Video Rocket

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Project Description: For a senior electrical engineering design project at California State University Long Beach, a transmitter and receiver shall be designed, built, and implimented for real time video transmission from a solid fuel rocket. The design and building of the vehicle is included in the project. The rocket will utilize a reloadable aerotech K550 as its propulsion. A PK6 altimeter kit will be used as it's method of parachute deployment.

Project Status: The engine mounting tube has been fabricated and attached into the aeroframe. Payload bay is partially completed. PK6 altimeter kit has been assembled and successfully tested. Fins have been cut and have been attached into the aeroframe. Bulkhead have been screwed in, and shock chord attached. We decided to go with DSB-SC AM as our type of signal modulation. To accomplish this, we are going to use a MC1496 chip for modulation in the transmitter. For the receiver, we are going to build a costas loop from a phase lock loop chip and a couple of the MC1496 chips to split the carrier from the incoming AM signal to be multiplied once again in a MC1496 chip for demodulation. We are also in the process of designing the amplifier output stage of the transmitter. The rocket is now fully painted. The 12 volt power source has been mounted in the payload bay. The camera housing is completed. We are currently researching upconversion and downconversion, since we are going to modulate/demodulate at 4Mhz in the MC1496 chip, we need to up/down convert the signal in the TX/RX to TX/RX the signal on a 445Mhz carrier. The RF oscillator is still in the design stages, however the amplitude modulating circuit has been fabricated and tested with a 3MHz carrier, the circuit has proven itself with good carrier suppression. Rocket is ready for test flight (w/out video camera)

Well, the launch did not go to well. For starters, the PK6 altimeter was malfunctioning (was working fine during lab testing), and did not work. So, we changed over to a passive recovery system. Once we finally got the rocket in the air, the fins were ripped off due to the high acceleration sending the rocket into an unstable tumble. So this project is put on hold for now. We are still going to build the video TX & RX, but not fly it in a rocket yet. Probably will rebuild the rocket over the summer.

Overall weight: ~6.5 lbs
Estimated altitude (Simulated): 7000 ft
Estimated max velocity (Simulated): 988ft/sec
Estimated max acceleration (Simulated): 623.29 ft/sec/sec
Estimated time to apogee (Simulated): 18.41 sec
Peak Thrust: ~200lbs
Avg Thrust: ~150lbs
Burn Time: ~3.0 seconds

Launch date (w/out video camera): Sunday March 14, 2004
Location: Mojave Test Area

Tentative launch date (w/ video camera): Saturday April 10, 2004
Location: Mojave Test Area
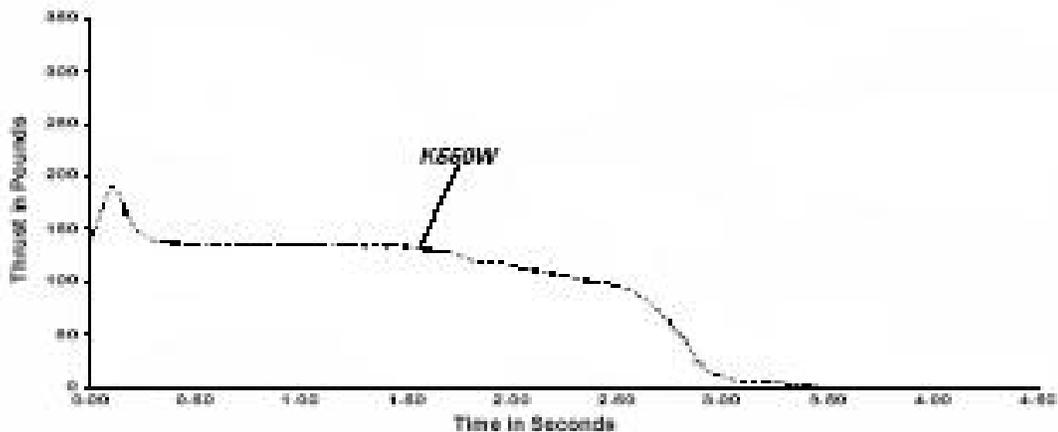
Ready for launch!

Beautiful
takeoff!

Making final
preparations
on the rocket.

Loading rocket into launch
tower.

Manuel adjusting
ejection controller
just before mounting.

Rocket painted and
nearly completed.

Manuel testing out
the 58" parachute.

Onboard video camera
and it's housing.

Drilling the bulkhead
mount.

Manuel standing next
to partially finished
rocket.

Engine Tube with
spacing rings before
insertion into the
aeroframe.

Epoxing the last fin
into the rocket.

Business end of the
video rocket.

Manuel and Hismar
cutting the fins.

Mike fitting
aeroframe, Hismar in
background sanding
centering rings.

Mike soldering leads
to the ejection
controller onto the
foward bulkhead.