

# Aerobatics News Review

April 2003

No 153



The Journal of the British Aerobatic Association



Steve Kirton preparing for battle at Sherburn 2002 - *Nick B*



Line up of Pitts' props - *Nick B*

**REPORT**

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**2003 US Contests**

- May**  
16-17 Apple Cup 2003, Ephrata, WA  
16-18 New England Aerobatic Contest, Orange, MA  
24-25 Rocky Mountain Aerobatic Challenge Sterling, Co
- June**  
30/5-1/6 PA Aerobatic Challenge, maytown, PA  
6-8 N. California Aerobatic Challenge, Paso Robles, CA  
13-15 East Coast Aerobatic Contest, Warrenton, WA  
14-15 Doug Yost Challenge, Rice Lake, WI
- July**  
11-13 Henry Haigh Challenge, Jackson, MI  
26-27 Salem Regional Contest, Salem IL
- August**  
9-10 Ohio Aerobatic Open, Columbus OH
- September**  
5-7 North Central Aerobatic Contest, Alberta Lea, MN  
6-7 Rocky Mountain Aerobatic Challenge, Stirling CO  
21-26 US Nationals, Sherman/Denison TX
- October**  
10-11 Borrego Akrofest, Borrego Springs, CA  
23-25 Southeast Regional, Sebring FL  
Further details from International Aerobatic Club (IAC)  
Executive Office, PO Box 3086, Oshkosh WI 54903-3086.  
[www.iac.org](http://www.iac.org)

**Stampe Club – Cathy O’ Brien Trophy**  
28 June at Headcorn. Briefing 1300.  
BAeA Standard KC.  
Contact Mike Cowburn, 27 Vandyke Close,  
Putney Heath Lane SW15 3JQ

**AMENDMENT**

**The contact number for Peterborough, Conington is incorrectly published in the Competition booklet, it should be 01487 834161**

**Photo Caption**

Cover: Steve Todd, winner of 2002 Tiger Trophy – Paul Tomlin

**REPORT**

**The Dan Smith Memorial Trophy - 2003**

*from Ray Stoward*

The aerobatic gliding community gathered at Dunstable for the season opener Dan Smith Memorial Trophy competition on Saturday 29th March. After a spell of very good weather it was disappointing to be grounded on the opening day by visibility of less than 2 kilometres. After a good meal and social evening however Sunday 30th dawned bright and clear, with the first competitors ready to launch to 4000ft. by 09.30 (only one had forgotten to reset his alarm as the clocks were put forward overnight - he shall be nameless!) Two of London Gliding Clubs ASK-21 gliders FYF and JWD were put to good use and the 14 competitors each safely flew 2

programmes of sports figures, to complete the competition 17.30 hrs. The Dan Smith Trophy for the top "sports pilot" was won by Mike Collett from Booker Gliding Club for a very consistent and tidy performance. Gold, Silver and Bronze BAeA medals were presented to Guy Westgate, Mike Woollard and Jamie Allen by Nick Buckenham. The CD Ray Stoward and the Chief Judge Dick Happs thanked everyone concerned for a safe and fun week-end. Cindy Copsey drove the computer, and the other judges were Nick B, John Gilbert and Graham Saw. A super start to the season - roll on The Icicle next weekend at Kemble!

**The Dan Smith Memorial Trophy - 2003  
Dunstable : 29/30 Mar  
Final Results  
Sportsman level**

|    | A/c type          | Reg'n      | Known #1 | Known #2 | O/all % | All Grps |
|----|-------------------|------------|----------|----------|---------|----------|
| 1  | Guy Westgate U    | Ask-21 JWD | 1374.4   | 1328.8   | 78.810  | 2703.2   |
| 2  | Mike Woollard I   | Ask-21 FYF | 1294.6   | 1355.7   | 77.266  | 2650.2   |
| 3  | Jamie Allen U     | ASK-21 JWD | 1295.6   | 1333.8   | 76.658  | 2629.4   |
| 4  | Andy Cunningham U | ASK-21 FYF | 1262.7   | 1364.4   | 76.591  | 2627.1   |
| 5  | Brendan O'Brien I | Ask-21 FYF | 1307.8   | 1287.1   | 75.653  | 2594.9   |
| 6  | Alex Yeates I     | ASK-21 FYF | 1255.4   | 1337.5   | 75.594  | 2592.9   |
| 7  | Paul Conran U     | Ask-21 JWD | 1350.0   | 1193.9   | 74.165  | 2543.9   |
| 8  | Chris Pollard I   | Ask-21 JWD | 1140.4   | 1224.3   | 68.940  | 2364.7   |
| 9  | Mike Collett S    | Ask-21 FYF | 1114.3   | 1205.3   | 67.628  | 2319.6   |
| 10 | Donald Gosden S   | Ask-21 JWD | 1021.4   | 1223.5   | 65.448  | 2244.9   |
| 11 | Chris Cain U      | Ask-21 JWD | 1127.2   | 995.1    | 61.875  | 2122.3   |
| 12 | Mark Erlund S     | Ask-21 FYF | 909.0    | 1120.1   | 59.156  | 2029.1   |
| 13 | Peter Miles S     | ASK-21 FYF | 1078.0   | 901.5    | 57.713  | 1979.6   |
| 14 | Mike Newbound S   | Ask-21 JWD | 930.4    | 939.2    | 54.508  | 1869.6   |



## REPORT

### Icicle Meet 2003

*from Ben Ellis, Judge 3, for the ANR, behind the Delta Hangar, Kemble.*

This year's search for new venues for competitions revealed Kemble as an excellent location. A former home of the Red Arrows, Kemble has recently gone through the rigours of obtaining a civil Aerodrome Licence. We witnessed the diversity of aviation that is welcomed here, from Microlights to formation take-offs of Hawker Hunters; flying schools to private owners. We managed to establish a box in the south-west corner of their site, south of the 08 threshold on the main runway. This was in the expectation of minimising the impact of our activity both on the local community and the rest of the operation of the airfield. Judges were conveniently positioned in the lee of the old Red Arrows hangar, which now houses Delta Aviation, home to a number of Hunters and Gnats, the latter painted in schemes representing the early Arrows and their forebears, the Yellowjacks. The Icicle has moved from being an early-season gathering of the few to 'test the air' to a packed programme for Intermediate and Advanced. There were a total of 9 entries at Intermediate and 19 at Advanced, making a total of 56 flights for the day.

CD Eric Marsh got us all marshalled in the excellent airfield restaurant for a prompt briefing with his usual panache. Corrine Dennis assumed the mantle of registrar and we all busied ourselves for a 1000 hours first flight. Phil Soper drew no. 1 for Intermediate but after the box flight landed back on as the cloud lacked about 200' of the minimum required. Quite suddenly, at about 1200, the cloud rolled back to expose a brilliant blue sky so a scramble to positions finally got the show on the road. Eight Intermediate knowns were followed by 18 full Advanced knowns. Due to

pressure of time a cut was imposed; only 4 of the Intermediates flew followed by as many of the Advanced as could be accommodated up to the 1800 curfew. To ensure a fair result, instead of the 'worst first' policy of International competitions, the more sensible 'top down' system was used. This left the round 1 top ranking of Tim Jenkinson, Colwyn Darlow, John Dixon and Julian Murfitt in the flyoff at Intermediate. This really confirmed the first round result with Tim Jenkinson at the top in both rounds, but Colwyn Darlow giving way to John Dixon in the 2nd round. Tom Cassells, Alan Cassidy, Davis Copse, Gary Ferriman, Adrian Howe, Gerald Cooper and Steve Carver completed the second round at Advanced. There were some interesting reverses of fortune at Advanced where Gerald Cooper made up an amazing amount of ground to come out 2nd overall to Tom Cassells' winning position. Steve Carver came overall 3rd in the ex-Diana Britten Extra.

There are some other changes of mounts at Advanced this time around. Tony Maxwell and Ron Allen are now going the S2B route with 'Golf- India, India, India, India'. Ron says that really winds up any ATC unit they're working, 'say again your callsign.' Well, you can just imagine, can't you! Dave Kaberry's Lazer looks smooth.

There were some interruptions to the proceedings. Initially ATC were stopping us for the fast jet movements but it was apparent that later on they were becoming more familiar with our operating methods. However, we did have to hold for a while for 2 sessions of 'aluminium overcast' when B-52s were recovering to Fairford. Kemble is on about a 7 mile final for Fairford's 09. One of them was seen to do a (small) wing

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rock on the approach to the box. The undercarriage could be clearly seen, angled to accommodate the B-52's seriously odd cross-wind landing technique (land with the a/c facing into wind and the undercart angled facing down the runway..) Those remaining at 1830 returned to the restaurant for prizegiving, where Tim Jenkinson received the Nigel Newbold trophy and

John Askew offered to look after the Icicle for Tom Cassells. Bottles of 'Aresti' wine were given to those holding up the rest of the field at each level. All in all, an excellent Power season opener, a super complement to last week's sizzler for the gliders at Dunstable. Ever the optimist, hopefully this is a good portent for the season to come.

### The Icicle and Newbold Trophies - 2003

*from Eric Marsh*

Apocryphal it might be, but legend has it that when aircraft builder Howard Hughes was asked to vacate his hotel suite for the next guest, he bought the hotel so he could stay on. It is probably similarly apocryphal that when the owners of heavy metal at Kemble were told they would have to leave because the station was closing, they bought the airfield. Such heavy metal ~ a pair of Hunters, a Jet Provost, a few passing B52's, that sort of heavy ~ provided interesting, if occasionally interruptive entertainment at BAeA's first visit there for the seasons first contests, the Icicle and Newbold Trophies on Saturday 5th April, a date significant not only as the tax year end but also my wife's birthday...

