

Approved Minutes of the RCPTC Meeting, 08/09/07

Present:

Les Eagle	Chairman
Steve Ogden	Council Delegate
Pete Christy	Secretary / AHA
John Barker	Treasurer / BMPRA
Peter Cappleman	PRO
John Mee	GBRCAA
Dave Lucas	IMAC
Tom Wilkinson	JMA
Richard Cant	GTBA

The meeting opened at 1108, with 9 voting members present.

1) Apologies:

Apologies were received from Gerry Harrison and Chris Bromley.

2) Correction and adoption of the provisional minutes of the 28th of January, 2007 meeting.

The Delegate requested that the heading on page 3, item 10 of the minutes be amended to clarify that the reference was to the Sun newspaper. This was agreed, and the Delegate then proposed that the minutes be adopted. The proposal was seconded by the GBRCAA, and carried unanimously. (9 for, 0 against, 0 abstentions)

3) Matters arising.

(Item 12) The treasurer reported that the RCPTC proposals regarding the splitting of the profits from the Nationals had been rejected, but that profits would henceforth be split according to the number of competitors travelling. The secretary noted that the subject of funding had been raised at Council, and that Council was sympathetic to the issue. The Committee felt that something needed to be done to improve fund-raising at BMFA level, and that perhaps this was a job for the PRO. It was agreed that this issue must not be allowed to be forgotten.

(Item 5) The Secretary had circulated an article spotted in Pilot magazine regarding a new environmentally-friendly smoke oil being developed by Shell. Shell was sponsoring a full size aerobatic team with the oil, which it was claimed was non-hazardous (having been developed for foodstuffs), less damaging to paint, and produced better smoke! It was also claimed to be relatively cheap! The Chairman is going to try and obtain some sample quantities of this oil to evaluate its usefulness in model applications.

4) Correspondence received:

The Secretary reported that he had been contacted by Horizon Hobby UK, who were concerned at the lack of response obtained from Horizon Hobby USA regarding 2.4 GHz. George Land from Horizon Hobby UK offered to put the Secretary in direct touch with Paul Beard (the designer of the Spektrum radio system) to answer any queries. Unfortunately this was too late for the Nationals, but responses subsequently received will be discussed in detail under item 9 of this agenda.

5) Treasurer's Update

The Treasurer reported that he had submitted a budget for the next financial year. He explained that the RCPTC had overspent its budget slightly in the last year, but this was primarily due to one of the meetings having been brought forward, so that four appeared in the financial year instead of the usual three.

The Team Travel fund remains healthy.

The Treasurer reported that he had received two claims from the GBRCAA under the training and excellence budget. GBRCAA responded that there were more in the pipeline. F3D had slightly overspent, but this was compensated by the absence of any claims from F3C.

It was emphasised that any claims under Training and Excellence need to be justified, and the Chairman requested that everyone get their claims submitted promptly so that accounts could be completed in time for the AGM.

6) The F3D Team Managers Report

The BMPRA Representative presented his report on this year's World Championship event held at Muncie in the USA.

He felt that the British Team had been thoroughly out-classed, mainly due to technical reasons, but reported that at least one pilot had shown himself capable of taking on the best, until his engine expired! He explained that the problem appeared to be that although the Team was extremely competitive during practice - when conditions were much like the UK - during the contest itself, the temperatures soared, and the team members were unable to tune their engines to cope with the new conditions.

The Chairman asked what the RCPTC could do to assist. The AHA representative suggested that the requirements for a pylon racing engine were not dissimilar to those of control-line speed. Since we had a world record holder in the C/L Speed class, it would seem logical to contact him and see if he had any suggestions that could help improve the pylon race team's ability to cope with varying conditions. He suggested that the pylon team might want to consider contacting Peter Halman to see if he would be willing to meet with the team and pass on any hints and tips. This suggestion was received warmly by the BMPRA delegate who promised to investigate this possibility.

7) Feedback on other international contests

The AHA gave a brief report on the F3C Team results from the World Championships in Poland.

He reported that the Team placed 7th out of 29, with our best placed individual pilot making it through to the fly-offs and taking 13th place. The other pilots placed 20th and 45th out of 74 entrants.

He reported that there had been considerable confusion over the new scoring system, and that the Jury had abandoned a scheme that had been introduced as a local rule, as it was providing strange results. He reported that in his role as F3C CIAM representative, he had initiated a discussion on the mailing list to try and resolve the issue.

The AHA representative also reported that a large contingent of British pilots had travelled to Aberdeen for the Scottish Helicopter Championships, and that British pilots had dominated the event, with Steve Roberts winning the F3C event, and the AHA representative taking 2nd and 3rd in scale!

The GBRCAA representative stated that their World Championships were not due to be held until November in Argentina, but that several pilots had travelled to European events. The UK had fielded a "B" team to the Triple Crown contest in Ireland, and that the UK was going to host the Triple Crown next year, in Cambridge. (Appendix 'A')

8) Feedback on the Nationals

IMAC commented that the Tx control room was closed before 9pm on Friday night, meaning that some late arrivals were unable to check their transmitters in until the following morning. The Chairman pointed out that it was unreasonable to ask the Tx control crew to stay open all

night for late arrivals, and pointed out that Contest Directors have the 'phone numbers of Tx control staff, and can notify Tx control of likely late arrivals.

IMAC also requested that the CDs briefing be held on Friday night, but the Chairman pointed out that many did not arrive until very late on Friday and would be therefore unable to attend.

The BMPRA representative queried the wisdom of the full-size display, bearing in mind the contest time lost by many disciplines. The GTBA felt that the full-size display was a good way of attracting the public, and pointed out that the profits benefited the Teams. Whilst agreeing with this, the AHA representative felt that the display could have been better co-ordinated, and that the 40 minute wait for the Spitfire on Saturday was excessive. Whilst the display itself was highly enjoyable, better communication between the full-size and the BMFA organisers could have significantly reduced the amount of time lost.

