



UKAYRoC Challenge Rules 2012

- 1 SAFETY:** All rockets must be built and flown in accordance with the Safety Code of the UK Rocketry Association (UKRA) <http://www.ukra.org.uk/node/33>. Rockets flown at the UK Finals must have previously flown successfully. They will be inspected before launch and observed during flight by an event official, whose judgment on their compliance with the Safety Code and with these rules will be final. Teams are encouraged to consult with designated UKAYRoC officials who are responsible for rocket flying at the UK Finals in good time to resolve any questions about design or flight safety, about the Safety Code, or about these rules.
- 2 TEAMS:** No more than three teams may be entered by any sponsoring organisation. The application for a team must come from a single school or a single UK incorporated non-profit youth organisation (excluding UKRA or any other rocket club or organisation). Team members must be students who are currently enrolled in years 7 through 13 in a UK school/college. Arrangements can be made for students who are part of home school networks, please contact the helpdesk for further information. Teams may have members from other schools or other organisations and may obtain financing from any source, not limited to their sponsoring organisation. Teams must be supervised by an adult approved by the principal of the sponsoring school, or by an officially-appointed adult leader of their sponsoring youth organisation. Minimum team size is three students and maximum is five students. Each student member must make a significant contribution to the designing, building, and/or launching of the team's entry. No part of any of these may be done by any adult, by a company (except by the sale of standard off-the-shelf components available to the general public, but not kits or designs for the event), or by any person not a student on that team. No student may be on more than one team. The supervising teacher/adult may supervise more than one team. UKAYRoC is open to the first 100 teams that submit a completed application, including payment, postmarked no later than 16th December 2011.
- 3 ROCKET REQUIREMENTS:** Rockets may be any size, 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 listed on the UKAYRoC Certified Motor List posted on the UKAYRoC website and provided in the UKAYRoC Team Handbook. 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 UKAYRoC Certified Motor 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 portion of the rocket containing the eggs and altimeter must return to the ground using a parachute recovery system. The rest of the rocket may be attached to the portion of the rocket containing the eggs, altimeter, and this parachute, or may return separately with a different recovery device of any size as long as it does so safely.
- 4 PAYLOAD:** Rockets must contain and completely enclose two raw hen's eggs of 57 to 63 grams weight, and must return these from the flight without any cracks or other external damage. Eggs will be issued to the teams by event officials during finals, but teams must provide their own eggs for their qualifying flights. The rocket must be allowed to land at the end of its flight without human intervention (catching) and will be disqualified if there is such intervention. The eggs must be removed from the rocket at the end of the flight in the presence of a designated UKAYRoC official observer and presented to that official, who will inspect them for any damage. Any external damage to one or both eggs will result in disqualification.
- 5 DURATION SCORING:** Scores shall be based on total flight duration of the portion of the rocket containing the eggs and altimeter, measured from first motion at lift off 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 must be measured independently by two people not on the team, one of whom is the official UKAYRoC observer, 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 43 to 47 seconds. Flights with duration in the range of 43 to 47 seconds get a perfect duration score of zero. Duration scores for flights with duration below 43 seconds will be computed by taking the absolute difference between 43 seconds and the measured average flight duration to the nearest 1/100 second and multiplying this by 3. Duration scores for flights with durations above 47 seconds will be computed by taking the absolute difference between 47 seconds and the measured average flight duration to the nearest 1/100 second and multiplying this by 3. These duration scores are always a positive number or zero.

