 or 4 different ones and always buy spares. They tend to get wrecked in a crash. The cam and lever were made in a small machine shop using a lathe and drill press, but you should be able to make them with hand tools.

To start the motor I use a headphone jack, the kind with internal contacts. Originally I mounted this jack in a housing on the outside of the rocket and tied the plug to the pad. This worked well, but sometimes the string burned in two. Many times the housing was damaged on landing. So I decided to move the jack inside the rocket and hang a lead weight from it. The acceleration of the rocket yanks the plug out of the jack. To keep this from happening when handling the rocket before flight, a small screw is inserted through the body tube, supporting the weight. In these pictures, a small button is visible next to the jack. Pressing this shuts off the gear motor after the flight. I wanted to add another push button to test the motor, but ran out of room.

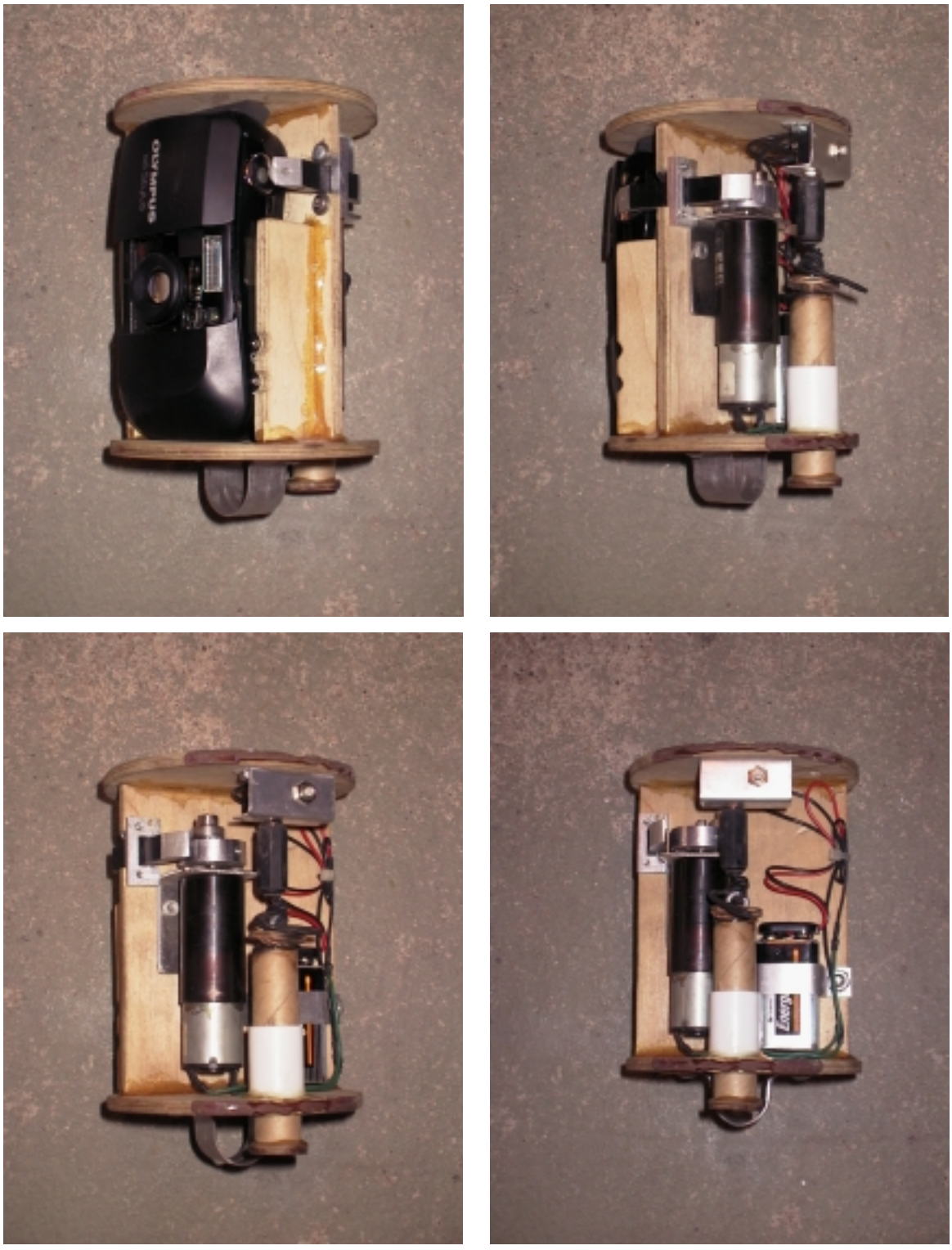
I want to clean up this design. Maybe build it out of G10 fiberglass. I'll make room for all the features I want, and also develop a better "G" switch, but until then this unit does a great job.

