

STEM Club Lent 2019 - UKRoC

National flight: No. 2

Date:

Height reached:

Flight time:

Feedback: Positives and Negatives

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What have we learnt?

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.....

.....

Date:

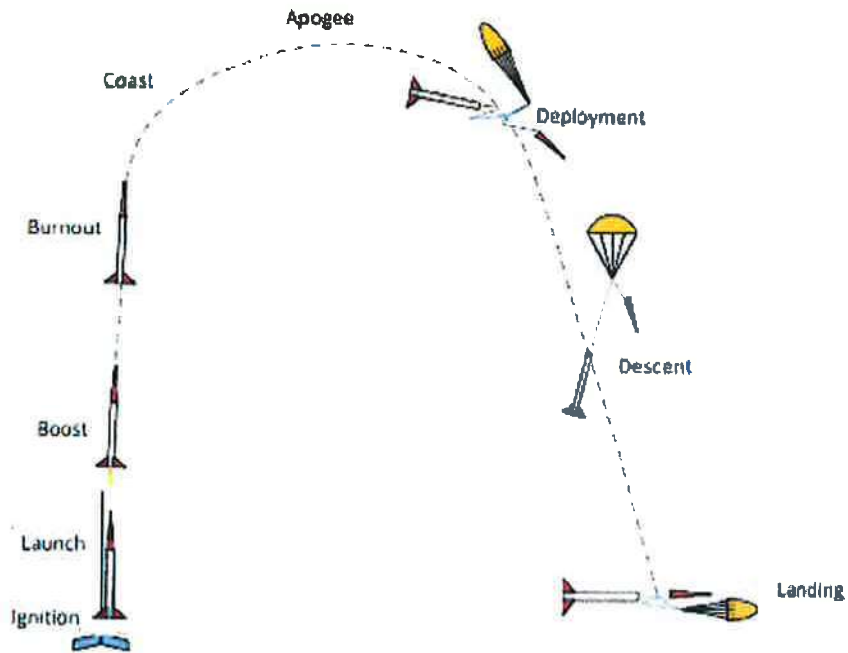
Team signatures:

SMART target:

Taken from Dr Philip Clawsworth's SFTS guide

2. Model Rocket Basics

How Model Rockets Work



Flight Profile

Figure ?? explains some common rocketry terms for the phases of an ideal flight. At the start of a flight the rocket is mounted on a launch pad. The flight starts with **IGNITION**, in which the motor is electrically ignited. The rocket accelerates up the launch rod, gaining speed until it leaves the end of the rod. The motor continues

Fin design

Initial Design:



