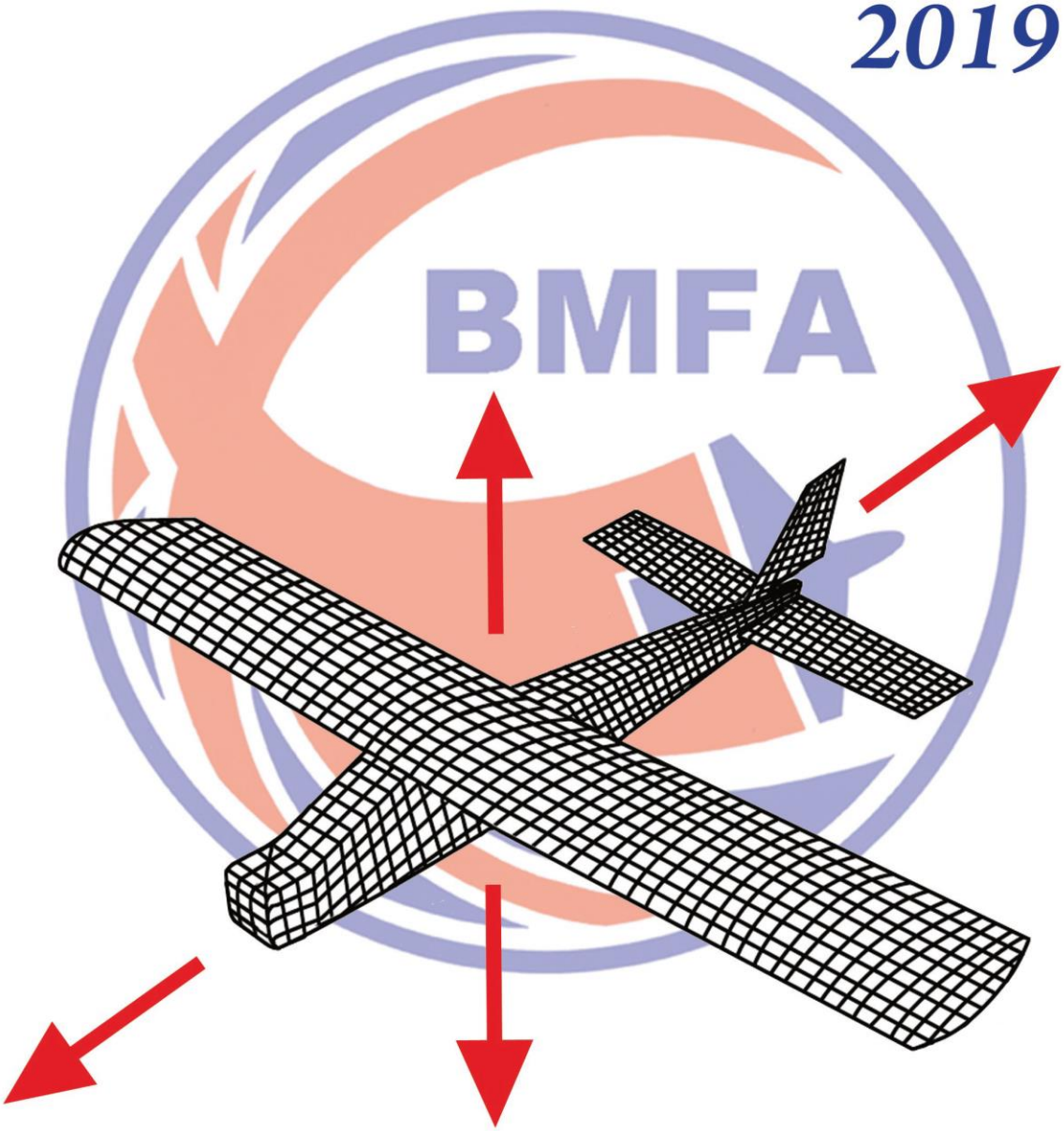
British Model Flying Association

Payload Challenge 2

Kit Lift

2019



ROYAL AERONAUTICAL SOCIETY

British Model Flying Association

2019 University and Schools Payload Challenges

Dates Notice

31st May & 1st, 2nd June 2019

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

In Partnership with

Supported By

BAE SYSTEMS

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

2019
Payload Challenge 2
Kit Class

The information contained in this brochure provides a detailed overview of the 2019 Payload Challenge 2 (Kit Class) as well as all information and forms for prospective entrants. We look forward to meeting your staff and students in 2019.

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.

INTRODUCTION

The Payload Challenge 2 (kit class) has been developed as a structured introduction to the more advanced concepts of aircraft design and build and also a meaningful lead in to Challenges 3, 4 and 5 where teams are required to design from "scratch"

The academic requirements are far less rigorous and the category makes use of a commercially available pre-cut airframe, the SLEC Sky 40 training aircraft.

