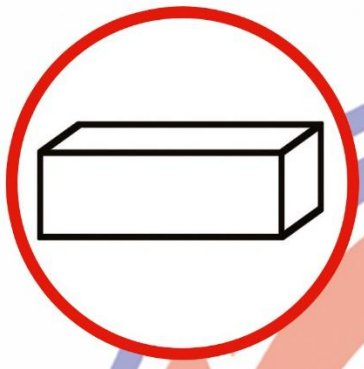
British Model Flying Association

2022 Payload Challenge 3 Distance



Celebrating 100 years of British Model Flying

British Model Flying Association

2022 University and Schools Payload Challenges

Dates Notice

14th & 15th June 2022

National Centre for Model Flying
BMFA Buckminster
Sewstern Lane
Grantham
Lincolnshire
NG33 5RW

In Partnership with

ROYAL AERONAUTICAL SOCIETY

Supported By

BAE SYSTEMS

ROLLS ROYCE

ROYAL AIR FORCE Engineering

ROYAL AIR FORCE model aircraft

The British Model Flying Association invite your school or youth group to enter a team or teams in the

2022
Payload
Challenge 3
Distance

The information contained in this brochure provides a detailed overview of the 2022 Payload Challenge (Distance) as well as all information and forms for prospective entrants. We look forward to meeting your staff and students in 2022.

Should you require any assistance please contact
the BMFA Challenge Co-ordinator.
Manny Williamson
(Address as on the entry form, final page)

NOTE

These competitions are supported by cash prizes, both for the school/department and the individual members of the winning team.

New for 2022:
All flight batteries supplied by competition organisers – ensure you read notes on specification and connectors.

INTRODUCTION

The Payload Challenge 3 (Distance) has been developed as an introduction to the more advanced concepts of aircraft design and build and also a meaningful lead in to Challenges 4 and 5.

The academic requirements are less rigorous than the more advanced challenges 4 and 5 (Quantity and Weight). Teams are required to produce 3 view drawings summarising their design process and are also required to conduct a 5 minute presentation to a team of expert judges prior to the flight element of the competition.

For the flying element of the competition, teamwork, planning and a well-structured approach combined with a well designed and practical airframe will be key elements to success in this competition.

Please note that it is strongly recommended that the help of an experienced aero modeller is enlisted from the very start.

Local contacts are available from the BMFA office.

We look forward to receiving your team's entry for the 2022 Payload Challenge 3.

In Partnership with the Royal Aeronautical Society

- The Royal Aeronautical Society (RAeS) is pleased to be able to once again join the BMFA Payload Challenge event.
- The RAeS will provide Aerospace Professional support for judging and operation of the competition
- This support for the competition is part of the RAeS outreach programmes to schools, colleges and universities.
- The RAeS also provides career support to aspiring and established Aerospace Professionals and details can be found on its website at https://www.aerosociety.com/careers-education/

ROYAL AERONAUTICAL SOCIETY

GENERAL CONTEST RULES

CONDUCT

G 1.1 The maximum number in a team will be five students plus a manager and a pilot.

G 1.2 For the flying element of the contest a pilot can be supplied by the contest organisers if required.

G 1.3 It is important that all team members including the pilot attend the morning briefing.

G 1.4 Teams should familiarise themselves with the contents of the competition rules brochures.

G 1.5 Deliberate or repeated violation of safety rules may result in the team's expulsion from the competition.

G 1.6 In the event of unsportsmanlike conduct, the team will receive a warning from the Competition Director. A second violation will result in expulsion of the team from the competition.

G 1.7 The Competition Director reserves the right to ground any aircraft if in his opinion, or that of his appointee, the aircraft does not meet an appropriate standard of construction or radio installation.

AIRCRAFT CONFIGURATION

G 2.1 Aircraft must be of fixed wing configuration (no rotating lifting surfaces).

G 2.2 The specified power system for each category must be used.

G 2.3 Only the battery pack supplied by the organisers may be used for the flight competition.

G 2.4 No modification to the motor is permitted.

G 2.5 The specified "isolator" (fuse unit) must be fitted.

G 2.6 The "isolator" must be mounted in such a location as to be readily accessible by team members and also easily visible to flightline marshals.

G 2.7 The Isolator unit must be located a minimum of 100mm from the propeller arc and orientated so as to promote removal of the fuse predominantly away from the direction of the propeller arc (25 degree minimum).

G 2.8 It is important that the unit is affixed to a suitably sturdy area of the airframe in order to prevent damage when fitting or removing the fuse.

G 2.9 It is required that a tag or pennant is affixed to the fuse to aid removal and visibility.

G 2.10 Only one flight battery may be used per flying round.

G 2.11 A propeller spinner or rounded safety nut must be fitted on forward facing motors.