FINS

PROS
- will stay put on top
- will be more stable

CONS
- difficult to design
- not effective

PROS
- flat surface area, more stable

CONS
- heavy

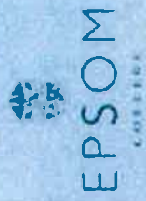
PROS
- unlike most other shapes

CONS
- best stable than square

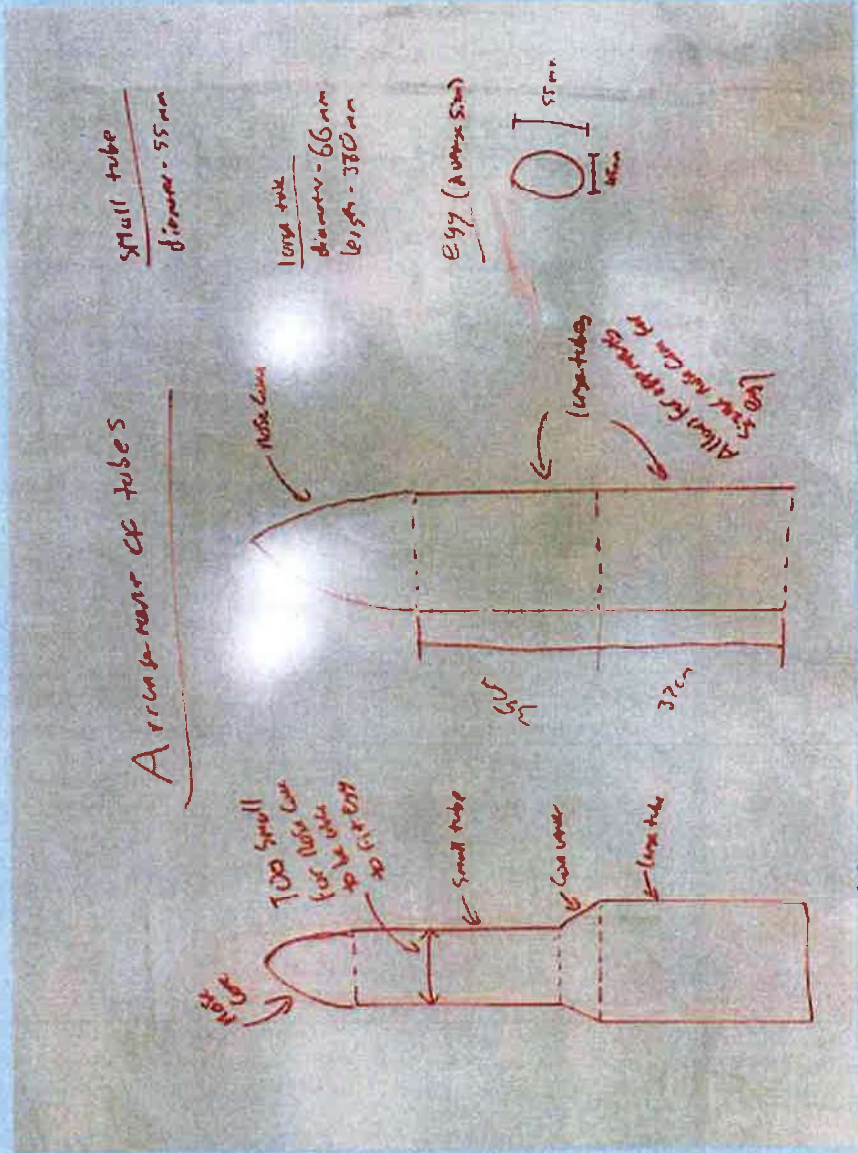
WWW.EPSOMCOLLEGE.ORG.UK

Isaac's designs

Arrangement of Rocket Tubes

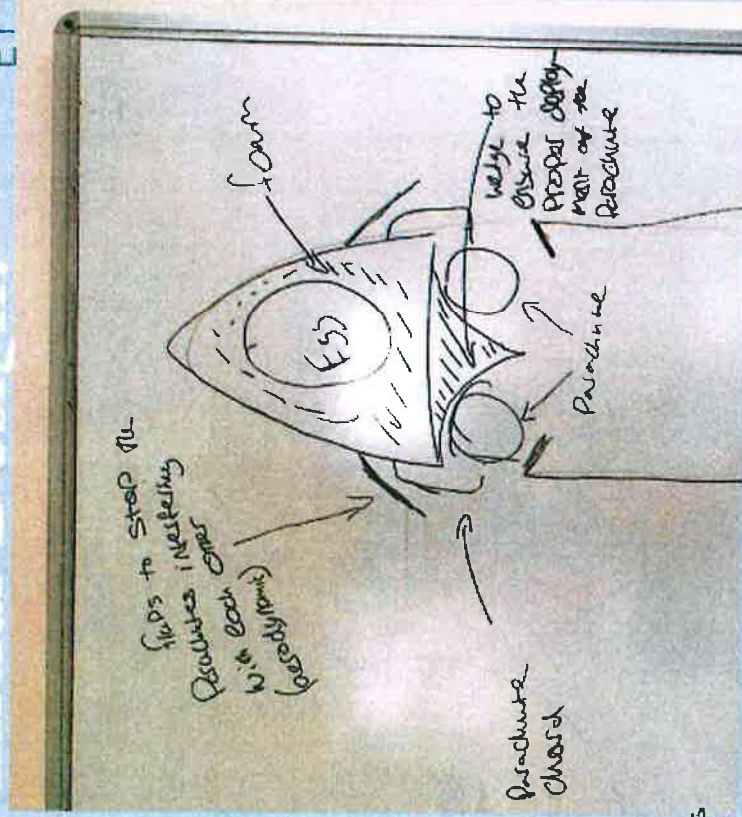
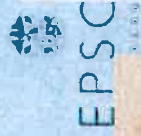


