The Civilian Space eXploration Team

GoFast Rocket Maximum Altitude Verification

March 8, 2005

The Civilian Space eXploration Team's GoFast rocket reached an official altitude of 72 miles, making it the first Civilian and Amateur rocket to successfully exceed the 62 mile (100km) international definition of space. Launched on May 17th 2004 at the Black Rock Desert in Nevada at 11:12 am, the GoFast rocket officially entered space at 11:13:41 am PDT 101 seconds into flight. The maximum altitude was determined by flight reconstruction from data measurements stored on two redundant on-board flight recorders. The official altitude of 72 miles was derived from a high precision 3-axis accelerometer (Crossbow, CXL25LP3) and 3-axis magnetometer (Crossbow, CXM113). Two back-up accelerometers provided additional sources confirming the vehicle exceeded 62 miles.

GoFast Rocket Launched Into Space May 17th 2004

At liftoff the motor produced 16,000 lbs of thrust and cleared the launch tower accelerating at over 23 g's. After tower clear and a predicted wind induced yaw maneuver, the vehicle flight performance was nominal and on a nearly straight trajectory as recorded by the onboard magnetometer. At 10.5 seconds into the flight and with the motor still burning and producing 1,500 lbs of thrust the vehicle hit a top speed of 3,420 mph and just over Mach 5 setting a new amateur speed record. Motor burnout was nominal at 13.4 seconds at an altitude of 49,000 feet with the rocket plume exhaust still visible by ground observers. The canted fins produced a

burnout spin rate of 8 revolutions per second and put the rocket on a straight trajectory towards space.

At 158 seconds from liftoff the rocket reached a maximum altitude of 379,900 feet (115.8 km or 72 miles) and began its weightless decent back towards earth. At 240 seconds and still over 250,000 feet in altitude the primary onboard computer sent a signal to the separation system that immediately separated the payload with the flight recorders from the booster section. Both parachutes, one on the booster and the other on the payload section deployed nominally. Decelerating at a peak of 5.5 g's at 160,000 feet both objects became subsonic at approximately 110,000 ft where both parachutes were fully deployed. At 850 seconds the payload section impacted on the side of a mountain at 62 mph nose first 20 miles from the launch site. During the booster's decent at approximately 50,000 ft the recovery system malfunctioned for unknown reasons sending the 211 pound inert booster nose first, impacting the ground at a terminal velocity of 511 mph.

GoFast Payload and Flight Recorders Recovered May 18th 2004

The Federal Aviation Administration's Office of Space Transportation AST-200 Licensing and Safety Division conducted an extensive analysis of the recovered flight data and provided CSXT with this statement on February 28, 2005:

"On Monday, 17 May 2004, the Civilian Space Exploration Team (CSXT) launched the GoFast rocket at 11:12 am PDT from the Black Rock Desert. The GoFast rocket was an

amateur rocket and therefore did not require a license to launch. However, a waiver to enter national airspace was required and was granted. Two FAA/AST safety inspectors were present for this launch to ensure that conditions of the waiver were met. While AST did not independently verify the maximum altitude attained by the rocket (as tracking radar was not present), post flight analysis based on CSXT's accelerometer data concurs with CSXT's stated maximum altitude of roughly 72 miles. AST's post flight results were generally within 5% of those of CSXT. Public safety was maintained as both sections of the rocket impacted harmlessly, roughly 20 miles from the launch site."

The Civilian Space eXploration Team would like to thank the office of AST-200 for their significant contributions in assisting public safety assurance and facilitation of approvals for this flight, and previous space launch attempts spanning nearly 7 years of cooperative effort. We would also like to thank the many sponsors and supporters that have assisted in this endeavor over the years, including Fuscient LLC and Go Fast Sports Inc for their unwavering support throughout the GoFast rocket development, launch, and recovery.

CSXT has made exclusive arrangements to publish an article containing details of the GoFast rocket design, flight data, and results in eXtreme Rocketry magazine later this year.

Jerry L. Larson
Vice President, Launch Conductor
Civilian Space eXploration Team

Photos courtesy of Go Fast Sports Inc. (www.gofastsports.com) and Billy Robin McFarland

The Civilian Space eXploration Team May 16th 2004