IMAC commented about over-flying by scale, and pointed out that everyone else seemed aware of the restrictions demanded by the crowded airspace at Barkston. He pointed out that they need to be aware that they don't have any God given right to all the airspace at Barkston! On a lighter note, the AHA representative commented that a call on the radio to scale when the Spitfire flew over elicited the response that they would talk to the pilot when he landed.....!

The Chairman gave a brief summary of the reasons for his resignation as Safety Officer on the Monday.

The Committee expressed its concern at the events leading up to the resignation of the Safety Officers at the Nationals.

Despite the above mentioned issues, the general consensus of the meeting was that this had been the best nationals ever.

The Delegate asked that the Committee congratulate Manny Williamson for getting the Nationals Programme published to such a high standard in such a short space of time. This was met with general approval.

9) Updates on 2.4 GHz

The BMPRA representative reported two incidents using Futaba 2.4 GHz equipment, one resulting in the total loss of an aircraft at the World Championships.

The problem appears to have been caused by following the manufacturer's advice regarding installation. Like the Spektrum, Futaba uses two receivers to improve reception, however unlike the Spektrum, they are both in the same case, each being fed by one half of the dipole aerial. Because the manufacturer recommends keeping both aerials in a straight line, both will experience "dead spots" simultaneously. American pilots at the World Championships always bent one aerial at right angles to the other to improve the diversity of reception. Once this had been done, no further problems were experienced.

[Note: Subsequent to the meeting, evidence was provided to the Secretary which shows that the Futaba instructions clearly indicate that the receiver aerials should be deployed at 90 degrees to each other. It is unclear how the pilot concerned came to misinterpret these instructions.]

It was also noted that Futaba sets don't have model name locking, which prevents the pilot accidentally trying to fly a model with the wrong memory selected, and this very nearly resulted in the loss of another aircraft.

The Secretary answered some questions from committee members regarding the Spektrum modules used in existing transmitters.

The Secretary also summarised answers he had received from Paul Beard, the designer of the

Spektrum system, which he felt considerably re-assured him over some aspects of 2.4 GHz operation. He had been concerned that at extreme distance (such as at Barkston) it would be possible for two Spektrum sets to select the same channels, as the two transmitters could be beyond each other's ground range. The air range being much greater, he was concerned that this could cause one set to block the other's transmission. In fact, it appears the Spektrum does not transmit on both frequencies simultaneously, but switches rapidly from one to the other. Safety codes embedded in the data packets would prevent the receiver from responding to the "wrong" transmitter. In order for the signal to be blocked, both transmitters would have to switch to the same frequency simultaneously, which is statistically unlikely. Even if this did happen, the data packets only occupy approximately 8% of the available bandwidth, and for blocking to occur, this precise 8% would have to be jammed. Again, this is statistically unlikely, but even if it did happen, the data rate is so fast compared to 35 MHz equipment, that updated packets should be received before the pilot even realises there has been a problem! In short, whilst it is a theoretical possibility, statistically, it is about as likely as winning the National Lottery!

Regarding the issue of operation over water, Paul Beard explained that by the time the receiver was one wavelength above the surface (approx 12 cm), it would be out of "ground effect", and would not be influenced by what lay beneath it. The Secretary had been contacted by the BWA representative who had purchased a Futaba 2.4 GHz system to evaluate the system's suitability for seaplane operation. He reported that he had fitted the receiver at the bottom of the hull of a flying boat - well below the water-line - and having set the fail-safe, proceeded to taxi it the length and breadth of the (large) lake. He detected no malfunctions at all, and on the basis of this experiment is recommending to the BWA that they lift their restriction on the use of 2.4 GHz equipment.

The Secretary commented that he felt the BWA representative was to be congratulated on taking this initiative. He also felt that he should be commended for sticking to his guns in refusing to allow a 2.4 GHz set to be used at a BWA event earlier in the year, despite the angry protestations of the pilot. The Committee agreed that a major event, open to the public, is no place to be taking chances with unproven equipment.

The JMA representative added his comments, as he uses 2.4 GHz equipment in boats without issues. However, he did comment that it didn't work at all in carbon fibre hulls, confirming earlier suspicions that these receivers should NOT be used inside carbon fibre canopies or fuselages.

Reported experience also indicates that 2.4 GHz equipment can take much longer to recover from a loss of signal condition than conventional PCM equipment.

10.) JMA/GTBA rules (Appendix 'B')

At long last, the Committee was presented with the draft joint code of practice for the operation of gas turbine powered model aircraft. This had been circulated prior to the meeting so that committee members could read and digest it beforehand.

The Chairman expressed concern at reference to a "trained and competent" person to operate a fire extinguisher, asking who would carry out the training and issue any necessary certification?

After some discussion it was pointed out that a later paragraph virtually repeated the sensible requirements, but in a more proficient manner, and that the problem could be solved by simply deleting the offending paragraph. This was agreed by all present. The JMA representative also pointed out that in one paragraph the word "will" should be replaced by "should", to avoid any problems when operating from all grass runways. Again, this was agreed by all present as a sensible change.

The JMA/GTBA agreed to send the Secretary of the RCPTC a copy of the amended draft so that it could be forwarded to the BMFA Technical Secretary for consideration. The RCPTC

Delegate is to advise the Secretary as to who else should receive a copy of the draft in the event of the Technical Secretary being incapacitated.

The deadline for the Technical Council agenda is the 24th Sept.

11.) Training and Excellence (Appendix 'C & D')

The AHA representative submitted written proposals, pointing out that they were either/or, and that they weren't expecting both to be accepted! The Cyprus coaching week is organised by members of the Cypriot team, and generally attracts pilots from several European countries, as well as international judges. There is a new F3C schedule being introduced for 2008, and he stressed the importance of team members being familiar with internationally accepted interpretations of the schedule.