G 2.12 The allocated team number must be displayed on the upper wing surface of the aircraft in characters a minimum of 100mm high in a contrasting colour.

RADIO RESTRICTIONS

G 3.1 Radio control will be used to fly and manoeuvre the aircraft.

G 3.2 Equipment on the 2.4GHz band only.

G 3.3 A serviceable failsafe must be fitted that as a minimum returns the throttle to stop on loss or corruption of the radio signal.

G 3.4 Radio installations will be scrutinised by the organisers and must be deemed fit for the intended application.

G 3.5 Computer transmitters are permitted.

G 3.6 Aids to flight stabilisation such as gyros and auto level are permitted but pilot authority must be maintained at all times.

FLIGHT COMPETITION

G 4.1 Time for trimming flights will not be available on the day of the competition.

G 4.2 The extent of the flying area will be announced during the morning briefing, any pilot flying within the briefed “no fly” areas will be directed to land immediately.

G 4.3 The pilot of the aircraft should perform appropriate pre flight checks.

G 4.4 The number of flight rounds will be announced at the morning briefing to reflect the expected weather conditions and number of entries.

G 4.5 The distances indicated on the flight plan sheet are for guidance purposes only, these will be set and announced at the morning briefing to reflect the prevailing wind conditions and location on the airfield.

G 4.6 Pilots will be individually briefed regarding flight pattern and dead airspace on the flight-line prior to their first flight of the competition.

G 4.7 The flight-line controller has overall responsibility and authority for all matters relating to flight safety.

G 4.8 Pilots must be prepared to “ditch” their aircraft on the order of the flight-line controller should he deem it necessary on safety grounds.

PROTESTS

G 5.1 Any protest must be filed in writing to the Contest Director by the faculty advisor or team captain.

G 5.2 Any protest must be filed no more than 10 minutes after the Flight Competition is announced as being completed.

G 5.3 In order to have a protest considered a team must be willing to put up points specified in each Challenge, which may be forfeit, if their protest is not upheld.

G 5.4 The Contest Director may call upon a jury of interested parties to help with his decision.

G 5.5 The Contest Director carries the final vote in the event of a split decision.

LIST OF CONTENTS

Competition resources supported by

4max

http://www.4-max.co.uk/bmfa-payload-challenge.html

Visit their website to view materials for the 2022 Payload Challenges but it is important that you place your order either by telephone or email in order to receive the discounted payload challenge prices.

Quote **2022BMFA** for 10% discount on competition items.

Please note: the BMFA does not stock competition materials

D 1 OBJECTIVES

D 1.1 Contestants are to research, design, build and prove an electric powered, radio controlled aircraft, to transport the designated payload over the longest distance possible in a prescribed 6 minute time slot utilising a standardised propulsion unit.

D 1.2 Teams are required to produce 3 view drawings summarising their design process. They are then required to give a verbal presentation in front of a panel of judges on their aircraft and finally take part in a flight competition to demonstrate the performance of their aircraft.

D 1.3 The winners are the team who achieve the highest combined score for all the parts of the competition.

D 2 CONTEST ELIGIBILITY

D 2.1 The contest is open to students in full time education. Teams may be from schools, cadets, scouts or other youth groups.

D 2.2 The maximum number in a team will be five students plus a manager and a pilot. For the flying part of the contest a pilot can be supplied by the contest organisers if required.

D 3 PAYLOAD

D 3.1 Provision should be made to accommodate a payload measuring a **maximum** of 150mm x 150mm x 300mm, the payload will be supplied by the organisers and will have a **maximum** weight of 500g, the assumption must be made that the payload will include instrumentation and data recording capability, and as such must be mounted to the airframe securely to ensure that it cannot move or breakaway in flight.

Note: It is likely that organisers will test the payload area with a block measuring 148mm x 148mm x 298mm, it is suggested that where the provision is made for internal carriage of the payload teams do not aim for a very tight fit, as failure to accommodate the appropriate payload dimensions will remove the aircraft from the flight competition until rectified.

D 3.2 The payload may be mounted externally or internally but may in no way contribute to the strength or integrity of the airframe.

D 4 AIRCRAFT POWER REQUIREMENTS

D 4.1 The power system will comprise one 4-Max PO-3541-1070 motor and 4M-ESC50A speed controller and a 3 cell Lithium Polymer battery of 2200 Mah capacity (supplied by competition organisers).

D 4.2 No modification to the motor or ESC is permitted, gearboxes are not permitted between motor and propeller.

D 4.3 Only batteries supplied by the organisers may be used for competition flights. Batteries will be fitted with XT 60 connectors (negative to pointed end).

D 5 COMPETITION PROCEDURES

There will be three elements to the competition in which all participants are required to compete

D 5.1 The design element, which will enable the contestants to present their designs in a three view drawing.