CORE OBJECTIVES

Teams are required to construct the aircraft using the instructions and parts provided within the kit and to utilise a standard electric propulsion unit.

In developing their aircraft teams are required to make provision to transport a payload of standard sized tennis balls.

Teams 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, teams are required to demonstrate their aircraft in flight in its empty state as well as with an increasing payload.

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 2019 Payload Challenge 2.

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 The battery pack must not exceed the stated capacity and must have the manufacturers label with the capacity shown.

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

K 1 OBJECTIVES

K1.1 Teams are to construct an airframe based on the standard SLEC Sky 40 kit.

K1.2 Teams are required to design and construct a fuselage to accommodate and transport the prescribed standard tennis ball payload.

K1.3 Teams are required to participate in a flight competition to demonstrate the performance of their aircraft.

K1.4 The winners are the team who achieve the highest aggregate score for all the parts of the competition.

K 2 CONTEST ELIGIBILITY

K 2.1 The competition is open to members of youth groups and students at schools and colleges and those in further education.

K 3 PAYLOAD

K 3.1 Teams are required to develop and modify the SLEC Sky40 airframe to accommodate a payload of standard sized tennis balls.

K 3.2 The payload must be accommodated in a location that does not substantially alter the centre of gravity of the aircraft between empty and full.

K 3.3 Lightweight foam packing blocks may be used to restrain the payload in flight as required.

K 4 AIRCRAFT/POWER REQUIREMENTS

K 4.1 The aircraft is to be based on a Sky 40 airframe constructed from the SLEC laser cut kit.

K 4.2 The power system will comprise one 4-Max PO-3541-1070 motor and 4-Max PP-TESC45AU speed controller and a 3 cell Lithium Polymer battery of not more than 2200 mAh capacity.

K 5 COMPETITION PROCEDURES

K 5.1 There will be two elements to the competition in which all participants are required to compete. The first, the construction and design element, will enable the contestants to present their completed airframe design to a panel of expert judges.

K 5.2 The second, the flight competition, will determine which aircraft is able to successfully transport the highest number of payload items.

K 5.3 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.

K 5.4 A safety and airworthiness inspection will also be conducted at this time to enable teams to address any item requiring attention before flight.

K 6 PRESENTATION

K 6.1 Presentation: Prior to the first competition flight, each team will present their aircraft design before a panel of professional engineers.

K 6.2 Each team will be allocated five minutes in which to describe the build process and the design of the payload module(s), content falling outside of the allocated time will not be considered during marking.

K 6.3 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.

K 6.4 The presentation is worth **30 points**. Judging criteria for the presentation will include:

- Balance and continuity
- Articulation
- Technical highlights

Experience has shown that teams do not make the best use of the opportunity to gain additional 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.

K 7 THE FLIGHT COMPETITION

K 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.

K 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 one tennis ball. 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".

K 7.3 The aircraft must take off from a standing start (no pushing) utilising its own undercarriage.

K 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.

K 7.5 Following a completed circuit the aircraft should be landed, rendered safe and returned to the loading bay where a second tennis ball is added, the process is to be repeated with one payload item added at each cycle until the end of the allocated slot time is reached. 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.

K 7.6 At the end of the prescribed time slot the number of tennis balls will be counted, only payload items transported during full laps will be counted towards the flight score. The final full lap must conclude with a compliant landing before the end of the time slot.

K 7.7 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.

K 7.8 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.

K 7.9 The aim is for each team to fly three, 6 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.

K 7.10 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.

K 7.11 Time for trimming flights may not be available on the day of the competition. Entrants should test fly their aircraft prior to the weekend of the competition.

K 7.12 For protest information see General Rules but in this category the team will need to put up 20 points.

K 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 transport the largest number of payload items over all rounds and all other scores will be calculated as a percentage of this figure (this has been implemented in order to maintain a valid balance between the points available for the drawings, presentations and flight score).

See scoring information panel for further detail

Challenge 2: Kit Lift Scoring

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 payload features, airframe adaptation and details of the build process. The aircraft is to be available for the presentation.
Articulation	10	
Technical Highlights	10	
Total Max Points	**30**	

Flight Competition

		Circuit 1	Circuit 2	Circuit n	End of allocated round time	Flight Score
	Round time starts, aircraft is loaded with one tennis ball and launched.	Fly with one tennis ball and land.	Add ball 2 and take off.	Add ball n and take off. Repeat to end of round or capacity of aircraft.	Land safely for nth time, before round ends.	
Round 1	6 minutes round time available					Count the number of tennis balls successfully carried. Final lap must be completed before time ends.
Round 2	6 minutes round time available					Count the number of tennis balls successfully carried. Final lap must be completed before time ends.
Round 3	6 minutes round time available					Count the number of tennis balls successfully carried. Final lap must be completed before time ends.