Initial Design:

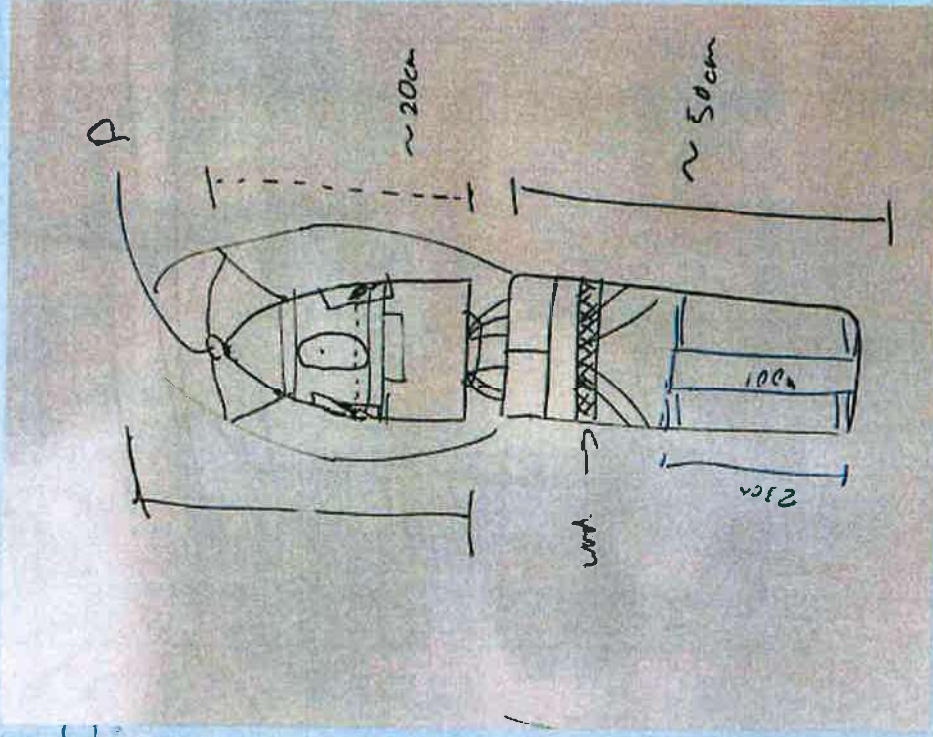


Final initial design

Initial Design:



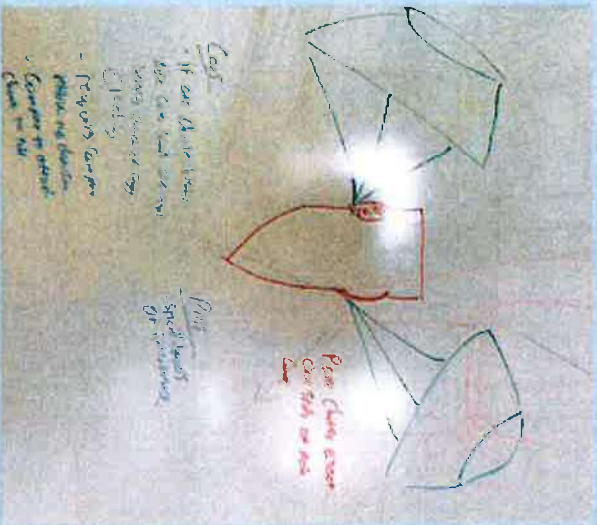
ARX's design



TOM's design

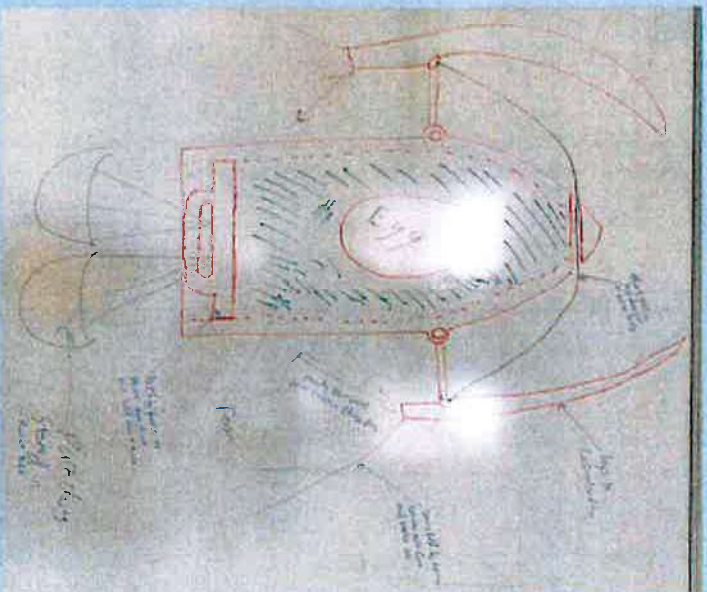
Final initial designs

Initial Design:

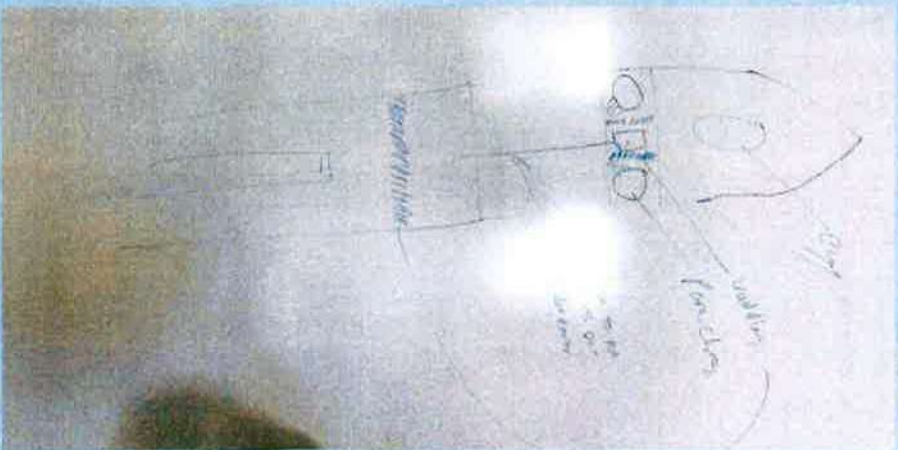


Jeff's design

EPSON
QUALITY OF
DESIGN



Will's design

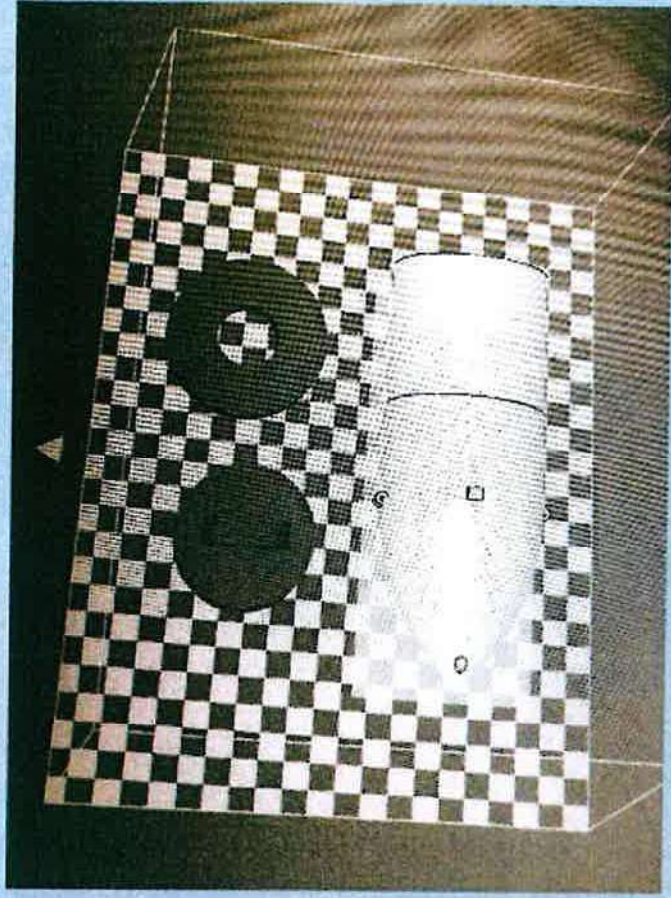
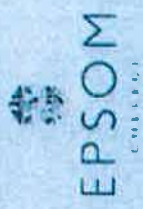