D 5.2 The presentation, where students will be required to explain their design to a panel of judges.

D 5.3 The flight element will determine which aircraft is able to cover the most distance within the allotted time period (most laps of the course over all rounds flown).

D 5.4 Each team must display their designated entry reference on the wing of the aircraft in characters a minimum of 100mm high in a contrasting colour. Aircraft not fulfilling this requirement will not pass scrutineering and processing.

D 5.5 Subsequent to each team's presentation, aircraft details will be recorded.

D 5.6 A safety and airworthiness inspection will also be conducted to enable teams to address any item requiring attention before flight. Correct failsafe operation must also be demonstrated at this time so it is important that the transmitter is made available to the scrutineering team.

D 6 DESIGN COMPETITION

DRAWINGS

D 6.1 Each team must submit a three view drawing for the aircraft which is to be flown. The drawing is not required to be to scale but must contain dimensioned front, end and plan elevations. Drawings must include the name of the team and the designated reference number in the title box.

Drawings to be supplied on a single side of an A3 size paper in landscape format (hard copies returned on request).

The drawings will be worth a maximum of **25 points** which will be allocated as follows:

3 clear views	max **5 points**
Inclusion of relevant dimensions	max **5 points**
Description of materials utilised	max **5 points**
Manufacture/assembly notes	max **5 points**
Overall graphic quality/clarity	max **5 points**

PRESENTATION

D 6.2 Prior to the first competition flight, each team will present their aircraft design before a panel of professional engineers.

D 6.3 Order of presentation will be established by the organisers and announced at the start of the competition.

D 6.4 Each team will be allocated five minutes in which to describe and promote their design, content falling outside of the allocated time will not be considered during marking.

D 6.5 Visual aids will not be permitted, however teams may utilise material/test samples, aircraft cross section samples and replica components as part of the presentation to judges. The aircraft should be available for the presentation and a **10 point** penalty will be incurred if the complete aircraft does not feature as part of the presentation.

D 6.6 The presentation is worth **30 points**. Judging criteria for the presentation will include:

- Balance and continuity
- Articulation
- Technical highlights

NOTE: Experience has shown that teams do not make the best use of the opportunity to gain addition points that the presentation offers, remember, your teams presentation should aim for a professional standard and "sell" the benefits of your particular design to the maximum.

This competition is as much a test of your organisational skills as of your engineering flair. You may well have a world-beating design....on paper. Each year several teams fail to complete their projects by the date of the Flight Competition.

D 7 THE FLIGHT COMPETITION

D 7.1 The aircraft must be rendered "safe" on all occasions that it is handled by the team for the purpose of payload loading, a team member must display the isolator/breaker for the benefit of the flight line marshals during loading and unloading.

D 7.2 At the start of the prescribed time slot the model should be without payload, on being given the start signal the team must load the aircraft with the payload. The model must then be carried to the take off line and set down facing predominantly into wind, at this time the power system can be rendered "live" by inserting the "isolator".

D 7.3 The aircraft must take off from a standing start (no pushing) utilising its own undercarriage. The take off must be completed before passing pylon number one.

D 7.4 Having completed a successful take off the model must proceed to pylon number one whereupon a flag will be raised immediately the model has passed the pylon. The aircraft will then proceed to pylon two where the same process will apply. The aim is to complete the highest number of laps of the course within the permitted time allowance. Only completed laps will count towards the overall score, the initial lap including the take off will be counted as one lap.

D 7.5 Should a successful take-off not be completed, teams may retrieve the model for further attempts without reloading the payload within the allotted time period.

D 7.6 The aircraft must complete a successful landing, remaining in airworthy condition other than damage to undercarriage and propeller and come to a complete standstill before a team member may approach, disarm, then retrieve the aircraft and return it to the loading bay.

D 7.7 At the end of the time slot the details of the flight will be recorded by the CD and added to the judge's scorecard.

D 7.8 The aim is for each team to fly three, six minute slots, however, a final decision will be announced at the morning briefing to reflect the time available, the number of teams competing and the expected weather conditions.

D 7.9 The distances indicated on the flight plan sheet are for guidance purposes only, these will be decided and set prior to the commencement of the flight competition.

D 7.10 Time for trimming flights will not be available on the day of the competition. Entrants should test fly their aircraft prior to the weekend of the competition.

D 7.11 For protest information see General Rules but in this category the team will need to put up 20 points.

D 8 SCORING

Penalty points are assessed as follows:

- **10 points deducted for no aircraft at presentation**
- **20 points deducted for unsuccessful protest.**

The flight score will be normalised, **100 points** will be awarded to the team who complete the largest number of laps over all rounds and all other team's scores will be calculated as a percentage of this figure.