As CD I arrived mid-afternoon on the Friday; no matter how early I arrive, others precede me, so the stunning new AV8 bar / restaurant was already doing good business to the buzz of "I-haven't-done-much-practice-this-winter-where-are-you-staying-can-you-give-me-a-lift". Shop re-opened sharp at 0800 on Saturday with all officials, both BAeA and Kemble, present and correct, closely followed by a stream of arriving contestants. At precisely 0900 yours truly provided my usual by-the-book-briefing, introducing Steve Green as Chief Judge, Corinne Dennis as (tyro) scorer and Mike Sparrow as Kemble ATC, plus 7 Intermediate and 19 Advanced / Unlimited

pilots. First flight was at 10.00 but achieved nothing other than to ascertain that the cloud base rendered further flights unflyable. After an hour of "how-was-your-B&B-last-night?" the clouds suddenly parted and the sun burst through (I hate it when He does that), and the first squadron scrambled. Intermediate completed in less than an hour, but Advanced not until 1600. With an 1800 curfew, some deletions from the second flights were unavoidable, so as CD I elected to allow the four highest placed Intermediate pilots to fly in descending order of score, then similarly the Advanced pilots to fly in descending order of score until the 1800 deadline. The plan provided a good incentive to expedite, and by the close of play 7 Advanced pilots had flown the Unknown. Significantly it was this second flight which jumbled the initial order. Whilst at Intermediate Tim Jenkinson held first place in both flights, at Advanced Gerald Cooper in his new Extra 230 stormed from sixth to displace leader Tom Cassells, joint favourite Alan Cassidy blew it and finished sixth, rising star David Copse fell from surprise third to surprise seventh, and those in between stayed in loose formation.

Kemble's AV8 pretty girl Sonya Russell presented the awards: The Newbold Trophy and gold medal to Tim Jenkinson, silver

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medal to John Dixon and bronze medal to Colwyn Darlow; the Icicle Trophy and gold medal to Tom Cassells (who had already departed to the dark wastes of Yorkshire), silver medal to Gerald Cooper (ditto), and bronze to Steve Carver. Recalling the "surprise" element of the

event, as an innkeeper (Cavendish Hotel on Chatsworth Estate in the Peak District of Derbyshire) I awarded consolations to the two lowest scorers after two flights: Julian Murfitt and David Copse received a bottle each of fine white wine from House of ARESTI in Argentina!

### Icicle & Newbold contest : Kemble : 5 April 03 Newbold Trophy Intermediate level

|   | A/c type       | Reg'n      | Known #1 | Unkwn #1 | All Grps | O/all % |        |
|---|----------------|------------|----------|----------|----------|---------|--------|
| 1 | Tim Jenkinson  | Pitts S-1S | G-IIIX   | 1385.4   | 1310.2   | 2695.6  | 73.450 |
| 2 | John Dixon     | Pitts S-1S | G-BRZX   | 1270.1   | 1273.6   | 2543.7  | 69.310 |
| 3 | Colwyn Darlow  | DR-107     | G-IIID   | 1358.5   | 1123.9   | 2482.4  | 67.639 |
| 4 | Julian Murfitt | Pitts S-2A | G-STUA   | 1237.7   | 943.2    | 2180.9  | 59.425 |
| 5 | Phil Soper     | CAP-10B    | G-BXRA   | 1196.2   | -        | 1196.2  | 32.593 |
| 6 | Clive Butler   | Pitts S-2A | G-BTTR   | 1167.8   | -        | 1167.8  | 31.821 |
| 7 | Patick Caruth  | Pitts S-1S | G-LITZ   | 1160.6   | -        | 1160.6  | 31.623 |

### Icicle Trophy Advanced level

|    | A/c type      | Reg'n        | Known #1 | Unkwn #1 | All Grps | O/all % |        |
|----|---------------|--------------|----------|----------|----------|---------|--------|
| 1  | Tom Cassells  | CAP-232      | F-GOTC   | 2715.8   | 2090.8   | 4806.6  | 77.902 |
| 2  | Gerald Cooper | EA-230       | G-CBUA   | 2439.7   | 2101.8   | 4541.5  | 73.606 |
| 3  | Steve Carver  | Extra-260    | G-EXTR   | 2392.2   | 2025.5   | 4417.7  | 71.600 |
| 4  | Adrian Howe   | Zlin-50      | G-MATE   | 2448.2   | 1837.8   | 4286.0  | 69.466 |
| 5  | Gary Ferriman | Pitts S1-11B | G-IIIV   | 2450.7   | 1756.9   | 4207.6  | 68.195 |
| 6  | Alan Cassidy  | CAP-222      | F-WWMX   | 2652.5   | 1533.6   | 4186.2  | 67.847 |
| 7  | David Copse   | Pitts S-2A   | G-STUA   | 2465.2   | 1159.2   | 3624.4  | 58.743 |
| 8  | Mark Walden   | CAP-222      | F-WWMX   | 2381.0   | -        | 2381.0  | 38.590 |
| 9  | Cas Smith     | Pitts S-2B   | G-ICAS   | 2342.0   | -        | 2342.0  | 37.958 |
| 10 | Cadbury Dave  | Laser        | G-CBHR   | 2269.4   | -        | 2269.4  | 36.780 |
| 11 | Simon Cattlin | Yak-55M      | RA-44537 | 2225.8   | -        | 2225.8  | 36.074 |
| 12 | John Askew    | Zlin-50      | G-MATE   | 2169.3   | -        | 2169.3  | 35.158 |
| 13 | Ron Allan     | Pitts S-2B   | G-IIII   | 2117.0   | -        | 2117.0  | 34.311 |
| 14 | John O'Vize   | Pitts S-1T   | G-IIIL   | 2080.0   | -        | 2080.0  | 33.711 |
| 15 | Tony Maxwell  | Pitts S-2B   | G-IIII   | 1963.6   | -        | 1963.6  | 31.825 |
| 16 | Pete Shaw     | Pitts S-1T   | G-OSIT   | 1920.4   | -        | 1920.4  | 31.124 |
| 17 | JP            | Extra-300L   | G-IICM   | 1913.3   | -        | 1913.3  | 31.009 |
| 18 | Alex Smee     | Pitts S-2A   | G-STUA   | 1901.1   | -        | 1901.1  | 30.812 |

See page 26 for Sequences

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### 3rd Advanced European Aerobatic Championships

The Championships will be held in Karlsborg, Sweden on 24th July through 1st August. An airshow will be held on 2-3 August. The competition is being organised under the leadership of Lars-Goran Arvidsson, Sweden's alternate delegate to CIVA, who has extensive contest and

judging experience. It will be the first time an FAI aerobatic championship has been organised in Scandinavia. Chief Judge will be Pavol Kavka of Slovakia and the International Jury will be chaired by Jiri Koblirle of the Czech Republic.

### FAI World Grand Prix

The 2003 FAI World Grand Prix to be held at Twin Ring Motegi, Japan from 31 October to 2 November has now been registered in the FAI calendar of events.

This is the 6th FAI World Grand Prix to be held at the Twin Ring Motegi racing circuit and the event has become a showcase for the rest of the world.

### Well we were blessed with good weather after the low cloud at the start

*from Tom Cassells*

I had arranged a training camp the week before the contest. Patrick Paris came over, Alan Cassidy, Adrian Howe, Gerald Cooper, John Askew, Mark Walden and myself all trained. I first trained with Patrick in 1998 and have train with him every year since. Proper training is the only way to improve, its expensive but is 'it'. What would Damon Hill charge for a track day? This year must have been one of the bigger fields for the Icicle and quite competitive. This year I reckon we will see some pilots moving up to unlimited which will be fantastic. British Aerobatic is improving right across the piece. First time for a contest at Kemble, second time I have been there. The first was to collect a Europe for a friend of mine. The mono wheel Europe is an acquired taste on the ground, great in the air, meerkat on the ground. The air traffic control was 'control' it gave an insight to holding a contest at Gatwick! The proceeding were from time to time stop by B52's returning from Iraq, they

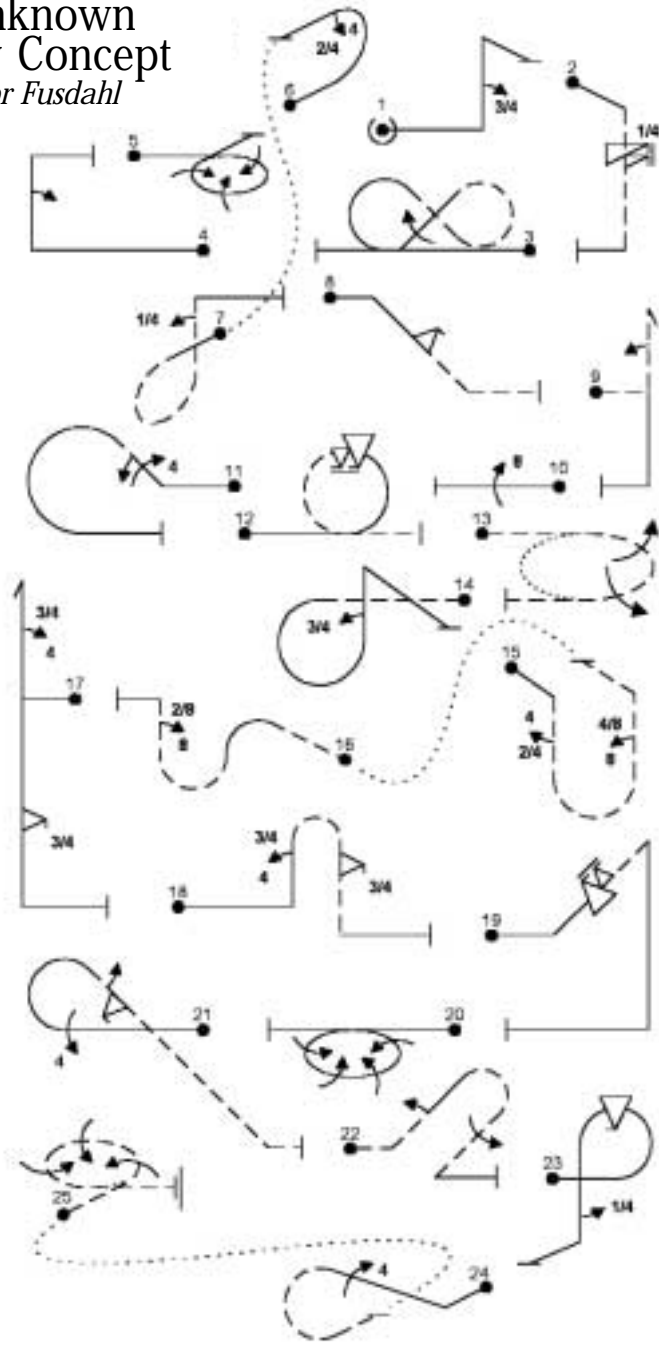
are very BIG! The weather at the start, the control and the B52 forced a cut. So only the leading pilots got to fly twice. It's the first time I have looked at the sequence card in the plane, as I was first up I was unable to commit to memory (as is my normal practice) so I read the card. Any way I won with 77.90 %. Cooper (mono plane new boy) second with 73.60%, he had a bad first flight but made up with a first place in the unknown (beat me by 10 points) to bring him into second place. Steve Carver (mono plane new boy) third with 71.60. Well done both of you. I suppose Unlimited pilots entering this contest are on a hiding to nothing, if we win we should have, if we don't - well?