The GBRCAA also submitted written proposals. The Secretary reminded both the GBRCAA and BMPRA to make sure they booked Cottesmore via the office in order to reduce the licensing costs.

Both proposals were accepted unanimously.

The BMPRA representative stated that they had lost the use of Cottesmore several times recently, and would like to be able to use Barkston as a back-up. However, there were issues with the Grantham Club, who, whilst not hostile, would like to be consulted more by the BMFA before events were arranged that conflicted with their normal club activities. The Committee felt that perhaps there was a need for better communication between the BMFA and the Grantham Club.

12) Training for Flight-line CDs

The Chairman pointed out that following some recent incidents, and increasing CAA scrutiny, there were now several steps that were mandatory at any public flying display. Flight-line CDs needed to be aware of these, and of what steps they needed to take should an incident occur.

Although all the relevant information is present in CAP 658, it is not always particularly digestible. The AHA representative suggested that perhaps there was a requirement for a document that would distil all the relevant information into one compact document, to be used as a quick reference.

The Chairman agreed to draft a quick reference guide.

13) Awards update

The Secretary gave a brief summary of the progress of the recommendations made to the Awards Committee.

14) Any other business

All items had already been discussed during the course of the meeting.

15) To confirm the date of the next meeting

The next meeting was confirmed for the 15th of December, 2007.

The meeting closed at 1520.

Appendix 'A'

Sivry (Belgium)

In May GBR/CAA members Richard Christopher and Arthur Silsby competed in the "Criterium du Sud Hainaut" F3A event held annually at Sivry Belgium, Richard placed 11th and Arthur 23rd, many well known European pilots enter this event which makes it an excellent venue to compare our standard of flying.

Romilly (France)

Three GBR/CAA members namely John Harrop Richard Christopher and Arthur Silsby competed in the "Tournament of Champagne" at Romilly in the Champagne region of France which takes place annually in June. This is an excellent competition for our pilots to fly against the likes of Wolfgang Matt and Christophe Paysant-Le Roux (current World Champion) and many top pilots from Europe, John Harrop achieved 14th place Richard Christopher 19th and Arthur Silsby 55th. Our Chief judge Bob Ailles was invited to take part this year as he has for the last 8years and is now a fixture on the judging panel.

Home International (Triple Crown) Wexford Southern Ireland

This annual event was the turn of Ireland this year and was held in Wexford Southern Ireland, we always send a five man team, four are the England Team and the other is part of an International team made up from Scotland Ireland and England the hosting country who must field two pilots as part of the international team. This is an excellent opportunity to have a friendly competition and exchange ideas whilst having a serious competition competing for the RCM&E Triple Crown Trophy.

Individual results:-

Keith Jackson (English Team pilot and team manager) placed 4th
Ken Moss (English Team pilot) placed 16th
Stephen Simm (English Team pilot) placed 8th
Brian Hoare (English Team pilot) placed 14th
Arthur Silsby (International Team pilot) placed 15th

Team result:-

Scotland 1st
Ireland 2nd
England 3rd
International 4th

Appendix 'B'

Draft Code of Practice in respect of gas turbine powered model aircraft.

Prepared jointly by the Gas Turbine Builders Association and the Jet Modellers Association for approval and adoption by the British Model Flying Association, to be effective from January 1st 2008.

Definitions

Persons complying with the requirements of the Code must be aware that throughout the Code there are certain words which have specific meanings, defined as follows:-

must - Indicates an absolute obligation to comply. There are **no** circumstances under which the requirement could be relaxed.

should - Indicates an obligation to comply so far as is practicable but allows a relaxation of the requirement under exceptional circumstances. There has to be a very good reason why the requirement is not complied with.

may - Indicates a preferred course of action, based on collective experience. Non-compliance is not expected to result in an unsafe situation.

Introduction

Gas turbine engines and model aircraft powered by them share many of the safety issues of conventional model power-plants and aircraft. Those embarking upon the construction of a gas turbine or model aircraft powered by such an engine should first make themselves familiar with these safety issues, as detailed in (for example) the BMFA handbook. Specific safety issues relating to gas turbine aircraft in particular are as follows:

- a. Danger of burns or damage caused by hot exhaust gases.
- b. Danger of fire, after a crash, ignited by hot components and made more serious by the relatively high fuel loads commonly carried.
- c. Danger of fire caused by overheating as a result of poor start-up procedures or engine failure.
- e. Dangers relating to the relatively large size, power and wing loading of many (but not all) turbine powered aircraft. These dangers are of course shared with many other large, powerful models.
- f. Problems of ground handling relating to the relatively high idle thrust of some engines.
- g. Risk of injury caused by engine parts, which may be ejected at high velocity after engine failure.

To prevent or minimise risk from all of these possibilities there are four approaches.

- i. Ensure that operators and pilots have a high level of skill, knowledge, and experience to enable them to avoid dangerous situations.
- ii. Ensure that failures and incidents happen as infrequently as possible by paying detailed attention to reliability issues and by careful, systematic design procedures, operational procedures and maintenance.
- iii. Provide fail safe and cut-off mechanisms whenever practicable to ensure that most failures follow a "low risk" path.
- iv. Pay attention to where and when aircraft are flown (or engines are operated) to ensure the safety of people, property and the environment.

The total safety approach is a compromise between each of these factors, although (iv) remains the most critical.

The Code of Practice

The guidance given below is distilled from the Gas Turbine Builders Association 'Code of Practice for the Safe Operation of Model Gas Turbines' and the Jet Modellers Association 'Flying Event Safety Rules'. It is presented to provide a document relevant to the needs of individuals and groups (such as model flying clubs).

