BRITISH MICROLIGHT AIRCRAFT ASSOCIATION
DEREGULATED SINGLE-SEAT MICROLIGHTS HANDBOOK

Introduction

At the end of April 2007, the CAA issued an exemption for a group of microlights to allow them to operate without needing to hold a Permit to Fly. This followed a number of years of campaigning by the BMAA to simplify the airworthiness requirements for lightweight, single-seat microlights.

This document outlines the implications of this rule change and how our members can take advantage of it. It also seeks to explain the operation and responsibilities of owning a deregulated machine, and the framework of support that the BMAA offers.

At issue 1, the document outlines the general philosophy of the rule change. It is anticipated that further details will be added in the near future as the system matures and the finer details are developed.

The definition

The exemption from the Air Navigation Order was issued by the CAA on 30 April 2007 and includes the following text:

General exemption against Article 8 of the Air Navigation Order 2005 for microlight aeroplanes with a maximum weight, without pilot and fuel, of 115kg.

1. The Civil Aviation Authority, in exercise of its powers under Article 153 of the Air Navigation Order 2005, hereby exempts any microlight aeroplane coming within paragraph 2 from the prohibition contained in Article 8(1) of the Order that it shall not fly unless there is in force a certificate of airworthiness.
2. A microlight aeroplane comes within this paragraph if it:
    a. is designed to carry not more than one person;
    b. has a maximum weight without its pilot and fuel of 115 kg; and
    c. has a maximum wing loading without its pilot and fuel of 10 kg per m^2.
3. This exemption shall only apply where the microlight aeroplane:
    a. is flying on a private flight; and
    b. is not flying over any congested area.
4. This exemption shall have effect from the date on which it is signed until 31 January 2008.

It is anticipated that the intent of this exemption will be included in the Air Navigation Order (ANO) at its next revision.

Of course, the aircraft must also continue to meet the definition of a microlight, which for a single-seater means a maximum take-off weight not exceeding 300 kg (330 kg for an amphibian or floatplane) and a stall speed not exceeding 35 knots at maximum take-off weight. Most conventional designs are unlikely to reach these limitations.

The BMAA considers that the definition of wing area (when calculating the wing loading) includes that portion of the wing contained within the fuselage section of fixed-wing aircraft. The area of the horizontal stabilising surface is not considered to contribute towards the total wing area of a standard fixed-wing configuration, although a 'canard' wing would. The wing area of parafoil-type wings is considered to be the area projected onto a horizontal surface when inflated.

It should be noted that the definition of a 'self-propelled hang-glider' still exists. The definition is as follows:

an aircraft comprising an aerofoil wing and a mechanical propulsion device which:

a. is foot launched;
b. has a stall speed or minimum steady flight speed in the landing configuration not exceeding 35 knots calibrated airspeed;
c. carries a maximum of two persons;
d. has a maximum fuel capacity of 10 litres; and
e. has a maximum unladen weight, including full fuel, of 60 kg for single place aircraft and 70 kg for two place aircraft.

Separate, more lenient rules govern the use of 'self-propelled hang-gliders'. The key thing to note is that if the aircraft is launched by use of undercarriage (and not by the legs!) then the aircraft does not qualify as a 'self-propelled hang-glider'.

What the change in rules means

What the exemption means is that for aircraft that meet the above definition it is not necessary to hold a valid Permit to Fly or associated Certificate of Validity. This in turn implies that the design need not meet a particular design or maintenance standard, and the aircraft doesn't need an annual inspection or check flight.

Much research has shown that the requirements for a design to be approved and for an aircraft to hold a Permit to Fly represent a large monetary burden which has proven to be an effective barrier to development of single seat types. Research has also shown that similar categories exempted from formally proving compliance with airworthiness codes operating worldwide have similar structural safety records as heavier, regulated sport-aviation types. On the other hand, with the absence of a formal requirement to prove airworthiness a significant safeguard has been removed and more emphasis is placed on the owner to understand and take responsibility for his/her aircraft and its operation.

The basic premise, therefore, is that the owner/operator takes full responsibility for the airworthiness of his or her aircraft, and the associated risks. In addition, the energy levels of the aircraft involved are kept low by keeping their empty weight to a minimum, thereby reducing the risk to 3rd parties.

This change also means that owners can design and modify their machines largely without reference to the CAA or BMAA. The only exception to this is changes that may alter the basis of the noise certificate (see the later section on noise certificates).