## REPORT

## Unknown New Concept

Tor FUSDahl



## REPORT

## A new concept for aerobatic contests

by Tor FUSDahl, CIVA delegate, Norway IAC 8806

### Background

CIVA is the international rule-determining body of FAI for international aerobatic competitions. Each country has one delegate with voting rights, but the president (now Mike Heuer, USA) cannot vote – so USA has another voting delegate. The annual November meeting was this time near Nurnberg in Germany. I have been the delegate of Norway to CIVA from about 1984, and have seen many rule changes over the years – mostly changes of minor importance to aerobatics overall. We have therefore seen that the main format of the aerobatic contests has really remained unchanged over the years.

Before the 2002 CIVA meeting my son Peter (IAC 13792) came up with some new ideas in our discussions about the unfortunate developments of our sport. We have escalating costs for aircrafts and fewer participants. An attempt has been made to reverse these developments. In CIVA we have established the simpler and less costly 'Class 2' (now 'Advanced'). Nevertheless, international championships are still about 11/2-2 weeks in duration, airplanes are ferried long distances, contest fees are high and the cost of competitive airplanes in Advanced and Unlimited remains sky high. Before the closing of the CIVA meeting in November – I took the advantage of presenting our new and – in our view – revolutionary idea for aerobatic contests. During informal discussions of this New Concept with other delegates, I have received the clear impression of widespread interest. The short presentation made at the meeting had just the intention of starting a thinking process for the future. Before the next CIVA meeting we are proposing establishment of a group to evaluate the New Concept for future use in national and

international contests and championships.

### The negative developments of aerobatic competition

In the Unlimited class, CIVA has in recent years given in to the idea of giving a bonus to fewer figures in the free program. The intention was to make the program more interesting and attract more TV coverage (with scant success). However, also with the expected result that to win these days you must have a free program of only 6-7 figures.

The second expected result has increased demand for aircraft performance – which means increased cost.

The third obvious expected result (for us cynical old-timers) was inaccurate judging. The background for this is that: most of these 'new' High-K figures consist of 5 separate catalogue manoeuvres, and a 9 is typically the best obtainable score, for even the simplest of figures.

We have experienced that, if the judges don't see the pilot make any obvious errors in these high-K figures, the judge will give a grade about 8 – based upon 'general impression'. (There went the judging criteria in the Red Rule Book; How accurately can a judge see and evaluate each of 4 additional manoeuvres on the basic figure? in other sports judges have a hard time focussing on one element.)

Now, with an 8-score on a 5-part high K figure – the pilot really gets scores of 9+9+10+10+10! these are scores which are unobtainable any other way. In reality, the pilot gets an additional bonus, on top of the bonus he gets for few figures! If you are in doubt, just look at the free programs for the top 10 pilots after the bonus system was introduced! And the scores! – Which leads to the aforementioned conclusions of a



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deteriorating sport.

### The New Concept of aerobatic competition

We are proposing a system to allow; judgeable figures, lower costs, shorter competitions – and for the first time – a final that could be interesting to spectators and TV viewers.

The first central idea is to have only one, but very long unknown flight – say of 25 figures. The figures must have limited complexity (maximum 40k), and consist of one basic figure with a maximum of 2 additional manoeuvres. The purpose is to make the figures really judgeable and reduce the competitive requirement for very high performance aircraft (eg Su 31, CAP 232, Edge 540, Extra 300+).

With an average figure of less than 25k, and 25 figures, the whole flight will have a total of about 625k.

The second central idea is to establish a maximum of error points – say of 1000 points. The pilot starts the flight with 1000 points to lose. Each figure will give minus points (unless a solid 10 score) – which is deducted from the 1000 as he flies. When the pilot has 'used up' his 1000 points and the sum goes negative – the pilot gets a 'stop flying' order over the radio from the chief judge. With an average grade of 7,5 – and no outs or breaks – the average pilot will be stopped after about 15 figures. If he gets off to a bad start with 3 zeros and a break – the flight would last only 4-5 figures.

The winner would be the one with the most figures flown. An equal number of figures flown will give a winner with the least minus points.

In a Continental or World contest we could have a final Champion round with the 10 highest scoring pilots flying. With running, competent commentary, and running online

scoring this final round could – for the first time ever – make a viewable TV program from an aerobatic contest. As you know, equestrian contests such as show jumping, with somewhat alike error-counting, have become popular on TV.

### International Championship issues

As most of you are familiar with, we have a TBL(P) scoring system. This cannot be used with the new Concept, because contests must have online judging with immediate result-reporting to become a resounding success. TBL is based on analysing all the scores together – after all the flights have been done. The Tarasov, Bauer, Long system was originally proposed and developed to avoid biased/nationalistic judging in favour of ones own pilots.

In my view the need for TBL is now past. The old East-West blocks are past history and I believe we should just have few, but very good judges – possibly with automatic deletion of the judge from the pilots own country.

### How to start – practical issues

We believe that the New Concept is worth a serious consideration and test period. Thus, in order to be able to try out the New Concept, possibly Nordic 2003 in Norway – we are thinking of having just 3 judges – showing paddles with grades to a scorer updating a spread-sheet on a computer – giving instant running results that would be shown directly on a wide-screen TV.

A chief judge could handle the outs and breaks – and stopping the pilot on the figure after his error points have been used up with the sum going negative. It should be much fun and certainly interesting!

If the New Concept is accepted internationally, the technical parts would of course be refined with judges on linked PCs, public display boards and so on. I

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believe the New Concept will fit very well also to the proposed new One-type contests and could make long distance ferry of aircraft unnecessary.

A question I have thought about is - what about Unlimited and Advanced? The figures in this long unknown would K-wise be on an 'advanced' level. One would, however, only expect that the unlimited pilots would last a bit longer before being stopped. Or we could let the unlimited unknown include the 'unlimited' manoeuvres – negative flicks and tail slides.

When organising a contest the pilots would have to be permitted to fly over the box to get the landmarks in mind. It would seem sensible to let all fly a few minutes – say 4 minutes after takeoff – to let the pilots familiarise themselves to the box – and then wing-wag and fly the short Known (Q-) sequence. In national contest one could have the Known count in some way.

We are excited to hear comments from BAeA and its members on this New Concept idea.

Happy flying!

## Effects of G forces on aerobatic pilots

*Based on FAA advisory circular by DC Beaudette*

Because aerobatic flying subjects pilots to gravitational effects (G's) that can impair their ability to safely operate the aircraft, pilots who engage in aerobatics, or those who would take up such activity, should understand G's and some of their physiological effects, their effect on the human body, and their role in safe flying. Aerobatic flying demands the best of both aircraft and pilot. The aircraft must be highly manoeuvrable, yet tolerant of G-loads. The pilot must possess skill and physiological stamina. The major physiological effects of G-loading vary from reduced vision to loss of consciousness. To be able to cope with these effects, the pilot must understand them.

During the early years of aerobatics, no physiological effects of G-loading were reported, probably because aircraft power and speed were limited. Perhaps the first reported disturbance due to G's occurred in 1918, when the pilot of a Sopwith Triplane noted that the sky appeared to be gray (grayout) just before he fainted during a tight turn at 4.5 G's. In 1927, Jimmy Doolittle, as part of his graduate studies in aeronautical engineering at the Massachusetts Institute of Technology,

mounted a recording accelerometer in a Fokker PW aircraft and logged G's during aerobatic maneuvers. He reported that in a sustained 4.7 G condition (power spiral) he began to lose his sight and, for a short time, everything went black. He retained all faculties except sight and had no difficulty in righting the airplane.

With increased military use of aircraft, there was an increased interest in the effects of G's on pilots. U.S. Navy pilots experienced diminished vision, and sometimes lost consciousness, during pullouts from dive-bombing runs. A need to study the effects of acceleration under controlled conditions led to the development of large centrifuges in which human subjects could be exposed to G's while they attempted to perform certain flying tasks. The development of higher performance aircraft encouraged the development of strategies for combating the effects of G-forces. Nowadays, anti-G suits and muscle tensing or grunting procedures (M-1, L-1 maneuvers), etc., are used to protect the pilots and crews from these effects.