Organisers of model jet flying events should refer to the JMA Flying Event Safety Rules, which can be seen at <http://www.jmajets.co.uk/>

Builders of homebuilt gas turbines or engine control units should refer to the GTBA Code of Practice for the Safe Operation of Model Gas Turbines, which can be seen at <http://www.gtba.co.uk/>

Article reference numbers are cross-referenced in Appendix 1 to the source documents. Topics are presented in a logical order for the achievement of safe and competent operation of gas turbine powered model aircraft.

- A. Operators Responsibilities**
- B. Gas Turbine Protection and Control**
- C. Fuel Systems**
- D. Gas Turbine Installation**
- E. Fire Safety**
- F. Test Running**
- G. Operations in Public**
- H. Maintenance**
- I. Flying Site Organisation**
- J. Pre-flight Checks**
- K. Flying Safety**

Appendix 1 Source document cross-references

A. Operators Responsibilities

- A.1** Manufacturer's or designer's operating instructions must be followed at all times.
- A.2** Inexperienced operators should, wherever possible, seek the assistance of an experienced operator before running a gas turbine. If in doubt - seek help.
- A.3** In order that the operator shall gain experience with the start-up procedure and the running characteristics of the engine, initial runs of any gas turbine must be carried out on a test stand. The operator must not attempt any operation of the engine in public until such experience has been gained.
- A.4** Operators in the UK must comply with the requirements of the Civil Aviation Authority publication CAP658 "Small (Model) Aircraft: A Guide to Safe Flying" and the current issue of the BMFA Members Handbook.
- A.5** Persons supervising gas turbine flying activities must also be qualified to a standard equivalent to the BMFA Power Achievement Scheme 'B' Certificate. Gas turbine operation requires that operators must be aware of the flying characteristics that arise from the application of gas turbine power. Paying particular attention to:-

The delay in response to opening the throttle.

The high speeds, which can result from the available thrust not decreasing with increasing airspeed.

The high thrust at engine idle speed, which makes for difficulties in slowing the aircraft down for landing.

Note that references below to Event Organiser or Flight Line Safety Officer should be interpreted, at club level, as any club official.

- A.6** The Pilot of an aircraft is that person who is operating the radio control transmitter whilst an aircraft is being prepared for or undertaking flight.
- A.7** The ultimate responsibility for the safe operation of an aircraft rests with the Pilot.
- A.8** All Pilots are expected to be competent to operate their aircraft. If the Event Organiser or Flight Line Safety Officer determines that a Pilot is not competent he will not be allowed to fly. Pilots must be competent to a standard equivalent to the British Model Flying Association Powered Fixed Wing Model Aircraft "B" Certificate of Proficiency.

At club or association events and where the general public are not present, pilots not holding a BMFA "B" Certificate of Proficiency (or equivalent) may, with the approval of a club official or Event Organiser, be allowed to operate an aircraft under the constant supervision of a holder of a BMFA "B" Certificate of Proficiency (or equivalent). The supervising pilot must have charge, at all times during the flight, of a 'master' transmitter from which control of the aircraft can be passed by the supervisor to a 'slave' transmitter held by the pilot under supervision.

- A.9** Any Pilot determined to be suffering from the effects of Alcohol or Drug abuse must not be allowed to fly.

B. Gas Turbine Protection and Control

B.1 Start up and static running

Where engines are being run statically, on a test bench or during start up procedures in a model aircraft, boat or vehicle, a manual fuel shutoff mechanism must be provided. This mechanism may take any suitable form such as a fuel valve or electrical switch to cut power to the pump, but must be independent of the normal throttle control. Where a fuel valve is used in a liquid fuel system it should be located in the low-pressure part of the fuel line, between the tank and the pump. In a self-pressurised (gaseous fuelled engine) system it should be located as close as possible to the engine to ensure a rapid shutdown.

B.2 Operation under remote control,

The following paragraphs apply only to engines that are operated remotely, such that the manual control referred to in B.1 above is inaccessible.

B.2.1 Shutdown mechanisms.

The engine control function must include an independent fuel shut off device in addition to the valve (gaseous fuelled engines) or pump speed controller (liquid fuelled engines), as used by the throttle control. The fuel shut off device could be a solenoid valve or a servo operated valve in the fuel line, in which case the considerations in regard of positioning given in B.1 above should apply. Alternatively a relay, servo operated switch or additional transistor in the pump circuit may be used. Engine control units (ECUs) driving fuel solenoid valves should meet this requirement.

B.2.2 Failsafe operation

"Failsafe" device refers to any equipment or facility associated with the radio control system that is activated by the loss of radio signal or interference to the signal.

B.2.2.1 Gas turbine powered models must incorporate a radio failsafe, which is capable of shutting down the engine (preferably via both of the mechanisms described in B.2.1 above in the event of loss of signal).

B.2.2.2 Failsafe action is to be set so that, in the event of loss of radio signal or interference to the signal, which persists for more than three seconds, the engine will automatically stop. The automatic action may be set to operate following periods of signal loss shorter than three seconds if the operator wishes.

B.2.2.3 This failsafe mechanism must be correctly programmed and in no circumstances should it be left at the default setting without checking. Where both fuel cut-off mechanisms are operated by a single control unit then this unit should be configured so that an internal failure will activate at least one of the mechanisms.

B.2.2.4 It is the responsibility of the pilot to demonstrate these functions on request.

B.2.2.5 The settings of failsafe devices must be checked prior to each flying session to confirm compliance with these rules.

B.2.3 Kill switch

Radio transmitters used for the control of gas turbine powered models should incorporate a control that will instantly shut the engine down when operated. This control should be easily accessible and must operate in a single action, independently of the throttle lever.