Tom's design

WWW.EPSON.COM/LED/CMS/JR

Design feature:

3D printed nose cone



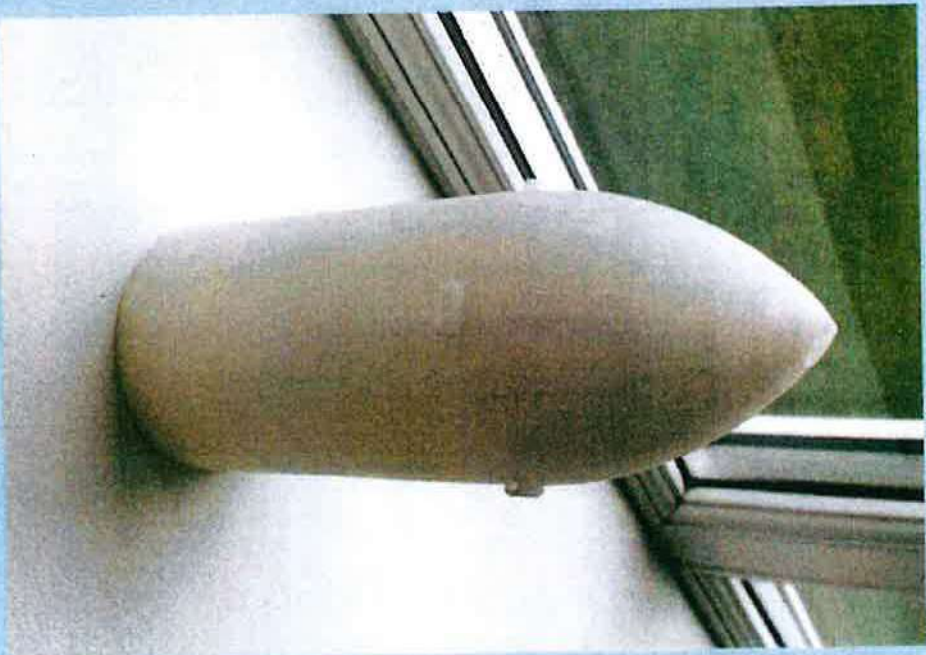
Design feature:

Down on the Style
locking mechanism



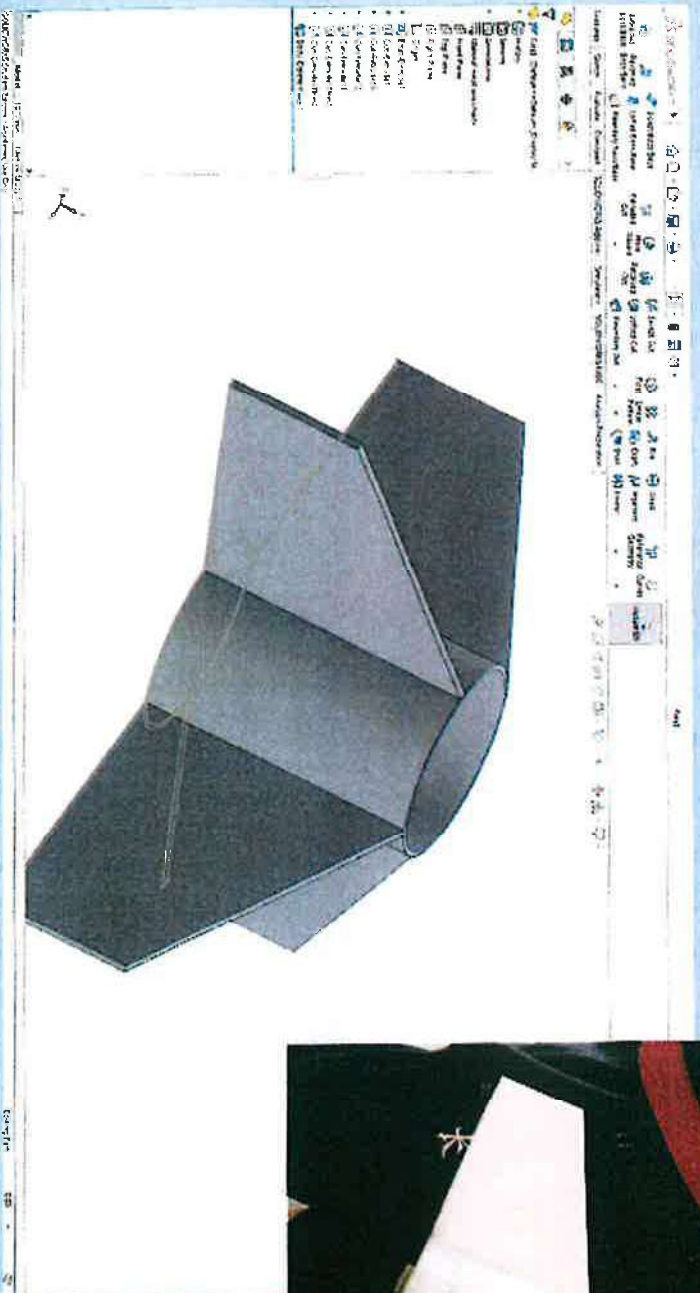
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DESIGN

Final Product





Design feature:



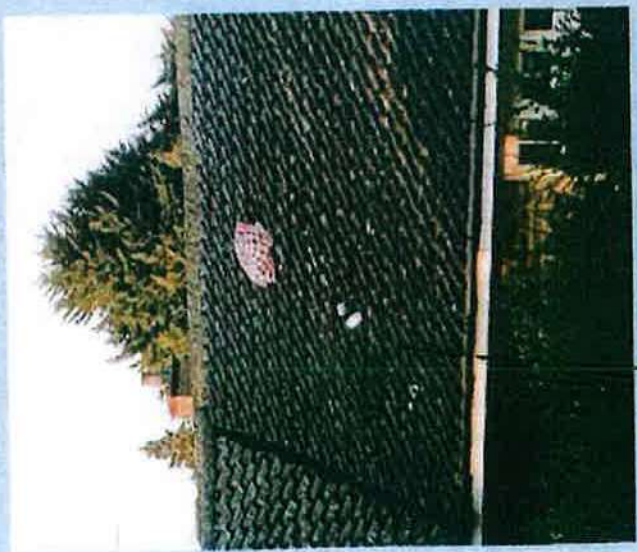
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used videos to record flight \Rightarrow analyse flight path and timings

Test flight:



Test flight:



payload



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~~As~~

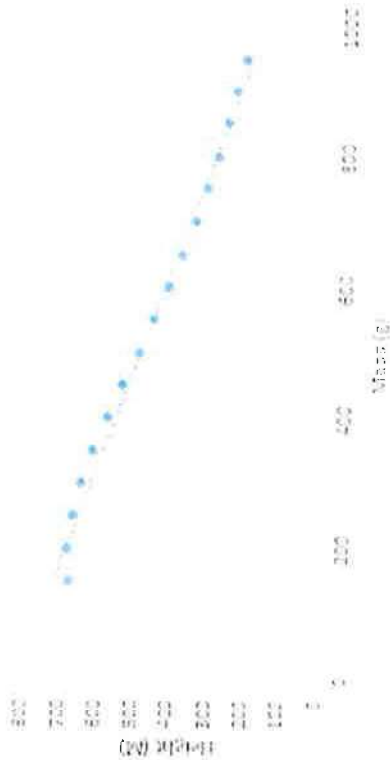
Isaac

Alex



Simulation:

Mass Vs Apogee Height



Calibration graph
 Launch at max and min
 Create a calibration curve

www.epson.com Rocket Altitude Calculator (Flash ver. 0.3)