See scoring information panel for further details

Challenge 3: Distance Scoring

Design Drawing : One single side sheet A3 Landscape

To be submitted prior to the presentation

Category	Points Available	The judges would like to see:
3 Clear views	5	Plan, side and front views.
Inclusion of leading dimensions	5	Include wing-span, length, wing area, CG, control surface outlines.
Description of materials used.	5	Label details in views to show parts made from ply, balsa, foam, etc.
Manufacture / assembly notes	5	Such as: hot wire foam, laser cut parts, 3D printing, laminating, covering.
Overall graphic quality / clarity	5	Neat outlines, clear text, fine leader lines and uncluttered dimensions.
Total Max Points	**25**	

Presentation (5 minutes)

Category	Points Available	The judges would like to know:
Balance and Continuity	10	In 5 minutes, the team is to describe the design of their aircraft. Include any interesting features and promote your design. We like to see contributions from several team members.
Articulation	10	
Technical Highlights	10	
Total Max Points	**30**	

Flight Competition

	6 minutes round time		End of allocated round time	Flight Score
	Round time starts, aircraft is loaded with the payload and takes off from the runway	Fly continuous circuits around the pylons	Land safely	
Round 1	6 minutes round time available			Count the number of completed laps.
Round 2	6 minutes round time available			Count the number of completed laps.
Round 3	6 minutes round time available			Count the number of completed laps.

Example Round	Aircraft completes 12 laps and is halfway to the 13th at end of the round time.	Flight score = **12**

Normalisation of flight scores

Upon completion of all three rounds, the number of laps are added together.
The team with the highest aggregate score is awarded **100** points.
All other scores are calculated as a percentage of this figure.

Summary

Drawings	Max possible score	**25 points**
Presentation	Max possible score	**30 points**
Normalised flight score	Highest aggregate flight score.	**100 Points**
Penalty 1	No aircraft at presentation	**-10 points**
Penalty 2	Protest not upheld	**-20 points**

D 9 ENTRY

PLEASE SEND YOUR COMPLETED ENTRY FORMS TO THE CHALLENGE CO-ORDINATOR AT:

The British Model Flying Association
Challenge Co-ordinator
Chacksfield House
31 St Andrews Road
Leicester
LE2 8RE

Or by email marked for the attention of the Development Officer (Manny Williamson) at admin@bmfa.org

To facilitate planning, we must receive, by 1st April 2022, a formal notification of your intent to enter the 2022 competition.

DRAWINGS

Drawings are to be submitted to the judging panel in hard copy (paper) format at the flight competition (at the time that the team conducts their presentation to the judges).

NOTE: On receipt of your completed entry form you will receive a confirmation and also your unique team designation reference; this reference must be quoted in **all** correspondence.

D 10 PRIZE AND AWARD DETAILS

1st Place

The Integro Payload Challenge Trophy*

£100.00 Cash prize, paid to department or school.

£25.00 Cash prize, paid individually to each team member (up to a limit of five persons).

Certificates will be awarded to all competitors.

* Note: the Integro Trophy is presented to the winning team on an annual basis and remains the property of the British Model Flying Association. The trophy must be returned 28 days prior to the competition of the following year in order that it is available to present at the event.

D 11

Flight Pattern Subject To Wind Direction
Loading Bay
10m
Start Line
300m Approx
Pylon 2
Pylon 1
Wind

D 12

Entry form for 2022

Payload Challenge 3

Distance

Note: Please copy this form and complete one form per team.

Forms to be received by 1st April 2022

Name of University, School, youth group or organisation:

_____

Name of Tutor/Teacher responsible for entry: _____

Team Name: _____

Names of 5 Team Members:

1. _____

2. _____

3. _____

4. _____

5. _____

Pilot: _____

Name and Address of Team Manager

Name: _____

Address: _____

_____

_____

Contact Number: _____

Email: _____

All correspondence relating to the 2022 Challenge will be conducted through the addresses and numbers given on this form

Do you require technical assistance from local aeromodellers? YES / NO

Do you require a pilot? YES / NO

Please note a fee of £125.00 is payable per Team entered (non refundable).

Cheque to be made payable to BMFA or alternatively to pay by credit/debit card please contact the office.

Cheque enclosed ☐

British Model Flying Association
Challenge Co-Ordinator
Chacksfield House
31 St Andrew's Road
Leicester
LE2 8RE

Telephone: 0116 2440028

Please note on receipt of completed Entry Form and payment each team will be issued with a unique reference number which must be quoted in all correspondence including submissions to the judges and also displayed on each aircraft as detailed in the Rules Brochure.

Office Use Only

Payment Received: ☐ **Date:** _____ **Signature:** _____

Reference Number: _____