C. Fuel Systems

- C.1** Where possible fuel tank(s) should be located in a separate compartment from the engine. The tank(s) must be protected from the heat of the engine.
- C.2** The fuel tank(s) and fuel system components must be adequately secured and protected to minimise the risk of rupture in the event of a crash.
- C.3** Flexible fuel tanks, including plasma bags, should only be used where it is impractical to use any alternative form of fuel tank. If such tanks are used, they shall be placed in a separate compartment, or protective 'shell', the construction of which shall not compromise the integrity of the tank, and be leak-proof and be fitted with a drain to route any spilled fuel overboard.
- C.4** Fuel lines, connectors and associated equipment must be tested to show the ability to withstand the pressure imposed without leakage or failure when the engine is operating at maximum safe speed. A drainage hole should be made in every part of the model where fuel could collect as a result of a leak.
- C.5** Fuel lines and associated equipment must be made from materials suitable for the intended service and which can adequately cope with the environmental conditions of the installation.
- C.6** Separate feed lines for starting gas and liquid fuel should be used to avoid the dangers of migration of the starter gas back into the liquid fuel system.
- C.7** The fuel tanks of liquid fuelled engines should not be subjected to any form of high pressure pressurisation. Low pressure pressurisation is permitted, in systems of a suitable pressure rating, up to a maximum of 5 psi (0.35 bar) for the purpose of aiding fuel movement between tanks and to fuel pumps.
- C.8** Tanks for gaseous fuel are pressure vessels and must be certified as such.
- C.9** All tanks and fuel lines should be regularly checked for deterioration and renewed where necessary, paying particular attention to the possibility of hardening of flexible pipes and seals in the vicinity of joints which are subjected to high pressures.
- C.10** Only clean, filtered fuel should be used and measures taken to prevent contamination of fuel systems.
- C.11** The oil content of the fuel must be as specified by the designer or manufacturer.
- C.12** An appropriate oil suitable for use in gas turbines should be used.

D. Gas Turbine Installation

- D.1** Engines must be securely mounted and attached in a manner to ensure that they remain so for all operating regimes.
- D.2** All components anywhere in the vicinity of the engine must be adequately secured to prevent ingestion.
- D.3** The engine should be protected from Foreign Object Damage (FOD) by suitable screens or by virtue of the position of the air intake(s).
- D.4** Pipes, lines, wires, control cables etc., should be routed away from the hot parts of the engine or be suitable for the temperatures arising.
- D.5** Until experience has been gained in operating gas turbines, engines powering aircraft or other vehicles should be mounted externally.
- D.6** For internal turbine installations adequate heat protection from the hot exhaust gases must be provided.
- D.7** The idle thrust of a gas turbine can be very high. If the model does not remain stationary with the engine at idle, positive measures must be taken to restrain it. Note that the behaviour of the aircraft may vary depending upon the nature of the runway surface.

E. Fire Safety

- E.1** Pilots operating gas turbines must nominate a competent Fire Person (see below) for the entire duration of the preparations to fly, the take-off, the flight and landing, to stand by with an appropriate serviceable fire extinguisher. The nominated Fire Person must assume responsibility, under the direction of the Pilot, for extinguishing any fires that may arise.
- E.2 Fire Person (in respect of Gas Turbine operations).**
- E.2.1** The Fire Person is that person nominated by the Pilot to undertake the responsibility of dealing with any fire that may occur during the preparation and flying of the Pilot's aircraft.
- E.2.2** The Fire Person must be familiar with the location on and around the aircraft of all equipment and substances that would represent a hazard in the event of a fire and be competent to deal with such hazards.
- E.2.3** The Fire Person must, whilst on duty, have ready access to an appropriate and serviceable fire extinguisher and be competent to operate it effectively.
- E.2.4** A Fire Person can only be assigned to one aircraft at any one time.
- E.2.5** The Fire Person's duties will have priority over all other tasks and he will maintain an overview of all activities while the gas turbine is being operated.
- E.3** Gas turbines must not be run if the surrounding environment presents a fire risk unless adequate precautions are taken to negate the risk.
- E.4** Smoking or other sources of ignition are prohibited within a radius of 50 metres of decanting, venting or fuelling of flammable gases. Signs designating the fuelling areas should be displayed if a gas-fuelled engine is being operated in public.
- E.5** Any venting of liquefied gas must be conducted in a safe manner, in particular venting must not be undertaken within a radius of 50 metres, and never upwind, of any other gas turbine which is running.
- E.6** All fuels must be contained in appropriate vessels clearly marked with a description of the contents.
- E.7** Fuelling of aircraft will only be carried out by competent persons nominated by the Pilot.
- E.8** A nominated Fire Person in possession of an appropriate and serviceable Fire Extinguisher must be in attendance throughout all fuelling operations.
- E.9** The Pilot or the nominated competent person must ensure that the fuelling equipment is fit for the intended purpose before fuelling takes place.
- E.10** During refuelling, the engines(s) must be shut down.
- E.11** It is strongly recommended that a manually operated shut-off device is fitted in the fuel supply line to the engine(s) to prevent inadvertent fuel flow to the engine(s) during refuelling.

E.12 Engine Fires constitute a major hazard and awareness of potential causes must be fully understood, they include:-

- L Residual fuel in the engine leading to a "wet start".
- L Incorrect starting procedure.
- L Turbine rubbing.
- L Excess lubrication oil introduced during the priming of the lubrication system.
- L Debris partially blocking the air intake, reducing compressor performance.
- L Blocked fuel jets.
- L Expansion of fuel into the engine after shut-down of the fuel pump.
- L Tail-pipes pointing into wind at start-up.

F. Test Running

- F.1** A test bed should be used with the engine securely fixed and constrained and located in a controlled area.
- F.2** The test area must be adequately ventilated.
- F.3** During protracted ground running adequate eye and ear protection should be worn.
- F.4** Mechanical abnormalities indicated at any time by vibration, unusual or excessive noise, excessive temperature, overspeed or any other unexpected phenomena must be investigated and corrected, before the engine is re-started.
- F.5** During ground running, particularly in built-up areas, due regard must be given to preventing noise nuisance.