What the change in rules *doesn't* mean

The exemption only allows the aircraft to fly without a Permit to Fly. The rest of the Air Navigation Order (and other legislation) still holds true. In particular, the following rules still apply, as they do to all microlight aircraft:

- The pilot must be in possession of a valid and relevant licence (plus all that goes with it, such as a 'certificate of experience' and medical declaration).
- The aircraft must have a noise certificate.
- The aircraft must have appropriate 3rd party insurance (minimum of 750,000 SDRs, approximately £600,000).
- The aircraft must be registered with the CAA ('personalised' registration letters are permitted).
- The aircraft must display its registration letters in the normal way (CAP 523 on the CAA's website gives details).
- A fire-proof metal plate shall be affixed to the aircraft showing the nationality and registration marking (i.e. G-ABCD).
- Radio equipment must be of a type approved by the CAA and licences for those radios held.
- A CAA approved logbook must be kept for the airframe and engine (the BMAA/Pooley's logbook is an acceptable alternative to the CAA publications).
- The Rules of the Air must be obeyed.
- Accident reporting continues as normal.

Pilot licensing

Pilots of this class of microlight must be in possession of an appropriate licence. Generally this is an NPPL (Microlight) with training appropriate to the control system being used (flexwing, 3-axis, parachute, etc). Some credit towards obtaining the NPPL can be taken for existing licences and ratings on other classes of flying machine: up-to-date information can be found on the NPPL website: www.nppl.uk.com

What types are there?

Within the definition above, any configuration of flying machine is possible; however, so far they fall into 4 distinct groups:

1. The flexwing 'trike'. This is the same as the heavier flexwing microlight types, and consists of a single delta-shaped wing, like a hang glider, with a 3-wheel fuselage/trike unit suspended beneath and a pusher engine. Control is by weightshift. The pilot manoeuvres the aircraft by moving the fuselage unit relative to the wing by means of a control frame.
2. The three-axis type. This resembles a conventional aeroplane in layout with wing and tail. Variations may include a 'canard' with the 'tail' at the front, and tractor or pusher engine positions. Three-axis generally refers

to the conventional control system of elevator, ailerons and rudder that offer control of all three axes of movement (pitch, roll and yaw). However some types may use linked or single roll/yaw controls.

3. The paratrike (powered parachute). This consists of a fuselage/trike unit suspended from a paraglider style wing. Simple versions can be adaptations to convert paramotors from foot- to wheeled-launch. Control is via control lines which adjust the shape of the canopy.
4. Hybrid types. These can use a combination of weightshift and aerodynamic control, and range from simplifications of three-axis types to sophisticated aerodynamic control additions to flexwing types.

How should I decide which to buy?

Selection of the right type for you will depend on your personal requirements of performance, cost, ease of storage and your own personal flying style aspiration.

When you look at purchasing an aircraft, you should think about the following points:

1. Does the type have a good track record and support? Existing types built in large numbers and having a good reputation provide a good indication of a sound purchase. Email forums provide an opportunity to contact existing owners and learn their experience and hear their recommendations. New types being developed may promise better performance and exciting new features, but also will naturally need some proving time in service to iron out all the small bugs, which may prove to be frustrating for the first customers. In such cases a proven company with good reputation for support will provide reassurance that such a purchase is sensible. Good UK based support is also highly desirable.

2. Does it really comply with the definition of a deregulated microlight? This is especially important when shopping from a foreign supplier who has not designed their aircraft specifically for the UK market. Often specifications on paper or from the internet may not reflect reality or current production. Weights quoted might be inaccurate. Seek a hard and fast assurance/guarantee that it will comply with the UK requirements. Empty weight should include all items fixed to the aircraft – that includes the wing, instruments and all actually present and fitted options. Only items that attach directly to the pilot, and fuel and baggage may be excluded. Don't forget that to have the maximum 115 kg empty weight allowance the wing must be at least 11.5 m^2.

3. If you're considering buying a used aeroplane - has it been maintained in a safe condition? A thorough look over the aircraft and through its logbook is a good starting point: has it been regularly maintained, has it been in any accidents/have there been any repairs made, etc. Be very wary of aircraft without logbooks!

I've got a microlight on a permit and want to take advantage of the new rules

If your aircraft has a valid Permit to Fly (or the powerplant hasn't been modified since it last held a valid Permit to Fly) and it fits into the above definition, then your aircraft can be operated under the new rules.

All you need to do is to complete the form at the back of this handbook and send it to the BMAA to let us know your intentions. There is no need to inform the CAA.