Changes in gravity pull, occurring in speeding up (acceleration) or slowing down (deceleration), are referred to as G's. For

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example, consider a pullup from a dive. The amount of G experienced by the pilot depends on how vigorously the pilot pulls back on the controls and how readily the aircraft responds. Assume, however, that the pilot "pulls" +4G's; if the pilot were on scales, he or she would appear to weigh four times his or her usual weight. The G's in this case are designated with a positive (+) number because of their direction. Now, imagine a pushover at the start of a dive. The aircraft changes direction in such a way that the pilot tends to be thrown upward and outward. The pilot may have the sensation of weightlessness; indeed, if the pilot were on scales, he or she would weigh less. The notation used would be in a negative (-) numbers because of the direction of the acceleration in relation to the axes of the body.

One notational system for describing G's is based on reference to the direction of accelerations to the axes of the pilot as he sits in the cockpit (Figure 3). Fore and aft accelerations (Gx), and lateral accelerations (Gy) have little effect on our physiology and can be tolerated better than can head-to-foot acceleration (+Gz); and the reverse, foot-to-head G's (-Gz).

The main effects on Gz accelerations are upon the blood in blood vessels. The +Gz effects encountered in the pullout of a dive (Figure 1) will impel the fluid columns of blood toward the lower portions of the body; the output of blood from the heart will thus be reduced and so will the blood supply to the eyes and brain, which require a steady blood supply for normal functioning. Diminished blood flow and the consequently diminished oxygen supply to the head can lead to disturbances of vision, inability to coordinate muscular activity, and unconsciousness.

### Symptoms of Gz effects

Positive Gz Effects. The +Gz induced effects

may be described as follows:

(1) Grayout. There is graying of vision caused by diminished flow of blood to the eyes. Although there is no associated physical impairment, this condition should serve as a warning of a significant impairment of blood flow to the head.

(2) Blackout. Vision is completely lost. This condition results when the oxygen supply to the light-sensitive retinal cells is severely reduced. Contrary to other common usages of the term, consciousness is maintained. In blackout, some mental activity and muscle function remains, thus the occurrence of blackout warns of seriously reduced blood flow to the head and of a high risk of loss of consciousness. Note: In some centrifuge studies, 50 percent of the pilots had simultaneous blackout and loss of consciousness. Therefore, a pilot cannot rely on blackout to precede loss of consciousness.

(3) Loss of Consciousness. When the blood flow through the brain is reduced to a certain level, the pilot will lose consciousness. He or she may have jerking, convulsive movements; these have been seen in many subjects of centrifuge studies and in some pilots during actual flight. The pilot will slump in his or her seat. Possibly, the pilot will fall against the controls, causing the aircraft to enter flight configurations from which it cannot recover even if consciousness is regained. In centrifuge studies, many pilots lost (and regained) consciousness without realizing they had done so.

(4) How long does induced unconsciousness last? In a series of studies of pilots in centrifuges, the pilots were unconscious for an average of 15 seconds. Following this, there was an additional 5- to 15-second interval of disorientation. Thus, if there is loss of consciousness due to +Gz forces, there will be a 20- to 30-second (or longer) period during which the pilot is not

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in control of his or her aircraft.

b. Negative Gz Effects. Negative Gz is encountered when acceleration is in a foot-to-head direction, such as might be obtained during inverted flight, or during an outside loop or pushover maneuver (see Figure 2). Blood is then pushed toward the head, and the amount of blood returning from the head is diminished, so the blood tends to stagnate, particularly in the head. Under mild conditions of -Gz forces, the pilot will feel congestion, as when standing on his or her head. Engorgement of blood vessels causes a reddening or flushing of the facial skin. Blood vessels in the eyes will become dilated. Some persons may experience a headache. A condition termed "redout" may occur. This may be due in part to congestion but may also occur when the lower eyelid, reacting to -Gz, rises to cover the pupil, so that one sees light through the eyelid.

Little is known about the effects of high -Gz on humans because -Gz accelerations have caused considerable discomfort in those studied. Aerobatic pilots have reported small hemorrhages in the eyes and skin. Harold Krier, an accomplished aerobatic pilot, wrote that if he got a pain in the top of his head while pulling -G's, he eased off on the controls to reduce the G-loading. The blood vessels in the brain tolerate mild -Gz stresses well, but the increased blood pressure in the chest and neck causes a slowing of the heart in virtually all subjects. In a few individuals, there is such a marked slowing of the heart that there are intervals of several seconds between beats. In some people, the heart may beat irregularly after -Gz exposure. The slowing of the heart and irregularities of beats can add to the stagnation of blood in the brain. Thus, it appears that the greatest threat from -Gz is the loss of consciousness from the slowing of the heart, irregularities of the heartbeats, and stagnation of blood in the head.

Obviously, much aerobatic activity takes place without imposing any ill effects on pilots. G incapacitation may be a serious matter in some military aviation activities, but is it of concern in civil aerobatic flying? A 32-year-old pilot was practicing for an airshow. His observer on the ground watched the aircraft complete a Cuban 8 maneuver, make an uncontrolled descent, and crash. The pilot died. Because of the aircraft's movements and since no mechanical problems were found, the accident investigators suspected that the pilot had become incapacitated. An autopsy and toxicological tests showed no condition that might have contributed to incapacitation. However, the medical history indicated the pilot had a chronic heart condition. He had occasionally passed out when his heart underwent a change to very rapid beating. It was ruled that the most probable cause of the accident was the pilot's underlying heart condition, which had made him more susceptible to the G's of aerobatic maneuvers. He had lost consciousness and control of the aircraft. A pilot who survived an episode of unconsciousness in flight reported the incident. As he practiced normal inverted turns, the nose of the aircraft began to drop and outside reference was lost. He applied forward stick pressure, producing 2.1 to 2.3 negative G's. In his last conscious act he reduced power (to idle). He thought he had lost consciousness for 3 to 4 seconds. Regaining consciousness, he found a nose high altitude and the G-meter needles were pointing to positive 9 and negative 2.4. Later inspection of the aircraft revealed that most of the metal ribs near the front spar of both wings were deformed and one wing spar brace was bent. Medical records revealed no condition that might have led to loss of consciousness. Had the pilot not regained consciousness in time to control the aircraft, the stated cause of the accident

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may well have been, "exceeded design stress limits of the aircraft."

During a practice flight, an experienced aerobic pilot completed a series of 18 maneuvers and, after a short rest, began his "free" sequence of 23 maneuvers under the watchful eye of his ground observer, a judge of aerobatic flying. After the 19th maneuver, a three-quarter outside loop followed by 2-1/2 rolls from inverted to upright, the aircraft flew straight and level for a short time, departed from the practice box in a 45 degree nosedown attitude, and crashed. The pilot was killed. He had not responded to a radio call made just before impact. The events suggest that the pilot had become incapacitated. Post-mortem examination did not reveal preexisting disease that could be related to the accident.

In a discussion of G-induced loss of consciousness in civil pilots, Art Scholl, an outstanding aerobic pilot told of a relevant episode. On the day of the incident he was not feeling well. He attempted a vertical 8 "the hard way," an outside loop on the top and an inside loop on the bottom. He completed the top loop and was pulling out of the bottom loop when he imagined he heard the sound of a clock alarm and he had the vague thought that there was some urgency in "getting up," that there was something important to do. When he became conscious, the aircraft was flying inverted about a mile away from the practice box. This was his only experience of unconsciousness during an aerobatic maneuver.

Other cases could be cited. Each year, there are a number of well- documented incidents in which military students or instructors experience loss of consciousness during maneuvers at 3 to 5 +Gz, a level of acceleration frequently encountered in civil aerobatic maneuvers.

### G Tolerance

#### Average Standard

| Symptom         | Threshold | Deviation | Range       |
|-----------------|-----------|-----------|-------------|
| Grayout         | 4.1G      | + 0.7G    | 2.2 to 7.1G |
| Blackout        | 4.7G      | + 0.8G    | 2.7 to 7.8G |
| Unconsciousness | 5.4G      | + 0.9G    | 3.0 to 8.4G |

A major outcome of these centrifuge studies was the demonstration of significant variations among subjects. The act of piloting an aircraft can raise the acceleration tolerance; thus, the results of some centrifuge studies during which the subject was passive may not apply directly to flight. This increased tolerance is not so great, however, that the aerobatic pilot should consider himself or herself immune to G-incapacitation.

One little-known, but important, aspect of tolerance to G's is the effect of rapid changes from +Gz to -Gz, or vice versa. Because aerobatics induce such rapid changes, tolerance to changes could be highly significant. It is known, for example, that when one is subjected to -Gz, blood-pressure receptors in the head and chest respond to the increased pressure and cause a reflex slowing of the heart (Figure 4). A rapid change to +Gz (for example, when the pilot executes a half-roll during a maneuver) would suddenly drop blood pressure in these receptors and there would be a rapid speeding up of the heart to maintain pressure; but because the reflex system requires some time to sense the need, the heart could be delayed in responding to this demand and blood flow to the brain might suddenly decrease. Because of the sudden transition, and possible delay in response of the heart, a vertical 8 with an outside loop on top (-Gz) and an inside loop on the bottom (+Gz) may be one of the most threatening of aerobatic maneuvers (Figure 5). An inability

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of the cardiovascular system to react to the rapid change from -Gz to +Gz was probably the basis for the loss of consciousness reported previously. Obviously, some persons can withstand greater G's than others. Even experienced military pilots in a simulated aerial combat maneuver using anti-G procedures (M-1, L-1 maneuvers) could remain conscious only about 6 to 7 seconds. Everyone has a limit. Seasoned aerobatic pilots may represent a selected group because persons with less physiological resistance probably drop out of aerobatics before reaching the highest levels of performance. The aerobatic pilot will realize the potential hazards of G's and will seek to find the level of acceleration he or she can safely endure.