Calculate Single Stage or Booster

Rocket Motor: (grams) (lb + 8)
 Drag Coefficient: (typical)

Motor Tube: **Select Tube**
 Diameter: (in)
 Payload Mass: (lb)

Motor: **Select Motor**
 Total Impulse (N-sec):
 Burn Time (sec):
 Motor Mass (grams):
 Propellant Mass (grams):
 Number of Motors in Cluster:

Side Elevation: (degrees)
 Temperature: (C)

Thrust Altitude: (meters)
 Peak Altitude: (ft)
 Coast Time: (seconds)
 Burnout Alt: (meters)
 Burnout Alt: (meters)

Air Density: (kg/m³)

UKRoC Rules 2019

- 1. SAFETY:** All rockets must be built and flown in accordance with the UKRoC Best Practices document. Rockets flown at the National Finals must have previously flown safely and successfully. Rockets will be inspected before launch and observed during flight by a UKRoC official, whose judgment about the safety of the flight and with these rules will be final. Teams are encouraged to consult with designated UKRoC officials well before the fly-off to resolve any questions about design, safety, or these rules.
- 2. TEAMS:** The application for a team must come from a single school or a single non-profit youth or educational organization. There is no limit to the number of teams that may be entered from any single school or organization, but no more than three teams containing students who attend the same school or who are members of the same organization, regardless of whether the teams are sponsored by that school or organization, can be invited to attend the National Finals. Team members must be students who are aged 11 to 18. Teams may have members from other schools or other organizations and may obtain financing from any source, not limited to their sponsoring organization. Teams must be supervised by an adult approved by the head of the sponsoring school, or by an officially-appointed adult leader of their sponsoring organization. Minimum team size is three students and maximum is ten 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 activities for a rocket used in a qualification flight or at the Finals 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.
- 3. ROCKET REQUIREMENTS:** Rockets must not exceed 650 grams gross weight at lift off. The egg payload portion of the rocket tube must be large enough to contain an egg of up to 45 millimetres in diameter. The overall length of the rocket must be no less than 650 millimetres as measured from the lowest to the highest points of the airframe structure in launch configuration. The portion of the rocket containing the egg payload and the altimeter must separate from the rest of the rocket in the air and must descend separately under at least two parachutes that are the same shape and are within 50 millimetres (2.0 inches) of the same diameter. The rest of the rocket must recover safely under any deployed recovery system. 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 UKRoC Approved Motor List posted on the UKRoC website. 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 UKRoC list. Motors must be retained in the rocket during flight and at ejection by a positive mechanical means (clip, hook, screw-on cap, etc.) and not retained simply by friction fit in the motor mounting tube. 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 only in the manner prescribed in the instructions for that motor.

















LOGIC RC

Customer

Sort by
Popularity



▶ Rockets ▶ Rocket Accessories ▶

<p>D-ES2274 £4.25 Recovery Wadding x2!</p> 	<p>D-ES2302 £3.99 Model Rocket Starters (PK5)</p> 	<p>D-ES2264 £3.25 12" Parachute</p> 	<p>D-ES2261 £9 24" Nylon Parachute</p> 
<p>D-ES2230 £24.99 E Launch Controller</p> 	<p>D-ES3143 £4.99 Engine Hook Accessory Pack</p> 	<p>D-ES3089 £7.99 17-1/2" Body Tube (PK3)</p> 	<p>D-ES3165 £7 NC-50a Nose Cone (PK1)</p> 
<p>D-ES2215 £17.99 Porta-Pad II Launch Pad</p> 	<p>D-ES2262 £2.50 6" Parachute</p> 	<p>D-ES3086 £6.99 17-1/2" Body Tube (PK3)</p> 	<p>D-ES3087 £7 27-5/8" Body Tube (PK3)</p> 
<p>D-ES2267 £4.25 10" Parachute</p> 	<p>D-ES2271 £4.50 24" Parachute</p> 	<p>D-ES2241 £34.99 E2 II Launch Controller</p> 	<p>D-ES2227 £10.00 Tuna Marking Guide</p> 

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