

**Syracuse Rocket Club  
August 23, 2014**

**TARC Rules Contest**

Our SRC August Contest will follow the rules of the 2014 Team America Rocketry Challenge as amended and condensed below.

**1. ROCKET REQUIREMENTS**

Rockets may be any dimension, but **must not exceed 650 grams (23 ounces) gross weight at liftoff**. They may not be commercially-made kits designed to carry egg payloads with the only modification being the addition of an altimeter compartment. They must have only one stage. They must be powered only by **commercially-made model rocket motors of "F" or lower power class** that are certified for use by NAR or Tripoli.

Any number of motors may be used, but the motors used must not contain a combined total of more than 80 Newton-seconds of total impulse based on the total impulse ratings in the NAR list. Rockets must not contain any pyrotechnic charges except those provided as part of the basic commercially-made rocket motor used for the flight, and these must be used in the manner prescribed in the instructions for that motor. **The entire rocket must return to the ground safely with all parts connected together using two separate and deployed parachutes of the same size as its sole recovery system.** The outer edges of the canopies of the two parachutes shall not be separated from each other more than one inch at any point when one is laid on top of the other for pre-flight measurement by an NAR official. Both parachutes do not need to fully deploy and inflate in order for a flight to be qualified, but both must come out of the rocket body and neither can be deliberately packed in such a way that it cannot inflate.

**2. PAYLOAD**

Rockets **must contain and completely enclose two raw hen's eggs** of 57 to 63 grams weight and a diameter of 45 millimeters or less, and must return these from the flight without any cracks or other external damage. The eggs will be issued by event officials. Rockets must be allowed to land at the end of flight without human intervention (catching) and will be disqualified if there is such intervention. The eggs and altimeter must be removed from the rocket at the end of the flight in the presence of the contest official and presented to that official, who will inspect the eggs for damage and will read the altimeter score. All coatings, padding, or other materials used to protect the eggs must be removed by the contestant prior to this inspection. Any external damage to either of the eggs noted after flight is disqualifying.

**3. DURATION SCORING**

Scores for each flight shall be based on total flight duration of the rocket, measured from first motion at liftoff from the launch pad until the moment of landing or until the rocket can no longer be seen due to distance or to an obstacle. Times will be measured independently by two people (not the contestant whose flight is being timed), using separate electronic stopwatches that are accurate to 0.01 seconds. The official duration will be the average of the two times, rounded to the nearest 0.01 second. If one stopwatch malfunctions, the remaining single time will be used. **The flight duration goal is a range of 48 to 50 seconds.** Flights with duration in the range of 48 to

50 seconds get a perfect duration score of zero. Duration scores for flights with duration below 48 seconds will be computed by taking the absolute difference between 48 seconds and the measured average flight duration to the nearest 1/100 second and **multiplying this by 4**. Duration scores for flights with durations above 50 seconds will be computed by taking the absolute difference between 50 seconds and the measured average flight duration to the nearest 1/100 second and **multiplying this by 4**. These duration scores are always a positive number or zero.

#### 4. ALTITUDE SCORING

Rockets must contain one and only one commercial electronic altimeter. The altimeter must be installed and pressure equalization port provided in accordance with the altimeter manufacturer's instructions. The altimeter must be inspected by the contest official both before and after the flight, and may not be modified in any manner. The altimeter must be confirmed by this official before flight to not have been triggered and to be ready for flight. The altitude of the rocket as recorded by this altimeter will be the sole basis for judging the altitude score and this altimeter may be used for no other purpose. **The altitude score for each flight will be the absolute difference in feet between the 825 feet (251 meters) target altitude and the altimeter-reported actual flight altitude in feet (always a positive number or zero).**

#### 5. FLIGHTS

**Contestant must fly two and only two contest flights.** A contest flight attempt must be declared to the contest official before the rocket's motor(s) are ignited. Once an attempt is declared, the results of that flight must be recorded. A rocket that departs the launch pad under rocket power is considered to have made a flight, even if all motors do not ignite. If a rocket experiences a rare "catastrophic" malfunction of a rocket motor (as determined by the contest official observer), a replacement flight may be made, with a replacement vehicle if necessary. Flights which are otherwise fully safe and qualified but which result in no altimeter reading despite correct usage of the altimeter, or that result in a reading of greater than zero but less than 50 feet despite a nominal flight will be counted as "no flight" and may be reflown without penalty.

#### 6. SAFE RECOVERY

The rocket must return to earth at a velocity that presents no hazard. Any entry which has any structural part (including but not limited to a fin or an expended engine casing) separate and fall to earth not connected to the rest of the rocket, or that falls at a velocity that is judged by an event official to be hazardous due to recovery system absence, insufficiency, or malfunction, will be disqualified.

#### 7. RETURNS

**Return of the entire rocket is required** by the deadline time established at the beginning of the day's flying. Entries which have parts (including but not limited to expended engine casings) not returned after flight shall be disqualified. If the rocket cannot be returned after an otherwise safe and stable flight because it landed in a spot from which recovery would be hazardous (as determined by the contest official), a replacement vehicle may be substituted for a replacement flight.

## 8. LAUNCH SYSTEMS

Contestants may use the club launch system with a 1-inch rail or 1/4-inch diameter rod.

## 9. FLIGHT CONTROL

Rockets may not use an externally-generated signal such as radio or computer control (except GPS navigation satellite signals) for any purpose after liftoff. They may use autonomous onboard control systems to control any aspect of flight as long as these do not involve the use of pyrotechnic charges. Any onboard flight-control electronics must use only commercially-made altitude and/or timing devices that are available to all TARC participants.

## 10. PLACES

Places in the contest will be determined on the basis of the sum of the altitude and duration scores for two contest flights.