- 6 ALTITUDE SCORING:** Rockets must contain one electronic altimeter of the specific types approved for use in the UKAYRoC event (Perfectflite ALT15K/WD or Perfectflite APRA), in a compartment that is properly vented to the atmosphere. The altimeter must be inspected by a UKAYRoC official both before and after the flight, and may not be modified in any manner. The altimeter must be confirmed by this official to have reset to zero before flight. The altitude of the portion of the rocket containing the eggs, 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 will be the absolute difference between 800 feet (244 metres) and the altimeter-reported altitude in feet (this difference is always a positive number or zero).
- 7 FLIGHTS:** Team members cannot be changed after the Qualification Flight Form has been received by the UKAYRoC Helpdesk. Only team members on record with UKAYRoC with valid parent consent forms are eligible to receive prizes. Only one flight is allowed per team at the UK Finals, except as specifically noted in these rules. In order to be eligible for the UK Finals, a team is required to fly a qualifying flight observed in person by a UKAYRoC official observer (unrelated to any team members and not a paid employee of their school or member of their youth group) and have the results of that flight electronically scanned and emailed to the UKAYRoC Helpdesk email address helpdesk@ukayroc.org.uk or faxed to the UKAYRoC Helpdesk on 0845 600 3612 before 12.00pm (noon) on the 2nd April 2012. Teams may make as many official qualification flight attempts as time and resources allow. More than one qualification flight is not required if the team is satisfied with the results of their first one. A qualification flight attempt must be declared to the UKAYRoC official observer before the rocket's motor(s) are ignited. 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 a UKAYRoC 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 an altimeter reading of greater than zero feet but less than 50 feet will be counted as "no flight" due to false triggering of the altimeter and may be reflown without penalty.
- 8 QUALIFICATION:** Only the official Qualification Flight Form will be accepted as proof of the results of a qualifying flight and you may print or copy as many official forms as you need. The official Qualification Flight Form can be scanned electronically and emailed to the UKAYRoC Helpdesk, helpdesk@ukayroc.org.uk or it can also be faxed to the UKAYRoC Helpdesk on 0845 600 3612 by 12:00pm (noon) on the 2nd April 2012. The receipt of an official Qualification Flight Form at the UKAYRoC Helpdesk will be considered to be the final submission by a team to the Rocketry Challenge. It is the team's responsibility to make sure that any email has been received by the UKAYRoC Helpdesk. This can be achieved by the following:

 - an official email from the Helpdesk, acknowledging receipt of the form (it is advisable to send a follow-up email specifically asking for acknowledgement).
 - a read-receipt email, but not a delivery receipt email.



UKAYRoC will not be held responsible for emails that have been misaddressed or lost in the system, or if the electronic image of the form is unreadable.

Once an official Qualification Flight Form has been received by the UKAYRoC Helpdesk no further Qualification Flight Forms will be accepted for that team. As teams may make as many qualification flights as time and resources allow, there is no need to send unsuccessful qualification flight details to the UKAYRoC Helpdesk. As soon as we receive your qualifying score, "Qualification Score Received" will appear under your team information on the "Registered Teams" page at www.ukayroc.org.uk. The top scoring team from each of the four UK nations, England, Scotland, Northern Ireland and Wales, will automatically secure a place at the finals along with the top scoring 16 teams from throughout the UK. Each team will be notified no later than the 6th April 2012, and invited to participate in the UK Finals to be held in early May 2012. The date and location of the UK Finals will be advised to Registered Teams in due course.

- 9 SAFE RECOVERY:** Each part of the rocket must either contain a recovery device or be designed to glide, tumble unstably, or otherwise return to earth at a velocity that presents no hazard. Any entry which has a major part (including but not limited an expended engine casing) land without a recovery system (gliding/tumbling components are considered to have a system), or at a velocity that is judged by an event official to be hazardous, due to recovery system absence, insufficiency, or malfunction, will be disqualified.
- 10 RETURNS:** Return of the portion of the flight vehicle containing the eggs and the altimeter is required once you have collected your rocket post launch. If this portion 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 a UKAYRoC official observer), a second replacement vehicle may be substituted for a replacement flight. Return of the other portions of the rocket is required only if there is a question from the UKAYRoC official observer concerning the safe operation of the vehicle (e.g. a question as to whether the vehicle ejected a part that landed in an unsafe manner). An entry which has any such portion not returned when its return is required for this safety inspection shall be disqualified.
- 11 LAUNCH SYSTEMS:** Teams may use the electrical launch system and the launch pads (with 1.5m long, 6mm diameter rods) provided by the event officials at the UK Finals, or may provide their own system. Systems provided by teams for their own use must be inspected for safety by an event official before use, and must provide at least 1.5m of rigid guidance, including use of a rod diameter of at least 6mm, if a rod is used. All launches will be controlled by the event Range Safety Officer and must occur from the ground.
- 12 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 UKAYRoC participants.
- 13 PLACES:** Places in the UK Finals of the competition will be determined on the basis of the sum of the altitude and duration scores above, the lowest combined score wins. Entries which are disqualified for reasons noted in these rules may not receive a place. Ties will result in pooling and even splitting of the prizes for the affected place(s) - for example, a two-way tie for 2nd place would result in a merger and even division of the prizes for 2nd and 3rd places. The organisers reserve the right to make all last and final contest determinations.