The ordinary accelerometer in an aerobatic aircraft "pegs out" at a maximum and a minimum value and gives no indication of the duration of the G's, so that the accelerometer record has little significance as a record of physiological stress. National Aeronautics and Space Administration (NASA) data show that a range of +8Gz to -6Gz (the limit of the accelerometer) can occur during aerobatic competition, but such values lack the time element. In one study both G's and time were recorded during four competitive sequences or airshows. The pilot experienced negative G's about half of the total time spent in the performance.

Approximately 10 percent of the time he has pulling +2Gz or more with spikes to +5.4Gz, and about 10 percent of the time he pulled -3Gz or more with spikes to -5.2Gz. In an "obligatory" outside 360-degree turn the pilot experienced -2Gz or more for 32 seconds.

The horizontal rolling 360-degree turn produced rapid and repeated G oscillations. In 28 seconds the pilot experienced 6 major G excursions: -3.4, +2.3, -3.5, +2.0, -4.0, and +2.3. The first transition from negative to

positive G's was 5.7G's in 2 seconds, or approximately 2.9G's/second.

The outside-inside vertical 8 was probably the most physiologically demanding; the pilot experienced a maximum of -5.2G's in the upper outside loop and 5 seconds later pulled +5.0 G's in the lower inside loop. This amounted to 10.2 G's in 5 seconds, or over 2G's per second for 5 seconds. Even G-tolerant pilots may have changes in vision or possibly loss of consciousness in this maneuver.

Any type of flying involves some degree of risk. The prudent pilot is familiar with the risks involved and acquires the knowledge and skills necessary for reducing these risks to a minimum. The pilot is also aware of his or her own limitations and can make accurate judgments of his or her ability to withstand the stresses of flight. As noted here, the susceptibility to acceleration is an especially important limitation of the aerobatic pilot, and to recognize and understand this limitation is important to safe aerobatic flying. Listed below are some suggestions for minimizing the hazards of acceleration in this type of flying:

- If you are just beginning in aerobatics, fly with an instructor. Take advantage of the instructor's experience and knowledge.
- Ask the instructor to familiarize you with the "feel" of various maneuvers, not only the rapid executions expertly done, but the hesitant, sluggish ones you will be doing in your early practice. Remember that the rate of onset of acceleration is an important factor that you must learn to appreciate.
- If you experience dimming or graying in vision during flight, realize that this represents diminished blood flow through the eyes and that you may be close to your tolerance limit. Ease off on the controls to reduce the G-load.
- If you experience incapacitation or have any lingering symptoms as a result of aerobatics, consult a knowledgeable flight



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surgeon before you resume flying. Some people may be unusually susceptible to G-loading. If you are one of these, you need to know about it; you may not be so lucky the next time.

e. Frequent exposure to G-stress may "tune" the human system, making it less sensitive to higher G-loads. If you have not flown aerobatics for some time, begin with the simpler, less stressful maneuvers when you take it up again.

f. Physical conditioning does not seem to increase tolerance to G-loads; marathon running lowers tolerance. On the other hand, a well-tuned cardiovascular system seems to recover more rapidly from many different kinds of stress. Keep in shape.

g. Be especially mindful of your current physical condition. Do you really "feel" like aerobatics today? If you don't feel well, wait until you do. Consult a physician if you have any doubts about your health.

h. Be careful of what, and how, you eat. Adequate exercise and diet help to maintain your blood sugar at normal levels. A low level of blood sugar can make you very sensitive to G-loading. Remember that after a high carbohydrate meal (e.g., pancakes and syrup, or candy bars), the blood sugar will fall in about an hour, sometimes quicker, so avoid such meals. Eat well balanced, light meals before flying. A large meal could cause pooling of the blood in the digestive tract and decrease G-tolerance by reducing the amount of blood available to the general circulation.

i. Be aware that if you are accustomed to flying in a coastal region and then undertake the same aerobatics at a region of higher altitude, such as Denver, Colorado, you will have a lowered tolerance to G's. The oxygen content of the blood if lowered by exposure to the higher altitude, and the oxygen supply to the brain might be reduced to critical levels during +Gz loading.

j. Remember that anything that reduces blood volume or cardiovascular response may reduce G-tolerance. Dehydration, excessive sweating, severe sunburn, low blood pressure, prolonged standing or sitting, hypoxia, infection (even minor illnesses), and medications all lower G-tolerance. Alcohol and hangovers will reduce your ability to perform aerobatic maneuvers. Make sure you are as fit as your aircraft.

Aerobatic flying is a beautiful coordination of pilot and aircraft. It requires a well-engineered aircraft and a highly-skilled pilot. Many pilots believe the restricting factors in aerobatics to be the load limits of the aircraft. For the exceptional pilot this may be so, but for some it is the ability of the pilot to withstand the accelerations of the maneuvers. The truly skilled pilot will know his or her limitations, will train to extend them, and will avoid conditions that lower tolerance and jeopardize safety.

*Based on FAA advisory circular 91-61  
2/28/1984 by D. C. Beaudette.*



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### Any pilot would benefit from some form of aerobatic training...

*Article from fly-aerobatics.ca*

*"Aerobatics for the experienced pilot is the true elixir of flight."* (William K. Kershner - The flight instructor manual)

#### Have you ever been upside down in an airplane?

There are pilots who intentionally fly aerobatic manoeuvres for fun, competition, or profit. You may have no specific desire to perform a precise loop or hammerhead, but no matter what you fly or for what reason, aerobatic training, in addition to being fun, can make you a safer & better pilot. You will also fly with increased confidence, because flight beyond the forty-five degree bank angle taught in basic training, flight at the edge of the envelope, whether intentional or not, will not be so mysterious anymore. According to Patty Wagstaff, three-time US National Aerobatic Champion: "More and more airlines and flight departments have recognized that only a small proportion of pilots have had aerobatic training, and have become aware that putting pilots into serious unusual attitudes is one of the best ways to make sure a pilot can successfully recover when the airplane gets rolled upside down." Any airplane may end up upside down, or vertical, or anywhere in between due to wake or other turbulence, wind shear, pilot distraction, flight into IMC or some other cause. You may find yourself and your airplane in a very unusual attitude. The first time you find yourself in such a situation should not be your first exposure to "aerobatic flight". The margin for error in a non-aerobatic aircraft is too small for that. Accident records show that loss of control is a major cause of aircraft accidents:

"The pilot probably encountered turbulence conditions that could have caused a loss of control."

*(Canadian Transport Safety Board Report Number A99Q013)*

"The aircraft stalled and recovery was not accomplished."

*(Canadian Transport Safety Board Report Number A98O0139 - Cessna 150M)*

"In 1991 there was a crash of a United 737 at Colorado Springs. The FAA investigators considered the possibility that the aircraft was upset by turbulence and that the pilots' reactions were not timely and appropriate. Keeping the control column fully aft while inverted is not a good survival tactic for an aircraft of this size, which highlights the need for even the most basic aerobatic skills when flying for a commercial operator."

*(Aviation Week & Space Technology, May 8, 1995)*

#### So what can aerobatic training offer you?

##### Improved knowledge:

A good aerobatic course will include a ground briefing on the physiological effects of aerobatic flying, and the aerodynamics involved. You will then have a better understanding of : angle of attack, stalls, and spins, as well as a good understanding of aircraft performance, structural limits and V-speeds, and what they mean. Below is a velocity versus G-loading diagram or "performance envelope" of the aircraft. The airplane will stall if you attempt to fly outside of the curved portions of the envelope known as the lift limits, and it

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may sustain structural damage or break apart if you attempt to fly beyond the straight portions, known as the structural limit defined by limiting positive and negative load factor, and by the never exceed speed, or Vne. You must also be aware of limitations associated with "asymmetric" G loading. Asymmetric G loads occur when you are rolling and pulling at the same time. For example, if, while recovering from a spiral dive, you roll upright and simultaneously pull to the limiting load factor of the aircraft, you could actually exceed the structural limit of certain parts of the aircraft.

But all the knowledge in the world will be useless, if you don't get out of your comfort zone, and build the motor skills and feel necessary to fly a properly certified aircraft in all flight attitudes. Unusual attitude training in a flight simulator has value, but it cannot duplicate the physiological effects of aerobatic flight, nor can one develop a kinesthetic feel for aerobatic maneuvers or unusual attitude recoveries in a simulator. Training must still be accomplished in the air.

### Increased confidence:

There is no substitute for knowing that you have done something and are able to do it again if necessary. If you have never been upside down, or in some other really unusual attitude, you don't know what your reaction will be. Typically, you will not have much time to analyze and think and your intuitive reaction will most likely be the wrong one. Lack of confidence and training promotes panic, which will lead to hesitation and inappropriate control inputs. A delay in response can be fatal as airspeed builds rapidly, the wrong control inputs can overstress the airframe and cause the aircraft to break apart or hit the ground. For undetermined reasons, the aircraft entered a spiral manoeuvre that continued

below the CARs minimum aerobatic recovery altitude.

*(Canadian Transport Safety Board Report Number A9900079 - Cessna 152)*

### Better skills:

No amount of knowledge can replace the motor skills necessary to roll an airplane smoothly upright whether to perform a good aileron roll, or for survival following an aircraft "upset." You do not have to be an aerobatic pilot to recover an aircraft from a wake turbulence encounter with minimum altitude loss. However, an aerobatic pilot will, if faced with a similar unusual attitude, be able to apply his or her aerobatic skills to recover much more effectively than a pilot who has no such training. In fact, most pilots without aerobatic or emergency maneuver training will pull through into a Split-S maneuver when faced with an inverted unusual attitude. That is totally incorrect and possibly deadly as the aircraft will lose a lot of altitude and build up airspeed fast. "Training should include flights in aerobatic aircraft to practice recovery techniques because no simulator can model the disorientation of actually being upside down... recurrent training every two years, with time in an actual aircraft, would be a good start."

