The RAeS General Aviation Group (GAG) reached a significant milestone at its conference in November. After almost ten years of lobbying, the Group heard the CAA announce the opening of a public consultation on more proportional regulations for the flight testing of proof-of-concept experimental aircraft. As argued in a 2006 Specialist Paper (http://aerosociety.com/Assets/Docs/Publications/SpecialistPapers/DDPLAUK_Paper.pdf), the GAG believed the current low levels of design and production activity of light aircraft have largely been brought about by an unnecessarily burdensome set of regulations which have effectively raised the barriers to entry too high for any enterprise that does not already hold full Design and Production Organisation Approvals (DOA/POA). It believes that this has meant that many potential innovators have been prevented from trying to enter the field.

The Group’s call for easement in the regulations was accepted as a project in the government’s Red Tape Challenge. A joint working group between GAG and CAA, convened in May 2013, has worked intensively since then to establish a new route to flight experimentation to be known as ‘E’ Conditions. The first of two planned public consultations was announced at the conference. The expected goal for completing the work and implementation is the end of August, with formal changes in the Air Navigation Order to follow by early 2016.

This exciting development was described in some detail at the conference. John Edgley, Group Chairman, who initiated and led the project, spoke briefly about the case made in the 2006 paper and showed that the trends identified in it have continued to the present; no lack of new designs being imported from countries with less burdensome regulation, but limited activity in the UK and virtually none from enterprises that do not already have DOA and POA. Mark Shortman, Manager, Policy & Business Delivery, at the new General Aviation Unit of the CAA then outlined the current proposals (see right). A few aspects remain to be finalised, but the overall process is believed to be sound and will be described in detail in a Civil Aviation Publication (CAP) which the working group has been preparing. Anyone interested in responding to the current consultation is strongly urged to do so.
The CAA’s response to much lobbying from the general aviation community is much wider than just this one project. The CAA launched a dedicated GA Unit in April 2014 headed by Tony Rapson. Tony presented an overall picture of the Unit’s work to the conference. The Unit is ‘dedicated to effective regulation that supports and encourages a dynamic GA sector’. Of 128 projects identified, 34 have already been completed and a further 56 are in progress.

Digital vintage designs

The remainder of the conference was a more traditional mix of current design practice and ideas that could find application in future light aircraft designs.

The designer’s interface with CAD tools has evolved significantly over recent years. SolidWorks 3D Design Software was demonstrated by Stuart Wortley and Dave Boswell of CADTEK Systems, a leading UK provider.

Dr Alex Ellin, Senior Lecturer of Aerospace Engineering, Teeside University, has spent the past five years teaching aircraft design and related topics at both undergraduate and postgraduate level. He believes strongly that it is important to present design exercises in the context of the whole vehicle and that this is most conveniently done with light aircraft. He described a variety of aircraft case studies including the Sopwith Tabloid, Miles Satyr and Lobet Ganagobie.

Unmanned air vehicles and systems have seen enormous development in recent years. On the premise that there is potential for significant technology overlaps with general aviation, Dr Joseph Barnard of Barnard Microsystems reviewed lessons that might read across to the advantage of GA. Examples include a relatively inexpensive satellite communication link which would enable the location and status of a light aircraft to be logged on the ground, a collision detect-and-avoid system based on the use of several cameras, and an adaptive autopilot system that can manage the degradation or failure of part of the aircraft. Such systems could possibly be used to increase the safety or operational effectiveness of light aircraft. To be applied in this way they would need to be characterised and extensively tested, but the potential can already be seen.

Similarly, current work on morphing structures may well find application in light aircraft (see Transforming flight, AEROSPACE December 2014, p 20). Several possibilities were outlined by Dr Ben Woods, Senior Research Officer in Prof Friswell’s Morphing Aircraft Group at Swansea University. The FishBAC (Fish Bone Active Camber morphing airfoil) combines an articulating internal structure with pre-tensioned elastomeric skin to give a progressive change in aerofoil section. Similar combination of underlying structure and skin is used in AdAR (adaptive aspect ratio) wing span morphing. More recent work is looking at means for making smooth shape transitions at flap ends – patent applied for.

As always, the Group would like to thank all its sponsors, especially lead sponsor, Swift Aircraft. Exhibitions were mounted by Strand7 and IHS/ESDU. The GAG is currently working with IHS to review and make available a number of the ESDU data sheets that would be of particular benefit to light aircraft designers.

To promote the new ‘E’ Conditions aircraft category, the Royal Aeronautical Society’s General Aviation Group will be launching a competition in May 2015 whereby design ideas that could be tested using the new regulations are submitted to an expert judging panel, with prizes being awarded for the best entries.

‘Proof of concept’ rule change

A proposal to simplify the initial testing process for experimental aircraft in the UK will benefit small-scale aircraft designers and manufacturers, as well as encouraging the growth of aerospace excellence in new design concepts. The UK Civil Aviation Authority (CAA) has launched a consultation aimed at reducing the red tape and financial burdens associated with securing airworthiness and operational approval for new light aircraft designs.

The CAA said its proposed changes to the existing rules were part of its response to the Government’s Red Tape Challenge, and consequent commitment to deliver a risk-based and proportionate approach to overseeing general aviation.

Under the CAA’s proposals, aircraft designers will be able to try out a new concept (up to a maximum take-off weight of 2,000kg) in the air without going through the costly and time consuming procedures that currently exist to get a new design past the initial stage of prototype. If, after trying out a promising idea, it is thought to be viable, then a full design approval programme can be planned and funded in the usual way.

Individuals and organisations conducting proof of concept flights will still be required to undertake a risk assessment to support the activity and in particular, ensure that the risks to third parties are adequately addressed. For example, flights would not be allowed over congested areas, the pilot must be suitably qualified and no passengers or cargo can be carried. The relaxation of the rules on light aircraft development, which is being supported by the core general aviation member associations, could also benefit the evolution of more environmentally friendly aerospace technologies, and offer an easier route into the aerospace sector for young skilled engineers. The main objective, however, is to reverse the decline in the number of new aircraft designed and developed in the UK, a trend observed by the RAeS over recent years.

Details of the consultation, including how to respond, can be found at www.caa.co.uk/consultations. The consultation will run for nine weeks and the CAA will publish its response in due course.