G. Operations in Public

- G.1** An engine must only be run in public after the operator is fully familiar and competent with its operation. Private club sites are excluded from this rule, provided the remaining rules in this section are followed strictly.
- G.2** All engine running must be conducted at a safe distance from non essential personnel with the jet pipe always facing away from them. When wind direction requires that tailpipes are directed towards people or property the distance from the tailpipe to people or property must be increased to the point where jet blast and temperature effects are of no consequence.
- G.3** No person must be allowed to stand close to an operating engine in the rotational plane of the compressor or turbine.
- G.4** Particular attention must be paid to site husbandry and cleanliness to reduce the risk of foreign object damage to the gas turbine by ingestion and to prevent any loose articles being carried in the jet efflux.

H Maintenance

H.1 Engine maintenance must be regularly performed. The frequency and detail of checks and actions will depend upon engine installation, experience and any manufacturer's instructions; and will vary between external inspections prior to flight to major dismantling and inspection of the engine at predetermined intervals.

I. Flying Site Organisation

I.1 Introduction

Most flying clubs will have a pre-existing flying site layout that is adapted to local conditions. Provided that this layout is broadly equivalent to the guidelines below it should be retained for jet operations since club members will already be familiar with it.

In other cases it may be necessary to revise the site organisation to allow gas turbine operations or declare the site unsuitable.

The guidelines regarding taxiing, the pit and start-up area safety rules and the guidance about afterburners will generally not form part of existing club practice and should always be heeded.

I.2 Crowd Line.

Note that the concept of a Crowd Line applies to events where the public is present. However the control principles set out below can be applied at club sites to keep those present, who are not directly involved in jet model operations, in safe areas. In these club site circumstances a physical barrier may not be necessary if there is adequate supervision from club officials, but the line must be designated by some means. Club sites should also employ the concept of a Display Line. The area that club members regard as safe and never overflown, (pits, club hut, car park etc., should be taken as the Public Area in the guidance below.

For club site situations in place of Event Organisers read club officials and for Flight Line Director read Safety Officer.

On any particular occasion, when none of these individuals are present, it is acceptable for the pilot to take on these responsibilities provided that:

- a) He has the consent of all other club members present.
- b) He acts in accordance with these guidelines and with any rules or standard practices that have previously been laid down by the relevant club officials.

For example, given a particular wind direction, the pilot might choose a suitable start-up area and taxi point from a small number of options that have previously been defined by the club safety officer.

I.2.1 The Crowd Line is a physical barrier that generally runs parallel to the Display Line in use and which is displaced at least 30 metres from that line. The Display Line is Air Side of the Crowd Line.

I.2.2 The Crowd Line is continuous and unbroken except for controlled Air-side access points.

I.2.3 Operators of aircraft, operators' nominated personnel and event organiser's nominated personnel are the only persons allowed in front of the crowd line.

I.3 Display Line

The Display Line is a line parallel to the crowd line. Aircraft must only be flown on the far side of the vertical plane that passes through the Display Line. The horizontal displacement of the Display Line from the Crowd Line must be at least 30 metres for aircraft under 7 kg. For aircraft over 7 kg the distance must be at least 50 metres but this may be reduced to 30 metres on take-off or landing only.

- I.4 Air-side.**
Air-side is defined as that area one side of the Crowd Line in which flying takes place. Pits and engine starting areas are sited in the Air-side area.
- I.5 Safety Line.**
The Safety Line coincides exactly with the Display Line.
- I.6 Taxi Point**
The Taxi Point is a designated point on the runway where aircraft are left by the Pilot's helpers at the commencement of a flight. The position of the Taxi Point will be specified by the Flight Line Director and will be such that the effects of crosswind and loss of directional control will not put any person at risk.
- I.7 Pilots Box.**
The Pilots Box is a marked area in which all pilots remain while their respective aircraft are in the air. It is advisable that the Pilots Box should, where practical, be physically protected by barriers, for the purpose of stopping errant aircraft.
- I.8 Public Area.**
The Public Area is all that which is not Air-side of the Crowd Line.
- I.9 Pit and Start-up Area Safety Rules.**
(Note that for operations at club sites or other locations where the general public is not present, references to Crowd line and Airside can be interpreted to suit the site safety designations.)
- I.9.1** Starting and running of engines will only take place in designated Start-up Areas, which will be located air-side of the Crowd Line. The Start-up Areas will be separated from the general Pits area and will be used to prepare aircraft for flight.
- I.9.2** At club sites where only a very small number of gas turbine aircraft are present a separate designated start up area may be dispensed with provided:
- a) Only one gas turbine engine is operated at any given time.
 - b) Engines are not started in the vicinity of the general pit area used by other (propeller) aircraft.
 - c) Other safety rules regarding positioning, in this section and section G above, are observed.
- I.9.3** An Engine Test Area will be established at a significantly greater distance from the Pits area than the Start-up Areas but remaining airside of the Crowd Line.
- I.9.4** When starting and running an aircraft's engine(s) the jet exhaust should, wherever reasonably possible, be directed away from the Crowd Line. Gas Turbines, which require to be started with tailpipes directed downwind, must be located such that the effect of the jet blast on people and property is negligible.
- I.9.5** All gas turbine powered aircraft whose engines are being started should be positioned such that jet tail-pipes will exhaust over hardened surfaces away from any dry grass areas and complying with rule I.9.1 above.