I've got/I'm about to buy a new microlight that I want to fly under the new rules

The first step is to check that your aircraft does indeed meet the above definition. If it does, you need to register the aircraft with the CAA using form CA1 which can be downloaded from the CAA's website (www.caa.co.uk). The CAA will seek confirmation that the aircraft is suitably insured (if the aircraft is in build then this can be deferred until the aircraft is complete). In addition, you should also complete the form at the back of this handbook and send it to the BMAA to let us know your intentions.

Before flying your aircraft you will also need to arrange a noise certificate to be issued (see section below on noise certificates).

The BMAA's involvement

Once an owner declares to the BMAA that an aircraft is to be operated as 'deregulated' machine, the Association takes no further part in its airworthiness.

It is recognised that in an ideal world technical advice and support should be available from the BMAA. At the current time, until the BMAA seeks further legal advice, the officers and volunteers of the Association (which includes the BMAA permanent staff, inspectors, check pilots and test pilots) must not offer technical advice regarding the airworthiness of a deregulated microlight. Until the Association has clearly defined the extent to which staff and volunteers can get involved, the legal liability risks to the Association are too large to ignore.

As more advice becomes available, it will be published here.

Modifications and noise certificates

The exemption which allows this class of microlight to operate without a permit does not extend to exempting the aircraft from The Air Navigation (Environmental Standards) Order 2002: i.e. to hold a noise certificate.

This means that each individual deregulated microlight must hold its own noise certificate. This certificate lists the registration (and airframe, wing, engine, exhaust, silencer, propeller and gearbox combination) to which it applies and certifies that the combination meets the noise regulations. In theory, if any of the airframe/wing/engine/exhaust/silencer/propeller/gearbox combination change, then the noise certificate needs to be changed to reflect this. This may entail further testing to determine whether or not the noise regulations are still met. Note that modifications that affect the speed at which the aircraft flies will affect the noise certification basis: aircraft that fly slower will be 'louder' as the time taken to fly over a point will be longer.

At the current time, the administration of noise certificates and noise testing of microlights is performed by the CAA free of charge.

If you require a new noise certificate for your aircraft (either because its new or because a modification has been made to a part of the aircraft that might affect the noise certification), then the application form can be downloaded from the CAA's website (go to www.caa.co.uk and search for 'microlight noise application form'). The CAA will then either issue a new noise certificate using the information you provide them, and existing test data that they have on file, or will contact you to arrange a test. If you believe that the modification is already approved on an identical or very similar aircraft, then give the CAA full details and they will be able to take this into consideration when assessing whether or not a physical noise test will be required.

Note that no aircraft in this class may legally fly without a valid noise certificate. In order to fly an aircraft for the purposes of noise testing, or for developing an aircraft prior to fixing its final configuration, you need to arrange an individual exemption from the CAA. The CAA can be contacted on department.certification@srg.caa.co.uk or on 01293 573309 or 573306.

General advice on operating a deregulated microlight

Whilst the BMAA cannot offer advice on individual aircraft designs or modifications, we can try to point you in the right direction!

In order to fly this class of microlight, it is a requirement that you have a suitable pilot's licence. When you learn to fly you pick up all sorts of useful advice as to how to go about doing so safely: dig out this advice and use it! You will be relying more heavily on your own assessment and observation of the day-to-day condition of your aircraft than you might normally be used to. If something is 'against your better judgement', don't fly, think about it carefully instead – perhaps sleep on it!

Don't forget to record flying hours, maintenance, modifications and other useful information in the logbook(s). This will help you keep your aircraft in tip-top condition, and help you to sell it later down the line.

Maintenance

In terms of maintenance, you are strongly advised to follow the manufacturer's advice. You might also consider using the BMAA's generic microlight maintenance schedule (TIL 020) as a basis or supplement. Operating data for aircraft that operate on Permits to Fly (TADS or operators/maintenance manuals) might give food for thought as to what areas to look at. Other things that might hint towards something becoming unsafe might include:

- visible cracks in parts
- perishing rubber/plastic items
- fabric that is discoloured, fraying or becoming easily damaged
- damaged stitching
- distorted or bent parts
- corrosion
- broken wires/strands/parts

You are strongly advised to source replacement parts from the original manufacturer of the aircraft. Replacement parts such as wires (or other critical items that are 'made up') might best be sourced from manufacturers of 'Approved' aircraft if they're not available from the original manufacturer. The use of correct materials and parts can often be vital in retaining the strength and integrity of a structure.