On my flights the camera lens always points out a hole in the side of the rocket. It is common practice to mount a diagonal mirror on the outside of the rocket, looking down. This provides a spectacular view of the exhaust and the ground dropping away. Videos taken from this perspective are terrific. However, mounting a mirror like this adds lots of drag and can effect stability. When the parachute opens, the camera is stuck pointing at the sky. With my system, I just turn the pictures over. Much simpler. I've noticed that most of my photos show the ground, too. I have no explanation for this except that maybe the heavy side always faces that way.

The cam keeps tripping the shutter button throughout the flight, and afterward, too. Be prepared to turn it off when you collect the rocket. All 36 exposures will be used in a single flight. After the film is expended, your camera may ignore the shutter button, or it may keep trying to take pictures on empty. You may wear down the camera battery as well if you don't recover the rocket quickly.

I've crashed several cameras, including this one, and usually they come out in pieces. Once I augured a Stylus into a smoking hole in the ground, and once I had a K550 leak out the front and slam everything into the ground. It was not pretty. But I got back on that horse and bought another camera. The current one will probably come to a bad end, too. Although, since I got my Level 3 certification my flights are getting higher and higher so the next casualty will probably be through a lost rocket. I always put my name and address inside for every flight.

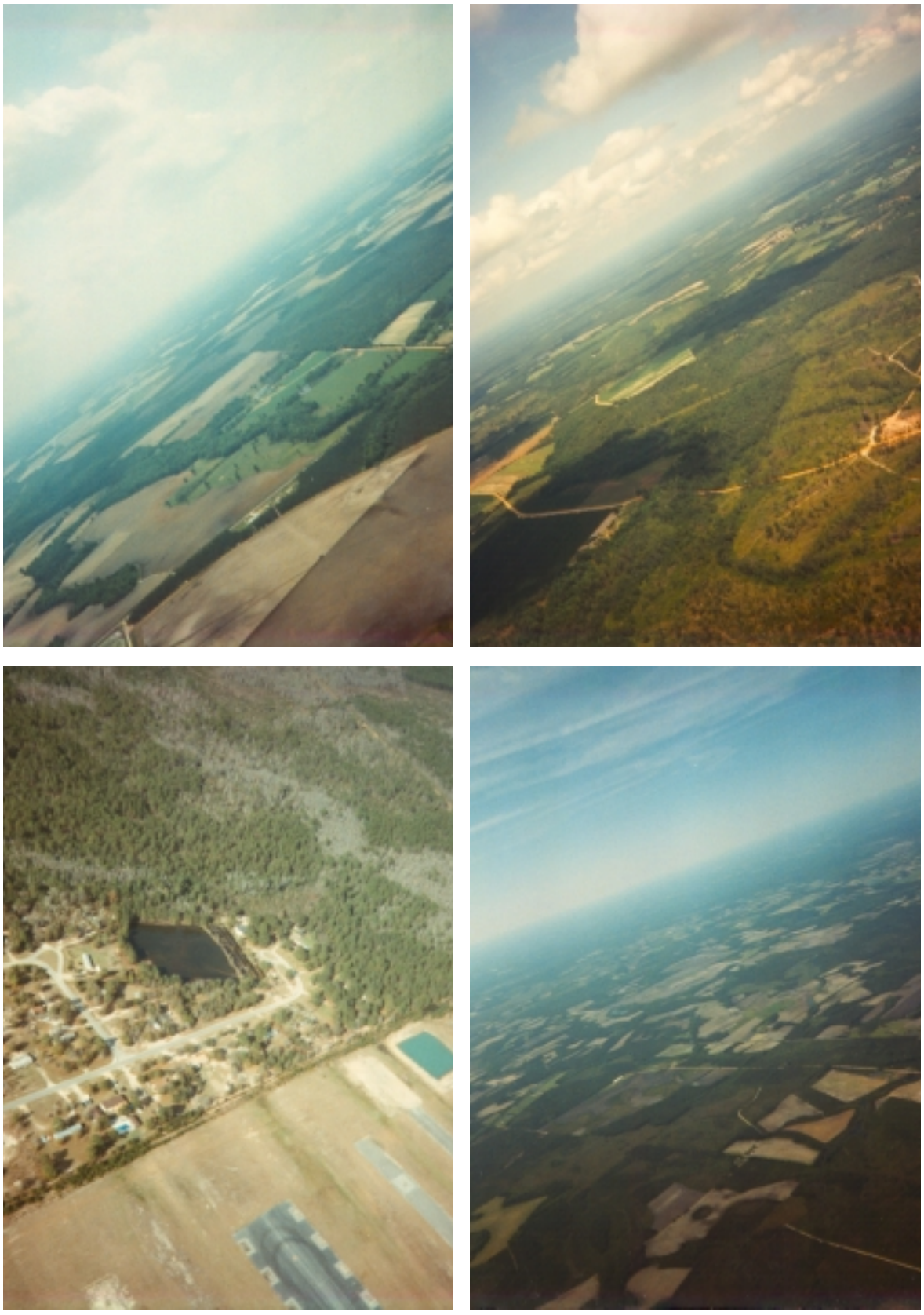
I hope this article is enough to get you started. Rocket Photography has made this hobby much more rewarding for me. It has led me to many friendships, magazine articles, cover photos and bigger and better rockets. May it do the same for you. The rest of this document contains a gallery of my favorite aerial photos. Enjoy!