- I.9.6** All non-essential personnel are to be kept clear of the immediate vicinity of aircraft whose engines are being started and run.
- I.9.7** The Pit and Start-up Areas must be kept clean and any loose items must be picked up or secured to prevent being sucked into a fan or gas turbine.
- I.10** Aircraft are not to be taxied without restraint in or out of the Pit Area. Aircraft must be carried or restrained while being moved from the designated starting point to the Taxi Point ensuring that the jet blast is always directed away from the Pit Area. Aircraft returning from a flight must be stopped at the Taxi Point and the engine(s) shut down.
- I.11** Aircraft powered by gas turbines consuming liquefied gaseous fuel will be fuelled in a designated area remote from the Pit Area.
- I.12 Use of afterburners (reheat)**
Because of noise and flame hazards, afterburners must not be operated on the ground, other than on the designated runway during take-off. However, should afterburner operation need to be checked, before the start of flying, such checks should be made in a reserved start box, away from the normal starting and pits areas. All aircraft equipped with afterburners should be required thereafter to be started from this reserved start box. There are no restrictions to the operation of an afterburner once an aircraft is airborne.

J. Pre-flight Checks

- J.1** Pilots are to ensure, before each flight, that their aircraft are airworthy and that their radio system is functioning properly and all batteries are adequately charged.
- J.2** The following gas turbine system checks must be made prior to every flight:-
 - J.2.1** Visual check of the fuel and oil systems for leaks.
 - J.2.2** Visual inspection of the compressor and turbine wheels for any signs of damage. Minor damage to a compressor blade, visible from the inlet, could indicate serious foreign object damage within the engine and must be investigated further before the engine is again operated.
 - J.2.3** Visual inspection of filters (if accessible and applicable) to ensure that they are contaminant free.

K. Flying Safety

These requirements are written for public display circumstances but the principles must also be applied at club sites, in which case for Event read day's flying session. (See also the notes heading section I - Flying Site Organisation).

- K.1** Pilots must remain within the confines of the Pilot Box for the duration of the flight.
- K.2** Aircraft are to be flown in an area to the far side of the Display Line, which will be also be designated as the Safety Line. Pilots will be required to terminate a flight if, at any time, they allow their aircraft to pass over the Safety Line. A subsequent infringement of the Safety Line will eliminate the Pilot from the Event. The Safety Line for aircraft over 7 kg may be crossed for take-off and landing but at no time during an aircraft's operation must such aircraft come closer than 30 metres from the Crowd Line.
- K.3** Any Pilot who allows his aircraft to over-fly the Public Area will immediately be required to bring the aircraft back to the runway and land. Any further flying by this Pilot for the duration of the Event will be at the discretion of the event controller.
- K.4** Except during take-off and landing, low flying, below 3 metres above ground level, may only be undertaken with the aircraft flying on a constant heading in a direction parallel to the runway centre line.
- K.5** High-speed manoeuvres must be made in a direction parallel to the Crowd Line or heading away from the Public Area. Such manoeuvres must be confined to the far side of a vertical plane, parallel to the Crowd Line, which is displaced 30 metres horizontally from the Pilots Box.
- K.6** There will be no high-energy manoeuvres permitted that would bring the aircraft on a heading towards the Crowd Line.
- K.7** Aircraft must be operated within the visual range of the Pilot who must also take into account the effects of the position of the sun.
- K.8** Pilots must assess the effects of the weather upon their aircraft and not make a flight in conditions in which their aircraft would not remain under full control.
- K.9** If an aircraft experiences radio interference or any other form of control malfunction it must be landed as soon as is practicable and not be flown again until all faults have been rectified to the satisfaction of the Flight Line Director.
- K.10** If any part of an aircraft becomes detached in flight which was not designed and controlled to do so the aircraft must be landed as soon as is practicable and not be flown again until all faults have been rectified to the satisfaction of the Flight Line Director.
- K.11** If an aircraft touches the ground while in flight, other than by contact involving normal use of the landing gear, the aircraft must be landed as soon as is practicable and not be flown again until it has been checked and all damage has been rectified to the satisfaction of the Flight Line Director.
- K.12** If an aircraft on the ground catches fire the Pilot must direct the nominated Fire Person to extinguish the fire. If as a result of a fire the aircraft crashes, or as a result of a crash an aircraft catches fire, only the nominated Fire

Person together with the Mobile fire Vehicle and crew should attend the aircraft until the fire is extinguished.

K.13 Pilots must have a helper in attendance for every flight. The helper must maintain a lookout throughout the flight to warn the Pilot of any circumstances that may jeopardise the safe conduct of the flight.

K.14 Display Smoke

Aircraft may be equipped with exhaust smoke systems but operators must ensure that smoke is not generated at low flight levels (to ensure that persons or property on the ground are not adversely affected), nor in any way that interferes with the operation of other aircraft.

Appendix 1 Source document cross-references

Source document articles are prefixed GTBA and JMA for identification.

- A.1** (GTBA 6.4.1)
- A.2** (GTBA 8.1)
- A.3** (GTBA 8.2)
- A.4** (GTBA 9)
- A.5** (GTBA 9.1)
(GTBA 9.2)
(GTBA 9.3)
- A.6** (JMA 1.5.1)
- A.7** (JMA 1.5.2)
- A.8** (JMA 5.1)
- A.9** (JMA 5.2)
- B.1** (GTBA 2.6)
- B.2** (GTBA 2.7)
- B.2.1** (JMA 7.2)
(GTBA 2.7.1)
- B.2.2** (JMA 7.1)
- B.2.2.2** (JMA 7.3)
- B.2.2.3** (GTBA 2.7.2)
- B.2.2.4** (JMA 7.5)
- B.2.2.5** (JMA 7.6)
- B.2.3** (GTBA 2.7.3)
- C.1** (GTBA 3.1)
- C.2** (GTBA 3.2)
- C.3** (JMA 4.12)
- C.4** (GTBA 3.4)
- C.5** (GTBA 3.5)
- C.6** (GTBA 3.6)
- C.7** (GTBA 3.7)
- C.8** (GTBA 3.8)