*(Aviation Week & Space Technology, May 8, 1995)*

### Acquire a feel for Gs:

You should be aware of the limit load factors of your airplane. But do you know what 2.5 or 3.5 G's feels like? Following a high speed dive recovery from an over-banked nose low attitude, with adrenaline flowing and heart pounding, it is easy to overstress the airplane as excessive backpressure is applied, since most aircraft do not have a G meter. Aerobatic training can provide you with the seat-of-the-pants

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feel for different G loads. Also, you will learn to feel when the airplane is approaching the stall or critical angle-of-attack, regardless of attitude or airspeed. If an aerobatic pilot pulls back excessively on the yoke or stick at the top of a loop while inverted and nose low, and the aircraft buffets and stalls, he or she knows to instinctively release a small amount of back pressure to un-stall the wings, then continue with the remainder of the loop. Are you totally confident doing stalls, upright?

Unfortunately, too many pilots do not even recognize an imminent stall:

When the pilot entered a turn, the combined effects of the increased g-forces, power reduction, the aircraft's heavy weight, the aft C of G, retraction of the flaps, and the wind conditions resulted in the aircraft stalling.

*(Canadian Transport Safety Board Report Number A00P0103 - de Havilland DHC-2)*

Following the loss of power, the pilot allowed the airspeed to decrease to the point that the aircraft stalled and descended uncontrollably to the ground.

*(Canadian Transport Safety Board Report Number A00C0162 - Piper PA-25-15)*

### Improved situational awareness:

In visual flight, the horizon is available for orientation, and is the only completely reliable "attitude indicator." Yet pilots who have no aerobatic training typically do not know where to look to find the horizon when in an extreme unusual attitude. When in an over-banked unusual attitude, you must quickly find the nearest horizon in order to roll in the shortest direction to upright, and avoid pulling the nose down through the vertical and back up to the horizon (Split-S) which would result in excessive altitude loss and increasing airspeed in most situations.

"Whether you fly a Cub or a 747, aerobatic training will increase your competence and ability as a pilot as you begin to gain a new understanding of holistic flight - flight on all axis." *(Patty Wagstaff - Foreword to "Basic aerobatics" by Geza Szurovy & Mike Goulian)*

"There are two kinds of airplanes — those you fly and those that fly you . . . You must have a distinct understanding at the very start as to who is the boss." — Ernest K. Gann

Always seek qualified instruction and only practice in an aerobatic-certified aircraft.

## The Diana Britten Aerobatic Scholarship

Candidates are now invited to apply for an entry form for the 2003 Beginner's Aerobatic Scholarship.

### Level 1

The scholarship will maintain the same format as in previous years, providing the winner with a 10-hour course of dual competition aerobatic instruction with one of the UK's top ranking aerobatic pilots, plus 1 years free membership to the British Aerobatic Association.

It is open to any British woman pilot wishing to enter national aerobatic competitions at the beginner's level for the first time. Applicants must hold as a minimum, a current UK PPL and medical. There is no minimum hour's requirement and a maximum of 350 hours total. Up to 10 hours of non-competitive aerobatic experience is allowed.

This Scholarship is not open to the holders of a CPL or ATPL.

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### Level 2

The Diana Britten Graduate Trophy will be awarded to a British female pilot gaining the highest percentage of total scores over three separate BAeA aerobatic competitions from Beginner's to Intermediate level. The winner will also receive 10 hours of aerobatic training tailored to suit their individual requirements

### Beginner's aerobatic scholarship

Applications for entry forms: Diana Britten Aerobatic Scholarship  
PO Box 8  
Chobham  
Woking  
Surrey GU24 8YE  
CLOSING DATE FOR RETURN OF ENTRY FORMS 30th June 2003

## Haute Voltige Newsletter

This is our first newsletter of the year, to inform you about the FAI World Grand Prix 2003 regulations (now online) and a few other items.

This newsletter is published at a time when a very nasty storm is blowing over the world, when aviation and the third dimension are acquiring a destructive image, which is unfair.

This timing is pure coincidence, but it is a good opportunity to remind ourselves that aviation, whatever its history, whatever its accidents, is still a space of dreams and hope for so many.

SPORT, TECHNIQUE, ART & CULTURE are the three fundamental elements of the HAUTE VOLTIGE activities... Elements developed through three different projects, which, more than ever, have a peaceful role to play in today's world:

- a.. FAI World Grand Prix
- b.. Haute Voltige Air Musical
- c.. Hummingbird Aircraft

### FAI World Grand Prix

It is the only International Sporting Competition of the World Air Sports Federation (FAI) with the following characteristics:

- a.. aircraft flying to music;
- b.. fitting in a 90-minute public event;
- c.. open to all types of aircraft (piston,

turbine, jet engines), including helicopters and different air sports;  
d.. open to solo pilots and formation teams;  
e.. ranking with no gender distinction;  
f.. open to public votes;  
g.. displayed as a yearly series of contests;  
h.. awarding an official world champion title to solo pilots, formation teams and aircraft manufacturers;  
i.. which can be held anywhere in the world where safety requirements are fulfilled, not necessarily at an airfield.

### 3 Programmes:

- a.. Technique and Precision
  - b.. Artistic Creativity
  - c.. The Ultimate Challenge
- An FAI World Grand Prix Special "Stars of tomorrow" will be open to young champions who aspire to make a career.

### Calendar of Events

As you may guess, the international situation is not in favour of peaceful aerial entertainment, and our 2003 schedule is still subject to several issues.

However, an FAI World Grand Prix competition is expected to be held at Twin Ring Motegi, Japan, between 31 October and 02 November.

We will keep you informed of all updates directly on the Haute Voltige website, and in our future newsletters.

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### Haute Voltige Air Musical

Since 1909, airshows have been used by Sportsmen to promote their skills, by Armies for their marketing and recruitment policies, and by the Aviation Industry to arouse vocations for aeronautical careers. One face has not been explored due to historical reasons, WWI, the economic crisis of the 20's, WWII, the Cold War, Terrorism, and so on...

This face is an artistic approach using the third dimension as a Theatre stage to entertain the public like at the opera or during a pop concert.

This is why Haute Voltige launched the Air Musical concept with "Dreamings". A story acted out by pilots flying their aircraft to the original music compositions of the Spanish group "Almadrava".

It is a 70-minute display depicting the story of Mandurah the Dolphin, Sirena the Mermaid, Prince Shark and his Generals.

*A performance of "Dreamings" will feature in the Sanicole International Airshow,*

*Hechtel, Belgium 10/8/03.*

### The Hummingbird

The Hummingbird programme is a project by Philip Carter for manufacturing the most manoeuvrable aircraft in the world.

It is a dream fully supported by Haute Voltige for the very good reason that until now aircraft have been built solely for the purpose of transporting people, freight or armament. Haute Voltige believes that aircraft have other missions to achieve.

Instead of re-inventing the same type of flying machine, is it not time for manufacturers to create new concepts?

We dream of aircraft designed not only for military purposes or for transportation, but as tools for artists and for the pure pleasure of flying creative figures which are today inconceivable.

To experience flight in all positions onboard a silent and comfortable machine, free of noisy and terrible vibrations should be a piece of paradise on earth.

## GAAC News

*Please take the time to read this. The General Aviation Awareness Council do a huge amount of work to try and preserve our most precious resource - airfields. As we discussed at the AGM, they are in very short supply, especially for our sort of activity.*  
*Cheers, Ben*

The General Aviation Awareness Council (GAAC) has 73 GA associations and groups in membership and is the only organisation that represents the entire spectrum of UK GA, ranging from the heavy end of the GA industry to the lighter end of the sporting movement, including aeromodellers.

### GAAC helps you

A large percentage of the work undertaken by the GAAC relates to planning matters.

Over the past ten years Anna Bloomfield has undertaken this work. She is a Chartered Town Planner and is retained as the Council Planning Co-ordinator. This work covers several key elements of the planning process, as it affects GA.

### 1. Development plan representations

The development plan includes Structure Plans, Local Plans and Regional Plans. They form the background policy framework against which planning applications and appeals are decided. It is therefore vital that GA is given as much encouragement as possible in such plans, as appropriate to the circumstances of the particular locality. This is very time consuming work as the GAAC encompasses all the UK and keeps track of these plans as they are regularly

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reviewed. Opportunities to submit representations occur only rarely during a period of between five to seven years, so it is important that full advantage is taken of such chances.

Well over 100 submissions were made in 2002 alone each of which ensures that GA is given full consideration in the relevant plan. With each passing year, more and more new policies are being incorporated in plans. This is of great and lasting benefit to the future of GA as firm foundations are being built.

### 2. Representations to Central Government

Representations are submitted regarding consultations relevant to GA interests. Again, the GAAC name is now recognised in Government circles as being the one body which represents all UK GA interests. As an example of this work, the Government recently consulted on possible removal of temporary use rights (which many small flying site operators currently enjoy). A campaign of strenuous resistance was subsequently successful and these rights remain intact.

### 3. Promoting GAAC

This is most commonly undertaken through articles in the planning and aviation press, but occasional radio or television interviews are also used to promote the importance of GA. The planning press is also monitored weekly for GA related items of importance with follow-ups where necessary.

### 4. Maintaining a database of GA-related appeal decisions

This relates primarily to England and Wales although decisions from all the UK would be welcomed. The flow of decisions has been slow of late, possibly because fewer appeals are being heard, possibly because the GAAC is not being kept informed. If

you know of a case, please send details to 50a, Cambridge Street. The more information, the better, as it may help someone else in a similar situation.