Various views of the rocket camera showing the gear motor, cam, and lever. The cardboard tube in the center is a lead weight for pulling the plug from the headphone jack.




These photos were taken while I lived in Mesa, AZ and flew with G. Harry Stine and the Superstition Spacemodeling Society. (1990-1991)



When I moved to Savannah, GA in 1991 I joined the Coastal Rocketry Association, which had several launch sites in south Georgia, including the “grass farm.” (1991-1994)

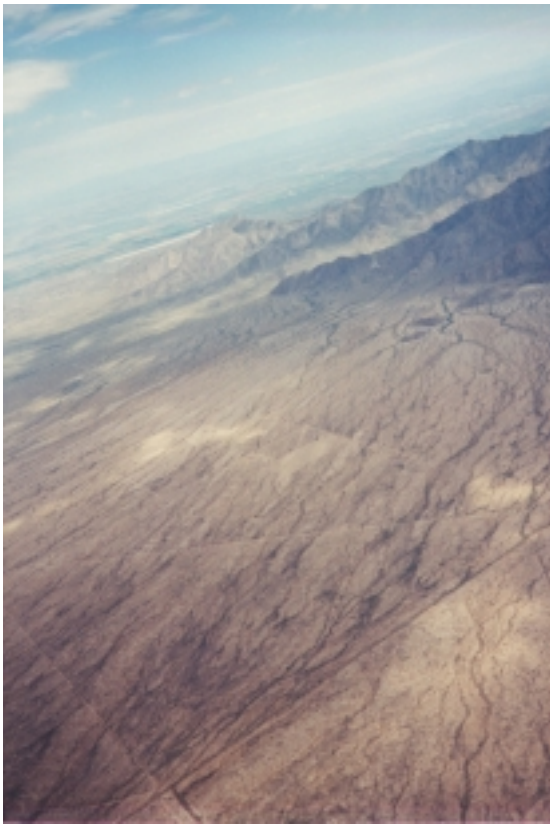
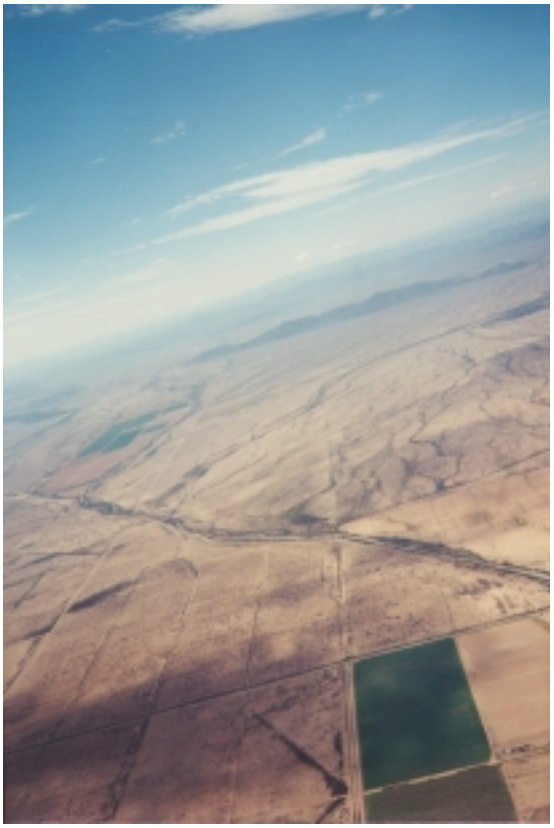
A move out to Los Angeles in 1994 led me to fly with Lucerne Test Range. This shot from El Dorado lake at 7000' shows Boulder City, NV and Lake Mead.

Another shot from El Dorado shows the flight line at Springfest '96, along with some model airplane buffs at the middle left.

Being out west has its advantages, such as returning to my favorite launch site, Lucerne Lake, CA. This view is to the west toward Bear Valley.

This shot of the town of Lucerne from around 6500' shows the mountains way south, beyond Big Bear lake. I was flying with the Rocketry Organization of California. (1994-1997).



In 1997 I came full circle with a move back to Mesa, AZ. Now I fly with AHPRA, the Arizona High Power Rocketry Association, at their site in Rainbow Valley, AZ. So far I've had one camera flight there, but all the pictures look just great.

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