Designing your own aircraft, modification or repair

When designing your own aircraft, modification or repair, there are almost limitless references you can use to help work out whether something is safe or not. You should bear in mind that it is your responsibility to satisfy yourself that your aircraft is safe to fly and that the design is fit for purpose. Bear in mind that strength is only one aspect of the design: don't forget to consider other aspects such as centre of gravity position, stability, control, aerodynamics, performance, handling and so on. You might consider performing some calculations to work out whether a design is safe, or perform some load testing, or some flight testing. Don't forget that what might seem like a fairly innocuous change can sometimes have a significant knock-on effect on other aspects of the aircraft.

Amongst the references available are the following:

BMAA reference (all available from the BMAA website, www.bmaa.org)

- TIL006 Understanding and using performance data
- TIL007 Fuel systems
- TIL011 Propellers
- TIL012 Weight and balance
- TIL013 Strobes
- TIL015 Sail repairs
- TIL020 Maintenance schedule
- TIL027 Avionics
- TIL029 Designing your own aircraft
- TIL101 & 102 Radio installations
- TIL103 Trike panniers
- TIL104 Transponder installations
- TIL105 Flexwing seatbelts
- TIL107 Auxiliary electrical sockets
- TIL108 Carb heaters
- TIL109 GPS installations
- Forms AW/005, AW/006, AW/007 Aircraft inspection reports
- Form AW/010 Flight test schedule
- Form AW/011 Check flight schedule
- Form AW/027 Flight test schedule
- Form AW/041 Engine installation checklist
- Form AW/051 Flight test schedule

CAA references (all available from the CAA website, www.caa.co.uk)

- BCAR Section S (CAP 482)
- Civil Aircraft Airworthiness Information and Procedures (CAAIP) (CAP 562)
- Amateur built aircraft (CAP 659)

FAA references (all available from the FAA website, www.faa.gov)

- AC43-13 1b Acceptable methods, techniques and practices – aircraft inspection and repair
- AC20-27f Certification and operation of amateur-built aircraft
- AC90-98a Amateur-built aircraft and ultralight flight testing handbook

EASA references (all available from the EASA website, www.easa.eu.int)

- Certification specifications for very light aeroplanes CS-VLA
- Certification specifications for sailplanes and powered sailplanes CS-22
- Certification specifications for normal, utility, aerobatic and commuter category aeroplanes CS-23

Miscellaneous books/references

- Wood handbook, US Department of Agriculture, Forest Service (search on the internet for 'USDA wood handbook')
- Aviation mechanic handbook, Dale Crane
- Analysis and design of flight vehicle structures, Bruhn
- Formulas for stress and strain, Roark
- Understanding aircraft structures, Jeremy Liber
- The design of the aeroplane, Darrol Stinton
- Simplified aircraft design for homebuilders, Dan Raymer
- The properties of aluminium and its alloys, Aluminium Federation Ltd
- Metallic materials properties development and standardization (MMPDS), USDOT (version 1 available from www.ntis.gov)
- ESDU data sheets (available as reference in major libraries)

Note that the above is not an exhaustive list, nor does it guarantee that if these references have been consulted that the design is safe!

Finally, it is the owner's responsibility to ensure continued compliance with the definition of this aircraft class. Remember that if weight creeps up (as it often does over time) then at some point it may no longer fit into this category of microlight – check the weight occasionally to make sure.

Approved for issue

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British Microlight Aircraft Association

BMAA Technical Information Leaflet

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DEREGULATED SINGLE-SEAT MICROLIGHTS HANDBOOK

Notice to BMAA of intention to operate a microlight aircraft under the 'deregulation' rules

Aircraft registration:	G- _ _ _ _	Aircraft type:	
Owner's name:		BMAA number:	
Address:		Email address:	
Phone number:			

		Notes:
Aircraft empty weight, kg:		Must include all modifications, fixtures and instruments. Excludes pilot weight and fuel. Must be 115 kg or less.
Projected wing area, m^2:		Projected wing area includes that section of the wing contained within the fuselage on fixed-wing types.
Empty wing loading, kg/m^2:		Empty weight divided by wing area. Must be 10 kg/m^2 or less.
Number of seats		Must be one!

I confirm that I have read the guidance information given in TIL045 and understand that it is my sole responsibility as the owner of the above aircraft to determine whether the aircraft is fit for flight. I hereby notify the BMAA that I withdraw my aircraft from the Permit to Fly system.

Signed:	Name:	Date:

Form BMAA/AW/059