### 5. Advice on legal issues relating to planning

While site-specific cases are not normally the province of the GAAC, some raise complex and interesting legal issues, which can be of wider benefit to others. Members are advised of these where they are not prejudicial to a particular site in particular, or GA in general.

### 6. Publications

Specialist advice is produced in the form of detailed guidance for those wishing to make a GA-related planning application, facing enforcement action or the prospect of an appeal. Such advice is valuable in helping to avoid many of the pitfalls in the planning system. Please refer to the other item on this page. Free fact sheets have also been produced on a wide range of planning related topics.

### Tips for planning applications

Are you currently, or likely to become, involved with your Local Authority planners in any way regarding your flying site? If so, have you ever wondered about answers to the following questions: What issues do I need to consider before establishing a new flying site? How can I overcome problems regarding my existing site? Do I actually need planning permission?

How can I make the best possible case for my planning application or appeal?

Should I bother to appeal?

What is the best type of appeal to use in my case? What are the warning signs that enforcement action is imminent? How can I avoid enforcement action?

The answers to these, and many more, questions can all be found in the GAAC's

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latest publication "Flying sites, Planning applications, appeals and enforcement action". This is a revised and updated version of previous publications. It has been written in non-technical language with the lay person in mind. The document takes the reader step-by-step through the planning process, not only where planning applications are concerned but also appeals and enforcement action.

It explains the process and gives helpful hints about how to make the best case and, perhaps just as importantly, when to know you should stop fighting a losing battle. Its author, the GAAC's Planning Co-ordinator, Anna Bloomfield, is a chartered town planner with extensive knowledge of the

planning system.

The publication contains a wealth of advice, which would be worth many hundreds of pounds if obtained through a planning consultant or other professional. It therefore represents exceptional value at only £20, and just £10 to GAAC subscribers. It has been heavily subsidised in order to assist as many as possible to further the GAAC's aims of promoting and protecting GA in the UK.

Copies can be obtained by sending a cheque for the appropriate amount to the GAAC offices at 50A, Cambridge Street, London, SW1V 4QQ, making it clear that you require a copy of this advice.

## Is It Dangerous?

by Eric Marsh

Being a simple innkeeper is a crucial factor of this thesis, for if I was cleverer I would perhaps perceive aerobatics as dangerous. But I am not, so I don't.

More to the point, if it was (dangerous that is) I would not do it. Conversely, I suspect that - perversely - many do it because they perceive it as dangerous. So does that make them cleverer?

I have debated "the danger of aerobatics" with myself and others for as long as I have been doing them, and opinions have varied, including my own. Overall the man in the street perceives it as dangerous, yet that same man will calmly walk across that same street straight in front of 25 tons of kinetic energy and consider himself safe, but aerobatics dangerous. Some pilots boast too that aerobatics are dangerous, and thrive on the adulation which it generates. Danger is relative, and directly proportionate to risk. From the minute we are born we face risk, which is only alleviated by our death. As one of God's

animals, it is instinctive in our psyche to survive and evolve, yet that very survival often requires us to take risks. I would argue that all activities such as aerobatics - diving, mountaineering, racing, exploring - ultimately result from man's instinct to survive and evolve.

So, are aerobatics dangerous? Because danger is relative to risk, that risk needs to be minimised. In aerobatics I perceive there to be 3 main risks, and with no statistics to hand I list them in random order.

1 Collision with unseen aircraft.

2 Loss of control leading to collision with terrain.

3 Structural failure.

My own counter-measures for the above are  
1. Look outside, head up, never look inboard, always keep one's head and eyes moving, hope, pray, squawk 2004, monitor radio, avoid busy areas, have someone (aboard or on the ground) watch for

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conflicting traffic, wear a helmet and parachute, employ a quick release harness and canopy, hope, pray.

2. Do an Icarus and fly so high the wings melt, then when it starts to spin do an Eric Muller and let go of everything except the closed throttle.

3. Before flight tug everything, every time, then hope and pray. In my opinion this is the least controllable risk, albeit fortuitously

also the most rare.

I practice all the above, and I perceive the level of risk as low, and per se the level of danger is low. Certainly I believe it is less dangerous than routing single engine IMC between Elstree and Luton on a freezing Friday night in December,... and that's in my comfy car! Doing it in a hired PA28?... now that's dangerous!

## The Royal Aero Club Trust 4th Annual Photographic Competition

The Royal Aero Club Trust, in conjunction with the Royal Photographic Society, announces the launch of its Photographic Competition for 2003. Once again there will be a unique collection of valuable prizes ranging from exotic photographic equipment to trial flying lessons, flights in aircraft, micro lights and balloons and tandem parachute jumps together with VIP tickets to events and subscriptions to a variety of magazines covering both real and simulated flight.

The theme is 'Flight' which covers all aspects of human flight from fixed wing flying through gliding, ballooning, paragliding, parachuting, micro lighting, aero-modelling and bungee jumping; it also includes the flight of birds, insects and even material blown in the wind such as leaves or debris. Meteorological events associated with danger to 'flight' such as tornados or hurricanes are also included.

As 2003 is the 100th anniversary of the first powered flight there will be a special award for a photograph which, in the view of the panel of judges, in some way commemorates or represents this important event.

There will be two main sections:

1. Photographs taken with conventional cameras

2 Photographs taken with digital cameras Both classes will be further divided into adult and junior sections. Juniors being entrants who are under the age of 18 on 1 January 2003.

The competition, which is open to entrants worldwide, is now starting and will run until 1 October 2003. The results will be announced by 1 January 2004.

The entry fee for adults will be £10 for up to three images and for juniors £5 for up to three images. Multiple entries are permitted. Full details of the competition, together with the Rules and Entry Form, will shortly be posted on the Trust web site - [www.royalaeroclubtrust.org](http://www.royalaeroclubtrust.org).

*For further information about the Annual Photographic Competition and about the Royal Aero Club trust contact Richard Crabtree OBE, Trust Administrator, Kimberley House, Vaughan Way, Leicester LE1 4SG.*



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## INFORMATION

### Aerofair 2003

#### *Major increase in exhibition space bookings*

Not only has Aerofair 2003 achieved a substantial increase in bookings of exhibition space but it has also gained many new exhibitors. Increased interest from helicopter sales companies has resulted in bookings by Aeromega Helicopters, JCM Disposals (Gazelle) and Southern Helicopters who will join previous exhibitors McAlpine Helicopters, Sloane Helicopters, Heli Air, Eastern Atlantic and Patriot Aviation to give visitors a complete spectrum of choice. Meridian Aviation, Aerofair's major sponsor, will be creating the "Meridian Air Park" to exhibit the full range of its activities, including maintenance and avionics. In addition, of course, they will be exhibiting the full Piper range, from Meridian to the Super Cub, and their new dealership aircraft the Pilatus PC12. Also on view in the Meridian Air Park will be the FRASCA simulator and Thielert engine.

Diamond Aircraft will be exhibiting their full range of certified aircraft and visitors will also be treated to a first sight of the Diamond D Jet in the form of a one-fifth scale model. Aviat Aircraft will be showing the Husky A1-B, Blue Yonder expects to bring a Super Decathlon and ST Aviation will be present with their 80% scale Spitfire kit.

CSE Aviation and CSE Aircraft Sales will be exhibiting their range of aviation products - from maintenance, spare parts, propeller

overhauls and training - to Cessna aircraft and the Schweizer helicopter. Pilot supplies are represented by Adams Direct, Harry Mendelsohn, Pilot Warehouse and Transair Pilot Shop, offering pilots the complete range of accessories. Aircraft finance is also well represented with newcomer Industrial Equipment Finance joining regular exhibitors Air & General Finance, Lombard and Singer and Friedlander.

Aerofair's sponsors in the insurance field, Besso Limited and Hayward Aviation, will be joined by Robert Fleming Insurance Brokers and Sovereign Life Assurance for Aviators.

French companies represented this year include Village Aeronautique des Lacs (another first-time exhibitor) offering "taxiway homes" in Bordeaux, Atlantic Air Park from the beautiful Vendee region and every UK pilot's favourite destination Le Touquet Airport on the Cote d'Opale. Aerofair organiser Anthony Hutton summarises "We have experienced a very positive mood for the future and this is born out by the number of new exhibitors and also regular exhibitors taking more space for more products".

*For further information, please contact Anthony or Samantha Hutton on +44(0)1992-522210 or fax +44(0)1992-522533 and see our regularly updated web site [www.aerofair.co.uk](http://www.aerofair.co.uk) (AIC now on site).*



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**INFORMATION**

**Dealer appointed for American Champion**

North Weald-based Blue Yonder Aviation has been appointed exclusive dealer for the American Champion Aircraft Corporation's light aircraft in Europe and Scandinavia. The five models currently in production include the top of the range 8KCAB Decathlon, which with 180 hp is competitive at Standard and Intermediate levels, having achieved some success in

Dutch and Danish championships over the years. Blue Yonder's managing director is Mark Waite who was runner-up in our 1998 Standard Level Nationals and won the Benelux Open at St Hubert that year, also at Standard level, flying a Yak 52. Contact 01268 561685 Email: mark @blueyonderaviation.co.uk

**The Royal Aero Club Trust Bursaries for youngsters wishing to progree in air sport and aviation associated activities**

In 2002 the Royal Aero Club Trust launched a Bursary Scheme for young people wishing to upgrade their existing qualification in a wide range of air sports and aviation related activities. Three sponsor companies, Getmapping of Hartley, Wintney, hampshire, Just Flight (The flight simulation software company) of St Ives, Cambridgeshire and Microlight Sport Aviation Ltd of Chatteris Airfield, Cambridgeshire each very kindly agreed to join this scheme and each generously donated a bursary in addition to the seven funded by the Trust.