- C.9** (GTBA 3.9)
- C.10** (GTBA 3.10)
- C.11** (GTBA 4.5)
- C.12** (GTBA 4.7)
- D.1** (GTBA 5.1)
- D.2** (GTBA 5.2)
- D.3** (GTBA 5.3)
- D.4** (GTBA 5.4)
- D.5** (GTBA 5.5)
- D.6** (GTBA 5.6)
- D.7** (GTBA 5.7)
- E.1** (JMA 4.8)
- E.2.1** (JMA 1.6.1)
- E.2.2** (JMA 1.6.2)
- E.2.3** (JMA 1.6.3)
- E.2.4** (JMA 1.6.4)
- E.2.5** (JMA 1.6.5)
- E.3** (GTBA 6.1.2)
- E.4** (GTBA 6.1.3)
- E.5** (GTBA 6.1.4)
- E.6** (GTBA 6.1.5)
(JMA 4.10)
- E.7** (JMA 6.1)
- E.8** (JMA 6.2)
- E.9** (JMA 6.4)
- E.10** (JMA 6.5)
- E.11** (JMA 6.6)
- E.12** (GTBA 6.1.6)
- F.1** (GTBA 6.2.3)
- F.2** (GTBA 6.2.4)

F.3 (GTBA 6.2.5)
F.4 (GTBA 6.2.6)
F.5 (GTBA 6.2.7)
G.1 (GTBA 6.3.1).
G.2 (GTBA 6.3.2)
G.3 (GTBA 6.3.3)
G.4 (GTBA 6.3.4)
H.1 (GTBA 7.1)
I.2 (JMA 2.1)
I.2.1 (JMA 2.1.1)
I.2.2 (JMA 2.1.2)
I.2.3 (JMA 2.1.3)
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I.9.6 (JMA 4.5)
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I.11 (JMA 4.9)
I.12 (JMA 4.11)
J.1 (JMA 5.3)
J.2.1 (GTBA 7.2.1)
J.2.2 (GTBA 7.2.2)

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K.1 (JMA 5.4)

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K.3 (JMA 5.6)

K.4 (JMA 5.7)

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K.8 (JMA 5.11)

K.9 (JMA 5.12)

K.10 (JMA 5.13)

K.11 (JMA 5.14)

K.12 (JMA 5.15)

K.13 (JMA 5.16)

K.14 (JMA 5.17)

Appendix 'C'



AEROBATIC HELICOPTER ASSOCIATION

TRAINING & EXCELLENCE PROPOSALS

1. The AHA propose to hold a judging seminar next year (provisional date of 17/18 May 2008) with the experienced International F3C Judge, Dag Eckoff, leading the seminar. It is proposed to have a classroom based session on Saturday 17th May followed by a scheduled F3C competition on Sunday 18th May with Dag leading the judges.

The breakdown of costs involved with such a seminar is as follows:

Return flight with BA from Oslo to LHR - quote from online request Arrive Friday evening & return Sunday evening 1541 Norwegian Krona	£135.00
Accommodation at local Premier Travel Inn (B&B) 2 nights	£123.00
Hire of local Scout Hut (Laughton Road, Northolt) for Sat. 17 th May	£ 40.00
Dinner allowance for Dag (2 nights)	£ 30.00
TOTAL	<u>£328.00</u>

2. The AHA would alternatively like to request that the RCPTC consider financial assistance for the 3 members of the British F3C Team to attend a training camp in Cyprus (coaching provided by an attending International F3C Judge). This is due to take place in the week preceding Easter (ie. 16 - 23 March 2008).

Return flights to Cyprus from a London Airport approx. £200 pp	£600.00
Apartment to be shared by team @ 25 Euros per night ie. 175 Euros	£120.00
Car Hire for 7 days (people carrier required in order to fit in pilots & all models / equipment (approximate cost)	£200.00
TOTAL	<u>£920.00</u>

@ 4th September 2007

Appendix 'D'

BMFA Training and Excellence budget application

GBR/CAA application for funding applied for via the RC Power-Tech committee Treasurer.

Date: 8th September 2007

Dear Sirs

We would like to be considered for funding for 2008 for the following reasons:-

Our Team consisting of John Harrop, Keith Jackson and Richard Christopher and accompanied by team manager Alison Harrop and will be competing at the European Championships Italy to be held in August 2008. We propose to include our 2008 Home International five man Team yet to be confirmed to also take part in this training. England will be hosting this event in 2008 where Scotland England and Ireland will compete for the RCM&E Triple Crown Trophy.

To try and improve their positions at these events we would like to hold three individual training days for Team building and coaching sessions between April and early August 2008. The ideal venue for these events would be RAF Cottesmore in Rutland, its central geographic location makes it accessible for the teams therefore keeping travel costs to a minimum.

RAF Cottesmore is an ideal venue for many reasons, we are left alone to carry out our training schedule, and we have a very good relationship with the RAF personnel that run the model aircraft club. We can use their club house as a classroom for briefing and discussing the expectations of the Judge/Coaching team with the pilots and team manager. The flying area is familiar to us and makes it easy for us to setup quickly with natural box markers on the horizon.

The costs below which we propose in this budget application are an estimate, until we have confirmation from the MOD regarding costs for 2008 the figures are based on what we paid in 2007.

Costing amounts

- Mod Licence £120
- Licence Preparation Charge £117
- Daily Cost for each event would be £40 x 3 = £120
- Cost towards travel and accommodation for three or possibly four Judge/Coaches = £200
- Total Cost applied for = £557 Five Hundred and fifty Seven Pounds.

We look forward to hearing from you in due course, should you wish to discuss the above further should you require more detailed information we would be happy to provide it.

Yours sincerely

John Mee

GBR/CAA Delegate to the RC Power Tech Committee.