**** If a team fails to complete a round or is still on task at the conclusion of the round time, the number of tennis balls successfully carried immediately before this circuit is counted.***

Example Round	Aircraft is airborne with 5 balls on board at end of allocated round time.	Flight score = **4**

Normalisation of flight scores

Upon completion of all three rounds, the balls successfully carried by a team's aircraft 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

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**

K 9 KIT NOTES

SLEC Sky 40 kit available directly from:

SLEC Ltd
Units 8 – 10 Norwich Rd Industrial Estate
Watton
Norfolk
IP25 6DR
01953 885279

sales@slecuk.com
www.slecuk.com

K 10 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 February 2019, a formal notification of your intent to enter the 2019 competition.

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.

K 11 PRIZE AND AWARD DETAILS

1st Place

The BMFA Innovation Trophy*

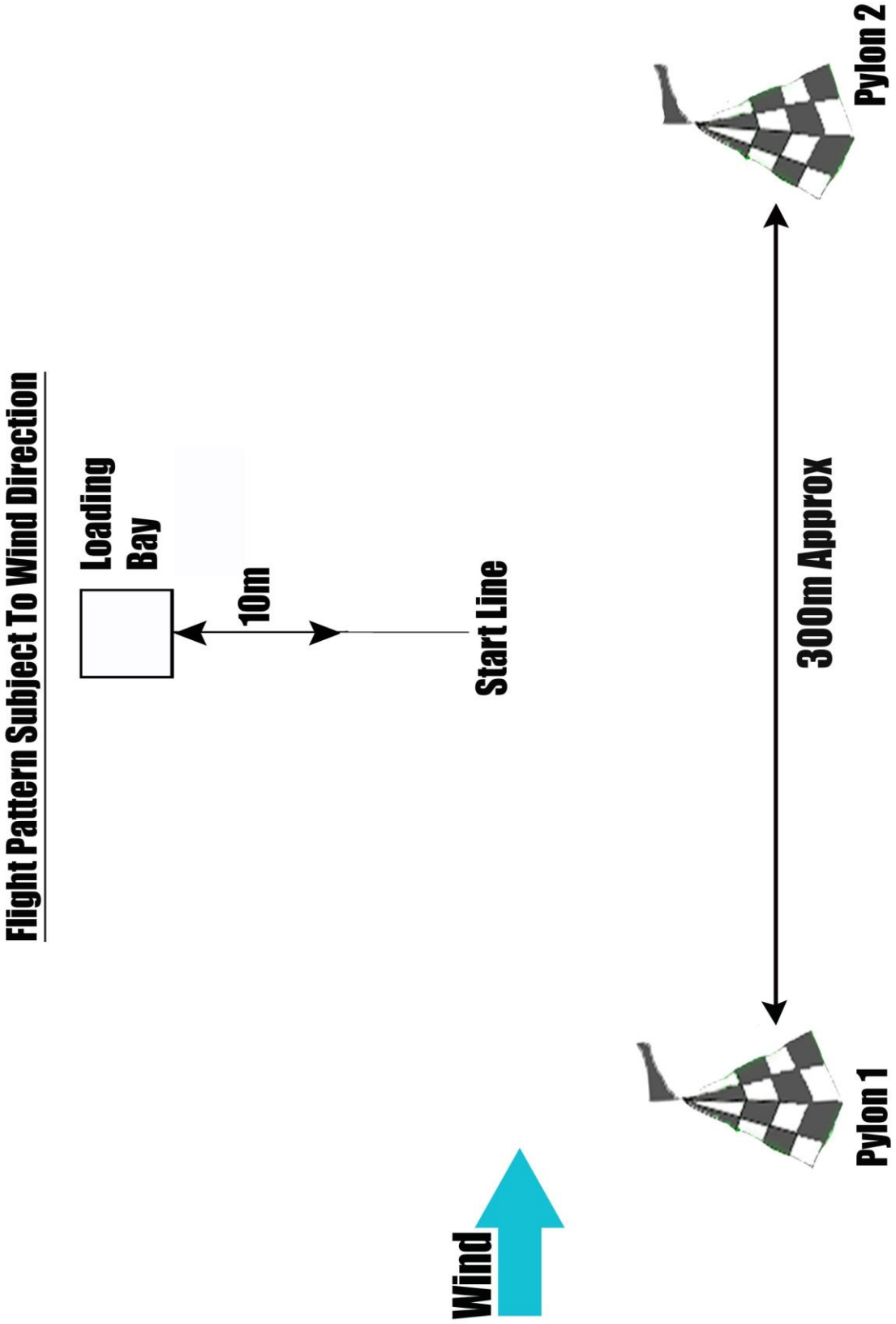
£100.00 Cash prize, paid to department or school.

£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 BMFA Innovation 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.

K 12


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

K 13

Entry form for 2019

Payload Challenge 2

Kit

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

Forms to be received by 1st February 2019

Name of 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 2019 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 £50.00 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 ☐

BMFA
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: _____