The Trust Bursary awards were made to young applicants who wished to advance from one recognised level of air sport competence to the next higher level. The Just Flight and Getmapping Bursaries were for PC (or SlimFlight) pilots who wished to gain practical 'hands on' experience of real flight. The Microlight Sport Aviation Bursary consisted of a number of hours of free microlight flying training at the company's base at March. Competition for these bursaries was very keen and the well-deserving winners were:

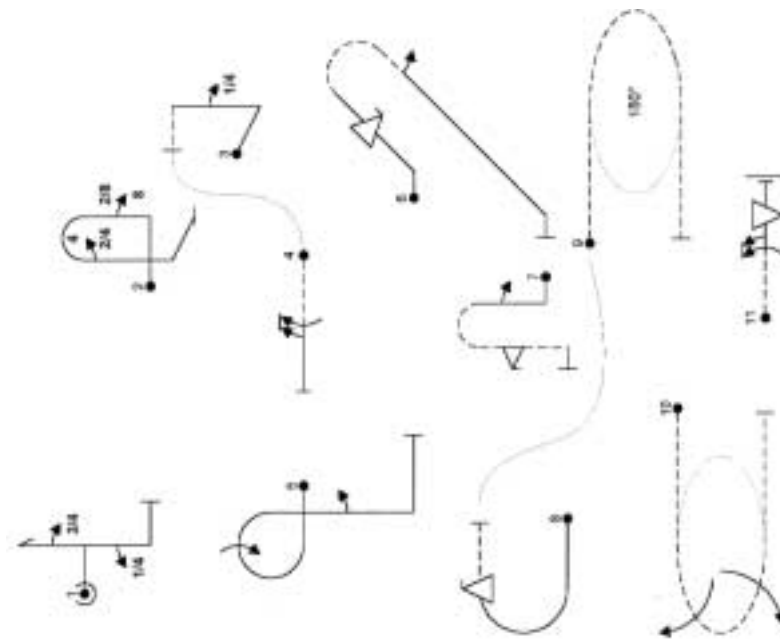
| Recipients      | Age | For               | Bursary Sponsors          |
|-----------------|-----|-------------------|---------------------------|
| Amy Barsby      | 18  | BGA Silver Badge  | RAeC Trust                |
| David Clarke    | 16  | BGA Bronze badge  | RAeC Trust                |
| Benjamin Dixon  | 19  | D Licence         | Microlight Sport Aviation |
| Adam King       | 16  | Flight experience | Getmapping                |
| Sally Longstaff | 17  | BGA Silver Badge  | RAeC Trust                |
| Amelia Nash     | 20  | BGA Silver Badge  | RAeC Trust                |
| Richard Revill  | 16  | Fligh experience  | Just Flight               |
| Amy Sentance    | 17  | BGA Silver Badge  | RAeC Trust                |
| Ian Thomson     | 18  | BGA Silver Badge  | RAeC Trust                |
| Paul Tribble    | 16  | Night rating      | RAeC Trust                |

Further bursaries will be warded in 2003. The Trust Administrator would welcome enquiries from commercial organisations, grant-gicing bodies and private donors

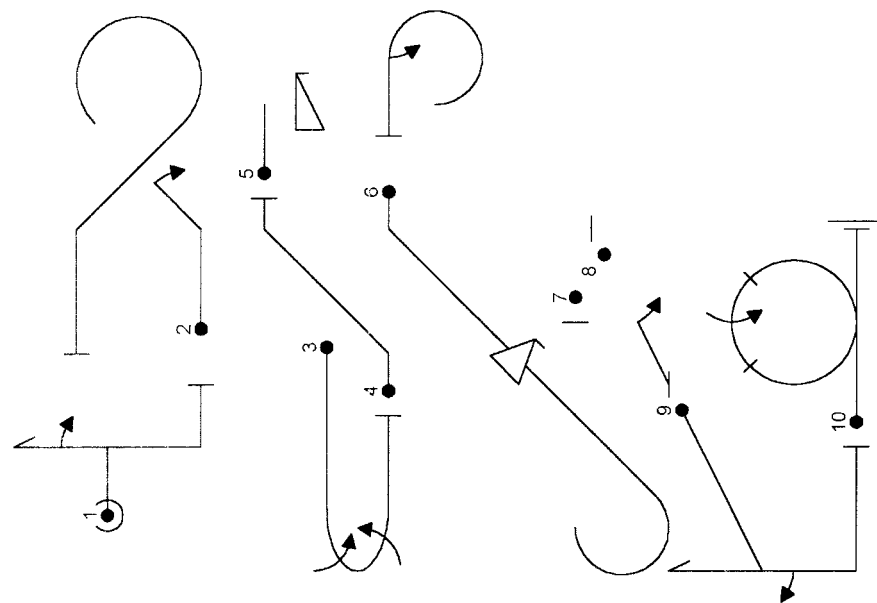
wishing to sponsor bursaries. Full details of the bursaries awarded will shortly be posted on the Royal Aero Club Trust Website at [www.royalaeroclubtrust.org](http://www.royalaeroclubtrust.org).

**INFORMATION**

**Icicle Advanced Unknown**



**Icicle Intermediate Unknown**





## INFORMATION

### CONTRIBUTOR'S GUIDE

The Editor is always keen to receive material, both written and pictorial for publication in BAeA Aerobatics News Review, the Journal of the British Aerobatic Association Limited.

Contributions should usually be original and previously unpublished. Previously published material will be used at the Editor's discretion in order to facilitate dissemination and exchange of information, opinions and ideas of interest and concern to aerobatics enthusiasts.

Articles should be sent to the Editor (Tony Lloyd - 70 South Road, Hockley, Birmingham B18 5LD). If produced using a wordprocessor, a copy of the document saved as **'text only'** on floppy (IBM or Mac Compatible). E-mails may also be sent direct to sarah@ashurstwood.demon.co.uk but with a courtesy copy by snail-mail to Tony too please.

Deadline dates for articles and advertising in 2003 are on the 1st of: June, August, October and 15 November

Opinions expressed by contributors are not necessarily those of the Editor or of the British Aerobatic Association.

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#### ADVERTISING

Classified advertisements are chargeable per issue at the rate of 5p/word, subject to a minimum charge of £2.00. Display advertising: Colour: full page £125.00; half page £75.00; quarter page £35.00. Black and white: full page £100; half page £50.00; quarter page £25. Surcharge if artwork/screen print required. All advertisements for publication should be

sent to the Editor, together with a remittance payable to 'British Aerobatic Association'. Acceptance of advertising does not constitute any guarantee or endorsement of goods or services so advertised.

#### INTERNET AND E-MAIL

General enquiries to the BAeA can be made via E-Mail using:

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Other people who can be reached via the Internet are:

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#### FAI COMPETITION LICENCES

Applications for issue or renewal of FAI competition licences should be directed to Jen Buckenham (address on next page).

The fee is £2. Renewal applicants, please enclose license for stamping.

#### MEMBERSHIP

Annual membership of the British Aerobatic Association Limited, fees for 2002 are:

|                    |     |
|--------------------|-----|
| Full (Competition) | £60 |
| Corporate          | £30 |
| Associate          | £30 |
| Glider Members     | £45 |

An application form can be obtained from the Membership Secretary, Jen Buckenham or the BAeA website. Please notify all details of change of address, telephone number, etc to Jen at the address on the next page, or by e-mail.

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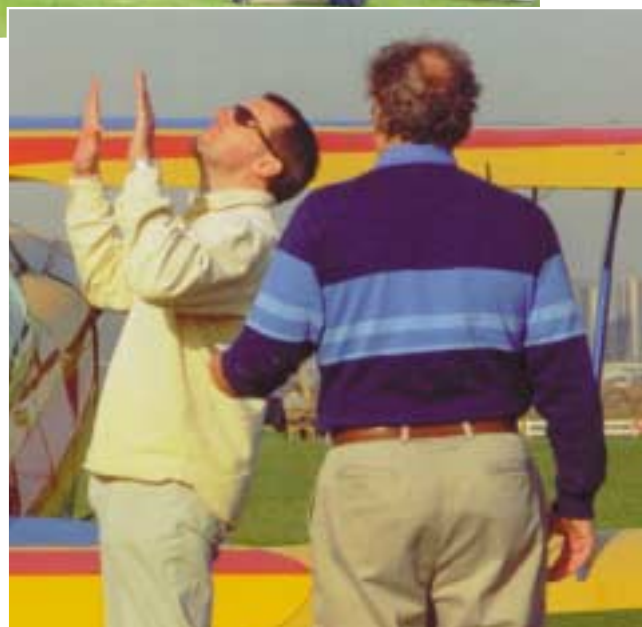
Note: Directors of the BAeA are marked with a \*



Simon Cattlin – skydiving  
– Sherburn 2002 – *Nick B*



Ben Ellis conducts a pilots  
briefing at Compton Abbas  
– in the sunshine – *Nick B*



If I wind the key in your side  
son... Cas & Graham Smith,  
Sherburn 2002 – *Nick B*



## *Again, European Aerobatic Champion*

As the current World Champion Aerobatic aircraft, Sukhoi again swept the board at the recent European Aerobatic Championships. Sukhoi finished 1st, 2nd, 4th overall as well as winning the overall team prizes for men and women. The overall winner was Ramon Alonso of Spain and notably two-seat Su-29 aircraft came 11th and 12th overall against the World's best single-seaters!!

***For the best aerobatic aircraft in the World contact:***

### **Richard Goode Aerobatics**

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Operations: White Waltham Airfield, Maidenhead, Berks

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